# UNIVERSITY OF GHANA


**PENSION FUNDS, INSTITUTIONAL QUALITY AND CAPITAL MARKET DEVELOPMENT IN AFRICA.**

BY

KATHRYN AWURA AMA OWUSUA ASSEFUAH

(10207159)

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF **PHD IN FINANCE DEGREE.**

JUNE, 2024.

## DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for academic award in this or any other university. All references used in the work have been fully acknowledged.

I bear sole responsibility for any shortcomings.

18TH JUNE, 2024.

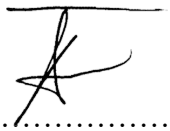
……. .....

KATHRYN AWURA AMA OWUSUA ASSEFUAH DATE

(CANDIDATE)

## CERTIFICATION

We hereby certify that this thesis was supervised in accordance with procedures laid down by the University.



…….. 18th June 2024

PROF. JOSHUA YINDENABA ABOR — DATE

(PRINCIPAL SUPERVISOR)

…… 18th June 2024

DR. SAINT KUTTU — DATE

(CO-SUPERVISOR)

…….. 18th June 2024

DR. LORDINA AMOAH — DATE

(CO-SUPERVISOR)

## DEDICATION

I dedicate this work to my God whose grace and mercy have made this work seen the light of day. Also, to my husband (Stephen Paapa Oweredu Assefuah) who has been behind the scenes pushing and encouraging me to finish this work and lastly to my adorable children (Anigyeba, Nkunim, Animuonyam and Adoma Nyameye) who have gone through a lot because of this work. I am forever grateful.

**ACKNOWLEDGEMENTS**

To the Almighty God, my God and King, Jesus. I thank you because all we see here today is just by your special grace and it has been evidently clear from day one and throughout the PhD program.

I wish to express my sincere gratitude to my supervisors, Prof. Joshua Y. Abor, Dr. Saint Kuttu, and Dr. Lordina Amoah, who have helped me through all the difficult times of this work. They devoted a great deal of their limited time to go through my work and made detailed comments on each item that required my attention including even commas. A special thanks to Prof. Joshua Y. Abor, who has been very instrumental in the success of this work with his strict deadlines.

To the entire Faculty of Finance, I say a big thank you for your guidance and constructive criticism during my presentations at seminars, which enriched my work. Special thanks to Prof. A.Q.Q. Aboagye; Dr. Patrick Asuming, and Dr. Emmanuel Sarpong-Kumankuma for their warm reception whenever I visited their offices. I wish to also say a big thank you to Prof. Justice Bawole, Dean of Business School, for holding me together when I was on the verge of giving up on this program and Prof. Raymond Dziwornu, former Dean of Faculty of Accounting and Finance, UPSA, for his awesome mentorship.

I need to mention with gratitude, Ghana Scholarship Secretariat and Ghana National Petroleum Company (GNPC) for sponsoring this PhD program and relieving me off the financial burden that this work came with.

To my colleagues, Dr. Daniel Ofori-Sasu and Mrs. Mariam French-Anaman, you have been so helpful throughout the entire program and I could count on you anytime to deliver one help or another, I am extremely grateful. To Alfred, Prince and Stanley, I am very grateful for the

immense help. A big thank you to my mates, Juanitta, Michael, Senanu, and David. You were a strong force and a formidable team.

Lastly, to my parents, Dada Tetteh and Auntie Connie, I am extremely grateful for your kind support. Daddy, you couldn't just wait for me to finish this program. You all contributed to making this work a reality.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| ADB | African Development Bank |
| BPOPF | Botswana Public Officers Pensions Fund |
| BRP | Basic Retirement Pensions |
| CARENI | la Caisse Autonome des Retraités du Niger |
| CM | Capital Markets |
| CMD | Capital Market Development |
| CNSS | Caisse Nationale de Securite Sociale |
| CSDB | Civil Service Defined Benefit |
| ESG | Environmental, Social, and Governance |
| FDI | Foreign direct investment |
| FFS | Fully Funded Schemes |
| FNR | Fonds Nationale de Retraite |
| FSB | Financial Services Board |
| GDP | Gross Domestic Product |
| GEPF | Government Employees Pension Fund |
| GLSS | Ghana Living Standard Survey |
| GMM | Generalised Method of Moment |
| ICA | Infrastructural Consortium for Africa |

| | |
|---|---|
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| IOPS | International Organisation of Pension Supervisors |
| IPRES | Private Sector Pension Scheme |
| IQ | Institutional Quality |
| JSE | Johannesburg Stock Exchange |
| KNDS | Kenya National Bureau of Statistics |
| LASF | Local Authority Superannuation Fund |
| LPFs | large Pension Funds |
| LuSE | Lusaka Securities Exchange |
| MENA | Middle East and North African |
| MDBs | Multilateral development banks |
| MINT | Mexico, Indonesia, Nigeria, and Turkey |
| MPS | Ministry of Public Service |
| NPF | National Pension Fund |
| NPSA | National Pension Scheme Authority |
| NSF | National Saving Fund |
| NSSF | National Social Security Fund |
| OECD | Organization for Economic Cooperation and |

| | |
|---|---|
| | Development |
| OLS | Ordinary Least Squares |
| OMERS | Ontario Municipal Employees' Retirement System |
| PAYG | Pay-As-You-Go |
| PF | Pension Funds |
| PFM | Pension Fund Mangers |
| PIC | Public Investment Commissioners |
| POIS | Private Occupational and informal schemes |
| PPRF | Public Pensions Reserve Funds |
| PSP | Public Service Pension Funds |
| PSPIB | Public Sector Pension Investment Board |
| PSPS | Public Service Pension Scheme |
| PwC | Price water house Coopers |
| RSA | Retirement Savings Account |
| SDGs | Sustainable Development Goals |
| SEC | Security Exchange Commission |
| SRI | Socially Responsible Investing |
| SSA | Sub-Saharan Africa |
| URBRA | Uganda Retirement Benefits Regulatory Authority |

| | |
|---|---|
| UN | United Nations |
| UN/DESA | United Nations Department of Economic and Social Affairs |
| WDI | World Development Indicators |

## TABLE OF CONTENTS

# Contents

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF BOXES

**Abstract**

Pension funds and capital market development have received a lot of attention across the globe with researchers' findings ranging from positive, negative, and no relationship at all. However, little attention has been given to the role of institutional quality in influencing the relationship between the two variables. Again, one vital aspect of the economic growth determinant which is pension fund, capital market, and infrastructure development has been little researched. The specific objectives of this thesis, which are based on three empirical essays, are: 1) to examine the effects of pension funds and institutional quality on capital market development in Africa; 2) to investigate the impact of pension funds and capital market on economic growth in Africa; and 3) to examine the effects of pension funds and capital markets on infrastructural development in Africa. The first empirical paper investigates the effect of pension funds and institutional quality on capital market development in 52 African countries using a system GMM regression model. The study shows that the interaction between pension funds and institutional quality negatively affects capital market development. The results of the study also show that pension funds in Africa contribute positively to overall financial development and that pension fund managers seem to be focusing more on other financial market assets. The second empirical paper examines the effects of pension funds and capital markets on economic growth by employing the GMM method of estimation based on a dataset of 52 African countries, over the period, 1990 – 2017. The results show that the stock market positively affects economic growth, whereas pension funds negatively influence economic growth. The interactive term (pension funds and stock market capitalization) shows a significantly positive effect on economic growth. This finding clearly suggests that a positive effect of pension funds on economic growth exists in the presence of a capital market and that capital markets positively improve the relationship between pension funds and economic growth. The third empirical paper examines the effects of pension funds and capital markets on infrastructure

development in Africa. The investigation was done by employing a GMM method of estimation based on 52 African countries during the period, 2005 - 2017. The results show a negative relationship between pension funds and infrastructural development. However, the interaction between pension funds and capital markets indicates a positive and significant relationship with infrastructural development. This suggests that even though pension funds may not have a positive influence on infrastructural development, the capital market is an important medium that pension fund managers use to support infrastructural development in Africa. The study concludes that pension funds have the potential to bridge the infrastructural gap in Africa but capital markets have an important role to play in this regard. The findings of these essays have important implications for the design of appropriate policies for developing the pension funds industry and capital markets to support infrastructure development and economic growth in Africa.

# Chapter One[1]

## Introduction

### *1.1 Background to the Study*

One of the most financially significant decisions individuals make in their lifetime is retirement planning because it signals the end of labour earnings and the beginning of drawdown of retirement resources built during their working career (Coile, 2015). Pension funds are investment pools set up to provide income for individuals during retirement. These funds receive contributions from employees, employers, or both, which are then invested in a diversified portfolio of assets such as stocks, bonds, real estate, and alternative investments. Pension funds can be categorized into two main types: defined benefit plans, where retirees receive a predetermined amount based on factors like salary and years of service, and defined contribution plans, where retirees receive funds based on the performance of their individual investment accounts. Pension funds serve a crucial role in ensuring financial security for individuals during their retirement years.

In Africa, the emergence and growth of pension funds and institutions have gained significant attention as countries strive to enhance their capital markets and foster economic growth. These funds accumulate contributions from both workers and employers, which are then invested in various financial assets such as stocks, bonds, and real estate. These funds generate returns over time, allowing retirees to receive regular payments and maintain their standards of living.

The two main objectives of pensions are for consumption-smoothing and to reduce poverty. Consumption-smoothing encourages the contribution of an able individual to a scheme, and then s/he can make withdrawals in their old age at pension. In theory, therefore, the more you

[1] The proposal to this thesis was presented at the 17th African Finance Association Virtual Conference held in May 2021 and received comments

save towards the scheme, the more likely you are to receive your contribution as pension. The state or private sector can provide for this scheme for the individual who can save from their incomes. Pension funds serve as a stable source of long-term capital for domestic investments, stimulating economic growth, and job creation, and contribute to the deepening of capital markets by providing a pool of investable funds and increasing market liquidity.

While social security schemes have the potential to positively impact the lives of older people in developing nations, the fact is that more than 342 million older people around the world currently lack income security. This is expected to increase to 1.6 billion, around 80%, by 2050 if nothing is done to change the cause (United Nations Department of Economic and Social Affairs [UN/DESA] 2007). Social protection is critical for achieving the 2030 Agenda for Sustainable Development, yet more than half of the world's population lacks social protection (Durán-Valverde et al. 2019; ILO 2021), raising policy challenges. Pensions for the elderly are the most common type of social security in the world, with 77.5 percent of those over the retirement age receiving some sort of old-age pension (ILO, 2021). To add to this estimate, globally, 56% of the population in rural areas lacks health insurance, compared to 22% in metropolitan areas (ILO, 2017). Social protection is an important policy issue for reducing rural poverty and disparities. There is substantial evidence that social protection reduces poverty and inequality while also promoting participation (United Nations, 2018). It is therefore not surprising that social security schemes have seen a lot of reforms over the years worldwide.

Africa's pension fund industry has witnessed significant growth over the past decades. As economies in the region have expanded, more formal employment opportunities have emerged, leading to increased participation in pension schemes (OECD (2023); Hujo, (2014)). Additionally, favourable regulatory frameworks and improved governance practices have helped establish robust pension fund institutions across the continent. The pension industry in Africa in the past 10 years is reported to have seen an increase in the annual rate of 8%.

Annually, Nigeria and East Africa, especially, have seen a remarkable increase in excess of 20% (PwC, 2015). According to the report, there are expectations for growth in the pension sector as a result of expansion of coverage and streaming of pension regulations.

With a global size of USD 178 trillion, capital markets are one of the most powerful drivers of economic growth and wealth creation, and one of the key investors is pension funds, (World Bank Report, 2020). A capital market is a financial market where individuals, institutions, and governments buy and sell financial securities, such as stocks, bonds, derivatives, and commodities, to raise capital for investment and financing purposes. Capital markets facilitate the allocation of savings and investment funds between borrowers and lenders, allowing businesses, governments, and individuals to access funding for projects, expansion, and investment opportunities. Capital markets provide liquidity, price discovery, risk management, and investment diversification mechanisms, allowing investors to buy and sell securities efficiently and transparently. They play a vital role in mobilizing savings, channeling funds to productive investments, promoting economic growth, and supporting innovation and entrepreneurship. Capital markets encompass primary markets, where new securities are issued and sold, and secondary markets, where existing securities are traded among investors. Extensive research has consistently highlighted the correlation between well-developed capital markets and higher levels of economic growth. This connection is well-documented in studies such as those conducted by King and Levine (1993), Demirgüç-Kunt and Maksimovic (1998), Rajan and Zingales (1998), and Bekaert et al. (2005). Recent studies by Bayar, Gavriletea, Danuletiu, Danuletiu, & Sakar (2022), Moleko (2019), and Nageri et al. (2020) also confirm this connection. In this, Gunu and Tsado (2012) stated that the introduction of the contributory pension scheme in Nigeria is intended to serve as a tool for achieving the goal of mobilizing savings. This, in turn, can contribute to the development of the capital market, subsequently fostering economic growth in the country. Pre-funded pension systems have the potential to

distribute the benefits of capital markets investments to a wider population, enhance the reputation of capital market, strengthen corporate governance, encourage international asset diversification, and stimulate financial innovation, as noted in the studies by Davis (1998, 2005) and Walker and Lefort (2002). Stewart, Despalins, Remizova, and Stewart (2017) stated that these benefits that funded pensions bring are not experienced in most countries because of the short-term assets that fund managers may invest in.

The financial market structure of a country determines its ability to make profit from pension funds. Preconditions are necessary for pension assets to make a considerable contribution to the growth of capital markets (Enache et al., 2015). Meng and Pfau (2010) posit that the level of financial development is an important precondition to be met; the higher the level of financial development, the more significant and substantial the influence of pension funds. Despite the progress made, Africa's pension funds face several challenges, such as low salaries and low contribution, unemployment, large informal sector, the Scarcity of Appropriate Vehicles through which pension funds can allocate their capital in infrastructure, governance and administrative challenges, and sustainability issues. Another challenge is the limited investment options and shallow capital markets in many African countries. The lack of diverse investment opportunities hampers the growth and profitability of pension funds. To overcome these challenges, governments and regulators need to focus on developing domestic capital markets by improving regulations, enhancing investor protection, and encouraging the listing of companies on stock exchanges.

It is, however, encouraging to see that several African nations have made progress in developing their capital markets. For example, the Lusaka Securities Exchange (LuSE) is one of the emerging stock markets in Africa according to Musawa and Mwaanga (2017). In Nigeria, for instance, state-owned businesses were successfully privatized, and this led to an increase in the number of publicly listed companies and an expansion of market capitalization,

(Muhammad 2015). Additionally, the Johannesburg Stock Exchange (JSE) in South Africa has established itself as one of the continent's most cutting-edge exchanges, providing pension funds with a variety of investment possibilities (Moleko and Ikhide, 2017).

The expansion of Africa's capital markets and pension fund sector can also be facilitated through international partnerships and collaborations. African nations can create efficient pension fund legislation, risk management frameworks, and investment strategies with the help of knowledge-sharing and technical support from international organizations (Guven, 2019). Foreign direct investment (FDI) in Africa's capital markets can also increase the variety of investment opportunities available to pension funds by bringing in knowledge and liquidity.

Institutional quality refers to the effectiveness, reliability, transparency, and credibility of formal and informal institutions within a country or economy. These institutions include government structures, legal systems, regulatory frameworks, governance mechanisms, property rights protections, and social norms. High institutional quality is characterized by strong rule of law, secure property rights, efficient regulatory systems, transparent governance structures, and low levels of corruption. Institutional quality influences economic behavior, investment decisions, and market outcomes by shaping incentives, reducing uncertainty, and fostering trust and confidence in the functioning of the economy. Countries with high institutional quality tend to experience higher levels of economic development, investment, and capital market activity, while those with poor institutional quality may face barriers to growth, instability, and inefficiency.

### *1.2 Problem statement*

Considering the Alonso et al. (2016) pension funds theoretical lifecycle in Figure 1 in the appendix, it can be seen that an increase in labour markets and the flexibility of participation in pension schemes allow for an increase in the accumulation of pension funds. These funds

can be allocated to various asset classes, which could bring about development in the economy as well as infrastructure. The authors argue that, capital market is one major medium through which pension funds could be used to bring about these developments. The principal Agency problem is likely to arise here because the interest of the principal (to receive benefits during retirement) is completely different from the interest of the agent (investing funds for more returns). The nature of pension funds calls for careful use of such funds in risky investments so that fund managers can fulfill their obligation towards contributors at all times. These funds are sometimes the only source of income for the survival of pensioners during their inactive lives. The institutional theory emphasizes the role of institutions, regulations, and governance in promoting the development of pension funds and capital markets (North,1990). Institutions provide the necessary framework for economic transactions, ensure investor protection, and establish trust in the financial system (North, 1990). Strong institutional frameworks and regulatory environments are crucial for the success and stability of pension funds and capital markets. Institutional quality theory has the potential to resolve the conflict of interest between the principal and the agent and therefore provide the basis for interaction with pension funds.

A considerable volume of research has examined the relationship between pension funds and capital markets development. (See for example: Sanusi & Kapingura (2021) Daradkah & Al-Hamdoun (2020); Babalos & Stavroyiannis (2020); Alda (2017); Moleko & Ikhide (2017); Meng & Pfau (2010); Kim (2010); Raisa (2012); Walker & Lefort (2002); and Poirson (2007)). They provide evidence that suggests a noteworthy correlation: countries with substantial pension fund assets relative to their GDP also tend to have significant stock market capitalization relative to their GDP. The literature suggests that institutional quality has also been studied extensively on other variables with few studies on pension funds and capital markets. These few studies are isolated studies on pension fund and institutional quality (For example: Eke et al. (2018); Agyemang et al. (2018); Manessah et al. (2017)) or capital market

and institutional quality. The institutional quality theory emphasizes the significant role that it plays on the pension funds capital market nexus; therefore one significant gap in literature would be filled in this study by examining the role institutional quality will play on pension funds and capital market nexus.

The Capital Market theory, on the other hand, enhances efficient allocation of funds between surplus and deficit units. The end results of this efficient allocation could be development in the economy and infrastructure. African capital markets have seen significant improvements over the last decade, but these developments cannot be said to have arrived since they are seen in just a few markets. This helps us to appreciate our unique nature and understand that studies done in developed countries with developed markets may not be applicable in our context.

Economic growth largely hinges on the financial development of a country. Financial development is largely brought about by financial deepening and financial widening. Pension funds have the potential to induce financial deepening by increasing liquidity in the financial systems, while capital markets have the potential to induce financial widening by increasing the number of financial institutions and assets in the financial system. The capital market theory brings to bare how efficient allocation of resources can lead to economic growth. That notwithstanding, the endogenous growth theory posits that; the growth in the economy could be brought about by financial innovations from intermediaries like pension funds and capital market. Again, studies done in this area have all concentrated on the direct relationship between pension funds and economic growth or capital market and economic growth with inconclusive results. For example (Morina & Grimma (2021); Kajwang (2022); Amahalu (2019) Bayar et al. (2014); Ikikii and Nzomoi (2013); Ho and Odhiambo (2012); Arestis et al. (2001); and Levine and Zevorse (1996)) found a positive relationship between pension funds and economic growth (Nwane (2015); Ake and Ognaligui (2010)), found a negative relationship and (Sanusi and Kapingura (2021); Ameh et al (2017); Echekoba et al. (2013)) found no significant

relationship between the two. More so since Alonso et al. (2016) in figure 1 (in appendix) indicate that pension funds and economic growth do not necessarily have a direct relationship, but through the dynamics of the capital market, it becomes interesting to examine this relationship, and this is another significant gap the study sought to fill.

Lastly, owing to the fact that Africa has the biggest and most significant infrastructural gap of US$68 billion and US$108 billion annually, (AfDB (2018); Goodfellow (2020)). Infrastructure development is one of the main agenda of the SDG Goals 2030 and Aspiration 2 of Agenda 2063 goals. There is a need for African governments to mobilize resources internally of which pension fund is a potential target due to its long-term nature, (Juvonen et al. 2019, Sy 2017). Pension funds could be a potential target also because of the low age dependency ratio in Africa and the steady growth over the past decade. Again, Alonso et al. (2016) contends that there is no direct link between pension funds and infrastructure development and considering the fact that the scarce literature has largely focused on the direct relationship between these variables, this study fills another significant gap by examining the effect of capital market on pension funds and infrastructural development in Africa. The above problem informed the choice of objectives below.

### *1.3 Research Objectives*

The objectives of the study are;

i. To examine the role of institutions on pension funds and capital markets development.
ii. To investigate the impact of pension funds and capital markets development on economic growth.
iii. To examine the effects of pension funds and capital markets development on infrastructural development.

### *1.4 Research Questions*

The above objectives informed the following questions;

i. What are the roles of institutions on pension funds and capital market development?
ii. What is the impact of pension funds and capital markets development on economic growth?
iii. What are the effects of pension funds and capital markets development on infrastructural development?

### *1.5 Theoretical Literature*

Various economic and financial theories underpin pension funds, institutions, and capital market development. The study explored, among other theories, three key theories: the life cycle theory, the capital market theory, and the institutional theory. These theories provide insights into the motivations behind pension fund participation, the role of capital markets in economic development, and the impact of institutional factors on pension fund development.

The life cycle theory, proposed by economists Modigliani and Brumberg (1954) and further developed by Ando and Modigliani (1963), argues that individuals' savings behavior is influenced by their life cycle stages. According to this theory, individuals save during their working years to accumulate wealth for consumption during retirement. The life cycle theory provides the foundation for the establishment of pension funds, as it emphasizes the importance of long-term savings and investment for retirement income.

The life cycle theory suggests that pension funds serve as a mechanism for individuals to pool their savings and invest in various assets over an extended period of time. By participating in pension schemes, individuals can benefit from economies of scale and professional fund management, which can potentially generate higher returns on their investments (Agarwal,

Driscoll, & Laibson, 2009). This theory underscores the role of pension funds in facilitating long-term savings and investment, aligning with the objective of ensuring financial security in retirement.

The capital market theory focuses on the relationship between capital markets and economic development. This theory argues that well-developed capital markets provide an efficient allocation of financial resources, foster savings and investment, and promote economic growth (Levine, 2005). Capital markets enable the transfer of funds from savers to borrowers, allowing productive investments to be financed. Moreover, they provide liquidity, price discovery, and risk management mechanisms, which contribute to overall market efficiency.

Pension funds play a vital role in capital market development. As institutional investors, pension funds channel long-term capital into the financial system, supporting the growth of capital markets. The presence of pension funds increases liquidity and enhances market depth, thereby attracting more investors and issuers. This phenomenon is known as the "pension fund effect" (Munnell, 1992). By investing in a variety of assets, such as stocks, bonds, and alternative investments, pension funds help diversify risks and contribute to the stability and efficiency of capital markets.

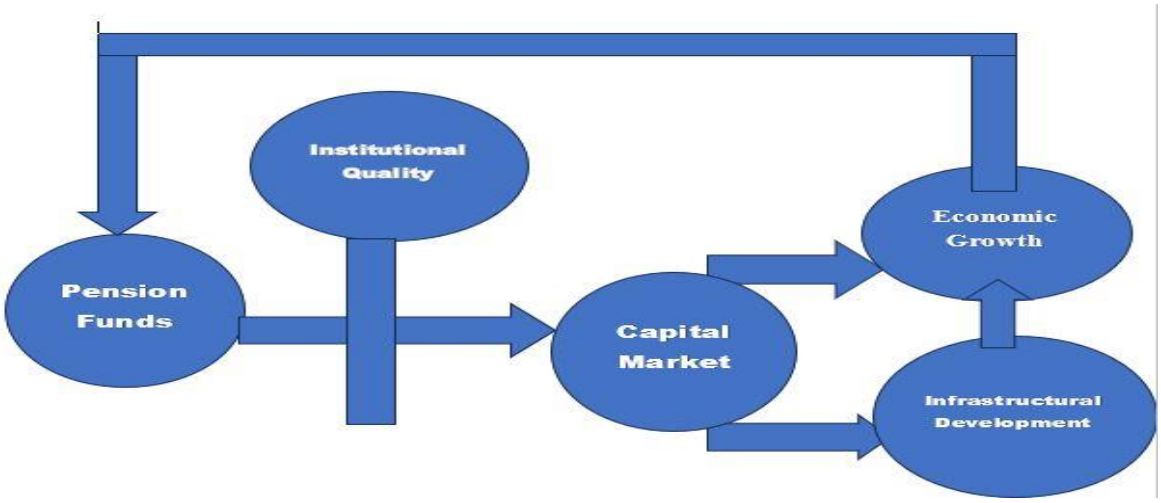
The institutional theory emphasizes the role of institutions, regulations, and governance structures in shaping the growth of pension funds and capital markets. Institutions provide the necessary framework for economic transactions, ensure investor protection, and establish trust in the financial system (North, 1990). Strong institutional frameworks and regulatory environments are crucial for the success and stability of pension funds and capital markets.

Effective regulation and supervision are essential to safeguarding the interests of pension fund participants and maintaining the integrity of the pension system. Clear rules and standards for pension fund governance, investment practices, and reporting requirements help build trust

among stakeholders. The institutional theory underscores the significance of regulatory frameworks, corporate governance, and transparency in promoting the development of robust pension funds and capital markets.

In the framework below, the life cycle theory helps in the accumulation of funds in the form of pension contributions. When these funds are accumulated, fund managers decide where to invest them. Research has shown that capital market is one place these funds could be invested, but as fund managers seek higher returns to fulfil their future obligations, the contributor only considers receiving future benefits, which may cause the principal agency problem to arise. The Institutional Quality Theory helps resolve this problem by putting in place strong institutions to mitigate any rent-seeking behaviour of the agent and safeguard the funds of contributors. However, the investment of these funds into the capital markets has the likelihood to bring about growth in the economy. The capital market theory posits that well-developed capital markets are able to efficiently allocate resources to bring about growth in the economy. In the framework, it could be noted that the results of the efficient allocation of resources in the capital markets bring about growth in infrastructure as well as the economy. Growth in the economy means that more employment opportunities will be available, better infrastructure, and better remuneration, which will go back to begin the cycle of increase in funds accumulation.

**Figure 1:1 Theoretical Framework**




Source: Author's modification of Alonso et al. (2016) pension funds theoretical lifecycle.

### *1.6 Significance of the Study*

Even though it has been proven in literature that the quality of an institution can influence capital market development, no study has examined how pension fund and institution have influenced the capital market development. Again, not much work has been done in this area in Africa, and the few works done still looked at pension reforms and how they have impacted growth of the capital market. The few studies done in these areas are overly concentrated on OECD countries and the developed countries. We aim to bridge the gap by considering how pension funds, together with institutions, would impact the development of the capital market.

While there is a substantial body of research on the impact of funding on savings and financial development, there has been relatively limited examination of the direct role of pension funds in the development of capital markets and their contribution to economic growth. Is the growth of pension funds positively correlated with economic performance? If so, what is the expected duration of this positive impact? We endeavour to shed light on these inquiries by presenting a theoretical model and conducting empirical research encompassing data from 48 African countries.

The study aims to make noteworthy contributions to the broader literature in the following ways:

- It will be the first study to investigate the relationship between institutional quality and capital market development.
- This research will join the limited number of studies that have explored how both pension funds and capital market lead to economic growth.
- This study will also mark the first study to ascertain the combined effects of both pension funds and capital market development on infrastructural development in Africa. This is particularly significant given the evolving investments landscape where pension funds are increasingly shifting from traditional assets classes to infrastructure.
- It will provide empirical evidence that can guide policy decisions aimed at developing capital markets to improve the economic impact of pension funds.
- It will also provide findings that have implications for both academic research and practical policy formulation.
- Last but not least, it will provide a foundation for future research in this area as the study is particularly relevant for policymakers in African countries.

The thesis therefore wishes to ascertain the role of institutional quality together with the pension funds in determining the development of the capital market. Again, the thesis will establish the role of capital markets in economic and infrastructural development in Africa. The rest of the thesis would be divided into the following chapters: Chapter two is an overview chapter, which looks at pension systems in Africa, and has been published as a book chapter in Abor, J.Y., Adjasi, C.K.D. (eds), The Economics of Banking and Finance in Africa. Chapter three, on the other hand, examines the role of institutions on pension funds and capital market development in Africa, and this has also been published in *Cogent Economics &*

*Finance*, *11*(1), 2172809. https://doi.org/10.1080/23322039.2023.2172809. Chapter four further investigates the of impact pension funds and capital market on economic growth whiles Chapter five examines the effects of pension funds and capital market on Africa's infrastructural development. The concluding chapter follows, and lastly, the policy implication and recommendations.

# Chapter Two

## Pension Markets in Africa[2]

### *2.1 Introduction*

Improvements in life expectancy and declining fertility rates have had an impact on the sustainability of traditional pay-as-you-go (PAYG) pension schemes in several nations throughout the world. The working class' reduced pension contributions under the PAYG or underfunded plan do not provide enough funding to cover retirees' retirement benefits. Countries are undergoing changes in their pension systems, moving towards the adoption of either partial or fully funded schemes. Funded pension plans are instrumental in fostering economic development by encouraging the development of capital markets, which is another justification for reforms in response to the need for social protection systems. This will help reduce population pressures and poverty among the elderly, and a number of African nations have also started reforming their pension policies. Additionally, the need for reform derives from the fact that Africa's current pension schemes come with a significant financial burden. That is, current pension schemes have a tendency to reduce spending on other crucial sectors like infrastructure, health, and education.

Typically, less than 5% of the population is covered by the existing pension systems in Africa. They are often composed of civil servants and/or a small number of highly compensated formal sector workers. The current pension systems are also quite regressive, with cross-subsidies from indirect taxes anticipated since payments of pension benefits frequently exceed payments of pension contributions (Stewart and Yermo, 2009). An important driver of pension reform in many of these African nations was the requirement to permit private investment in the pensions sector as well as to enhance the management and governance of the pension system. These

[2] The chapter has been published as a book chapter in Abor, J. Y. and Adjasi, C.K.D. (Eds.), *The Economics of Banking and Finance in Africa: Developments in Africa's Financial Systems*, London: Palgrave Millan

objectives were pursued alongside the primary justification of addressing demographic pressure and the fiscal burden associated with pension benefits.

It is essential to understand the pension system landscape in Africa after changes have been implemented for some time in a number of African nations. In this chapter, we look at the function of African pension markets, pension system reforms, and an overview of African pension systems. Also, we talk about how pension markets have helped the growth of capital markets as well as the difficulties African pension markets are facing. The rest of the chapter is structured in the manner mentioned below. The general function of the pension market is covered in Section 2. Pension reforms in Africa are covered in Section 3. Section 4 provides an overview of pension systems in Africa. The pension market and its connections to the capital market are covered in Section 5. The difficulties that African pension markets face are examined in Section 6, and some policy recommendations are made in Section 7, which concludes the paper.

## *2.2 The Role of Pension Markets*

The pension markets serve several crucial roles in the economy, including, creating appealing pension plans, mobilizing and pooling national savings, promoting the growth and development of financial markets, ensuring corporate governance and monitoring of firms, supporting the development of infrastructure, supporting the housing finance market, and funding green growth initiatives. These are discussed below.

### 2.2.1 Establishing Attractive Pension Schemes for Staff

Pension funds serve a critical role by creating programs to help businesses recruit top talent and reduce employee turnover. Additionally, pension schemes can serve as tools for rewarding and keeping on board skilled and productive workers (a concept often referred to as “business” or “commercial expediency”). Management may utilize pension plans for negative

reinforcement to fire outdated and ineffective employees, whose continued employment burdens the company and may cause significant financial losses. For instance, defined-benefit pension plans, which have an inherent insurance element, are frequently used to both recruit highly qualified employees and retain current high-performing ones. Since employees' rights to accrued pension benefits increase in accordance with their term of service, defined benefit plans ensure the employees' income level during retirement. Managers can reduce employee turnover by increasing the time an employee needs to work r in order to be eligible for accrued pension benefits. Employees who are assured of future financial stability through a solid pension plan typically feel more motivated to work more and produce more.

### 2.2.2 Mobilising and Pooling of National Savings

A crucial function of pension funds is to increase long-term savings through pension contributions and distribute them to economically productive areas. In order to be able to pay future retirement benefits to pensioners after retirement, pension funds are required to receive pension contributions from both employees and employers and invest these funds. By mobilizing savings through pension contributions and directing them for investment, pension funds serve as an intermediary. The intermediation function that pension funds perform is beneficial for the effective distribution of resources to the economically productive sectors. A thriving pensions market will help to effectively mobilize funds and enable effective resource allocation to support economic and productive activity.

### 2.2.3 Facilitating Financial Market Development

Pension funds are important for the growth of financial markets, particularly in developing nations like Africa with underdeveloped financial markets. They make it easier to obtain production financing, which aids in the expansion of the economy. Pension funds frequently take on the role of institutional investors, just like any contractual savings institution. They are very active in the financial sector, particularly the capital market, and frequently invest in

securities like bonds and shares. They can help the financial market grow in terms of activity and liquidity through their active participation in the market. By increasing the effectiveness and transparency of the market, they can also contribute to better financial markets. The modernization of the trading systems on the markets, for instance, can be pushed by pension funds. Also, they have the power to exert pressure on banks to adopt progressive banking methods or launch novel financial technologies. The market must be properly handled, however, as a sudden and extremely large demand for domestic assets by pension funds could cause distortions. Due to the fact that these funds are invested in annuity products for pensioners upon retirement, pension funds also aid in enhancing the performance of life insurance companies.

### 2.2.4 Ensuring Corporate Governance and Monitoring of Firms

Due to the size and makeup of their holdings, pension funds have a significant impact on corporate governance. They often handle enormous sums of assets and maintain diversified portfolios by making investments in many economic areas. Pension funds participate in shareholder activism as institutional investors and block holders to restrain the opportunistic management style of their investee companies. Pension funds frequently use voting at annual or special shareholder meetings as one of the most direct ways to influence corporate decisions outside of private conversations. They can even ask to join the board or advocate for a change in the composition of the board. In order to verify and keep track of projects and businesses, pension funds have the knowledge and economies of scale required. They have investment departments with the necessary knowledge to track the performance of the investments in the different companies, and they are able to keep an eye on the management of the companies in which they have invested. As a result, they can act in good governance when it is needed.

### 2.2.5 Supporting Infrastructure Development

One of the major factors influencing economic development is acknowledged to be infrastructure development. Infrastructure projects all across the world are receiving more private sector funding as a result of the ongoing demand for infrastructure development. Policymakers are increasingly becoming more aware of the need to use pension assets to assist infrastructure finance due to the relatively high size of pension funds, their long-term investment horizon, and their emphasis on domestic assets (Sy, 2017). Pension funds are concentrating their attention on investing in such alternative assets because of the significant infrastructure gap and governments' failure to raise sufficient public financing to assist infrastructure development, especially in emerging regions like Africa. A variety of infrastructure projects are included in these investments, (i.e., from economic infrastructure such as transportation, telecommunication, and energy, to social infrastructure such as health, education, and housing). Infrastructure projects are actively being funded by pension funds in a number of African nations, including Cape Verde, Kenya, South Africa, Swaziland, Tanzania, and Uganda.

In order to provide for the retirement benefits of pensioners, pension funds must increase the returns on their investments, which is why they are diversifying into these new asset classes. Pension funds are able to match their investments in infrastructure with their assets and simultaneously reap the benefits of diversification because pension assets are long-term in nature. In the past, pension funds have made infrastructure investments through real estate portfolios or publicly traded utility firms. They do, however, occasionally invest directly, and more recently through private equity funds. Institutional investors, like pension funds are now concentrating their investments in infrastructure. They are looking for new sources of returns and improved risk diversification, expanding beyond the conventional asset classes including bonds, shares, cash, and real estate. Pension funds are investing in a wider variety of

infrastructure investments than they previously did, and as a result, they are making a significant contribution to the development of this infrastructure, which is essential for promoting inclusive growth.

### 2.2.6 Supporting the Housing Finance Market

It is believed that having access to safe, affordable housing is a basic human right as well as a necessity of existence. Yet, there is a severe housing deficit in many developing nations, particularly those in Africa, and many people struggle to find cheap homes. This circumstance in these nations has been greatly exacerbated by the absence of suitable financing for the construction and purchasing of dwellings. For instance, in rich nations, the mortgage financing markets are highly developed and capable of supporting the housing market, but in sub-Saharan Africa, things are different (SSA). Due to the strict restrictions and the fact that mortgage finance is still in its infancy in Africa, most employed people even find it challenging to obtain it. By providing the financing to enable home development for the general public and particularly for pension fund contributors, pension funds play a significant role in housing provision. The majority of SSA pension fund contributors reside in impoverished areas, are unable to purchase their own homes, and are frequently subjected to more suffering after retirement. Pension funds have the capacity to combine and collect long-term savings and direct those money into the home finance sector, which may improve SSA's housing problems.

### 2.2.7 Financing Green Growth Initiatives

Like other institutional investors, pension funds play an important role in funding green growth initiatives (Jones et al 2010). There are two types of funds that are interested in green projects. One example is the rise of "Socially Responsible Investing" (SRI), which has boosted the demand for ethical, including green, projects through "ethical funds" (Della Croce et al, 2011). SRI entails making investment decisions that take into account environmental, social, and governance (ESG) concerns. The second possibility is that pension funds are looking beyond

the fact that projects are green and are interested in projects that offer attractive returns while taking into account the associated risk. Some large pension funds are already investing in green projects, either directly or through private equity. Huge pension funds frequently use direct investment because they have significant expertise and in-house resources to do so. Smaller pension funds, on the other hand, may allocate assets to such investment projects through structured finance, green equity, or green bonds. Pension funds generally seek lower-risk investments with consistent, inflation-adjusted returns. Though pension funds' investment in green projects is currently low, the availability of opportunities and green instruments has the potential to increase pension funds' asset allocation into such areas.

### *2.3 Pension Reforms in Africa*

Pension systems' fundamental goal is to get people to spread out their consumption over their lifetimes and save money now for their retirement. In cases when people are unable to save, the government would provide non-contributory programs to provide the poor with money (Holzmann, 1999; Rhodes and Natali, 2003; Uthoff, 2006). Several African countries' structural aspects of the economies, labor markets, and politics frequently result in particular risks and difficulties. When creating pension systems and making future decisions that could result in reforms in Africa, demographic data like life expectancy, median population age, and old-age dependency rate must be taken into account. Pension reform is to lower the risks associated with the macroeconomic, political, and demographic developments that could affect the ability to support the elderly in retirement (Holzmann, 1999). The structural qualities of a nation are crucial for identifying these dangers, and the demographic shift in less developed regions demonstrates that the indications are not uniform. Africa's population is predicted to remain steady and is ageing far more slowly than the global north, despite the fact that the entire world is ageing.

The ability to absorb a typically expanding working age population into the labor markets is hindered by inequality and low growth rates, a challenge primarily found in countries in Africa and South America. This has an impact on both the number of people who are fully employed and their contribution levels. The design of pension plans and the degree to which the state is responsible for decreasing poverty will depend on this.

On the contrary, rising life expectancies, which present the challenge of an aging population, are the most prevalent risk in developed and industrialized economies. These lead to higher old age dependency ratios when combined with lower fertility replacement rates. The dependency ratios in Germany, Italy, and France are greater than 40%, which indicates that there are significantly more elderly people than there are working-age people in these countries. The total amount of contributions will not be sufficient to cover the rising and current benefits needed to pay the nominal pensions of current retirees. This basically indicates that, over the medium to long term, there won't be enough people in the working age group (15–64) to make the necessary contributions to support retirees' retirement income. There are signs that this would increase taxes or debt to pay for pension expenses, which will put a lot of strain on national budgets. This is where the discussion of long-term financial viability becomes important.

It is crucial to note that countries are at different stages of the demographic transition, even though developing nations are in the early and middle stages where youth populations are rising, fertility rates are high, and the proportion of elderly people to working-age populations is low, as is the case in the majority of African nations. Certain nations, mostly those in Europe, are consolidating and showing indicators of a full demographic transition, including reduced birth rates and an increase in the senior population (Uthoff, 2006). Although not as severely as European nations, Latin American nations like Brazil, Peru, Venezuela, and Colombia are already at the advanced phases of dealing with them. According to Rhodes and Natali (2003),

pension schemes that are nearing maturity make financial viability even worse. Fiscal sustainability is projected to be further threatened by a growing disparity between the working-age population (contributors) and the elderly (beneficiaries). Employed people contribute to PAYG programs, and pressure on contribution levels by the working population is intensified in circumstances where unemployment rates are high. This problem has two sides since there will be more dependents in the future who will need social assistance from the government and fewer contributors will be paying into the PAYG system to support current beneficiaries. Contributions to pension plans are treated as transfers from the young to the old under PAYG programs rather than as savings. As a result of the contribution being a small portion of the money used to pay out pensions to the elderly, it is viewed as a tax. In a funded system, contributions to pension plans (which are composed of pension plan contributions that are paid to an employee in their senior years) are recognized as savings. Only if individuals were saving less than what was saved in their mandatory pension contributions would an increase in aggregate savings result in a growth increase.

Barr's (2000) pension system model is an equation consisting of the number of pensioners multiplied by the nominal pensions, which is equal to the contribution rate of the current number of workers multiplied by the wage bill. In a later study, Barr and Diamond (2006) modify the model by taking into account a pay decrease. To satisfy the pension payouts for current pension holders, the equation would demand either an increase in the contribution rate or an increase in the number of workers contributing. When the number of employed is not likely to increase or when the contribution levels of the employed are not a viable choice, decreased productivity and wage levels pose a serious threat to continued viability (Rhodes and Natali; 2003). The PAYG system faces political risk, market risk, and regulatory constraints when existing workers cannot meet the current pensioner obligations; occasionally, the political environment and fiscal pressures erode the likelihood that pensioner obligations will

be met; and if the regulatory institutions and framework cannot ensure economic security among other government expenditure priorities. As a result, pension reform is necessary.

There are three main types of pension reform mentioned in the literature; they include systemic, parametric measures, and notional-defined contribution reforms. These actions can be taken as changes to the particular kind of pension system. To reduce the issue of financial instability and intragenerational inequality, Rhodes and Natali (2003) claim that reform paths within occupational plus purer occupational constitute enacting non-parametric changes that converge benefits, improve labor market conditions, and increase labor supply. Pure universal models have issues with financial viability, particularly when the labor market isn't creating new jobs.

Pension reform occurs within the framework of an already-existing pension plan or system, and it can take many different shapes. A decommodified pension system is heavily tax-financed and supported by the political economy of the individual nation, whereas a commodified regime is one where there is a significant drive toward privatization. The method of change is determined by how frequently the government provides pension plans as opposed to the private sector. In light of the prevalence of public vs private pension plans and the existence of several pension plans, the question of who is more responsible for paying pension benefits arises. Public programs provide benefits through universal or means-tested systems, whereas private programs offer benefits through occupational arrangements (second or third pillar) (first pillar). The universal plus occupational plan is the result of combining the various systems (multiple pillars). Barr (2000) suggests tiers as an alternative to pillars, which are created in accordance with national priorities. Tiers lay a lot more focus on a country's goals than pillars do on prescribing a change before any reform is aligned with measures. In contrast to the World Bank's position, he contends that the second tier does not necessarily need to be privately managed and suggests that publicly managed programs may be less risky.

According to the World Bank, country responses in the event that a country's pension system experiences a financial viability problem have centered on switching from a PAYG to a fully funded scheme (FFS) and, in the medium term, cutting payouts (Holzmann, 1999). Due to flaws in the PAYG system, reforms have been implemented in numerous nations to move away from PAYG and toward FFS. Barr (2000) contests the idea that altering the pension plan is the sole way to address the issue of long-term financial viability. He contends that raising the savings rate, implementing measures to increase employment, or increasing output can all result in an increase in the average nominal wage. Alternative options include cutting back on government spending or prepaying future debt, a strategy that heavily relies on good financial management.

To ensure that there are enough reserves to pay pensions, these measures will all help raise overall contributions. All pension schemes, including the occupational universal plus plan, are impacted by the labor market participation rate. Total contributions would also increase if policies were implemented to lessen the amount that people rely on casual and part-time work has a positive impact on productivity and output. Viability is typically represented by simulation models and graphical forecasts.

When analyzing the impact of reform, the literature focuses on Latin American countries such as Chile and Columbia, with only one measurement on Russia and India (Holzmann, 1999; Vittas, 1999; Schmidt-Hebbel, 1995 and 1999; Walker and Lefort, 2002; Hauner, 2008; Uthoff, 2006). There are few empirical studies on Sub-Saharan Africa. It is argued that increasing pension assets in an FFS has a positive effect on growth. Savings is one of the factors that contribute to the growth of a pension fund. This capital accumulation leads to better resource allocation and investment, which leads to capital market development.

**Box 2.1: Pension Reforms in South Africa**

Most pension fund reform research is on developed economies, however, there is a focus on Chile due to the historical significance and reform measures taken in 1981. Its reform was the replacement of PAYG with FFS partly motivated by an ageing population. It remains a popular case study in the literature for reducing political risk, improving fiscal sustainability and reducing labour market distortions. A prominent feature in pension reform literature is centered around the privatisation of pension asset managers, focusing on the transition from a publicly to privately managed pillar.

Hendricks (2008) provides a critique of the reforms experienced in South Africa post-1994. Stating that beyond the protection of apartheid era public servants pensions, the downside has been the cost of debt maintenance and opportunity costs of forgoing meeting the social needs the people of South Africa are in dire need of. There remains little evidence found in literature concerning the nature and motivation of the shift from PAYG to FFS. The reform propelled by a demographic transition at advanced stages does not hold for South Africa, in fact, National Treasury (2004) agrees that there is no problem with an agiing population as do most developed economies. Therefore, the PAYG to FFS shift propelled by the government has significant debt costs, whose cost has likely outweighed the benefits of privatization. The argument of political risk cannot be adequate in lieu of the additional investment risk from the stock and bond markets, annuity risk and pension fund management risk that pensioners face under such a scheme. Financing the transition have possibly had major welfare and distributional adverse effects, whilst it minimised the future fiscal constraints the current reforms for poverty eradication and financing of government economic and social priorities were more urgent.

In the 1980s and mid1990s, South Africa effected major reforms in the public pension system. The National Treasury's Annual Reports (1998 and 1999) reported that the Government Employees Pension Fund (GEPF) was formed after the amalgamation of several funds. A single homogenous fund with standard benefits, retirement provisions and requirement and management was formed post 1994. As at 1998 the fund had 1.1 million contribution members. It was reported that the pension funds were previously obligated to provide loans to the government using pension assets. These legislative requirements were removed by amendments made to the PIC Act in 1999. The fund is also shown to have improved in the level of unfunded liability levels, which were reduced quite significantly on a yearly basis. The percentage levels of the funded liability increased from 72% in the previous year, to 96.5% in the year ending 31 March 1998. The value placed on the unfunded liability was R5.26 billion. Little mention of the nature of the reform and how it was financed is reported. The Annual Report (1999) stated more than a fifth of the fiscal at 21.4% went towards debt repayment in1998. This cost is due to domestic debt, of which 98% was incurred after 1994 or agreed to during the negotiated or re-negotiated CODESA talks. This debt is domestic debt, with National Treasury stating that 96% of it is recorded as such and the holder of 40% of the domestic debt were the Public Investment Commissioners (PIC), which held the assets of the GEPF.

During pension reform there is a transition period where social security contributions no longer directly offset existing pension payments. They are deposited in a fund, as in the case of South Africa, the GEPF is managed by the PIC. The pension payments to existing pensioners must continue and it is herein that public debt, which is usually raised if the fiscal position is not in surplus. Financing the transition requires selling of state assets, incurring of liabilities, reducing government expenditure or raising taxes. In South Africa, evidence points to issuing of government debt, which is argued by Hendricks (2008) to have had a neutralizing and even negative impact on the improvement of aggregate savings. Cuevas *et al.* (2008) explain broadly that a pension systems change does affect the debt structure of a country. The pensions owed to pensioners are known as implicit debt and this debt when privatisation occurs, becomes explicit debt, changing the composition of liabilities with financial debt by replacing the implicit which has a direct impact on country credit risk. It is no longer hidden and must be repaid. Empirical evidence (see Cuevas *et* al, 2008) suggests that financial debt increases the perception of riskiness as the nature of liabilities is amended. Pensioners are afforded equal status on their claims as creditors, equal to bondholders, a far higher status than those offered to PAYG participants, who hold lesser claim than any creditor with government. It has been argued by many that this part of the transition may erode all benefits of reform as financing costs are too high.

Source: (National Treasury, 1998, 1999; Moleko & Ikhide, 2017)

**Box 2.2: Micro-Pensions in East Africa**

It is important to consider the labour market and economic structure of a country, with the level of development an important consideration for policy makers in developing and emerging market pension systems. The Kenyan pension system has shown growth in the contribution to GDP, increasing from 11.5% in 2002 to 14.3% in 2011. The Retirement Benefits Authority currently estimates the assets under management were a value of Kshs. 1,298.74 billion in 2020, having grown from 117.4 billion in 2002, to 432.8 billion in 2011, the growth in pension assets has grown significantly. Despite this, it is reported that the financing needs of pensioners remain constrained with the population over 65 million likely to face significant hurdles in meeting their retirement goals. The low pension coverage of 22% of the labour force is due to the type of pension products offered to the informal sector, whose workers comprise a large proportion of the labour force. The level of pension penetration in the informal work sector, when it constitutes more than three-quarters of the workforce, is a determinant of the level of worker savings in the economy. Thus, when considering issues of pension reform, African nations should have a strong emphasis on the provision of policies and products that target the majority of the labour force, namely focusing on the informal economy. This differs from developed economies and high to upper middle-income countries whose financial markets Africa tends to emulate.

Pension reforms that the Kenyan financial sector have adopted to improve the financial market infrastructure also focused on informal sector contributions. A pension plan known as the Mbao pension plan was established in 2009 and it targeted SMMEs with the intention to increase participation in the informal sector. A minimum of 20 Kenyan shillings was required from participants daily, with a provision pushing out collection of benefits by 3 years or later. An additional use of mobile technology and partnership with the M-Pesa services was encouraged to increase participation. The following policies were implemented to bring reform to the financial services sector:

- Payment mechanism that does not come through the banking system but enables the rural population to make contributions
- Enabling direct contributions from the beneficiaries rather than employers making contributions
- Cellphone usage and mobile money systems enabling deposits, transfer of funds, and payment of contributions as an alternative to bank payments or cash deposits
- The minimum contribution should be designed to encourage deposits, daily or weekly with the Mbao 20 shillings a day equivalent to US $0.25c
- The costs of service providers need to be monitored and low, with fee structures encouraging savings
- The pension regulators should include financial literacy campaigns and a marketing campaign in an effort to provide the benefits of savings and to demystify the concerns around pension plans and the associated risks to low-income and rural households

Source: (Finance Sector Regulators, 2020; Kwena and Turner, 2013)

### *2.4 Overview of Pension Systems in Africa*

Africa has evolved over time with regards to pensions. Moving from one pension regime to another all in the quest to provide better lives for individuals during their inactive working days. Regulators as well as supervisory teams have migrated from one policy direction to another in terms of pension systems in Africa. African countries have different pension schemes and this may be as a result of the different financial systems in place. There exists some form of pension coverage available in only a few African countries and benefits are derived from national, occupational and public service pension scheme. These benefits are mostly received by formal sector workers. According to Bloom and Mckinnon (2013), Sub-Saharan African countries with lower income have coverage extended to less than 10 percent of the population and may only cover a number of eventualities (old age, disability, survivorship, and work injury, etc.). The public sector worker receives benefits from the Public Pension Scheme. The national (usually) mandatory covers private sector workers as well as public sector workers while the occupational schemes are mostly managed by the employers. However, there exist an individual / personal pension schemes which are managed by insurance companies and contribution to this scheme is on voluntary basis. It can however be noted that, a larger portion of the African population are employed in the informal sector and this means these formal schemes may not cater for them, an indication that they may need to depend on their own informal provisions, resources or family assets.

This section provides an overview of pension systems in selected African countries, including Ghana, Nigeria, Senegal, Botswana, South Africa, Zambia, Mauritius, Egypt, Niger, Uganda, Kenya, and Rwanda.

### 2.4.1 Ghana

Ghana currently is running a three-tier pension system. This consist of two compulsory and one voluntary scheme and these schemes are integrated unlike other sub-Saharan African countries. According to the PwC (2015) report, creating the three-pillar pension system is the most significant development in the pension sector. The first Tier, a distinct benefit scheme, is required for workers to have 13.5% contributed on their behalf. The second Tier is a defined contributory Occupational Pension Scheme compulsory for employees with 5% contribution made on their behalf. The third Tier includes all Provident Funds and other Pension Funds outside Tiers I and II and it is an optional scheme covering all employees in the private and public sectors. It is non-mandatory for the business owner (the informal sector worker). Micro pensions for the informal sector through mobile telecommunication platform is a recent development in the Ghanaian Pension Industry. Certain Pensions and Insurance companies have partnered with telecommunication companies to deliver micro pensions to those in the informal sector via mobile phones.

### 2.4.2 Nigeria

Nigeria introduced the Contributory Pension Scheme in 2004 by the Pension Reform Act which was a fully funded, Defined Contribution and was privately managed. It was a compulsory requirement for all public sector workers and a Retirement Savings Account (RSA) was deployed for all members. For easy access to enrolment, an online enrolment application was designed to get members have easy access to enrolment since the application could register, verify, and enrol individuals unto the scheme. According to 2019 annual report of the Pension Commission, there was a significant increase (5.72%) in the membership base which translated into the fund base as well. The funds are invested in ordinary shares, bonds, stock, money market instruments, infrastructure, and real estate among others. There exist also a Micro Pension Plan launched in 2019 under the RSA.

### 2.4.3 Senegal

There are two compulsory pension schemes that Senegal currently runs. These are the Retirement Savings Fund of Senegal (IPRES) covering private sector workers, employees in local government and government employees without the civil servant status. This is a Defined Benefit scheme which is centred on a point system, and these points are considered based on three factors: the salary from which contributions are deducted, average salary and number of years contributed. The contribution rate is 14% of salary to which the employee takes 40% (5.6%) and the employer pays 60% (8.4%). The second scheme is the National Pension Fund and it caters for workers in the public sector and those in the armed forces. Contribution to this scheme is 35% of which employee pays 12% and the employer pays 23%. Benefits for this scheme is on a pay as you go basis and to be a beneficiary, one must have worked for at least 30 years and aged 60. Armed forces workers must have to work for 25 years and aged 55 to benefit from the scheme.

### 2.4.4 Botswana

Botswana operates a universal old Age Pension System introduced in 1996 with coverage extending to all citizens above the age of 65 years who resides in Botswana and the cost for this scheme is born by the government. Benefits provided under this scheme normally gets adjusted according to the cost of living. In 2001 the Botswana Public Officers Pensions Fund (BPOPF) which is a funded public sector scheme for employees had a reform where it was moved from Defined Benefit to Define Contribution and this brought about an incredible growth in the funds. Even with this growth, 84% of private formal employees do not have coverage and about 33% of public sector workers are not covered. The pension fund industry is overseen by a Non-Bank Financial Authority.

### 2.4.5 South Africa

One of both Africa's and the world's largest pension fund is the Government Employees Pension Fund (GEPF) operated in South Africa. With more over 1.2 million active members, the GEPF have over 450 000 pensioners and beneficiaries, and assets worth over R1.61 trillion. (GEPF Report 2021). Established in May 1996 by consolidating different public sector funds the GEPF is a Defined Benefit pension fund that sees to the management and administration of pensions and benefits for workers in the South Africa government. In recent times, R 8,701 per month is the means tested old age grant for those who cannot support themselves and this is the difference between subsistence and total poverty. Many families, particularly those in rural areas, largely rely on these pensions as their only means of income, and there can be no doubt that access to pensions has had a significant impact on poverty levels.

Aside the contributory occupational pensions and the social non-contributory pensions in the public sector, South Africa has two other funds; the private occupational pensions and the voluntary savings, such as annuities at retirement. On the surface, South Africa appears to have the fiscal and institutional capacity to implement a differentiated system that meets the World Bank's requirement for multi-pillar pension schemes (Van Der Merwe 2004). The assets from these funds are largely invested in domestic and foreign equity and bonds as it is being managed by the Public Investment Commissioners (PIC)

### 2.4.6 Zambia

Restructuring of the Zambian National Provident fund took place in 1990 and became a mandatory social insurance scheme managed by the National Pension Scheme Authority (NPSA). This scheme covers local government, civil servants or employed individuals and voluntary coverage exists for workers in the informal sector and those self-employed. Contribution to the scheme is on a 5% of earnings for employee and 5% of earnings for employer. There is a 10% voluntary contribution too. The system consists of both private and

public schemes. And there are three pillars on which these schemes are based. The first pillar is made up of National Pension Scheme Authority, which is a basic compulsory scheme. The second pillar consists of Public Service Pension funds (PSP) and the Local Authority Superannuation Fund (LASF). These two are occupation based and in addition to this are the private occupational schemes, which are managed by insurance and non-insurance companies.

### 2.4.7 Mauritius

Basic Retirement Pensions (BRP), occupational compulsory pensions and the voluntary pensions are the three types of pension systems that exist in Mauritius. The BRP is a non-contributory pension scheme designed to cater for all citizens of Mauritius who are 60 years and above. The benefits consist of a fixed monthly payment dependant on the age which is reviewed annually. This scheme is managed by the National Pension Fund. The occupational compulsory pensions however entail the Civil Service Defined Benefit (CSDB) scheme which comprises of civil servants who joined before 2012. Employees of this scheme pay 6% of their salaries while the government settle any deficit. However, members who joined after 2012 were enrolled unto another scheme which is a Defined Contribution Scheme (Civil Service Defined Contribution). Again, The National Pension Fund (NPF), a defined benefit funded scheme is compulsory for employees in the private sector. Employee pay 3% of earnings while the employer pays 6%. More so, self-employed workers can join this scheme voluntarily. There is also a National Saving Fund (NSF) which is fully funded with a mandatory contribution of 2% of earning from employees and a lump sum payment is received based on amount contributed and returns on investment. The NSF is largely invested in government bonds and Treasury bills. Then lastly is the Private Voluntarily Pension Schemes which are privately managed and membership is voluntarily.

### 2.4.8 Egypt

The structure of Egypt's pension system has public and private schemes. The public pension scheme comprises of government employees, military personnel, public and private enterprises employees and a number of social programs exist for special groups of population. The Private Pension, which is voluntary occupational pension plan, exist for those in the private sector. The National Authority for Social Insurance oversees the mandatory social insurance system that comprises of employees in both private and public sector including those who work aboard and the workers in the informal sector. The coverage rate of pensions in Egypt is about 80% of the employed population and it is considered as one of the highest in developing countries. There was growth in the number of funds, (733 to 749) number of members (4.8m to 4.9m) and assets (77.5m to 88.9m) over the period of 2019 to 2020 according to the annual report of the Financial Regulatory Authority.

### 2.4.9 Niger

Niger operates a two pensions system namely the "Caisse Nationale de Securite Sociale" (CNSS) which caters for workers in the private sector, and the "Fonds Nationale de Retraite" (FNR) which caters for civil servants, the military personnel, and workers in local government. Total contribution received from the CNSS Scheme is 4% out of which the employer contributes 2.4% and the employee contributes to the rest as a percentage of his earnings. On the other hand, the employer contributes 14% with employee contributing 6% for the FNR Scheme. The coverage of the two schemes is 3% of the labour force which comprises of civil servants and formal sector workers. However, the contribution to pensions is 2.7% of GDP (ILO, 2019). "la Caisse Autonome des Retraités du Niger" (CARENI), a financially and legally independent institution took over the management of the public sector scheme, something which was initially under the management of FNR. This was due to some administrative and

financial management issues with the pension and retirement funds. Government bonds, real estate and bank deposits are examples of assets that the FNR invests in.

### 2.4.10 Uganda

Uganda has the National Social Security Fund (NSSF) which is a defined contribution fund for employees in the formal sector, the Public Service Pension Scheme (PSPS), which is a non-contributory defined benefit scheme that caters for civil servants, the Military Pension Schemes as well as other occupational schemes and Individual Savings and Retirement Benefits Schemes. The NSSF is a defined contribution mandatory provident funds that pays a lump sum upon retirement. Contribution is a 5% and 10% of earnings between employee and employer respectively. Benefits to participants are based on adequacy of funds and how investments risks are managed to bring in more returns. The PSPS caters for local government workers, civil servants, judiciary, teachers, doctors, police, and prison officers. Supported by general tax revenues, this Pay As You Go (PAYG) scheme is administered by the Ministry of Public Service. The Military Pension scheme also called the Armed Forces Pension Scheme covers military officers and tax revenues fund it. The Private Occupational and informal schemes comprise of formal sector workers whose institutions or companies have the pension plans for their employees as well as individuals who voluntarily want to save toward their retirement and they are regulated by the Uganda Retirement Benefits Regulatory Authority (URBRA) Act. It is worth noting that workers in the informal sector have established two informal sector schemes since the (URBRA). These funds are invested in government securities, bonds, equities, real estate among others.

### 2.4.11 Kenya

Kenya has four different types of pension programs namely; National Social Security Fund (NSSF), Public Service scheme, Occupational Schemes and Individual Schemes. The NSSF is a funded and mandatory scheme comprising of employees in formal sector institutions with

more than five workers excluding those in the Public Service. The Public Service scheme is unfunded and is made of all public service employees, including, teachers, civil servants, and security forces. The occupational scheme is a funded but voluntary scheme comprising of formal sector workers in companies that operate retirement schemes. The individual scheme is open to all on a voluntary basis. All the above are regulated by Retirement Benefit Authority, except the public service scheme which is regulated by an Act of Parliament. The employer-provided occupational pensions account for 61% of total assets, the NSSF accounts for 38%, and individual pension programs account for 1 percent. The accumulated assets in the funded programs equal 20% of GDP (Odundo 2004).

There has been a great improvement in the industry with regards to growth in the membership, according to the Kenya National Bureau of Statistics (KNDS) FinAccess Report 2019. In their report there was a significant compounded annual growth rate of 15.7% in membership and 15.8% compounded annual asset growth rate over a ten-year period between 2009 to 2019, and this was attributed to factors like education on the importance of retirement savings, financial technology and improvements on communication between schemes and members. Some of the asset classes that funds from pensions are invested in are equities, immovable properties, bonds among others. The Mbao Pension Plan exists in Kenya to take care of those in the informal sectors; once you are above 18 years and have either a national ID or passport. This is managed through a mobile money platform and reaches a large portion of the population because of its flexibility.

### 2.4.12 Rwanda

Rwanda's social security scheme has three pension pillars. Rwanda has one mandatory public pension scheme known as "Caissa Sociale du Rwanda" or National Social Security Fund (NSSF) comprising of public and private sector workers and it is a plan with a clearly defined benefit. Contribution towards the scheme for both employee and employer is 3% and 5%

respectively. The second pillar is Occupational Pension plan, a fully funded, Defined Contribution or Defined Benefit scheme for the formal sector workers whose employers have the schemes and contribution differ from each employer. Most of the schemes invest in insurance companies and benefits are paid as lump sums. The third scheme, however, is voluntary saving for those who wish to supplement their savings towards retirement. The scheme is a defined contribution and mostly offered by insurance companies.

**Table 2.1**
***Types of Pension Systems in Selected African Countries***

| Country | Legal status | Contribution from insured person | Contribution from employer | Contribution from government | Contribution from self-employed | Statutory retirement age – Men | Statutory retirement age – Women |
|---|---|---|---|---|---|---|---|
| Ghana | Statutory implemented | 5.5%; 18.5% (voluntarily insured). | 13% | None | 18.5% | 60; 55 (if working under hazardous conditions) | 60; 55 (if working under hazardous conditions) |
| Nigeria | Statutory implemented | 8% | 10%; pays the total cost of a life insurance policy. | 1% of monthly earnings to subsidize the guaranteed minimum pension for federal public-sector employees; contributes as an employer. | n/a | 50 | 50 |
| Senegal | Statutory implemented | 2.4% | 3.6% | None | n/a | 55 | 55 |
| Botswana | Statutory implemented | None | None | Total cost | None | 65 | 65 |
| South Africa | Statutory implemented | None | None | Total cost | None | 60 | 60 |
| Zambia | Statutory implemented | 5%; 10% (voluntarily insured). | 5% | None | 10% | 55; 60 (persons whose insurance period began after August 14, 2015) | 55; 60 (persons whose insurance period began after August 14, 2015) |
| Mauritius | Statutory implemented | 3%; at least 160 rupees a month (non-employed | 2.5%; none (persons age 65 or older). | Finances any deficit; pays contributions for certain low-income agricultural and household workers. | At least 170 rupees a month. | 60 | 60 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | persons); none (certain low-income agricultural and household workers). | | | | | |
| Egypt | Statutory implemented | 10% + 3% for lump-sum benefits. | 15% + 2% for lump-sum benefits. | 1% (special increment and social solidarity allowance); finances any deficit. | None | 60 | 51; at any age |
| Niger | Statutory implemented | 5.25% | 6.25% | None | n/a | 60; 55 (if prematurely aged) | 60; 55 (if prematurely aged) |
| Uganda | Statutory implemented | 5%; at least 7.5% (voluntarily insured). | 10% | None | At least 7.5% | 55; 50; before age 55 | 55; 50; before age 55 |
| Kenya | Statutory implemented | 5% | 5% | None | 5% | 50 | 50 |
| Rwanda | Statutory implemented | 3%; 6% (voluntarily insured). | 3% | None | 6% | 60 (younger if prematurely aged) | 60 (younger if prematurely aged) |

*Sources: ILO, World Social protection Database and Authors own selection of countries*

### *2.5 Pension Funds and Capital Market Development*

It's critical to understand how pension funds or other assets fit into the larger financial system. Financial system development includes all of the intricate interactions that take place between lenders and borrowers of funds. Financial institutions serve as middlemen, supplying more money to markets, transferring funds, establishing markets, and ensuring the effective distribution of these monies. The movement of these monies from surplus to deficit economic units is facilitated by financial intermediaries. Financial intermediaries can be depository or non-depository. Depository intermediaries in the financial industry include institutions like banks, credit unions, savings and loan businesses, post ffice, and savings banks. Insurance firms, pension and provident funds, mutual funds, unit and investment trusts, and participation mortgage bond schemes are examples of non-depository intermediaries. Thus, Insurance companies, pension funds, and provident funds acquire surpluses in the form of insurance premiums and pension contributions. They are then transferred to deficit economic units on the equity and securities markets.

A pension fund's contributions are distributed among several asset classes and are subject to the legal system of the country in which it is located. Private pension funds in Ghana are provided with investment advice for the several asset classes by the National Pensions Regulatory Authority. Kenya's Retirement Benefits Authority establishes investment restrictions in each asset class in accordance with the Retirement Benefits Regulations, much like the Nigerian Pension Commission regards pension investments. Regulation 28 regulates the investment risk across shares, foreign assets, property, cash, bonds, and Krugerrands in South Africa by defining the maximum exposure to the various investment classes that funds are expected to adhere to.

It is crucial to point out that the accumulation of capital through pension funds is known as institutional capital due to the regulatory environment necessary for interactions between investors, businesses, and authorities in the market.

Financial system innovation is spurred by pension funds. The growth of pension funds leads to new instruments, the modernization of infrastructure, and improved rules (Davis, 2006). Market efficiency is increased by the creation of new products and consumer demand for them. According to Hu (2012), financial innovation refers to the creation of derivative, securitization, and equities markets, along with indexed instruments, corporate bonds, index futures, zero coupon bonds, and certificate of deposits. Pension funds play an important role in improving competitiveness in the loan and securities market by competing with the banking sector. This leads to increased efficiency, lower transaction costs, reduced market volatility, and lower lending rates, which in turn lowers the costs for accessing capital for both firms and households (Davis, 2006). Walker and Lefort (2002) suggest that pension fund assets can decrease dividend yields and increase price-to-book ratios, indicating a decline in the cost of capital. These benefits are further enhanced when increased corporate governance and liquidity are present.

According to Impavido and Musalem (2000), the securities market will profit from higher pension savings because it will become more competitive, efficient, and modern. When fund managers participate more actively in the bond and stock markets, competitive bidding on bond and equity offerings follows. To handle rising trading volumes, stock exchanges occasionally undergo structural alterations and technological advancements. Settlement systems and professional specialization are becoming more prevalent as pension funds and their size on the market grow. Because of rising pension fund activism, which is heightened by the fact that sometimes they represent minority interests, corporations are more focused on being open, improving company disclosures, and enhancing the execution of good governance, which benefits capital markets.

Even though they do not increase savings, the endogenous growth model theory demonstrates that pension funds have additional advantages that support the growth of capital markets. In order to improve capital markets, pension fund savings can either increase savings or allocate savings in a more effective way. Better long-term investments, which have a positive growth impact, are made possible by more efficient and liquid stock markets (Pagano, 1993). The fact that pension funds pay out returns on managed funds to fund members after retirement qualifies them as institutional investors.

By the expansion of the capital market, pension funds are also connected to growth and development. The first justification is that pension funds amass substantial capital, which is then put to use in investments. The markets create financial instruments via which investment can be made in order for investment to occur. The emergence of more favorable regulations for these participants coincides with the presence of substantial numbers of institutional investors. Pension funds hold a larger percentage of assets than do households, and by pooling and diversifying their bond and equity holdings, they are able to offset risk.

Pension funds have stronger ties to investment banks than consumers do, have access to more skilled workers, and perform better as a result of economies of scale and higher degrees of specialization. They display a level of specialization and expertise that households do not. Growth and financing from pension funds are provided to new economic sectors like mutual funds and private equity. Long-term securities have been established in other asset classes to accommodate defined benefit contribution systems' long-term vision. To align the maturities of assets and liabilities, pension funds make long-term investments (Kim, 2010, Hu, 2012). This tendency is reflected in the rise of long-term corporate bonds and securitized debt products in the markets.

Table 2.2 below shows the distribution of assets of South African pension funds between the years 1981-2015. The last three decades have seen considerable changes in the asset portfolios of privately managed pension funds. According to data from the Financial Services Board Pension Funds Registrar. FSB's annual reports outline the investment pattern for pension funds for each period. Until 1994 the reports reflected only the self-administered, state-controlled, and foreign funds. The annual reports show that from 1994 to date investment patterns remain isolated to self-administered funds.

**Table 2.2**
***Investment by Asset Class of South Africa Pension Funds***

| No. | Asset Class | 1981 | 1987 | 1991 | 1995 | 1999 | 2002 | 2005 | 2008 | 2011 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Immovable properties | 5.8 | 5.9 | 4.8 | 4.3 | 3.6 | 1.1 | 0.6 | 1.1 | 0.7 | 1.2 |
| 2 | Bills and Bonds | 22.4 | 17.9 | 9.4 | 12.6 | 12.0 | 10.5 | 8.6 | 7.2 | 7.5 | 8.5 |
| 3 | Bills and Bonds issued by government or provincial administration | 9.1 | 3.6 | 0.5 | | | | | | | |
| 4 | Bills and Bonds issued by local authorities and administration boards | 8.2 | 7.0 | 3.6 | | | | | | | |
| 5 | Bills and Bonds issued by Rand Water Board or Electricity Supply Commission | 7.9 | 0.3 | 2.6 | | | | | | | |
| 6 | Bills and Bonds issued by Land and Agricultural Bank and SARB | 4.5 | 0.7 | 0.5 | | | | | | | |
| 7 | Loans | 6.3 | 1.4 | 0.5 | 0.3 | 0.6 | 0.8 | 0.1 | 0.1 | - | - |
| 8 | Debentures | 8.7 | 6.6 | 10.2 | 0.7 | 0.2 | 0.6 | 0.1 | 1.1 | 1.1 | - |
| 9 | Deposits and savings accounts | 15.6 | 19.5 | 24.4 | | | | | | | |
| 10 | Equities/Shares in companies | | | | 47.7 | 34.3 | 29.3 | 23.3 | 20 | 18.8 | 17.6 |
| 11 | Collective Investment Schemes/Unit Trusts | | 24.4 | 33.3 | 1.5 | 5.8 | 6.2 | 5.5 | 6.6 | 7.9 | 7.2 |
| 12 | Insurance Policies | | | | 24.6 | 28.2 | 35.0 | 47.6 | 46 | 45.9 | 40.7 |
| 13 | Deposits and Krugerrands | - | | | 7.5 | 7.0 | 6.7 | 4.3 | 6.3 | 5.1 | 4.3 |
| 14 | Foreign Investments | | | | - | - | | 7.8 | 9.9 | 11.8 | 18.8 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | Other Assets | 17.0 | 12.7 | 10.2 | 0.8 | 8.3 | 9.8 | 2.1 | 1.7 | 1.2 | 0.11 |

Source (Financial Services Board, 1981-2015, Moleko & Ikhide, 2017)

### *2.6 Challenges Affecting Pension Markets in Africa*

Africa's pension markets are confronted with a number of challenges, including high unemployment rate, large informal sector, and scarcity of appropriate investment vehicles.

High unemployment rate. According to the World Bank report 2020, sub-Saharan Africa had unemployment rate of 6.19% in 2019, which makes it the fourth highest in the world. The current unemployment rate in Africa gives an indication of a high percentage of the labour force that is available and looking for work but does not have one. Unemployment seems to be a canker in most African countries. The high level of unemployment is a major challenge affecting the growth of pension funds in Africa, as the unemployed cannot contribute to these pension funds. The unemployed, with limited resources and the burden of catering for themselves and their families, may find it difficult to contribute to such funds. Only a small number of the populace who are working who can contribute to pension funds.

Pension funds offer individuals who contribute to the scheme some kind of consumption smoothening. By contributing to such schemes, the individual can be assured of receiving some benefits upon retirement. With this benefit, even if the amount received does not measure up to the amount received prior to retirement, the contributor can have some comfort and may be able to cater for some basic needs to some extent. Consumption smoothening is an economic term used to express the desire to have a stable path of consumption. This desire mostly pushes workers to contribute to pension, whilst in active service when they are earning enough so that, in the event they retire, they will earn some benefits. This would have been the ideal case but the high level of unemployment in Africa poses such a major challenge to pension funds. With the high level of unemployment, where individuals are struggling to meet their basic needs, it is virtually impossible to contribute to such funds. Although social security schemes have the ability to change the lives of the elderly in developing countries, over 342 million of them worldwide do not have income security because they are unemployed, and if nothing is done,

this figure is expected to rise to 1.6 billion, which is around 80% by 2050 (United Nations Department of Economic and Social Affairs [UN/DESA] 2007).

Another challenge is the presence of a large informal sector. It is estimated that 85.8% of Africans are informally employed (ILO, 2018b). In addition, the Ghana Living Standard Survey (GLSS) (2010) estimates that the informal sector constitutes about 87% of the working population. It is evident that they may have insufficient access to social security, few or no workplace rights, and low wages. The high level of the informal sector may be partially due to urban migration. As a result of the increasing levels of development in urban areas, a lot of youth have migrated into the cities to seek for greener pastures. These young people, who may have little or no education and therefore cannot secure jobs in the formal sector, end up doing menial jobs. Even though people in the informal sector contribute a lot to the GDP, there is little effort to enroll them unto a formal pension scheme. Those institutions/countries running the 3-tier system of pension make room for the informal sector, where the informal sector workers could patronize the third tier, which is a voluntary contributory scheme. Only 12.3 percent of African workers are employed in high-skilled labour occupations. This is frightening, as it is expected to worsen with the working-age population growing at a faster rate (ILO 2020 report). Even though there was an improvement in the GDP growth from 2.8% in 2019 to 3.7% in 2020, the economic growth was too low to improve the livelihood of the people due to the strong population growth in the region (UN, 2019b). The slight increase in the GDP may be partially due to the improvement in private consumption, continuous investment in infrastructure, and increasing production of oil (UN, 2019b). Pension funds may experience significant growth in their market share if little comes from the informal sector.

Another limitation for pension funds in Africa is the scarcity of the appropriate means for infrastructure investment. However, the increasing interest of private equity funds in African investments, including infrastructure, may aid alleviate this challenge. Recently, investing in

infrastructure has received attention in the area of pensions. Pension funds were mostly invested in the traditional asset classes like bonds, equities, cash, and real estate. However, fund managers seek to look beyond the traditional asset classes so they can diversify their investment and reduce their investment risk. Investing in infrastructure, which is considered less risky, is gradually becoming an option to consider. This diversification into infrastructure is in search of return to meet its primary responsibility. Due to market volatility, inflation and interest rate risk which pension funds are not protected from, it is just appropriate to spread the funds along a broader spectrum of investment to reduce pension liabilities. Again, the long-term nature of infrastructure and its tangibility make fund managers appreciate the underlying value of it rather than the traditional assets, which may be affected by other factors. Inasmuch as this may sound good to the stakeholders of pension funds, the dearth of means through which infrastructure investment could be done poses a major challenge to managers. The vehicles are so limited that there is little room to make a good choice for various portfolios. For instance, fund managers are either investing in roads, social amenities, hospitals, schools, etc.

## *2.7 Conclusion and Policy Recommendations*

Encouraging people to smoothen consumption over their lives to accumulate money to provide for the elderly when they retire is the main goal of pension systems. A number of African countries have also introduced policies to restructure their pension systems in response to the need for introducing systems of social protection to assist in alleviating demographic pressures and poverty amongst the elderly.

The pension markets play a number of important roles in the economy, including establishing attractive pension schemes, mobilising and pooling national savings, facilitating financial market development, ensuring corporate governance and monitoring of firms, supporting infrastructure development, supporting the housing finance market, and financing green growth

initiatives. A general overview of the pension systems in Africa shows that the system is not mature, coverage is low, and contributions are low. Coupled with these are the problems of unemployment, large informal sector, and lack of appropriate vehicles to invest in infrastructure. A few countries, including, Ghana, Nigeria, and Kenya, have introduced micro pension schemes that the informal sector can subscribe to, and these may increase the asset base of the pension industry. It is therefore important to get the remaining countries implement some of these policies to improve the coverage since the informal sector in Africa is very large, contributing to about 80% of the working population. Pension funds drive financial system innovation. The development of pension funds results in the creation of new instruments, the modernisation of infrastructure, and the improvement of regulations. A few countries invest some of the pension fund assets in infrastructure. Asset managers should expand their portfolio base so that they can earn enough returns to sustain the schemes as the system matures.

# Chapter Three[3]

## Pension Funds, Institutional Quality, and Capital Market Development in Africa

### *3.1 Introduction*

Many countries migrated from the single pillar system, where contribution was limited to a few (especially public sector workers only), to the three-pillar system proposed by the World Bank (1994), which includes pensions for both public and private workers. Contributions to these schemes have been extended to include informal sector workers, leading to an increase in the overall pension contributions.

The various reforms and flexibilities (expansion in coverage and simplification of pension regulations) resulted in an 8% rise annual rate in the pension industry in Africa. Nigeria and East Africa, especially, have witnessed a 20% increase in the previous year's funds (PwC, 2015). In 2017, approximately USD 41.355 trillion of assets were managed by pension funds (Willis Towers Watson, 2018). As more workers contribute to pensions, assets grow, and funds may be invested in areas that facilitate development and enable contributors to earn their benefits. According to the OECD 2021 Global Pension Study, assets held by pension funds exceeded USD 56 trillion globally, an increase of 11% from the 2019 statistics, of which Africa holds about $700 billion (Soumaré, 2020), *(see Table 2 in appendix).*

Once more, it was observed that assets from the defined contribution and personal plans grew faster than those from the defined benefit plans. Two primary asset types - bonds and equities provided an average rate of return on real investment of 3.5% (OECD, 2021). Financial markets refer to platforms where individuals and groups perform transactions such as the exchange of goods, securities, and contracts. Frequently, these places may be classified as secondary markets, which include capital markets. One aspect of the financial market where pension funds

[3]This chapter was presented at the 18th African Finance Association held in May 2022 and has been published in *Cogent Economics & Finance*, *11*(1), 2172809. https://doi.org/10.1080/23322039.2023.2172809

may be invested is the capital market. According to the World Bank (2020), capital markets refer to the type of financial system that channels an economy's savings to those who require capital.

Globally, capital markets are estimated to be USD 178 trillion in size, making them one of the most powerful drivers of economic growth and wealth creation. One of the key investors in the capital markets is pension funds (World Bank, 2020). A comparison of nominal market capitalization showed that South Africa, Morocco, Egypt, and Nigeria encompass the top four stock exchanges in Africa. Each of these countries has a market value that exceeds $30 billion. However, where data is available, the majority of African stock markets have capitalizations under $6 billion (PWC, 2020). The market capitalization to GDP ratio of South Africa (235%) is greater than the average value of the high-income countries (118.98%), and this high percentage may be attributed to the higher number of listed companies (365) and variety of instruments offered by the exchanges (see *Table 3 in appendix).* Bonds and equities market accounted for almost 75% of pension fund investment at the end of 2020 (OECD, 2021) (*see Table 4 in appendix*). A number of studies have also reported that there is a positive effect of pension funds on capital market development (see for example, Bayar, Gavriletea, Danuletiu, Danuletiu and Sakar (2022); Bayar & Kilic (2019); Zubair (2016); Enache et al., (2015); Moleko & Ikhide (2017)). Capital markets tend to provide more appealing investment alternatives than bank deposits in terms of profits, but the risk involved is higher. Again, the availability of a diverse range of instruments enables capital markets to offer investors a diversified portfolio, thereby contributing to risk management. This is because higher rates of return are required to assure appropriate payouts in the future, which is especially important for pension funds and insurance firms in nations with young populations. Nonetheless, this must be done cautiously owing to the fact that the funds are crucial. The Principal Agency problem is likely to arise here since the interest of the contributor (principal) may be different

from the fund manager (agent). Whilst the contributor is interested in getting benefits during retirement, the fund manager may be interested in investing the funds for higher return so s/he could fulfil the obligation towards the contributor. To be able to resolve this problem, institutions play a critical role in moderating the relationship between pension fund managers and their investment in the capital market. This provides the basis for which this objective was investigated. Institutions have better mechanisms and capacity to protect the interest of retirees and help maintain a strong capital market. Institutional quality is imbedded in growth. According to Institutional theory, institutional quality can address rent-seeking behaviour, and this is likely to produce a positive growth (North, 1990).

However, research on the role of institutions on pension funds-capital market development nexus is scarce. The few studies were focused on the direct effects of institutions on capital market development. For example, Eke et al. (2018) found that regulatory quality Granger-caused market capitalization in the short-run and market capitalization responded negatively to regulatory quality. Agyemang et al., (2018), on the other hand, found that high institutional quality is relevant in explaining financial market variables such as ease of access to loans and venture capital availability. Manessah et al., (2017) indicated the existence of a favorable relationship between institutional quality and stock market, and also found that control of corruption and democratic accountability is a key institutional quality indicator for stock market development.

Further, developed countries and growing economies in Eastern Europe and Latin America have benefited from substantial work in the areas of pensions and capital market development as compared to the developing economies. (see for instance Sanusi & Kapingura (2021) Daradkah & Al-Hamdoun (2020); Babalos & Stavroyiannis (2020); Alda (2017); Moleko & Ikhide (2017), Meng & Pfau (2010); Kim (2010); Raisa (2012); Walker & Lefort (2002); and Poirson, (2007))

The study adds to existing literature by examining the role that institutional quality play in the pension funds-capital market development nexus. The findings of this chapter suggest that institutional quality plays a crucial role in the pension funds capital market development nexus. Stronger institutions tend to suppress the risky behavior of participants in the capital market, and thereby help reinforce a desirable relationship between pension funds and the capital market. Again, the study in this chapter finds that pension funds impact positively on the financial markets in African countries more so because fund managers focus on investing more in the money markets due to the underdeveloped nature of most African markets.

The rest of the chapter is organized as follows: Section 2 provides a review of literature, Section 3 describes the methodology employed in this study, Section 4 discusses the results of the study, and Section 5 concludes the study by providing relevant recommendations.

## *3.2 Literature Review*

This section reviews the theoretical literature on the topic and also three strands of empirical literature by considering the relationship between pension funds and institutional quality followed by pension funds and capital market development and lastly institutional quality and capital market development.

### 3.2.1 Theoretical Literature

Principal-agent theory proposed by Jensen and Meckling (1976) is a fundamental concept in economics and organizational theory that examines the relationship between two parties: the principal and the agent. The principal-agent relationship arises when one party, the principal, delegates authority to another party, the agent, to perform certain tasks or make decisions on their behalf. The theory explores how the interests and incentives of the principal and the agent may diverge, leading to agency problems, and how these problems can be mitigated through various mechanisms. The relationship between pension fund contributors and pension fund

managers could be likened to theory. In this case, the agency problem is likely to arise due to the conflicting interests of the two parties.

Institutional quality theory, also known as institutional theory or institutional economics, is a branch of economics that focuses on the role of institutions in shaping economic behavior, performance, and outcomes. This theory proposed by North (1990) emphasizes the significance of formal and informal rules, norms, regulations, and organizations in influencing individuals' and firms' decisions and interactions within an economy. Institutions refer to the formal and informal rules, norms, laws, regulations, organizations, and conventions that govern economic and social interactions within a society or economy. Formal institutions include government laws, property rights, contracts, and regulatory agencies, while informal institutions encompass cultural norms, traditions, customs, and social networks. The institutional quality theory posits that institutions play a crucial role in driving economic development and growth by shaping incentives, reducing uncertainty, facilitating cooperation, and promoting efficiency in resource allocation. Good institutions are associated with higher levels of economic prosperity, while poor institutions are linked to underdevelopment, poverty, and instability.

Institutional quality can be used to address the principal agency problem in the management of pension funds. Some earlier researchers highlighted the benefits of having stronger institutions in the financial system. Scholars such as La Porta et al. (1998) have shown that countries with strong legal and regulatory environments have better-functioning financial markets. Institutional investors like pension funds are more likely to thrive in environments with robust corporate governance frameworks, as highlighted by the OECD Principles of Corporate Governance. Beck and Levine (2004) demonstrate that countries with stronger institutions have more developed financial markets, which provide better investment opportunities for pension funds. Studies like those by Acemoglu et al. (2001) have linked political stability and economic growth, which are crucial for the stable returns needed by pension funds. The success of

infrastructure investments by pension funds in countries like Canada and Australia is often attributed to strong institutional frameworks that support public-private partnerships and effective project management.

High-quality institutions help pension funds run successfully, make prudent investments, and ultimately ensure their beneficiaries' financial futures by maintaining a stable, transparent, and efficient economic environment.

### 3.2.2 Empirical Literature on Pension Funds and Institutional Quality:

Pension schemes worldwide experience challenges in their setup, management, and distribution of benefits to members. Many stakeholders, who are part of every scheme, have expectations, and these expectations ought to be met without compromise. Institutions have the ability to limit the options available to actors. The work of Strumskis and Balkevi˘cius (2016) examined the integration of interests of participants of second pillar pension as well as fund managers. They argued that for this to be possible, measures must be considered by the state and fund managers to reduce risk. Again, the stability of the pension accumulation system must be ensured to protect the interests of participants. In addition, for participants to have understandable information which reflects real performance results, it is prudent that all interested parties have mutual confidence in each other. Given that the ability to earn income may be completely or partially lost in old age (ILO, 2010a), pensions are crucial for reducing poverty among the elderly, maintaining economic stability, and addressing social inequalities (ILO (2017); Juergens and Galvani (2020); Stewart and Yermo (2009)). Recently, the inclusion of institutional quality in the growth model has become a common practice (Eke et al., 2018; Agyemang et al., 2018; Manessah et al., 2017; Hu et al., 2010; Alesina & La Ferrara, 2005; Barro, 1996; Hall & Jones, 1999; Knack & Keefer, 1995; Rigobon & Rodrik, 2005; Stroup, 2007).

### 3.2.3 Empirical Literature on Pension Funds and Capital Market:

One of the primary arguments in favor of the World Bank (1994) model is that pension reform contributes to the growth of capital markets. Davis, (1995, 1998c, 2000a, and 2003c) examined pension funds and capital markets extensively, and particularly in EU countries. Similarly, other early researchers like Holzmann (1997), Catalan et al. (2000), and Impavido et al. (2003) posited that the effect of pension funds on the stock market was phenomenal. More recent literature have differing views on this relationship. Every economy needs investment for longer-term growth and development. Capital market is a medium through which funds are mobilized and allocated for growth and development (Osaze, 2000). Additionally, crucial to the growth of the capital markets and the enhancement of liquidity are pension funds (United Nations, 2019a). For example, Enache et al. (2015) discovered that market capitalization in 10 countries in Central and Eastern Europe increased because of pension fund assets. And Thom (2014) indicated that South African pension funds have improved liquidity and reduced volatility of stock markets. This was corroborated in a recent study by Bayar et al (2022) who revealed that pension funds had a favourable impact on stock market development in Brazil, Chile, Hungary, Mexico, Peru, and South Africa, according to their cointegration analysis.

In this same vein, Ertuğrul and Gebeşoğlu (2020) examined the effect of pension funds on Turkish national savings and found that pension funds boosted national savings, leading to the growth of the financial markets. Babalos and Stavrajiannis (2020), on the other hand, concluded that pension fund investments in equities strengthened and increased the stock market development in several economies when they used Panel VAR to examine the relationship between pension funds and the stock market development in OECD nations. Moreso, Milos (2012) studied the spillover effects of pension funds on capital markets and found a positive connection between the latter and the former with panel data regression in an old member state of the European Union. Similarly, works of Zubair (2016), and Bayar and

Kilic (2019), who also found a positive relationship between pension fund investments and the capital market confirmed this, whilst Daradkah and Al-Hamdoun (2020) found no statistically significant relationship between pension funds and capital market development in the short run. In confirmatory studies, Sanusi & Kapingura (2021) concluded pension funds have no statistically significant effect on the overall investment levels and growth of the South African economy. On the contrary, Moleko and Ikhide (2017) found a positive relationship between pension savings and stock market development but no long-run relationship between pension savings and bond market development. This was achieved by using an ARDL bound-testing approach to investigate the long-term relationship between pension funds and capital market development. Nageri et al. (2019), in contrast, discovered a long-term cointegration between variables. Some short-run causalities running from pension funds and inflation to the capital market were reported. That was, however, not the same for real interest rates. Prudent investment, management planning, and policies were required to encourage investors in the Nigerian capital market. Meng and Pfau (2010) posited that the level of financial development is important in determining the success of the funds; thus, the higher the level of financial development, the greater and more substantial the impact of pension funds on Capital Markets (CM). Hu (2012) confirmed this and found that pension funds positively affect financial sector development.

### 3.2.4 Empirical Literature on Institutional Quality and Capital Market Development

The development of the financial sector in emerging economies is facilitated by institutional quality, according to a study on the factors that influence financial development in Asia and the Pacific between 1995 and 2011 (Le, Kim, & Lee 2016). Also, Eke et al. (2018) examined the impact of the Nigerian Security Exchange Commission (SEC) regulatory quality on the primary capital market. The authors concluded that market capitalism responded negatively to regulatory quality in the long run while liquidity responded positively. Likewise, Ajide's (2014)

findings showed that low levels of corruption and effective administration have a positive impact on stock market growth, while the opposite is true when political instability prevails. According to Anwar and Cooray (2012), the level of financial development is influenced by the quality of institutions, which suggests that the extent of the advantages of financial development is dependent on the effectiveness of governance. Similarly, Jain, Kuvvet, and Pagano (2017) argued that corruption has a large and detrimental impact on a country's financial system, and as a result, highly transparent nations have lower transaction costs than corrupt nations.

In a study by Asongu (2011) on the effects of government policies and institutions on stock market performance, the results indicated a link between stock market performance measures and the quality of government institutions as significantly positive. This suggests that countries with better-developed government institutions favour stock markets with higher market capitalization, better turnover ratios, higher value in shares traded, and a greater number of listed companies. On the other hand, Bolgorian (2011) established a negative association between corruption and financial market development. Likewise, Asongu (2012) and Hooper et al. (2009) also confirmed that higher institutional quality led to better performance of stock markets.

The above review shows that the relationship between pension funds, institutional quality, and capital market development has been studied in isolation. The unique nature of the African capital markets calls for a stronger institution for pension fund investments into such markets basically due to the underdeveloped nature. The institutional quality theory provides basis for examining the interaction between pension funds and institutional quality on capital market development. The study in this chapter therefore examined firstly the relationship between pension funds and capital market development and secondly, the role institutions play in this relationship, bridging a significant gap in literature.

### *3.3 Data and Methodology*

To investigate the interdependence between pension funds and capital market development (CMD) as well as the role of institutions in this relationship, the study employed panel data on 52 African countries from 1990 to 2017. The choice of the 52 countries was based on the availability of data on these countries. The data was sourced from the World Development Indicators (WDI) and the International Monetary Fund (IMF). It was a strongly balanced panel data but with a few missing points.

#### 3.3.1 The Model Specification

**Relationship Between Pension Funds and Capital Market Development**

Following previous studies (Saadaoui, 2014; Sadorsky, 2010, 2011; and Doytch & Narayan, 2016), the study examined the impact of pension funds on capital market development. The study showed the role institutions play in the relationship between pension funds and capital market development. Following the argument in literature (Gaies et al, 2020; Dhahri & Omri, 2020), the study specified the relationship using the Dynamic System Generalised Method of Moment (system GMM) estimations. The empirical models may be summarized as follows:

$$\boldsymbol{Capital\ Market\ Development'_{it} = \beta_1 Capital\ Market\ Development'_{it-1} + \beta_2 Pension\ Funds_{it} + \beta_3 Institutions_{it} + \sum_{k=4}^{N} \beta_k C_{it} + \sigma_i + \mu_t + \varepsilon_{it}} \quad \textbf{(1)}$$

**where subscript *i* denotes cross-sectional dimension (country specifics), *i* = 1, …, M;** $t$ denotes the time series dimension (time), $t$ = 1, …, T. $\beta_1$ represents the coefficient of the lag of the dependent variable in equations 1 (i.e., capital market development indicators); $\beta_2$ represents the coefficient of pension funds; $\beta_k$ represents the coefficient of institution's variable, $\beta_k$: k = 4…, N, represents the regression coefficient parameters for vector C to be estimated. C is a vector of control variables that explain the two-equation models. $\boldsymbol{\sigma_i}$ is the unobserved country-specific effect assumed to be independent and identically distributed, and

$\mu_t$ is the time-specific effect. $\varepsilon_{it}$ is the idiosyncratic error term for equation 1, which controls for unit-specific residual in the models for the i$^{th}$ *country* at *period t*.

In equation 1, capital market development is the dependent variable. We decompose capital market development into five indicators, namely: (1) stock market capitalization, (2) bond market capitalization, (3) financial development index, (4) financial market index, and (5) financial institution index.

Stock market capitalization is the total dollar market value of a company's outstanding shares of stock. It is measured as the market capitalization of listed domestic companies as a percentage of GDP. Data was obtained from the World Development Indicators. Bond market capitalization is the total debt outstanding. This was measured as government domestic bonds as a percentage of GDP with data obtained from the World Development Indicators. Following the financial development database of the IMF, the study provided additional proxies of capital market development indicators. These indicators (financial development index, financial market index, and financial institution index) considered the complex multidimensional nature of financial development.

Data on financial development index, financial market index, and financial institution index were obtained from the financial development database of the IMF. These indicators were normalized between 0 and 1. Thus, the highest (lowest) value of a given variable across time and countries is equal one (zero), and all other values are measured relative to these maximum (minimum) values. As such, the five indicators are defined so that higher values indicate greater capital market development.

Following earlier studies by Sadorsky (2010, 2011) as well as Doytch and Narayan (2016), pension funds was used as the key independent variable in equation 1. Pension funds is defined as any plan, fund, or scheme that provides retirement income. It is measured as pension fund assets to percent GDP. Data was obtained from the Global Financial Development of the World

Bank for this study. Higher values indicated greater contributions of the funds at a given time, across the countries.

In equation 1, we controlled for institutions an aggregate of six indicators (rule of law, government effectiveness, control of corruption, political stability, regulatory quality, and voice and accountability), inflation, real GDP per capita, population (log of population in million people), real interest rates, money supply (broad money to GDP), and gross domestic savings. We obtained data on the control variables from the Global Financial Development database and the WDI database. The control variables used in this study follow those that are used by several studies to control the impact of pension funds on capital market development. For instance, studies like (Kuluratne, 2002; Pradhan et al., 2016; Raisa, 2012; Thom, 2014, and Zhou et al., 2015) used macroeconomic indicators like interest rates and inflation, Empirical studies have shown that inflation negatively affects pension funds and capital market development by eroding the real value of savings and investments, reducing investor confidence, and increasing uncertainty in financial markets (Levine & Zervos, 1998). Again, higher real GDP per capita is positively associated with pension fund development and capital market growth, as it indicates greater economic activity, higher incomes, and increased demand for financial services (Demirgüç-Kunt & Levine, 2009; Beck et al., 2000).

We expect either a positive or a negative result on the impact of population size on pension funds and capital market development. Some studies suggest that larger populations may lead to deeper and more liquid financial markets, while others argue that rapid population growth can strain resources and hinder economic development (Beck & Levine, 2004). On the other hand, lower real interest rates stimulate investment, encourage savings, and promote capital market development, leading to increased pension fund participation and asset accumulation. However, changes in money supply, controlled by monetary policy, influence capital market liquidity, interest rates, and inflation, which in turn affect pension fund performance and

investor behavior. Moreso, evidence suggests a positive relationship between gross domestic savings and capital market development, that is; higher savings rates provide a stable source of investment capital, fueling the growth of pension funds and financial markets (Levine & Renelt, 1992; Demirgüç-Kunt & Huizinga, 1998). Empirical research consistently finds that strong institutional quality, including legal systems, regulatory frameworks, property rights protection, and governance structures, positively impacts pension fund development and capital market efficiency (La Porta et al., 1998; World Bank, 2002). Detailed measurement of all variables used in this chapter can be found in *Table 1* in appendix.

### 3.3.2 Interactions

In what follows, the study argues that institutions play a role in moderating the relationship between pension funds and capital market development. We expand equation 1 by introducing interaction terms to moderate the relationship between pension funds and capital market development indicators. To capture possible unobserved heterogeneity and to analyze the impact of institutions on the pension funds-capital market development nexus, the study specified the following model which includes the interaction terms:

$$\boldsymbol{Capital\ Market\ Development'_{it} = \varphi_1 Capital\ Market\ Development'_{it-1} + \varphi_2 Pension\ Funds_{it} + \varphi_3 Institutions_{it} + \varphi_4 (Pension\ Funds_{it} * Institutions_{it}) + \sum_{k=5}^{N} \varphi_k y_{it} + \gamma_i + \psi_t + \varepsilon_{it}} \quad \textbf{(2)}$$

where,

$\varphi_1, \ldots, \varphi_N$ are the coefficient parameters, $\gamma_i$ is the unobserved country-specific effect assumed to be independent and identically distributed and $\boldsymbol{\psi_t}$ is the time-specific effects

$y_{it}$ represents other control variables. $\varepsilon_{it}$ is the stochastic component defined as $\varepsilon_{it} \sim i.i.d.\ (0, \sigma_\varepsilon), and\ E(\psi_i \varepsilon_{it}) = 0$

Following Brambor (2006), the study interpreted the results by computing the marginal effects of pension funds and capital market development in equation 3. This interpretation makes economic sense as it reports how institutions affect pension funds-capital market development nexus.

Thus, we compute the marginal effect from equation 2 as follows:

**Marginal Effect =>** $$\frac{\partial Capital\ Market\ Development_{i,t}}{\partial Pension\ funds_{i,t}} = \varphi_2 + \varphi_4 Institutiions_{\ it} \quad (3)$$

From equation 3, the study expected institutions to enhance the impact of pension funds on capital market development indicators.

### 3.3.3 Estimation Technique

Both equations were estimated using the System Generalised Method of Moment (system GMM) proposed by Blundell and Bond (2000). A potential problem associated with the model specified above was the problem of endogeneity. Based on the dynamic term and bi-causal relationship that may have existed between some of the explanatory variables and the dependent variable, both the Ordinary Least Squares (OLS) and fixed effects may not have been useful. The study applied the dynamic system GMM to handle the endogeneity problem. The dynamic system GMM is an improved technique over the difference GMM proposed by Arellano and Bond. The system GMM tends to avoid finite sample bias due to weak instruments, especially, in the presence of a unit root. It does so by introducing higher lags [4]either than first lag (as in the case of Arellano-Bond GMM) as instruments for the lagged dependent variable so that there is zero correlation between the random component and the lagged dependent regressor. In addition, the system GMM corrects for any correlation between the unobserved country-specific effect and the difference variables, hence allowing for the use

[4] The use of higher lags of the respondent variable as instruments hinges critically on the assumption of no autocorrelation in the initial disturbance term.

of lagged first difference as instruments for levels. This quality renders the system GMM a more efficient estimator than the static fixed effect estimator (Baum & Rother, 2013). For robustness, the Im, Pesaran, and Shin (IPS) (2003) test for stationarity and the Sargan test for over-identification to investigate the validity of instruments were conducted. Also, to correct for autocorrelation, Arellano and Bond (1991) test for serial correlation was conducted.

## *3.4 Discussion of Results*

The section discusses the results from the empirical estimation. This includes the descriptive statistics, correlation matrix, and the regression results.

### 3.4.1 Descriptive Statistics

*Table 3.1* presents the descriptive statistics. It was noted that the stock market is 26% of GDP over the sample period, and this suggested that the stock market plays an important role in the financial development of African countries. Pension funds, with a mean of 12% to GDP also indicated the important role it plays in the financial development of African countries. Institutional quality, on the other hand, has a negative mean of 0.6%, and this indicates that the quality of institutions in Africa is low. Inflation with a mean of 44% shows that Africa has recorded relatively higher inflation during the period under study. There has been less growth in GDP as GDP recorded a mean of 7%. However, interest rates in Africa are high, with a mean of 10%. Whilst imports and broad money are relatively high in African countries (mean of 39.9% and 34.5%, respectively), savings levels are low, with a mean of 13.5%.

### 3.4.2 Correlation Results

The results of the correlation matrix are presented in *Table 3.2*. Generally, the correlation results in *Table 3.2* show that none of the variables are highly correlated with each other, even though some of the relationships are insignificant. The correlation results show only the

association between two variables without controlling for the effect of other variables and therefore have limited insight into multicollinearity. The Variance Inflation Factor with a mean of 2.1 shows that the variables used for the estimation have no multicollinearity.

**Table 3.1**

***Descriptive Statistics***

| Variables | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Stock market capitalization | 1318 | 26.046 | 23.336 | 0.01 | 311.101 |
| Stock market total value | 1423 | 7.802 | 16.335 | 0.00 | 163.32 |
| Government domestic bonds | 1447 | 28.11 | 46.259 | 0.00 | 289.845 |
| Corporate bond issuance | 1454 | 1.135 | 1.063 | -0.783 | 3.815 |
| Financial development index | 1456 | 0.163 | 0.115 | -0.008 | 0.616 |
| Financial markets index | 1411 | 0.068 | 0.122 | -0.365 | 0.583 |
| Financial institutions index | 1456 | 0.254 | 0.134 | 0.095 | 0.769 |
| Pension fund assets | 1412 | 12.26 | 18.359 | 0.001 | 99.66 |
| Institutions avg | 988 | -0.628 | 0.588 | -2.1 | 0.88 |
| Inflation consumer price | 1262 | 44.84 | 699.58 | -11.686 | 23773.131 |
| Real GDP pc | 1390 | 7.097 | 1.047 | 5.102 | 9.929 |
| Population total | 1450 | 15.691 | 1.6015 | 11.150 | 19.067 |
| Real interest rate | 869 | 10.461 | 49.649 | -93.513 | 1158.026 |
| Imports of goods and services | 1315 | 39.867 | 22.248 | 7.066 | 236.391 |
| Broad money of GDP | 1342 | 34.54 | 27.837 | .024 | 251.618 |
| Gross domestic saving | 1258 | 13.555 | 19.694 | -141.974 | 83.287 |

***Source: Authors own computation***

**Table 3.2**
***Correlation Matrix***

| Variables | VIF | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|---|
| (1) Pension funds | 1.061 | 1.000 | | | | | | | | |
| (2) IQ | 1.861 | 0.028 | 1.000 | | | | | | | |
| | | (0.379) | | | | | | | | |
| (3) Inflation | 1.207 | -0.012 | -0.082 | 1.000 | | | | | | |
| | | (0.686) | (0.014) | | | | | | | |
| (4) GDP | 3.531 | 0.017 | 0.372 | -0.038 | 1.000 | | | | | |
| | | (0.540) | (0.000) | (0.184) | | | | | | |
| (5) Population | 1.445 | 0.207 | -0.188 | 0.032 | -0.059 | 1.000 | | | | |
| | | (0.000) | (0.000) | (0.255) | (0.027) | | | | | |
| (6) Interest rate | 1.215 | -0.043 | -0.131 | -0.450 | -0.055 | -0.033 | 1.000 | | | |
| | | (0.215) | (0.001) | (0.000) | (0.105) | (0.327) | | | | |
| (7) Imports | 3.031 | -0.159 | 0.200 | -0.029 | 0.236 | -0.321 | 0.039 | 1.000 | | |
| | | (0.000) | (0.000) | (0.322) | (0.000) | (0.000) | (0.265) | | | |
| (8) Broad money | 2.027 | -0.048 | 0.304 | -0.041 | 0.431 | 0.022 | -0.033 | 0.299 | 1.000 | |
| | | (0.082) | (0.000) | (0.162) | (0.000) | (0.427) | (0.346) | (0.000) | | |
| (9) Savings | 3.725 | 0.033 | 0.073 | -0.007 | 0.593 | 0.162 | -0.115 | -0.315 | 0.014 | 1.000 |
| | | (0.242) | (0.031) | (0.816) | (0.000) | (0.000) | (0.001) | (0.000) | (0.633) | |
| Mean VIF | 2.123 | | | | | | | | | |

Pension Funds is given by Pension fund asset to GDP, IQ is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability. Inflation is the consumer price index, population refers to the total population, interest rates are real as a % of GDP, Imports is imports of goods and services as a % of GDP, Savings are gross national savings divided by GDP

***Source: Authors own computation***

### 3.4.3 Empirical Results and Discussion

The lag of all the dependent variables was positive and statistically significant in *Table 3.3* except financial development index, which was negatively significant. This indicates that historical facts may have a greater influence on the development of capital markets but not necessarily on the financial market development in Africa. The stock and bond data are likely to possess some lags; hence, the estimation results provided evidence. It implies that poor performance of the capital market from previous year is likely to cause poor performance of capital market in the current year. However, good performance from prior year is likely to induce good performance of the market in the current year. Similar results are observed in *Table 3.4*. The GMM estimator that was employed in the setting of a dynamic panel suggests that the emphasis of this study is on the dependent variable's short-term dynamics. The strongly significant coefficient on the dependent variable's lag value in each equation indicated that the dependent variable has substantial persistence. Tests on the residuals indicated that there is no serial correlation; thus, supporting the chosen specification and instruments.

Institutional quality variable was negative and significant for both stock market capitalization and corporate bond as well as government bond. The negative relationship suggests that African countries have weak institutions that limit the promotion of capital market development. This agrees with the work of Bolgorian (2011) who reported that institutional quality reduces capital market development. This means stronger institutions may minimize investment into the capital market whilst weaker institutions are likely to allow fund managers invest more into the capital market. Institutional quality may, therefore, be viewed as a form of risk management tool for investing in the capital market in relation to pension funds. On the contrary, there was a positive and highly significant effect of institutional quality on financial market development. This proved that because institutional quality may restrict fund managers from investing in capital markets, the fund managers may concentrate more on short-term

financial instruments that provide reliable income sources and, hence, promote financial market development. The estimation results presented in *Table 3.3* show a negative and significant relationship between pension funds and government domestic bonds (Model 3), but a positive and statistically significant effect on corporate bond market (Model 4) and financial development variables (see models 5, 6, and 7). This suggests that pension funds reduce government bonds but increase corporate bonds and improve financial development. The implication is that countries with more pension funds channel more of those funds into corporate bonds and other financial assets other than stock markets; thus, enhancing the development of the bond market and financial market. Resultantly, as pension funds grow, fund managers may focus on investing in the money market instruments which offer risk-free returns and more reliable income compared to the stock market which is comparatively risky. Further, even if fund managers decide to invest in the capital market, they may be more likely to do so in corporate bonds than stocks because of the volatile nature of the stocks. This confirms findings of Hu (2012). The negative effect of pension funds on government bond market may be due to the underdeveloped nature of such markets in Africa, while the positive impact of pension funds on corporate bonds and financial development indicators are attributable to the attractiveness of the corporate bond market and the financial market. The negative relationship may also imply that in a strong institutional environment, fund managers may prefer more of some financial market assets other than stocks and bonds. For instance, investment in infrastructure, which is also long-term in nature, has become increasingly attractive to institutional investors such as pension funds. Most studies that found a positive relationship observed such in the long run (See for example, Meng and Pfau, 2010; Daradkah and Al-Hamdoun, 2020; Bayar and Kilic, 2019). Meng and Pfau (2010) argued that pension funds have positive influence on capital markets in countries with relatively high financial sector development, while Africa (with a low level of financial development) may account for the

negative relationship. According to Bright Africa Pension Report (2019), most African countries, apart from South Africa, Botswana, and Namibia, have their asset allocations skewed to fixed income securities (RisCura, 2020).

*Table 3.4* presents the results of the role institutional quality plays in moderating the effect of pension funds on capital market indicators. In Model 8, the coefficient of the constitutive term (unconditional effect) of pension funds was negative, while the estimated marginal effect was -0.1278. This suggests that the negative effect of pension funds on the stock market indicators was reduced at higher levels of institutional quality. It may be noted that the existence of stronger quality institutions may restrict the amount of pension fund assets that could be invested in the stock market, and weaker institutional quality may allow for a larger portion of the pension fund assets to be invested in the stock market. However, considering the crucial nature of the pension funds and the perceived risks associated with the stock markets, stronger institutional quality may act as a risk management instrument against investing in the capital market. In other words, institutional quality may act as a risk-reducing agent that tends to reduce the negative impact of the capital market on pension funds especially, in Africa, where the capital market is generally underdeveloped. In Model 10, it may be observed, based on the marginal effect, that institutional quality enhances the negative effect of pension funds on government bonds. Also, it is noteworthy in *Table 3.4* that pension funds have a positive and statistically significant unconditional effect on the financial development indicators.

In Models 12 and 13, it may be highlighted, based on the marginal effect, that the positive effect of pension funds on financial development index and financial market index is reduced in a strong institutional quality environment. Thus, stronger institutions may likely minimize the amount of pension fund assets that are directed towards investment in financial markets. In Model 14, it is observed, based on the marginal effect, that institutional quality magnifies the positive effect of pension funds on financial institutions. Thus, pension funds improve the

development of financial institutions in countries with strong institutional quality.

In general, the conclusion can be made that the development of the capital market through pension funds is influenced by the quality of institution. This is evident in the positive relationship of the interactive term with the bond market variable and the negative relationship of the interactive term with the stock market variable. This suggests that the effect of pension funds on the development of the capital market is likely to be influenced by the quality of institutions. Thus, as pension funds increase, strong institutions may discourage investment into the stock market whilst simultaneously encouraging investments into the bond markets. This may be attributed to the volatile nature of the stock market.

In terms of the controls, GDP was positive and statistically significant with the financial development index, even though it was insignificant for any of the capital market variables in *Table 3.3*. This suggests that improvement in income levels may not necessarily lead to development in the capital markets as capital market development may be less of a focus for African countries. As mentioned earlier, concentration may be shifted to the money market and other instruments, which may spur improvement in financial development, hence the positive effect. Similar results were observed in *Table 3.4*.

On the other hand, inflation was negatively significant with the stock market total value to GDP variable in *Table 3.3*, and this suggests an inverse relationship. With this inverse relationship, high inflation may deter fund managers from investing in the capital market, more so due to the volatile nature of stocks. Ostensibly, high inflation is detrimental to good conditions in relation to investment in stocks. The reverse is also true and consistent with theory and literature as an increase in inflation leads to higher economic uncertainties. (See, for instance Impavido et al., 2003; Moleko & Ikhide, 2017).

Further, population was reported to be significant for stock and bond market. There was a negative effect on the stock market, but a positive effect on government bonds. Savings was

positive and significant with stock market and government bonds in both *Table 3.3* and *Table 3.4*. This also indicates that the more African countries save (of which Pension funds could be one of the means of saving) the more money is invested into capital markets, hence the growth. Imports remained positive and highly significant for both stock and bond market variables. This stands to reason that the more goods and services are imported into African countries, the tendency for them to lead to the development of the capital markets. It may also mean that most of these transactions are conducted using the capital markets. Similar results were found in *Table 3.4*. Broad money was only significant and negative at 10% for the corporate bond market variable and financial market index, but had a positive and statistically significant relationship with government bonds. This is an indication that the financial market seems illiquid for African countries, and this is a negative incentive for the development of the capital market.

Real GDP was significant and negative only for government bonds but had a statistically positive effect on financial development. The implication is that even though African countries may not have capital markets as their focus, increase in income levels may lead to investments in other instruments like the money market; hence, the positive effect on financial development.

**Table 3.3**
***System GMM Estimation***

| | Stock Market | | Bond Market | | Financial Market | | |
|---|---|---|---|---|---|---|---|
| | Stock market capitalization | Stock market to GDP | Government domestic bond to GDP | Corporate Bond to GDP | Financial Development Index | Financial Market Index | Financial Institution Index |
| VARIABLES | model 1 | model 2 | model 3 | model 4 | model 5 | model 6 | model 7 |
| Pension funds | -0.109 | -0.0759 | **-0.180*** | **0.00722***** | **0.000864**** | **0.000590**** | **0.000814*** |
| | (0.0835) | (0.0576) | **(0.102)** | **(0.00114)** | **(0.000316)** | **(0.000266)** | **(0.000423)** |
| IQ | -4.192** | 0.222 | **-22.67***** | **-0.109*** | **0.0768***** | **0.0648***** | **0.0908***** |
| | (1.481) | (1.035) | **(4.142)** | **(0.0606)** | **(0.00610)** | **(0.00883)** | **(0.00819)** |
| Inflation | -0.0336 | -0.0721*** | 0.131 | -0.00107 | -4.08e-05 | 0.000278* | -0.000259 |
| | (0.0252) | (0.0247) | (0.201) | (0.00179) | (0.000172) | (0.000152) | (0.000245) |
| GDP | 0.208 | 1.712 | -4.818 | -0.0235 | 0.0159*** | 0.0296*** | 0.00493 |
| | (0.959) | (1.347) | (3.435) | (0.0699) | (0.00522) | (0.00609) | (0.00579) |
| Population | -0.1456* | -0.2515 | 2.5568*** | 0.1192** | 0.0084 | 0.0142 | 0.0160 |
| | (0.4529) | (0.4278) | (1.3114) | (0.8966) | (0.0097) | (0.0133) | (0.0200) |
| Interest rate | 0.0270 | 0.00645 | 0.762* | 0.00401 | -0.000651 | 0.000441 | -0.00131 |
| | (0.0493) | (0.0964) | (0.372) | (0.00276) | (0.000749) | (0.000478) | (0.000873) |
| Imports | 0.194*** | 0.235*** | 0.395** | 0.00709** | -0.000305 | -0.000557** | 4.56e-05 |
| | (0.0581) | (0.0421) | (0.175) | (0.00305) | (0.000180) | (0.000223) | (0.000220) |
| Broad money | 0.0881 | 0.0391 | 0.346*** | -0.00419* | -0.000476** | -0.000318 | -0.000695** |
| | (0.0590) | (0.0553) | (0.113) | (0.00231) | (0.000218) | (0.000325) | (0.000325) |
| Savings | 0.215*** | 0.197*** | 0.480** | 0.00138 | -0.000133 | -0.000608** | 0.000492 |
| | (0.0669) | (0.0360) | (0.191) | (0.00303) | (0.000212) | (0.000214) | (0.000305) |
| Stock market capitalization$_{t-1}$ | 0.285*** | | | | | | |
| | (0.0951) | | | | | | |
| Stock market total value $_{t-1}$ | | 0.859*** | | | | | |
| | | (0.0945) | | | | | |
| Government bonds $_{t-1}$ | | | 0.335*** | | | | |
| | | | (0.0909) | | | | |
| Corporate bond $_{t-1}$ | | | | 0.933*** | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | (0.0285) | | | |
| Financial development index $_{t-1}$ | | | | | -0.225*** | | |
| | | | | | (0.0422) | | |
| Financial markets index $_{t-1}$ | | | | | | -0.146** | |
| | | | | | | (0.0604) | |
| Financial institutions index $_{t-1}$ | | | | | | | -0.240*** |
| | | | | | | | (0.0402) |
| Constant | 2.236 | -21.35** | 3.289 | 0.0190 | 0.120*** | -0.0979*** | 0.307*** |
| | (4.308) | (9.778) | (19.68) | (0.432) | (0.0327) | (0.0315) | (0.0388) |
| Observations | 383 | 447 | 462 | 464 | 468 | 428 | 468 |
| Number of years | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| Number of Groups | 31 | 31 | 34 | 34 | 29 | 29 | 29 |
| Number of instruments | 18 | 18 | 18 | 18 | 19 | 19 | 17 |
| F-Statistics (p-value) | 643.40 | 19.31 | 39.92 | 15.51 | 25.75 | 4.47 | 24.22 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) |
| AR (1) | -2.61 | -2.30 | -2.14 | -1.90 | -2.54 | -3.71 | -1.90 |
| | (0.011) | (0.076) | (0.033) | (0.057) | (0.0124) | (0.004) | (0.057) |
| AR (2) | -2.48 | -2.14 | -2.35 | -2.51 | -1.08 | -1.08 | -0.46 |
| | (0.013) | (0.025) | (0.073) | (0.0612) | (0.282) | (0.281) | (0.642) |
| Sargan Test | 46.59 | 125.19 | 15.87 | 44.39 | 81.97 | 108.07 | 76.28 |
| | (0.000) | (0.000) | (0.026) | (0.000) | (0.000) | (0.000) | (0.000) |
| Hansen Test | 8.72 | 4.70 | 8.33 | 4.57 | 7.03 | 10.27 | 13.50 |
| | (0.274) | (0.696) | (0.304) | (0.712) | (0.534) | (0.246) | (0.036) |

**Capital Market** is measured by Stock Market capitalization as a % of GDP, Stock Market Total Value Traded as % to GDP, Corporate Bond Issuance as a % of GDP, Government Domestic Bond as a % to GDP, Pension Funds is given by Pension fund asset to GDP, **IQ** is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality, and voice and accountability. Inflation is the consumer price index, population refers to the total population, interest rates are real as a % of GDP, Imports is imports of goods and services as a % of GDP, and Savings are gross national savings divided by GDP.

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

***Source: Authors own computation***

**Table 3.4**
***System GMM Estimation_ Interactions***

| | Stock Market | | Bond Market | | Financial Market | | |
|---|---|---|---|---|---|---|---|
| | Stock market capitalization | Stock market to GDP | Government domestic bond to GDP | Corporate Bond to GDP | Financial Development Index | Financial Market Index | Financial Institution Index |
| VARIABLES | model 8 | model 9 | model 10 | model 11 | model 12 | model 13 | model 14 |
| Pension funds | **-0.232*** ** | -0.0554 | **-0.180*** | **0.00726*** ** | **0.000821** ** | **0.000574*** | **0.000769*** |
| | **(0.0739)** | (0.0514) | **(0.102)** | **(0.00117)** | **(0.000343)** | **(0.000293)** | **(0.000441)** |
| IQ | **-3.103*** | -1.192 | **-27.27*** ** | -0.102 | **0.0792*** ** | **0.0677*** ** | **0.0944*** ** |
| | **(1.559)** | (1.186) | **(4.567)** | (0.0711) | **(0.0101)** | **(0.0119)** | **(0.0107)** |
| Pension fund * IQ | **-0.166*** ** | **0.141*** ** | **0.601*** ** | -0.000681 | **0.433*** ** | **0.413*** ** | **-0.138*** |
| | **(0.0281)** | **(0.0433)** | **(0.218)** | (0.00327) | **(0.217)** | **(0.112)** | **(0.0768)** |
| Inflation | -0.0306 | -0.0833*** | 0.0316 | -0.00104 | 2.51e-06 | 0.000304* | -0.000216 |
| | (0.0222) | (0.0228) | (0.182) | (0.00185) | (0.000207) | (0.000162) | (0.000281) |
| GDP | 0.231 | 1.001 | -8.771** | -0.0203 | 0.0173*** | 0.0317*** | 0.00858 |
| | (1.073) | (1.268) | (3.566) | (0.0704) | (0.00579) | (0.00644) | (0.00713) |
| Population | -0.1720*** | -0.3077 | 2.4160*** | 0.14431** | 0.0084 | 0.0135 | 0.0200 |
| | (0.3967) | (0.4023) | (1.2031) | (0.0945) | (0.0098) | (0.0106) | (0.0221) |
| Interest rate | 0.0267 | -0.0100 | 0.644 | 0.00409 | -0.000599 | 0.000486 | -0.00123 |
| | (0.0450) | (0.0921) | (0.379) | (0.00283) | (0.000784) | (0.000528) | (0.000916) |
| Imports | 0.183*** | 0.265*** | 0.533*** | 0.00693** | -0.000359 | -0.000628** | -4.69e-05 |
| | (0.0542) | (0.0395) | (0.168) | (0.00309) | (0.000230) | (0.000254) | (0.000286) |
| Broad money | 0.110* | 0.0397 | 0.339*** | -0.00422* | -0.000476** | -0.000317 | -0.000706** |
| | (0.0616) | (0.0517) | (0.0972) | (0.00236) | (0.000216) | (0.000350) | (0.000327) |
| Savings | 0.202*** | 0.229*** | 0.646*** | 0.00112 | -0.000190 | -0.000700*** | 0.000363 |
| | (0.0600) | (0.0364) | (0.174) | (0.00294) | (0.000215) | (0.000236) | (0.000365) |
| Stock market capitalization $_{t-1}$ | 0.257** | | | | | | |
| | (0.103) | | | | | | |
| Stock market total value $_{t-1}$ | | 0.821*** | | | | | |
| | | (0.0836) | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Government bonds $_{t-1}$ | | | 0.295*** | | | | |
| | | | (0.0825) | | | | |
| Corporate bond $_{t-1}$ | | | | 0.934*** | | | |
| | | | | (0.0296) | | | |
| Financial development index $_{t-1}$ | | | | | -0.231*** | | |
| | | | | | (0.0455) | | |
| Financial markets index $_{t-1}$ | | | | | | -0.149** | |
| | | | | | | (0.0599) | |
| Financial institutions index $_{t-1}$ | | | | | | | -0.244*** |
| | | | | | | | (0.0414) |
| Constant | 3.388 | -18.13* | 25.12 | 0.0101 | 0.113*** | -0.109*** | 0.288*** |
| | (4.585) | (8.759) | (20.26) | (0.426) | (0.0323) | (0.0303) | (0.0458) |
| Observations | 383 | 447 | 462 | 464 | 468 | 428 | 468 |
| Number of years | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| Number of Groups | 31 | 34 | 34 | 34 | 29 | 29 | 29 |
| Number of instruments | 19 | 19 | 19 | 19 | 20 | 20 | 18 |
| **Marginal Effect** | **-0.1278** | | **-0.5574** | | **-0.2711** | **-0.2588** | **0.0874** |
| F-Statistics (p-value) | 763.00 | 26.95 | 48.19 | 24.35 | 31.72 | 4.54 | 136.57 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) |
| AR(1) | -2.59 | -2.50 | -2.13 | -1.90 | -2.53 | -2.70 | -2.14 |
| | (0.011) | (0.0617) | (0.033) | (0.057) | (0.0126) | (0.048) | (0.032) |
| AR(2) | -1.48 | -1.32 | -2.33 | -2.67 | -2.82 | -1.06 | -2.12 |
| | (0.138) | (0.188) | (0.0739) | (0.050) | (0.041) | (0.288) | (0.09) |
| Sargan Test | 47.03 | 130.60 | 15.80 | 40.64 | 66.38 | 106.81 | 47.35 |
| | (0.000) | (0.000) | (0.027) | (0.000) | (0.000) | (0.000) | (0.000) |
| Hansen Test | 8.81 | 5.11 | 8.50 | 4.69 | 7.16 | 10.37 | 10.43 |
| | (0.267) | (0.646) | (0.290) | (0.698) | (0.519) | (0.240) | (0.108) |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

### 3.4.4. Extended Discussion

The finding that the interaction between pension funds and institutional quality negatively affects capital market development suggests a complex relationship between these variables. While pension funds are typically expected to bolster capital market development by providing long-term capital, the quality of institutions within a country can significantly influence this potential. Institutional quality encompasses factors such as regulatory frameworks, governance standards, transparency, and the rule of law.

Some of the reasons accounting for this negative impact include; Regulatory Environment, Governance Issues, Market Inefficiencies, and Political Instability. Poor regulatory frameworks can hinder the efficient functioning of capital markets. Overly stringent or unclear regulations may deter pension funds from fully participating in capital markets. Conversely, lax regulations can lead to inadequate oversight and increased risk, dissuading investment. Weak governance and corruption can undermine investor confidence. Pension fund managers might be reluctant to invest heavily in markets where governance standards are low, fearing mismanagement and fraud. Poor institutional quality can lead to market inefficiencies such as lack of liquidity, high transaction costs, and inadequate financial infrastructure. These inefficiencies can reduce the attractiveness of capital markets for pension funds. Countries with poor institutional quality often face political instability, which can lead to volatile market conditions. Pension funds, being conservative by nature, may avoid such markets to minimize risk.

The positive contribution of pension funds to overall financial development indicates that these funds play a crucial role in enhancing financial market efficiency, increasing the availability of capital, and fostering economic growth. Pension funds, with their substantial asset base, can provide stable and long-term capital, which is essential for the development of financial markets. The observation that pension fund managers in Africa seem to be focusing more on

other financial market assets, rather than directly contributing to capital market development could be due to several factors such as; diversification strategies, risk aversion, lack of depth in capital markets, and regulatory constraints. Pension fund managers often diversify their portfolios to mitigate risk. This diversification can include investments in bonds, real estate, private equity, and other alternative assets, which may offer more stable returns compared to volatile capital markets. Given the fiduciary responsibility to safeguard retirees' funds, pension fund managers tend to adopt a conservative investment approach. They might prefer safer assets over potentially higher-yielding but riskier capital market investments. Many African capital markets lack the depth and breadth found in more developed markets. Limited investment opportunities, low liquidity, and a small number of listed companies can push pension funds to look for investment opportunities elsewhere. Pension funds might face regulatory constraints that limit their ability to invest in certain types of assets or markets. These regulations are often put in place to protect the funds but can also restrict their potential to contribute to capital market development.

The relationship between pension funds, institutional quality, and capital market development is multifaceted. While pension funds have the potential to significantly contribute to financial development, the quality of institutions plays a crucial role in determining the extent of this contribution. By addressing institutional weaknesses and creating a more favorable investment environment, policymakers can better harness the potential of pension funds to drive capital market development and broader economic growth in Africa.

### *3.5 Conclusion and Policy Recommendations*

Pension funds are huge financial assets that have the potential to transform the capital market and promote economic growth. The study examined the effect of pension funds and institutional quality on capital market development in Africa using a system GMM estimation

method. The study found that pension funds and institutional quality have a negative impact on capital market development. This means that pension funds affect capital markets. When pension funds, as a variable, was interacted with institutional quality, it was proven to have a negative impact on the capital market development. This may be as a result of the underdeveloped nature of Africa's financial system. However, both pension funds and institutional quality had a positive and highly significant relationship with financial development. This indicates that fund managers are more likely to invest in bonds than stocks because of volatile nature of stocks. They may shift more focus to the money market because of the fixed and reliable income it provides than the capital market where stocks are volatile in nature. According to Bright Africa Pension Report 2019, most African countries, apart from South Africa, Botswana, and Namibia, have their asset allocations skewed toward fixed income securities (RisCura, 2020).

The findings have implications for policymakers, investors (fund managers), and scholars. As pension funds were found to impact negatively on the capital market in the presence of institutions, there has to be stronger institutional quality in place. This will serve as a check on any rent seeking behaviour of pension fund managers as a way to prevent the locking of funds of pensioners and the inability to fulfill fund managers' obligation towards pensioners. African governments need to implement measures to develop the financial markets since fund managers focus more on other assets from the financial markets than assets from the capital market. This provides investors with diverse options to diversify their portfolios, which in turn brings development to the financial sector by minimizing the risks that investors are exposed to. Capital markets in Africa experience a lot of challenges because of their underdeveloped nature. However, the demutualization of exchanges (Abukari and Ochere, 2020; Sial et al., 2015) and integration of capital markets via ensuring the cross-listing of some of the national exchanges and cross-border investment are a few strategies for market development. This may

be implemented by increasing the number of listing companies (demutualization and integration) as well as increasing the number of instruments traded on the exchange. Investment in alternative asset classes, such as infrastructure, also proves to be helpful.

Governments in Africa ought to strengthen the reforms, especially the third tier (which includes private contributions) to cover all sectors. According to Bright Africa Pension Report 2019, only 8.5% of working Africans have pension coverage compared to 32.5% of their global counterparts (RisCura, 2020). The third tier makes room for people from the informal sector to also make contributions towards their old-age income. Considering the large size of the informal sector (85%) in Africa, it is prudent to encourage the third-tier contribution, which not only deepens the assets of the funds, but also helps alleviate poverty in the informal sector. Certain micro pension schemes, which can be emulated by others, have been introduced by a few African countries.

Lastly, it is prudent that scholars investigate further for other factors that account for the negative relationship between PF, institutional quality, and capital market development.

# Chapter Four

## The Impact of Pension Funds and Capital Markets Development on Economic Growth in Africa[5]

### *4.1. Introduction*

Funded pension plans have advantages for everyone, not just retirees, as they may boost capital accumulation and economic growth. Every country's financial progress is crucial to its economy's expansion. According to Fashola (2016), investing in pension funds is a pivotal factor in the diversification and expansion of Africa's economy. The African capital market has undergone tremendous growth since the early 1990s, but this growth does not always mean that most advanced African capital markets have reached maturity (Ngare et al., 2014; Yartey & Adjasi, 2007). A considerable portion of the market capitalization in the majority of these African stock exchanges is made up of trading in just a few select stocks. Stewart, Despalins, Remizova and Stewart (2017) argued that the advantages that funded pensions bring are not experienced in most countries because of the short-term assets that fund managers may invest in.

Economic growth largely depends on the efficiency of the financial sector or activities within the financial sector. An important component of the financial sector is pension funds, which until recently have received little attention. Pension fund managers are now focusing their attention on investing in the capital market. According to the World Bank report, pension funds rank among the most significant in institutional investors in the capital market. With global assets of over USD 56 million in the year 2020, which is an increase of 11% over the 2019 figure, pension funds have proven to be one that can be relied on for most development across

[5] This empirical paper was presented at the 12th Annual African Accounting and Finance Association conference held in September 2023, received comments and won an AAFA-InSPiR2eS award.

the sectors of the economy, World Bank Report (2020). It can be noted that even in the midst of the COVID-19 pandemic, pension funds still received an increase of 11% globally. Reasons may be alluded to: increase in population, increase in the workforce, the flexibility of the system, and people becoming more conscious of life after retirement. As pension coverage expands and contributions grow, there is a likelihood that the investment into the capital market may increase, causing its growth. How, then, will pension funds and capital markets drive economic growth?

The capital market is one of the most important aspects of the financial sector due to its role in accumulating funds from surplus owners and efficiently allocating them to those with deficits. With the mediating role of the capital market, funds should have always been available for economic activities, which would have brought about growth in the real sector of the economy. Unfortunately, the African economy is not doing so well compared to the developed economies. In 2018, Mauritius had the largest stock market capitalization in Africa (69 percent of GDP), while South Africa (235 percent of GDP) was excluded. The Mauritius stock exchange's market capitalization was significantly lower than the average market capitalization in the East Asia and Pacific region, amounting to 83 percent of GDP, and in high-income countries 119 percent of GDP (Soumaré et al., (2021)). A pension fund is long-term in nature; therefore, it is important to note that investing in these funds through the right asset can yield a lot of improvement in the economy as well as secure funds for contributors in the event of retirement. The capital market provides managers of pension funds with a variety of asset classes to invest in, including fixed deposits, treasury bills, bonds, and stock markets, among others.

Current empirical studies that established a connection between the growth of the capital market and economic development revealed that the capital market plays a significant role in fostering both economic growth and development. (See for example: Bayar, Gavriletea,

Danuletiu, Danuletiu, & Sakar (2022), Moleko (2019), and Nageri et al. (2020)). Nations with well-developed capital markets tend to experience greater economic growth compared to nations without them (Meng and Pfau (2010) and Hu (2012)). According to World Bank Group research (World Bank Report 2020), emerging market nations with healthy bond markets were better prepared to handle the global financial crisis of 2008, preventing significant economic disruptions and assisting businesses and citizens in maintaining their financial solvency and liquidity.

The majority of capital markets in African countries are relatively underdeveloped, but evidence suggests that those countries that have enacted reforms aimed at developing their capital markets have expanded significantly faster and experienced more sustainable economic growth rates (Moleko (2019), Nageri et al (2020); Zubair (2016), and Meng and Pfau (2010)) In literature, the capital market has been recognized as having a positive effect on economic growth by efficiently allocating resources to several sectors of the economy. (For example, Bayar, Kaya, and Yildirim (2014), Ikikii and Nzomoi (2013), and Ho and Odhiambo (2012)).

Firstly, global pension fund assets have increased and continue to increase as a result of the funded nature of the many newly established pension schemes. It is projected that pension assets will continue to increase given the administration of the current pension systems across the African sub-region and the significant progress made toward the World Bank's (1994) multi-pillar system consisting of an unfunded pillar, a mandatory publicly managed pillar, a mandatory but privately managed funded pillar, as well as supplemental voluntary private funded schemes (OECD, 2023). Since the capital market is one avenue through which the increased funding can be effectively allocated to promote economic growth, this raises the question of whether the shift is simply a matter of reallocating the financial burden of ageing, or whether funding actually improves economic performance. This study, therefore, aims to address this question and bridge the existing gaps in the literature.

Secondly, there have been numerous studies on the correlation between pension funds and economic growth, as well as the role of capital markets in driving economic growth. The results of these studies are, however, not conclusive, with some authors having positive relationships (Bayar et al. (2014), Ikikii and Nzomoi (2013), Ho and Odhiambo (2012), Arestis et al. (2001), and Levine and Zevorse (1996)), while others have negative relationships (Ake and Ognaligui (2010)), or no relationships at all (Echekoba et al. (2013). This opens up the debate for further investigations into this nexus, and moreso because these studies are on the direct relationship between the variables.

Again, according to Bijlsma, Bonekamp, Ewijk, & Haaijen (2018), it is difficult to directly link pension funds and economic growth, even though it seems intuitive that pension funds which can lead to financial deepening will likely lead to economic growth. Since it is difficult to find this direct relationship, there must be other ways by which pension funds could influence economic growth. Empirical studies by Zanderg & Spierdijk (2013), Davis and Hu (2008), and Alda (2017), who studied the direct effect of pension funds on economic growth, may encounter endogeneity and causality issues due to the limited number of countries compared to the numerous variables that affect pension funds and economic growth. To avoid this problem, Bijlsma et al. (2018) used a transmission mechanism approach, which was first established by Rajan, and Zingales (1998) in a seminal paper. Sanusi and Kapingura (2021) explored the impact of pension funds on economic growth in South Africa using the overall investment levels as a transmission mechanism. In addition to this, Alonso et al. (2016) theoretical cycle for pension funds and economic growth brought to bare this indirect relationship. They argued that the capital market dynamization helps in transmitting pension funds to economic and infrastructure activities.

This study is distinct as it considers the capital market as a transmission mechanism for pension funds and economic growth. It first of all investigated the relationship between

pension funds and capital market development in the African context as the developed economies have benefitted substantially from this nexus and moreso because most of the markets in Africa are not too developed. Secondly, the study in this chapter interacted with pension funds and capital market to find their effect on economic growth. The study found that pension funds negatively relate to economic growth whilst the stock market has a positive influence on economic growth. This shows that even though pension funds may cause financial deepening, they do not necessarily translate to economic growth. Again, the interactive effect showed that the presence of capital market improves the relationship between pension funds and economic growth.

The study contributes to the existing body of knowledge by empirically proving that the state of the capital market can moderate the impact of pension funds on economic growth in Africa. It also provides policy recommendations for African governments. It adds a new layer of complexity to the existing literature by introducing an interactive term. This makes the study a significant contribution to both academic research and policy formulation. The remainder of the chapter is structured into the theoretical and empirical literature, followed by the methodology used in this objective, then the findings are discussed next, and the chapter is concluded with pertinent recommendations.

## *4.2 Literature Review*

This section reviews the theoretical literature on the topic and also two strands of empirical literature by considering the relationship between pension funds and economic growth, followed by capital market and economic growth.

### 4.2.1 Theoretical Literature

The development of the financial sector comprises both financial deepening and financial widening. Financial widening pertains to the extension of financial services and the growth of financial institutions. Financial deepening, in contrast to financial widening, is an increase in the number of financial institutions and services provided per capita or an increase in the ratio of financial assets to income (IMF,2012). From the definitions, it can be noted that financial deepening could be improved by pension funds, while financial widening could largely be improved by the capital markets. Thereby, pension funds and the capital market are major drivers of the expansion of the financial sector.

Both the theoretical and empirical literature have devoted a great deal of study to the evolution of the financial sector's contribution to economic growth. According to some economists, the growth of the financial sector is necessary to achieve a substantial level of economic growth (Goldsmith, 1969; McKinnon, 1973; and Shaw, 1973). Patrick (1966) describes this as the "supply-leading" function of financial development. Financial development has the following effects on economic growth: small savers can pool assets through financial markets; there is a greater variety of tools for savers that encourage saving; and as the percentage of financial saving in total wealth increases, effective capital allocation is attained. Increase in wealth is created due to financial intermediaries diverting savings from individuals and industries with slow growth to those with rapid growth. Financial intermediaries partly solve the issue of adverse selection in the loan markets; again, financial markets promote entrepreneurship, production specialization, and the adoption of new technologies.

However there exists a lot of debate on the precise impact of financial development on economic growth (Gupta, 1984; Spears, 1992). In 1969, under the leadership of Goldsmith, the structuralists held that financial development directly raises savings in the form of financial

assets, which in turn promotes capital formation and economic expansion. The works of Wallich, Sinai and Stokes (1972), and Tun Wai (1972) provide empirical evidence for this idea.

In the literature, there has also been a pronounced shift toward what Patrick (1966) labels the "demand-following" function of financial development. From this perspective, financial development serves as the economy's "handmaiden," passively responding to the expanding economy's need for new financial services (Robinson, 1952; Stern, 1989). The expansion of the actual sector of the economy helps the financial sector expand. As a result, a larger range of financial services and an increasing number of institutions are required to deliver them as the economy expands. This viewpoint contends that a lack of financial institutions and services indicates a limited demand for such services. Because financial intermediation facilitates the transfer of resources from the economy's slow-growing sectors to its fast-growing ones, the need for financial intermediation is also influenced by differences in the growth rates of the various economic sectors (see Patrick, 1966).

In light of the foregoing, it can be deduced that economic growth and expansion of the financial sector, which includes capital markets and pension fund assets, will have a bicausal relationship. Patrick (1966) proposed that the growth relationship is dependent on the nation's economic development stage. In his view, the supply-leading hypothesis holds that financial sector expansion serves a growth-augmenting function in the early phases of development by producing financial institutions and financial assets. However, the financial industry does play a demand-following function in more advanced stages of growth.

Recent research has embraced the endogenous growth paradigm (e.g., Greenwood & Jovanovic, 1990; King & Levine, 1993a). In this strategy, financial intermediaries like the capital markets significantly influence the growth process. That is, they aid in lowering investment in low-return liquid assets innovation (Bencivenga & Smith, 1991), aid in

specialization and technological innovation (Cooley & Smith, 1991), and last but not least, aid in capital accumulation and savings through technological innovation (Grossman & Helpman, 1991; Aghion & Howitt, 1990). Following from the above arguments, African economies seem to be following Patrick's 'supply-leading hypothesis. This is attributed to the fact that most of the markets are still at the early or developmental phase of life.

In addition to the above, the financial intermediation theory focuses on the significance of financial institutions, including pension funds and capital market in facilitating the flow of funds from savers to borrowers. This theory suggests that financial intermediaries bridge the gap between those with excess savings (surplus units) and those in need of capital (deficit units) by offering various financial services, including pooling funds, providing risk management tools, and offering expertise in investment decision-making (Diamond, 1984).

Pension funds, as institutional investors, perform an intermediation function by channeling funds from pension contributors to investment projects. Through their professional management and expertise, pension funds can identify and allocate resources to promising investment opportunities, thus facilitating capital formation and economic growth (Poterba, 2001).

The financial intermediation theory underscores the significance of pension funds in efficiently mobilizing and directing savings towards profitable investments, thereby contributing to economic growth.

The economic growth theory, pioneered by Robert Solow (1956), posits that technological progress is a primary driver of continuous economic growth. This theory advocates that, technological advancements and innovation lead to increased productivity, higher output, and improved living standards (Solow, 1956). In the context of pension funds and capital markets, this theory underscores the importance of fostering an environment that encourages innovation

and technological development. Pension funds and capital markets serve a critical role in facilitating economic growth by providing the necessary financial resources for innovation and technological advancements. By investing in these areas, pension funds contribute to the creation of new products, processes, and industries, which are crucial for long-term economic growth.

Moreover, capital markets provide a platform for raising capital for innovative companies and start-ups, enabling them to access the necessary funding to develop and commercialize new technologies (Hall & Lerner, 2010). This access to capital facilitates entrepreneurial activity and fosters an environment conducive to technological progress and economic growth.

### 4.2.2 Empirical Literature

The literature can be looked at from three different perspectives: the relationship between pension funds and economic growth, the relationship between pension funds and capital market, and the relationship between capital market and economic growth.

#### 4.2.2.1 Pension Funds and Economic Growth:

Pension funds and economic growth have been well researched in the past and recent times. Past researchers like (Beck & Levine, 2004; Demirguc-Kunt & Levine, 1996; Klapper et al., 2004 Arena, 2008; Curak et al., 2009; Haiss & Sümegi, 2008; Ward & Zurbruegg, 2000; Davis & Hu, 2006; and Holzmann, 1997) have argued institutional investors like pension funds, insurance companies and mutual funds become more active in the capital market when there is an increase in economic activities, and this is expected to have a favourable impact on economic growth. Chang et al. (2014); and Liu et al. (2016) in quite a recent literature confirmed this. Davis and Hu (2004) in their research, examined the direct correlation between pension fund assets and economic growth by employing a modified Cobb-Douglas production

function with PF as a shift factor. The study was based on a dataset of 38 countries, and the outcomes were notably positive for both OECD and emerging economies.

In recent times, researchers have found varied results for pension funds and economic growth for different countries across the globe. These results range from positive (Morina & Grimma (2021); Kajwang (2022); Amahalu (2019); Bayar et al. (2014); Ikikii and Nzomoi (2013); Ho and Odhiambo (2012); Arestis et al. (2001); and Levine and Zevorse (1996)), negative (Nwane (2015); Ake and Ognaligui (2010)), and no relationship (Sanusi and Kapingura (2021); Ameh et al. (2017); Echekoba et al. (2013)). This opens up for more discussion on this topic.

From the developed economies, Morina and Grima (2021) analyzed the impact of pension funds asset investments on economic growth from selected OECD and non-OECD countries between 2002 to 2018 and concluded that investments in pension fund assets have a positive influence on economic growth in these countries. Similar findings were seen in the works of (Ertuğrul and Gebeşoğlu (2020); Bijlsma et al. (2018); Davis and Hu (2008); and Davis and Hu (2004)). Zandberg and Spierdijk (2013) explored how market returns affected the growth of pension fund. They discovered a two-way relationship where a high market return boosts the pension asset growth, and conversely, pension fund growth can also affect market returns. Additionally, their research revealed that, during 2001 to 2008, there was no correlation between pension funds and economic growth when analyzing data from both OECD and non-OECD countries.

In developing and emerging countries, studies have largely focused on individual countries and the direct relationship between pension funds and economic growth with varied results. For instance, Sanusi and Kapingura (2021) examined the impact of accumulated pension funds on the level of investments and economic growth in South Africa between 1990 and 2019 and found that accumulated pension funds have no significant influence on the South African

economy. This is intuitive because accumulated funds cannot lead to economic growth unless the funds are invested in economic activities.Authors, therefore, recommend the prudent investment of the funds in economic activities that can bring about economic growth whilst protecting interest of contributors. Using a desktop review, Kajwang (2022) examined the role of pension funds management on the economy and concluded that pension fund assets have a positive relationship with economic growth and that contributory pensions have the ability to increase GDP but competent risk management and portfolio management by pension fund administrators is crucial to achieving this.

Amahalu (2019) investigated the relationship between pension fund assets, pension fund contribution, and pension fund investment on economic growth and concluded that all three variables have a positive relationship with (GDP) economic growth. Similarly, Farayibi (2016) provided evidence that contribution from both private and public sectors increased tremendously. forming huge capital for most economic activities.

On the other hand, Nwane (2015) using data from 2004 to 2012 examined the impact of pension fund on economic growth in Nigeria and found a negative and significant impact on economic growth whilst pension savings was found to have a positive influence on economy. This confirms the recommendation of Sanusi and Kapingura (2021). Contrarily, Ameh et al. (2017) provided evidence that suggests that pension fund assets and contributions have positive but insignificant influence on economic growth.

#### 4.2.2.2 Capital Markets and Economic Growth:

Researchers consistently underline the stock market's critical importance for economic well-being in emerging and developing countries and view it as a fundamental component of the global financial system (Ngare et al., 2014). Through effective capital allocation, the stock market assists the economy in putting long-term investment projects with long-term returns

into action. In some studies, such as those by Bayar et al. (2014), Ikikii and Nzomoi (2013), Ho and Odhiambo (2012), Arestis et al. (2001), and Levine and Zevorse (1996), it was discovered that the development of the stock market had a positive and significant influence on economic growth, whereas Ake and Ognaligui (2010) found that the stock market had a negative effect on economic growth.

To explore the impact of capital markets on economic growth, Queen (2015) analyzes time series data from South Africa spanning the years 1971 to 2013. Findings from the studies demonstrated that capital markets and economic growth are inextricably linked in South Africa. Additionally, the state should focus on elements such as the development of financial institutions that contribute to the expansion of capital markets.

When examining the capital market's effect on Nigeria's economic growth during democratic governance, Echekoba et al. (2013) investigated the link between the capital market and economic growth using time series data. The results showed that while total market capitalization and all share indices positively impact the GDP growth rate, total stock value negatively impacts the GDP growth rate, and none of these effects are statistically significant.

Using multiple regression analysis, Alam and Hussein (2019) investigated the impact of capital market on the economic growth in Oman. They found out that, over time, there was a positive correlation between the capital market and economic growth. Based on their findings, economic progress will be ensured if more emphasis is put on the financial sector's development, particularly the capital market.

Between 2002 and 2014, Mo (2017) examined and quantified the historical impact of capital markets on the development of economic growth using time series data. This, research was conducted in four (4) Middle East and North African (MENA) regions. It was determined that Egypt's capital market had a considerable impact on economic growth, whereas Saudi Arabia,

Kuwait, and Tunisia's capital markets had less of an impact. However, capital market development has a combined, major impact on the economic progress of the four (4) countries. Therefore, they stated that the integration of capital markets must be used to implement policies that are focused on the economic performance of these countries in the region.

Again, from a time series data spanning 1985 to 2014, a period of 30 years, Araoye, et al. (2018) investigated how the stock market development in Nigeria affected the country's growth in economy. The GDP was employed as a proxy for growth in economy whereas market capitalization and the turnover ratio of the stock market served as indicators of its size and liquidity, respectively. The empirical results suggest that the stock market is important in predicting economic growth in Nigeria when using the error correlation model.

In another study, Sabariah and Norhafiza (2016) looked at the effects of the debt and stock markets on the Malaysian economy. Results after employing the Johansen-Juselius co-integration test showed a co-integrating link between real growth in the domestic product per capita, the stock market, and the debt market. Compared to the debt market, the stock market has a higher impact on the Malaysian economy. It is also shown that the stock market has a uni-directional causal effect on the economy. On the other hand, using time series data for the years 2000–2012, Torbira and Joshua (2017) explored how the rise of capital markets, a subset of financial development, has directly influenced economic growth in the MINT countries comprising Mexico, Indonesia, Nigeria, and Turkey. Results indicate that the number of registered financial securities is the factor that has the greatest impact on the MINT's overall capital market development and economic growth. The gross fixed capital formation and gross domestic savings ratios to GDP were considered to be positively and significantly correlated with this indicator, whereas the gross domestic product (GDP) was understood to be negatively and significantly correlated with it. Additionally, statistical evidence shows that Indonesia

often favourably benefits from the growth of the capital market, especially given that it increases both gross fixed capital formation and gross domestic savings ratios.

Empirical literature on the relationship between pension funds and capital market have been discussed in chapter three of this thesis. These strands of literature review suggest that more discussions and exploration have to be done on these variables and how they interrelate.

## *4.3 Data and Methodology*

The study conducted an analysis using panel data on 52 African nations over the period from 1990 to 2017 to examine the linkages between pension funds, the capital market, and economic growth and also to determine how the interaction of pension funds and the capital market will drive economic growth. The choice of the 52 countries and the year period was based on the availability of datas at the time of this research which is 2019. The World Development Indicators (WDI) and International Monetary Fund (IMF) data were used as sources. The panel data was not balanced.

### 4.3.1 Model Specification

We employ a GMM dynamic panel estimator given the panel structure of our data, which corrects for the endogeneity of explanatory variables, time-specific effects, and unobserved country-specific effects (in which time invariant institutional factors other than GDP/capita and contractual savings are included). To account for endogenous persistence, we incorporated the lag-dependent variable into each equation. This suggests that we are concentrating on the short-term dynamics of the financial markets in our study. Again, the number of countries under study is 48, which is greater than the number of time periods and this satisfies one of the conditions for the use of the dynamic GMM estimator; N>T.

We analyze the impact of pension funds and the capital market on growth by defining a baseline model in which economic growth depends on its one-period lag, pension funds, the capital market, and the set of estimated controls in Eqn. (1) below

$$\mathbf{EG}_{it} = \beta_1 \mathbf{EG}_{it-1} + \beta_2 \mathbf{PF}_{it} + \beta_3 \mathbf{CM}_{it} + \sum_{k=4}^{N} \beta_k C_{it} + \gamma_i + \mu_t + \varepsilon_{it} \qquad (1)$$

where $\mathbf{EG}_{it}$ is the economic growth of country *i* at time *t*; $\mathbf{EG}_{it-1}$ is the growth lag representing the initial condition; $\mathbf{PF}_{it}$ is pension fund assets; $\mathbf{CM}_{it}$ is capital market which is comprised of stock and bond markets; $C_{it}$ is a vector of control variables; ($\beta_1 \ldots\ldots \beta_4 \ldots\ldots \beta_N$) are the coefficient parameters; $\gamma i$ is country-specific fixed effects; $\mu t$ is time effects while $\varepsilon it$ is the idiosyncratic error term. We estimate Eqn. (1) above by employing the system generalized method of moments (GMM). This approach, in contrast to conventional cointegration and ordinary least squares techniques, addresses the econometric issues raised by the endogeneity of the lagged dependent and the unobserved $\gamma i$ that are prominent in growth models.

In equation 1, economic growth is the dependent variable measured by real GDP per capita.

In line with previous research by Sadorsky (2010, 2011) and Doytch and Narayan (2016), pension fund is a key independent variable in equation 1. Pension funds are considered as any plan, fund or scheme that provides retirement income and it is measured as a percentage of GDP. Data were obtained from the Global Financial Development of the World Bank. In this dataset, higher values signify a greater contribution of the funds at a specific time across the countries.

Our expectation is that of either a positive or a negative effect of pension funds on each of the capital market development indicators. A positive effect suggests that countries that contribute more funds to the scheme are able to invest more into the capital market. This agrees with Zubair (2016), who identified a positive relationship between pension fund investments and

the capital market. A negative effect suggests that greater pension funds lead to a reduction in capital market development. This suggests that nations with substantial pension funds may allocate a significant portion of these funds to other sectors of the economy rather than investing in the capital market. This leads to a negative relationship between pension funds and the capital market.

Capital market development, which is also a key independent variable, decomposes into two indicators, namely:

(1) stock market capitalization is measured by stock market capitalization to GDP and stock market total value to GDP.

(2) bond market capitalization measured by domestic government bonds and corporate bond issuance as a percentage of GDP. Data is obtained from the World Development Indicators.

In equation 1, we control for Foreign Direct Investment (FDI), trade openness, inflation, unemployment, population (log of the population in a million people), money supply (broad money to GDP), and institutions. Data on the control variables were obtained from the Global Financial Development database. In order to account for the significant and diverse effects of pension funds and capital markets on economic growth, these control variables must be taken into account. By controlling for other influential variables, these variables help isolate the specific effects of pension funds and capital markets on economic growth, ensuring a more accurate and robust analysis.

FDI is a critical source of capital that can enhance economic growth, while trade openness reflects a country's integration into the global economy. It influences economic growth by facilitating access to larger markets, promoting competition, and enabling the exchange of technology and knowledge. Open economies often experience faster economic growth, which can also affect the functioning and development of capital markets. Including trade openness

as a control variable helps to distinguish the impact of domestic financial developments from the benefits derived from international trade.

On the other hand, high inflation can erode savings, reduce investment, and disrupt financial markets, including pension funds and capital markets. Again, high unemployment rates can reduce consumer spending, lower overall economic demand, and hinder economic growth. It also affects the contributions to pension funds and the performance of capital markets.

Population size and growth rate impact economic dynamics by determining the labor force, consumption patterns, and market size. A larger population can provide more opportunities for economic growth but also presents challenges in terms of employment and resource allocation. Strong institutions promote investor confidence, efficient markets, and sustainable economic growth. Details of how these variables are measured are provided in Table 1 in the appendix

We investigate how pension funds and capital markets affect economic growth by introducing a multiplicative interactive term involving the pension fund and capital market variables. We define our general system GMM framework as follows using Eqn.(2):

$$\mathbf{EG}_{it} = \Theta_1\mathbf{EG}_{it-1} + \Theta_2\mathbf{PF}_{it} + \Theta_3\mathbf{CM}_{it} + \Theta_4(\mathbf{PF}_{it} * \mathbf{CM}_{it}) + \sum_{k=5}^{N} \Theta_k \boldsymbol{C}_{it} + \gamma_i + \mu_t + \varepsilon_{it} \qquad (2)$$

where $\mathbf{EG}_{it}$ is the economic growth of country *i* at time *t*; $\mathbf{EG}_{it-1}$ is the growth lag representing the initial condition; $\mathbf{PF}_{it}$ is pension fund assets; $\mathbf{CM}_{it}$ is capital market which is comprised of stock and bond markets; $\mathbf{PF}_{it} * \mathbf{CM}_{it}$ is the interactive term between pension funds and capital market; $\boldsymbol{C}_{it}$ is a vector of control variables; $(\Theta_1 \ldots\ldots \Theta_5 \ldots\ldots \Theta_N)$ are the coefficient parameters; $\gamma i$ is country-specific fixed effects; $\mu t$ is time effects while $\varepsilon it$ is the idiosyncratic error term.

In line with Asongu and Nwachukwu (2017), the study computes the models' net impacts to interpret the data. Asongu and Odhiambo (2019) state that unconditional and marginal effects are used to calculate net impacts. The equation is specified below in equation 3

**Net Effect** => $\frac{\partial Economic\ Growth_{i,t}}{\partial Pension\ funds_{i,t}} = \Theta_2 + \Theta_4 Capital\ Market\ Devt_{it}$ **(3)**

From equation 3, it is expected that capital market will enhance the impact of pension funds on economic growth.

### 4.3.2 Estimation Technique

Our panel estimator leverages both the pooled cross-country and time series properties while also taking advantage of the additional information derived from the variations in the level of economic growth and its intrinsic drivers. The first difference, or system GMM, can be used to estimate the aforementioned equation. We choose the latter method over the former because it has better finite bias and precision qualities, especially when the explanatory factors are persistent over time and the lagged values of these variables are poor instruments and predictors of endogenous changes (Blundell and Bond,1998).

Blundell and Bond (1998) suggest the inclusion of additional moment criteria that rely on the stationarity property of the variables in order to permit the operation of the system GMM. It is important to note that the system GMM's additional requirement could call for deviations from long-run averages to be uncorrelated with the fixed effects. This criterion is especially relevant to this study since, given the relatively low-income levels, all of the sample countries might not exhibit considerable variance in their economic conditions.

Consistent and effective estimates are produced using the GMM technique, which is invariably dependent on the validity of the instruments. To address the validity of the instruments, we employ the two formal tests; serial correlation and Sargan's tests for over-identifying restriction. Variables had cross-sectional dependence, which was addressed by applying the Discroll and Kraay (1998) correction technique. In the estimations, strong standard errors were

employed. Tables under Panel B display the results of additional robustness tests that were carried out; (*Tables 5, 6, 7, 8, and 9 in appendix*).

## *4.4 Empirical Results and Discussion*

The findings of the empirical estimation are discussed in this section. The discussion will start with the descriptive statistics, then go on to the correlation matrix and the outcomes of the regression results.

### 4.4.1 Descriptive Statistics

*Table 4.1* presents the descriptive statistics for the variables used for the study. It was noted that pension funds, capital market capitalization, and domestic government bonds had means of 12.26, 26.05, and 28.11, respectively. These values seem to be high compared to the stock market value traded and corporate bonds with means of 7.8, and 1.13, respectively. This suggests that, in Africa, pension funds and the capital market play an important role in the growth of its economies. FDI recorded a low mean of 4.04, even though most African countries are noted for receiving FDI because of their natural resources. Trade openness was also low, with a mean of 0.69, indicating that most African countries are not open to trade. Inflation, on the other hand, was high, with a mean of 44.84, which suggests high inflation in most African countries during the period under study.

**Table 4.1**
***Descriptive Statistics***

| Variables | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Economic Growth | 1390 | 7.097 | 1.047 | 5.102 | 9.929 |
| Pension fund assets | 1412 | 12.26 | 18.359 | 0.001 | 99.66 |
| Financial devt | 1232 | 0.127 | 0.091 | 0.000 | 0.640 |
| Stock mkt cap. | 1318 | 26.046 | 23.336 | 0.010 | 311.101 |
| Stock market value | 1423 | 7.802 | 16.335 | 0.000 | 163.32 |
| Government bond | 1447 | 28.11 | 46.259 | 0.000 | 289.845 |
| Corporate Bond | 1454 | 1.135 | 1.063 | -0.783 | 3.815 |
| FDI | 1388 | 4.036 | 9.132 | -8.589 | 161.824 |
| Trade openness | 1251 | 0.693 | 0.350 | 0.191 | 3.762 |
| Inflation | 1262 | 44.84 | 699.58 | -11.686 | 23773.131 |
| Population | 1450 | 15.691 | 1.601 | 11.149 | 19.067 |
| Unemployment | 1377 | 9.299 | 7.593 | 0.285 | 37.94 |
| Broad money | 1342 | 34.54 | 27.837 | 0.024 | 251.618 |

| | | | | | |
|---|---|---|---|---|---|
| Institution | 987 | -0.598 | 0.630 | -2.100 | 1.220 |

**Economic Growth** is proxied by Real GDP per capita, **Capital Market** is measured by Stock Market capitalization as a % of GDP, Stock Market Total Value Traded as as % to GDP, Corporate Bond Issuance as a % of GDP, Government Domestic Bond as a % to GDP, **Pension Funds** is given by Pension fund asset to GDP, **FDI** is Net Inflows as percentage of GDP, **Financial Devt** is measured by the financial development index **, Trade openess** is the ratio of total trade to GDP, **Inflation** is the consumer price index, **Population** refers to the log of total population, **Unemployment** is Unemployment total (% of total labour force ), **Broad money** is Sum of currency outside bank as % of GDP, and **Institutions** is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability

***Source:*** *Author's own computation*

### 4.4.2 Correlation Results

Pension funds, sock market, FDI, financial development, trade openness, unemployment, broad money, and institutions all exhibited a positive relationship with GDP, with the exception of the bond market, inflation, and population, according to findings of the correlation matrix presented in *Table 4.2.* Except for unemployment, which recorded a relatively high coefficient of 0.6 with GDP, none of the variables are highly correlated with each other, according to *Table 4.2.* The correlation results merely display the relationship between two variables without accounting for the impact of additional factors, and as a result, they are not very informative regarding multicollinearity. However, the results of the variance inflation factor analysis, as presented in *Table 4.3* indicate that the variables used for the estimation do not exhibit multicollinearity.

**Table 4.2**
***Pairwise correlation Matrix***

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Economic Growth | 1.000 | | | | | | | | | | | | | |
| (2) Pension fund assets | 0.017 | 1.000 | | | | | | | | | | | | |
| (3) Stock mkt cap, | 0.118 | -0.191 | 1.000 | | | | | | | | | | | |
| (4) Financial devt | 0.234 | 0.208 | -0.133 | 1.000 | | | | | | | | | | |
| (5) Stock market value | 0.218 | 0.141 | 0.841 | -0.123 | 1.000 | | | | | | | | | |
| (6) Government bond | -0.066 | -0.099 | 0.003 | -0.147 | 0.057 | 1.000 | | | | | | | | |
| (7) Corporate Bond | -0.014 | 0.076 | 0.001 | 0.220 | -0.188 | 0.080 | 1.000 | | | | | | | |
| (8) FDI | 0.040 | -0.048 | 0.004 | -0.003 | 0.039 | -0.020 | 0.045 | 1.000 | | | | | | |
| (9) Trade openness | 0.433 | -0.095 | 0.048 | 0.053 | -0.026 | 0.005 | 0.277 | 0.300 | 1.000 | | | | | |
| (10) Inflation | -0.038 | -0.012 | 0.005 | -0.023 | -0.018 | 0.108 | 0.000 | -0.015 | -0.025 | 1.000 | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (11) Population | -0.326 | 0.247 | 0.009 | 0.178 | -0.049 | 0.207 | 0.076 | -0.178 | -0.377 | 0.049 | 1.000 | | | |
| (12) Unemployment | 0.633 | 0.143 | 0.004 | 0.111 | 0.175 | -0.039 | 0.046 | 0.013 | 0.362 | -0.016 | -0.244 | 1.000 | | |
| (13) Broad money | 0.431 | -0.048 | 0.160 | 0.090 | 0.171 | -0.023 | 0.189 | -0.037 | 0.255 | -0.041 | -0.104 | 0.255 | 1.000 | |
| (14) Institution | 0.400 | 0.012 | -0.093 | 0.035 | 0.102 | -0.150 | 0.046 | -0.009 | 0.203 | -0.079 | -0.324 | 0.413 | 0.303 | 1.000 |

***Source: Author's own computation***

**Table 4.3**
***Variance inflation factor***

| | VIF | 1/VIF |
|---|---|---|
| Institution | 1.83 | .546 |
| Broad money | 1.797 | .557 |
| Trade openness | 1.726 | .579 |
| Stock market capitalization | 1.672 | .598 |
| Population | 1.629 | .614 |
| Stock market value traded | 1.514 | .66 |
| Unemployment | 1.496 | .668 |
| Corporate Bond | 1.479 | .676 |
| Government domestic bond | 1.251 | .799 |
| Financial development | 1.233 | .811 |
| Pension funds | 1.183 | .846 |
| FDI | 1.18 | .848 |
| Inflation | 1.05 | .952 |
| Mean VIF | 1.465 | . |

***Source: Author's own computation***

### 4.4.3 Empirical Results

The system GMM results are presented in *Tables 4.4 and 4.5* for the independent and interactive terms, respectively. The lag of GDP can be seen to be positive and statistically significant across all the models in both *Tables 4.4 and 4.5*. This indicates the persistence of the dependent variable. Pension funds were seen to be negatively and statistically significant across the models except for model 11. The negative relationship means that, even though pension funds may contribute to financial deepening, they may not necessarily translate to the economy's growth. This could be as a result of various factors, including the fact that assets held by pension funds are invested in asset classes other than the capital markets, or that they are not invested at all because of the unstable economic conditions in the majority of African nations and the immaturity of most African capital markets. It could also mean that pension funds are invested in other assets outside the country, as posited by Zandeberg and Spierdijk (2013). The stock market variable was positive and highly significant to GDP. This was not the same for the bond market variable. Even though significant, it was negative. This suggests that African stock markets help grow their economies, as evidenced in the literature. Even though most of the markets are not mature, they have the capacity to induce growth in the economy. The bond markets, however, may not influence the growth of the economy, as indicated by the negative relationship. Financial development had a positive and highly statistically significant association with GDP across all the models. This was not surprising, as empirical evidence shows that economic growth hinges on the financial development of the country.

The GMM estimation results of the interactive term in *Table 4.5* show that pension funds were also statistically significant across the four models. From models 22 and 23, it can be noted that pension funds was negatively related to economic growth and capital market also had a negative relationship with economic growth. But when pension funds interacted with capital

market, there was a positive association between the interactive term and economic growth. This indicates that, the presence of capital market improves the relationship between pension funds and economic growth. Again, the net effect indicates that the positive association between pension funds and economic growth in the presence of the capital market is likely to increase at higher levels of capital market development. This confirms earlier empirical works by Araoye, et al. (2018), Alam and Hussein (2019), among others. However, in models 21 and 24 where the interaction between pension funds and capital market was negative, the net effect indicates that the negative association is likely to reduce at higher levels of capital market development. In all, it can be seen that the capital market is a good mediator for pension funds and economic growth as underscored by the financial intermediation theory.

FDI inflows, though statistically significant across all models, had a negative relationship with growth, and this indicates that, even though most African countries receive FDI due to the rich nature of their natural resources, they do not have the sufficient absorptive capability of the advanced technologies to translate it into economic growth. Trade openness was also positive and significant across all models, which shows that if Africa is to open its trade with other countries, they are likely to spur up the growth of its economy, and this has been empirically proven. More so, broad money and unemployment were also significant across all models. Similar results for these control variables are seen in *Table 4.5*.

**Table 4.4**
***System GMM Estimation Independent Effect***

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | model 11 | model 12 | model 13 | model 14 | model 15 |
| L.Economic Growth | 0.991*** | 0.992*** | 0.992*** | 0.993*** | 0.992*** |
| | (0.00519) | (0.00496) | (0.00462) | (0.00464) | (0.00499) |
| Pension Funds | -0.000658 | -0.00301*** | -0.00405*** | -0.00415*** | -0.00218** |
| | (0.00115) | (0.00112) | (0.000993) | (0.000976) | (0.00103) |
| Stock Market Capitalization | 0.00541*** | 0.0103*** | | | |
| | (0.00206) | (0.00217) | | | |
| Stock Market Traded Value | 0.0602*** | | 0.00267 | | |
| | (0.00864) | | (0.00318) | | |
| Government Bonds | 0.000685 | | | 6.62e-05 | |
| | (0.000575) | | | (0.000525) | |
| Corporate Bonds | -0.142*** | | | | -0.104*** |
| | (0.0242) | | | | (0.0237) |
| Financial Development | 2.639*** | 2.095*** | 1.999*** | 2.025*** | 2.083*** |
| | (0.254) | (0.272) | (0.267) | (0.283) | (0.266) |
| FDI inflows | -0.00508** | -0.00511*** | -0.00609*** | -0.00596*** | -0.00557*** |

| | | | | | |
|---|---|---|---|---|---|
| | (0.00202) | (0.00190) | (0.00207) | (0.00203) | (0.00210) |
| Trade Openness | 0.528*** | 0.293*** | 0.354*** | 0.355*** | 0.503*** |
| | (0.134) | (0.104) | (0.109) | (0.113) | (0.124) |
| Inflation | -0.00187* | -0.00189* | -0.00192* | -0.00191* | -0.00202 |
| | (0.00108) | (0.000971) | (0.00108) | (0.00109) | (0.00127) |
| Population | -0.0298 | -0.0243 | -0.0259 | -0.0265 | -0.0118 |
| | (0.0234) | (0.0197) | (0.0200) | (0.0217) | (0.0221) |
| Unemployment | 0.0678*** | 0.0788*** | 0.0787*** | 0.0793*** | 0.0772*** |
| | (0.00552) | (0.00611) | (0.00629) | (0.00634) | (0.00638) |
| Broad money (M2/GDP) | 0.0102*** | 0.0113*** | 0.0133*** | 0.0132*** | 0.0138*** |
| | (0.00121) | (0.00130) | (0.00119) | (0.00115) | (0.00116) |
| Institution | 0.0804 | 0.0876* | 0.0555 | 0.0745 | 0.0715 |
| | (0.0506) | (0.0480) | (0.0459) | (0.0465) | (0.0455) |
| Constant | 5.941*** | 5.858*** | 6.011*** | 6.036*** | 5.792*** |
| | (0.396) | (0.329) | (0.341) | (0.370) | (0.375) |
| Observations | 574 | 576 | 593 | 600 | 598 |
| Number of id | 35 | 35 | 36 | 36 | 36 |

| | | | | | |
|---|---|---|---|---|---|
| No. of Instruments. | 18 | 15 | 15 | 15 | 15 |
| AR1 | | -2.02 | -2.07 | -2.06 | -1.86 |
| P-value | | (0.04) | (0.038) | (0.039) | (0.063) |
| AR2 | -0.679 | -1.23 | -1.54 | -1.66 | -1.70 |
| P-value | (0.00545) | (0.219) | (0.125) | (0.09) | (0.089) |
| Hansen's Test | 12.65 | 12.64 | 13.59 | 14.02 | 14 |
| P-value | (0.000) | (0.000) | (0.00353) | (0.207) | (0.208) |
| Sargan Test | | 31.38 | 30.52 | 30.20 | 28.83 |
| P-value | | (0.000) | (0.000) | (0.000) | (0.000) |
| F-test | 1.031e+06 | 5609.00 | 4834.16 | 4534.27 | 2891.93 |
| P-value | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |

**Economic Growth** is proxied by Real GDP per capita, **Capital Market** is measured by Stock Market capitalization as a % of GDP, Stock Market Total Value Traded as as % to GDP, Corporate Bond Issuance as a % of GDP, Government Domestic Bond as a % to GDP, **Pension Funds** is given by Pension fund asset to GDP, **FDI** is Net Inflows as percentage of GDP, Financial Devt is measured by the financial development index, **Trade openess** is the ratio of total trade to GDP, **Inflation** is the consumer price index, **Population** refers to the log of total population, **Unemployment** is Unemployment total (% of total labour force ), **Broad money** is Sum of currency outside bank as % of GDP, and **Institutions** is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability

Robust standard errors in parentheses

(*** p<0.01, ** p<0.05, * p<0.1)

***Source: Author's own computation***

**Table 4.5**
***System GMM Estimation (Interactive Effect)***

| | (6) | (7) | (8) | (9) |
|---|---|---|---|---|
| VARIABLES | model 21 | model 22 | model 23 | model 24 |
| L.Economic Growth | 0.992*** | 0.992*** | 0.992*** | 0.991*** |
| | (0.00510) | (0.00469) | (0.00464) | (0.00510) |
| Pension Funds | 0.00316** | -0.0101*** | -0.00717*** | 0.0161* |
| | (0.00149) | (0.00217) | (0.00108) | (0.00854) |
| Stock Market Capitalization | 0.0159*** | | | |
| | (0.00273) | | | |
| (Pension Funds*Stock Market Capitalization) | -0.000496*** | | | |
| | (0.000116) | | | |
| Stock Market Traded Value | | -0.0204** | | |
| | | (0.00861) | | |
| (Pension funds*Stock Market Traded Value) | | 0.00460*** | | |
| | | (0.00178) | | |
| Government Bonds | | | -0.00171** | |
| | | | (0.000734) | |
| (Pension funds*Government Bonds) | | | 0.000228*** | |
| | | | (7.07e-05) | |

| | | | | |
|---|---|---|---|---|
| Corporate Bonds | | | | -0.0222 |
| | | | | (0.0413) |
| (Pension Funds*Corporate Bonds) | | | | -0.00977** |
| | | | | (0.00446) |
| Financial Development | 2.082*** | 2.097*** | 1.880*** | 2.103*** |
| | (0.274) | (0.256) | (0.301) | (0.267) |
| FDI | -0.00508*** | -0.00549*** | -0.00583*** | -0.00545*** |
| | (0.00190) | (0.00195) | (0.00200) | (0.00206) |
| Trade Openness | 0.298*** | 0.335*** | 0.357*** | 0.498*** |
| | (0.103) | (0.105) | (0.113) | (0.122) |
| Inflation | -0.00195** | -0.00182* | -0.00194* | -0.00203 |
| | (0.000968) | (0.00104) | (0.00110) | (0.00125) |
| Population | -0.0200 | -0.0223 | -0.0267 | -0.00987 |
| | (0.0196) | (0.0198) | (0.0216) | (0.0221) |
| Unemployment | 0.0778*** | 0.0789*** | 0.0787*** | 0.0766*** |
| | (0.00615) | (0.00596) | (0.00632) | (0.00630) |
| Broad Money (M2/GDP) | 0.0108*** | 0.0133*** | 0.0130*** | 0.0139*** |
| | (0.00127) | (0.00116) | (0.00116) | (0.00116) |
| Institution | 0.0911* | 0.0526 | 0.0761 | 0.0650 |

| | | | | |
|---|---|---|---|---|
| | (0.0482) | (0.0454) | (0.0469) | (0.0458) |
| Constant | 5.725*** | 5.967*** | 6.095*** | 5.623*** |
| | (0.327) | (0.335) | (0.370) | (0.373) |
| Observations | 576 | 593 | 600 | 598 |
| Observations | 576 | 593 | 600 | 598 |
| Number of id | 35 | 36 | 36 | 36 |
| No. of Instruments. | 16 | 16 | 16 | 16 |
| **Net effects** | **-0.00976** | **0.03905** | **0.00957** | **-0.00793** |
| AR1 | -1.98 | -2.10 | -2.15 | -1.86 |
| P-value | (0.048) | (0.036) | (0.032) | (0.062) |
| AR2 | -1.25 | -1.52 | -1.69 | -1.70 |
| P-value | (0.213) | (0.129) | (0.091) | (0.089) |
| Hansen's Test | 12.56 | 13.61 | 13.64 | 14.07 |
| P-value | 0 | 0.00349 | 0.195 | 0.222 |
| Sargan Test | 31.40 | 30.45 | 30.48 | 29.20 |
| P-value | (0.000) | (0.000) | (0.000) | (0.000) |
| F-test | 6681.32 | 4450.17 | 8114.39 | 2558.87 |
| P-value | (0.000) | (0.000) | (0.000) | (0.000) |

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

### 4.4.4 Temporal and Spatial Cross-sectional Dependence Analysis:

The study used data containing variables such as regional (or spatial) differences, which are crucial to the analysis's conclusion. These differences show that there may be some levels of noise in the data as well as patterns of dependence. Compared to solely spatial or time series analysis, spatiotemporal analyses have a few advantages. A cross-sectional dependence test was carried out because the data was gathered over a long period of time (1990–2017) and across geographical locations (48 African countries), and the results verified the presence of cross-sectional dependence (*see Tables 5 and 6 in appendix*. However, as indicated *in Table 9 in appendix*, this was resolved using the fixed effect Discroll-Kraay regression. As a robustness check, the results were consistent with the GMM results.

### *4.4.5 Extended Discussion*

The study's findings present an intriguing interplay between pension funds, capital markets, and economic growth. The results indicate that while the stock market independently contributes positively to economic growth, pension funds, on their own, appear to exert a negative influence. However, when pension funds interact with well-developed stock markets, this interaction significantly boosts economic growth. This suggests that the positive impact of pension funds on economic growth is contingent upon the presence, maturity, and effectiveness of the capital markets.

Stock markets play a pivotal role in economic growth through several mechanisms including, capital mobilization, liquidity provision, information dissemination, and risk diversification**.** They facilitate the raising of capital for businesses, allowing them to invest in expansion and innovation. This influx of capital drives productivity and economic growth. Stock markets provide liquidity, enabling investors to buy and sell shares with relative ease, which enhances the attractiveness of

investing in businesses. Stock markets promote transparency and efficiency by disseminating information about companies' performance, which helps in better investment decision-making and resource allocation. They allow for diversification of risk, making investment in the economy more attractive and fostering an environment conducive to investment and growth.

The negative impact of pension funds on economic growth, as found in the study, may be attributed to several factors such as investment constraints, risk aversion, and administrative inefficiencies**.** Pension funds often face regulatory constraints that limit their ability to invest in high-growth sectors or innovative enterprises. This conservative investment approach can stifle economic dynamism. Due to their mandate to ensure stable returns for retirees, pension funds may prefer low-risk, low-return investments, which may not contribute significantly to economic growth. In some regions, pension funds may suffer from poor management or corruption, leading to suboptimal investment strategies that fail to stimulate economic growth.

The significantly positive effect of the interactive term (pension funds and stock market capitalization) on economic growth underscores the importance of a robust capital market in harnessing the potential of pension funds for economic development. For instance, a well-developed capital market offers a wider range of investment opportunities for pension funds, including high-growth sectors that can drive economic expansion. Again, capital markets enhance the efficiency of capital allocation, ensuring that pension funds can achieve better returns on their investments, which in turn can stimulate economic growth. By investing in capital markets, pension funds can support innovative and entrepreneurial ventures that are crucial for economic dynamism and growth. Moreover, developed capital markets provide better tools and mechanisms for managing investment risks, enabling pension funds to invest more confidently in growth-oriented assets.

The complex relationship between pension funds, stock markets, and economic growth highlighted by the study underscores the importance of a synergistic approach. While pension funds may have inherent constraints that limit their direct impact on economic growth, the presence of a robust and well-developed capital market can unlock their potential. By fostering a conducive environment for both pension funds and capital markets, policymakers can create a virtuous cycle that supports sustained economic growth and development.

### *4.5. Conclusion and Recommendations*

Results from this study show that the stock market positively affects economic growth, whereas pension funds negatively influence economic growth. This may be due to factors such as the immaturity of the capital markets in most of these nations, fear of investment due to the unstable economic conditions in the majority of African nations, and other factors, such as pension fund assets being invested abroad and in asset classes other than the capital markets. When stock market total traded value and government bonds were used as a measure of capital market, the interactive term between pension funds and capital market showed a positive relationship with economic growth while it was negative for stock market capitalisation and corporate bond. Studies, however, conclude that, the presence of the capital market improves the relationship between pension funds and economic growth because the positive effect of the interaction is increased at higher levels of capital market development whereas the negative effect of the interaction is reduced at higher levels of capital market development.

African governments should therefore, make developing the capital market one of their main agenda since it acts as a transmission mechanism for the growth of the economy from pension funds. Again, pension funds are estimated to increase as individuals become more conscious of

their retirement benefits and how they will affect consumption smoothening. African governments could consider directing the funds into the appropriate asset classes to promote this growth since it has the potential to lead to financial deepening if invested in the local capital markets.

Lastly, if capital markets are developed, and pension funds are channeled to the right asset classes, there will be financial development which will induce growth in the economy, as seen in *tables 4.4 and 4.5*. African economies seem to be following the supply-leading hypothesis of growth; therefore, government of Africa should develop the capital markets to attract more investors, which will end up bringing development to the economy. The supply-leading hypothesis of growth within Africa could be related to the fact that the markets are still at their early stages or phases of life as alluded to Patrick (1966).

# Chapter Five

## Pension Funds, Capital Markets, and Infrastructural Development in Africa

### *5.1 Introduction*

Infrastructure has the ability to reshape our economies and communities. The development of electricity, transportation, and telecommunications networks has transformed our ability to power our homes and businesses, facilitate connections between producers and markets, and rapidly share information. These networks have not only enhanced our trade and competitiveness but have also expanded economic opportunities and significantly improved our overall quality of life. Building resilient infrastructure, supporting sustainable industrialization, and fostering innovation are included in Goal 9 of the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda, which specifically mention how important infrastructure is to advancing our shared prosperity.

Per the African Development Bank's (AfDB) Africa Economic Outlook 2018, meeting the demands of a growing population and rapid urbanization, would necessitate an annual investment of about $130-170 billion into Africa's infrastructure until 2025. Currently, $75 billion is invested annually. Poor infrastructure has the consequence of limiting economic growth in Africa. A World Bank study indicates that the poor state of infrastructure in Africa reduces national savings by 2% and cuts business by 40% every year. (Foster,2016).

However, because of the tremendous infrastructural needs in Africa, achieving this goal will require prompt action. In contrast to other growing nations where internet penetration ranges from 70 to 90 percent, just 30% of Africans have access to electricity, 34% have access to roads, and internet penetration in Africa is only 6%. Africa's poorest nations lag behind other low-income nations by a wide margin on all infrastructure-related indicators, making the infrastructure gap in

Sub-Saharan Africa particularly noteworthy. According to the AfDB (2018), the annual funding gap for infrastructure in Africa is between US$68 billion and US$108 billion, and over the next medium term, it is predicted to grow even more. (Juvonen et al. 2019). The funding gap grew during the COVID-19 pandemic as a result of the exit of foreign banks and the decrease in multilateral and bilateral assistance, according to a recent report on the dynamics of infrastructure financing in Africa (McKenzie 2021). Infrastructural funding averaged $83 billion in 2019-2020, which was below the 2017-2018 average of $91.2 billion. Out of this $83 billion, $68 billion were raised by Infrastructural Consortium for Africa (ICA) members and other bilateral and multilateral organizations in 2019/2020. Transport received the highest amount of $34.4 billion followed by energy $23.5 billion. ICT ($10.4 billion), water ($8.1 billion), and multi-sector ($4.6 billion) in 2020. The increase in the gap for 2020 was because most multilateral and bilateral companies redrew their commitments to infrastructure. However, ICT exceeded its estimated financing need. This research is important because it aligns with the importance of infrastructure, as highlighted by five out of the 17 SDGs. These include goals related to access to water and sanitation, affordable and clean energy, decent work, and economic growth (particularly within infrastructure services), as well as industry, innovation, and infrastructure.

To bridge the existing infrastructure gaps, achieve the objectives outlined in Goal 9 of the SDGs, and meet Aspiration 2 of Agenda 2063, governments must step up in their commitment to producing both domestic and external financial resources dedicated to infrastructure development. Where can African countries then locate the funding required to complete these projects? What novel and untapped resources can be used to support Africa's infrastructure? There is the need to mobilise resources to bridge the infrastructure gap and this presents an opportunity for pension funds, which are currently underutilized in SSA (Juvonen et al., 2019; Sy, 2017).

Researchers have proposed that institutional investors like pension funds, sovereign funds, and insurance could be a major source of funding for these projects. Along with other institutional investors such as insurance companies, and sovereign wealth funds, pension funds have the potential to serve as valuable sources of long-term investment resources due to their long-term investment horizons (AfDB 2021). According to the World Bank Group Report (2017), one of the strategies to improve infrastructural needs and support includes sustainable growth through private partnership. Pension funds in the six main African markets are expected to expand to $7.3 trillion by 2050 (up from $800 billion in 2014) if favourable demographic, economic, and regulatory conditions exist. At this rate of growth, African pension funds could spend nearly 20% of their total yearly assets on infrastructure, contributing $77 billion to overcome the continent's infrastructure financing shortfall (Maurer, 2017).

Pension funds can be considered mostly because of the steady growth it has had over the past years (*see Table 2 in appendix*). These growths could be attributed to the fact that there are significant improvements in savings; people have become more conscious of retirement, an increase in labour force, and flexibility in the system. According to World Bank Research Report (2020), one of the biggest institutional investors in the capital market is pension funds. Pension funds have established themselves as one that can be relied on for the majority of development throughout the sectors of the economy. Similarly, from the risk-return and diversification point of view, pension fund managers may invest in infrastructure due to the fact that it is long-term in nature, has low correlation with market value financial asset hedges against inflation, has cash flow stability, and lastly social development objective can easily be matched to financial interest. In other words,infrastructure has a low ratio of risk and return, (Andrews & Wahba (2007); Alfen & Weber (2010); Sawant (2010)).

It has been a little over a decade since researchers took an interest in looking at the possibilities of pension funds being invested in infrastructure development. Even though infrastructure is now considered an alternative investment asset, according to OECD, little of pension fund is invested actually in this asset. The appetite to invest in infrastructure started growing from the developed countries after the working papers of Inderst (2010), and Della Croce (2012), which outlined the importance of investing in infrastructure. These researchers also examined the pros and cons of investing in infrastructure and concluded that investing in this kind of asset needed a lot of strict regulation. Pension funds is said to affect infrastructural development in several ways and there exist many channels through which pension funds can be invested in infrastructure to bring development and growth. If pension funds are not investing directly in infrastructure, what mechanism can they use to bring about development in infrastructure? Alonso et al. (2016) contend that there is no direct link between pension funds and infrastructure development within the vicious cycle, but rather a mechanism through which pension funds might influence infrastructure development. One of these mechanisms is the capital market (See fig 5.1). This relationship to this end, has not been examined by any study.

Considering the fact that infrastructural gap has widened in Africa, and more so because of the COVID-19 pandemic, bridging this gap calls for a lot of innovation in the mobilizing of resources. One of these innovative ways is pension funds because of their long-term nature and the steady growth of the funds in Africa (*see Table 2 in appendix*). Again, African economies are in the early or middle stages of demographic transition, therefore, the age dependency ratio is low, which makes pension funds one source of funds that can be used for long-term investments like infrastructure. Considering the indirect relationship between pension funds and infrastructure development, the study examined firstly the relationship between pension funds and infrastructure

development and, secondly, the indirect relationship by interacting pension funds and capital markets on infrastructural development. The intermediation theory and the Alonso et al. (2016) pension funds and infrastructure vicious cycle as shown in figure 5.1 aid in establishing these relationships. Empirical literature is scarce on this phenomenon and one major contribution of this study is to discuss this topic more specifically in an African context where infrastructure deficit is wide.

The remainder of the paper is structured into the theoretical and empirical literature, methodology, and findings are discussed next, and the study is then concluded with pertinent recommendations.

## *5.2 Literature Review*

A review of the of the theoretical as well as existing literature on the subject matter is given in this section.

### 5.2.1 Theoretical Literature

Pension funds, as significant participants in capital markets, play a vital role in allocating long-term capital to infrastructure projects. Pension funds, with their long-term investment horizon, are well suited to invest in infrastructure assets, which typically have long-term revenue streams and provide stable returns over time (see for instance: Bouteska, Abedin, & Ghouli-Oueslati (2023); Gupta and Sharma (2022); Andonov, Kräussl, & Rauh (2021) and Della Croce and Gatti (2015)). By investing in infrastructure, pension funds contribute to the development of essential public goods, such as transportation networks, energy systems, and communication networks, which are crucial for economic growth (OECD, 2015).

Pension funds, through their investments in infrastructure projects, help address the financing gap for infrastructure development. They provide long-term funding often not readily available through traditional bank loans or government financing. By participating in infrastructure

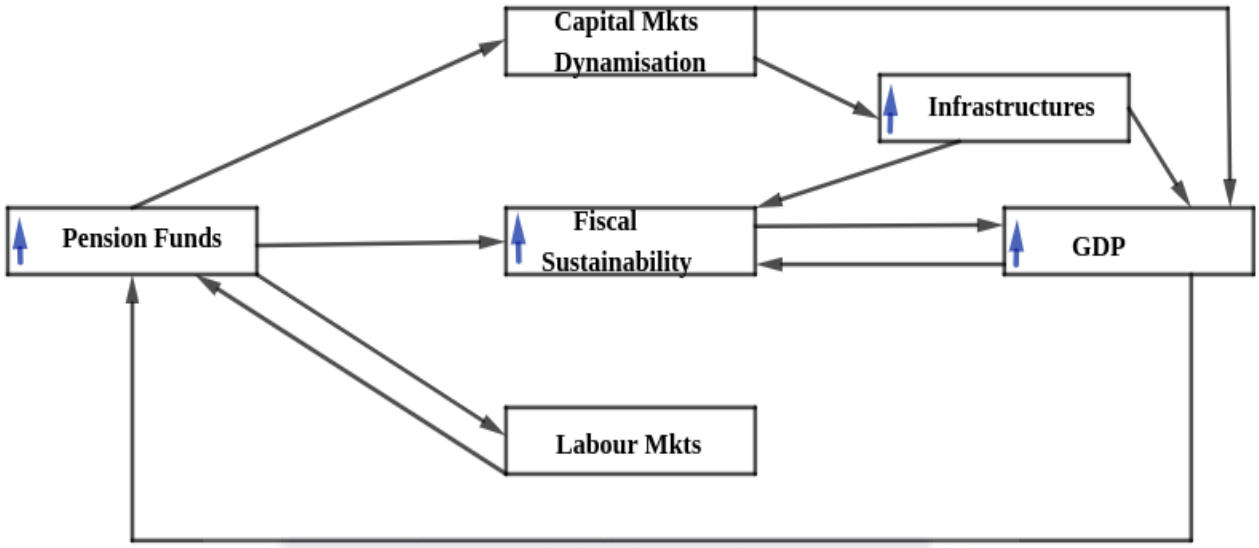
investments, pension funds contribute to the expansion and improvement of infrastructure, which in turn promotes economic growth and development. This is also said to be a socially responsible investment, (Findlay and Moran, 2019).

The infrastructure-led growth theory argues that infrastructure development can act as a catalyst for broader economic growth. According to this theory, investments in infrastructure have multiplier effects on the economy, generating positive externalities and fostering economic activity in various sectors (Agenor (2010), World Bank, (1994)). Infrastructure development stimulates employment, attracts private investment, and enhances the overall competitiveness of a country.

Estache & Fay, (2010) posited that pension funds investment in infrastructure projects contributes to the creation of employment opportunities and income generation. Infrastructure investments generate a demand for labor and stimulate economic activity in related industries, such as construction, manufacturing, and services. This, in turn, leads to increased consumption, tax revenues, and economic growth.

Furthermore, infrastructure development supported by pension funds can have a positive impact on the overall investment climate and attract foreign direct investment (FDI). Well-developed infrastructure, such as efficient transportation networks and reliable utilities, creates an attractive environment for businesses and investors (Asiedu & Lien, 2011). Pension funds' participation in infrastructure investments helps create a virtuous cycle of economic growth, attracting both domestic and international investments.

**Figure 5.1: Pension Funds and Infrastructure: The Theoretical Vicious Circle**




**Source:** Alonso *et al* (2016)

### 5.2.2 Empirical Literature

Generally, a lot of discussions have taken place concerning investments of pension funds in infrastructure development across the globe by the World Bank, AfDB, ICA, OECD, and International Organisation of Pension Supervisors (IOPS), among others. In developed countries, Canada and Australia have been the pioneers of infrastructure investments from pension funds since the 1990s and are currently the countries with the highest allocations in infrastructure, (Inderst, 2014). Some developed countries are still having low asset allocation to infrastructure. Less developed countries are more focused on other assets than infrastructure. (*see table 18 in appendix*)

The decision to move pension funds to the infrastructure asset class was first made in Canada, home of the world's largest pension fund. Skerrett (2018) offers a thorough examination of how Canada spearheaded the shift in investing strategies away from traditional shares, Treasury bills,

and bonds and toward categories of 'other' assets, with a focus on private equity and public infrastructure. Africa's infrastructure gap is the biggest and most significant gap now debated regarding the continent's development, surpassing all other gaps such as human capital, microfinance, and fine-tuning institutional development strategy (Goodfellow, 2020).

The literature is reviewed by firstly considering the relationship between pension funds and infrastructural development, then the relationship between capital market and infrastructural development. One thing to be noted here is that the literature on these nexuses isinsufficient and that is one major contribution of this chapter.

#### 5.2.2.1 Pension Funds and Infrastructure Development:

Many national infrastructures have profited substantially from the investment of pension funds over the years, including the water utilities in Chile (financed by Ontario Teachers' Pension funds), the airports in Britain and Europe (supported by OMERS), and the ports in Australia (funded by the Ontario Public Sector Pension Investment Board [PSPIB]). Pension fund investors' perceptions of the role pension funds can play in infrastructure development have become strongly influenced by the overwhelmingly positive press surrounding these investments and the clamor from pension fund investors in other countries as well as the UK for a greater selection of viable projects.

According to Inderst (2010), although infrastructure investment has a number of unique and alluring characteristics that have piqued the interest of pension fund managers, the most crucial one is the consistent and predictable payback cash flows connected with infrastructure projects. Again, most countries that are plagued with public debt can have the opportunity to utilize pension fund assets to build high-quality infrastructure without adding to the debt.

Siemiatycki (2015) in a case study on Canadian pension funds investors in transport infrastructure, sought to examine the opportunities and challenges available to pension funds when involving themselves in financing, operation, and delivery of transportation infrastructure. He argued that previously, African, European, and American pension fund managers were reluctant to adopt this strategy using the excuses of regulations to restrict participation of pension funds in infrastructure investment. Many countries are, nevertheless relaxing these regulations to allow more funds to be available for infrastructural projects. It can be said that now there has been a rise in diversification into other asset classes of European and American pensions whilst Africa is still on the average due to high inflation, political and economic instability. The author posited that due to the variance of the pension structure, regulatory environment, and benefit plans across countries, care must be taken in generalizing results, but also agreed the largest pension funds had certain universal characteristics in their investment profile and areas of interest.

According to Collier (2014), securing international private funding for African infrastructure stressed the need for foreign private finance since the continent's demand for infrastructure much outweighs its ability to fund it. He argues that deficiency in infrastructure creates impediment to the expansion of the economy. According to Collier (2014), there are four main contributors to infrastructural needs in Africa; government, donors, private sector institutions, OECD countries, and China. Over the years now, donors have switched from infrastructural spending to social spending, leaving the infrastructural gap widened. Again McKenzie (2021) confirmed that the gap widened when multilateral and bilateral withdrew their support during the COVID-19. Africa therefore needs to find innovative means of bridging this gap.

While Inderst (2009) explored the theoretical basis of investing pension funds' assets in infrastructure, whether they are already practising it or not and how regulators can encourage them

to do it, Alonso et al. (2016) performed a panel data analysis to test the importance of the financial regulatory stance for pension fund decisions to invest in infrastructure. Their results show that financial regulatory restrictions on pension funds to invest in infrastructure, the institutional framework, and factors related to the depth and strength of the financial markets could be important. More so, Della-Croce (2012) concluded that pension funds are preferred for investment on a global basis primarily in large unlisted equities and mature infrastructure project.

Sy (2017) in a discussion paper on how Africa can leverage pension funds for financing infrastructural development concluded that given the appropriate governance, regulation, and effective instruments for assessing and managing the unique risks associated with long-term infrastructural investment, pension funds have the capacity to transform the infrastructural landscape of the continent.

The review conducted by Onwuka and Nwafor (2017) explored the potential of using the largely untapped pension funds in Nigeria to address the infrastructural financing needs. The authors put forth the argument that it is important to re-evaluate the regulatory and institutional framework governing pension funds administration to make way for creative use of some of the pension funds to fund infrastructure. In this same vein, using a mixed method approach, Christian and Wobiaraeri (2016) found a significant relationship between the superannuation pension account and economic and social infrastructure when examining the relationship between pension fund administrators and infrastructure financing in Nigeria. The authors concluded that investment in infrastructure is crucial to the growth of every economy.

The work of Juvonen et al. (2019) delved into the analysis of potential opportunities for the MDBs, including the African Development Bank (AfDB), to establish collaborative relationships with

institutional investors. The goal is to facilitate the mobilization of additional resources dedicated to the development of infrastructure in Africa. According to Arezki and Sy (2016), the African continent's ability to address its greenfield infrastructure, which often involves high risks, is dependent on a careful balancing act between development banking and institutional long-term investment like pension fund.

#### 5.2.2.2 Capital Market and Infrastructure Development:

Capital markets encourage the participation of private sector in infrastructure project and this eases the pressure on government to be the biggest financier of infrastructure projects in many countries. When the private sector is actively involved in financing infrastructure projects, the burden that the government imposes on the taxpayer in order to meet these infrastructure needs is reduced. Regan (2017), in investigating the relationship between capital markets, infrastructure investments, and economic growth in the Asian Pacific Region, concluded that the capital market is important to mobilize funds locally to finance infrastructure development, however, the slow integration of the region's market needs a continued reform to achieve this.

Discussion on how private partnership is needed in infrastructure financing cannot be overemphasized (see for instance: IOPS (2020); Hyun, Park & Tian (2018); Collier (2014); Oyedele (2014); Erol, & Ozuturk (2011)). Most of these private partners are institutional investors like pension funds, insurance companies, and sovereign wealth. Investment of pension funds in infrastructure received attention a little over a decade ago. Stewart and Yermo (2012) attest to the fact that investment of pension funds in infrastructure is pretty new; the focus has largely been on mature markets, and investing in new markets needed a lot of prudent regulations to guide it.

The IOPS (2020) report revealed that pension funds in most countries allow for investment in infrastructure, be it directly or indirectly, with majority of the countries investing indirectly

because of lack of supervision for direct investment. which may be risky for such funds. *Table16* in the appendix shows the various allocations for infrastructure investments in some selected countries. It is therefore clear, according to this report, that, majority of selected countries do not have restrictions on investment in infrastructure but require prudent regulations for such investments and the indirect investment is done through the capital markets.

Ray & Bisbey (2020) emphasized the importance of the capital market through which domestic and corporate savings are made from the market-listed financial products across asset classes to bridge infrastructure gaps in Asia. Hyun, Park & Tian (2017) also found in their study that the bond market contributed significantly to the development of infrastructure in Europe, and therefore improving regional integration of Asian bond markets would be useful to reach efficient economies of scale to foster infrastructure bond markets.

Furthermore, the idea of leveraging capital markets to direct greater resources towards infrastructure development while mobilising assets owned by institutional investors such as pension funds and insurance firms were investigated by Alper and Verougstraete (2018) and they proposed that different criteria work for different countries under different situations.

As discussed earlier, the literature on these nexuses are scarce and this opens it up for more discussion and exploration. Moreso because the phenomenon gained the attention of researchers about a decade ago, and most of the literature are more of discussion papers and proposals, it leaves a gap in the literature. Therefore, it becomes important to examine some of these relationships empirically. According to the IOPS (2020) report and most of the literature reviewed in this chapter, it can be noticed that there are restrictions on investing pension funds in infrastructure even though there is a percentage of the funds that could be invested. The concern has mainly been

the regulatory, institutional framework, supervision of infrastructure investment and integration of the capital market. The study therefore fills a significant knowledge gap by firstly examining the relationship between pension funds and infrastructure development in 52 African countries where data exist. Secondly, with the help of the pension fund-infrastructure development vicious lifecycle of Alonso et al 2016, and the capital intermediation theory, the chapter will empirically determine the effect of pension funds and capital market on infrastructure development in Africa. This brings significant contributions both to literature and policymakers.

## *5.3 Methodology*

### 5.3.1. Data

The study utilized panel data on 52 African nations from 2005 to 2017 to examine the linkages between pension funds, capital market, and infrastructural development and also, to determine how the interaction of pension funds and capital market will lead to infrastructural development. The study sourced its data from the World Development Indicators (WDI), and International Monetary Fund (IMF), World Bank, OECD database, and African Development Bank (AfDB), although the panel data was not balanced. Due to the unavailability of data on infrastructural development in African countries within the period of 1990 to 2005, this particular study will focus on the period of 2005 to 2017 when data exist. Again, the 52 countries were selected based on the availability of the data on variables for this study.

### 5.3.2 The Model Specification

#### 5.3.2.1 Relationship between Pension Funds and Infrastructural Development

The paper employed a GMM dynamic panel estimator given the panel structure of our data, which corrects for the endogeneity of explanatory variables, time-specific effects, and unobserved country-specific effects. To account for endogenous persistence, we incorporated the lag-

dependent variable into each equation. This suggests that we are concentrating on the short-term dynamics of the financial markets in our study. Again, the number of countries under study is 48 which is greater than the number of time periods under the study and this satisfies one of the conditions for the use of the dynamic GMM estimator; N>T.

We analyze the impact of pension funds and the capital market on infrastructural development by defining a baseline model in which infrastructural development depends on its one-period lag, pension funds, the capital market, and the set of estimated controls in Eqn. (1) below

$$\mathbf{ID}_{it} = \beta_1 \mathbf{ID}_{it-1} + \beta_2 \mathbf{PF}_{it} + \beta_3 \mathbf{CM}_{it} + \sum_{k=4}^{N} \beta_k C_{it} + \sigma_i + \mu_t + \varepsilon_{it} \qquad (1)$$

where $\mathbf{ID}_{it}$ is the infrastructural development of country *i* at time *t*; $\mathbf{ID}_{it-1}$ is the infrastructural development lag representing the initial condition; $\mathbf{PF}_{it}$ is pension fund assets; $\mathbf{CM}_{it}$ is capital market which is comprised of stock and bond markets; $C_{it}$ is a vector of control variables; ($\beta_1 \ldots\ldots \beta_4 \ldots\ldots \beta_N$) are the coefficient parameters; $\sigma_i$ is country-specific fixed effects; $\mu_t$ is time effects while $\varepsilon it$ is the idiosyncratic error term. We estimate Eqn. (1) above by employing the system generalized method of moments (GMM). This approach, in contrast to conventional cointegration and ordinary least squares techniques, addresses the econometric issues raised by the endogeneity of the lagged dependent and the unobserved $\gamma i$ that are prominent in growth models.

In equation 1, infrastructural development (ID) is the dependent variable measured by infrastructural development index of a country. This data was sourced from the AfDB database. Following earlier studies by Sadorsky (2010, 2011) and Doytch and Narayan (2016), pension fund is a key independent variable in equation 1. Pension funds are defined as any plan, fund or scheme that provides retirement income. It is measured as pension fund assets to percent GDP. Data were

obtained from the Global Financial Development database of the World Bank. Higher values indicate greater contributions of the funds at a given time across the countries.

The study is expected to produce either a positive or a negative effect of pension funds on the ID index. If the analysis reveals a positive effect, it implies that countries that contribute more funds to the scheme tend to invest more into ID. Conversely, a negative effect suggests that greater pension funds lead to a reduction in ID. This implies that countries with substantial pension funds may choose to direct more of the funds into other sectors of the economy rather than investing in infrastructural development. Capital market development, which is also a key independent variable, decomposes into two indicators, namely:

(1) stock market is measured by stock market capitalization to GDP and stock market total value to GDP

(2) bond market measured by domestic government bonds and corporate bond issuance as a percentage of GDP. Data are obtained from the World Development Indicators.

In equation 1, we control for Foreign Direct Investment (FDI), unemployment, money supply (broad money to GDP), and institutions. The institutional quality is represented by an aggregate of six indicators: rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice, and accountability. To obtain data on these control variables, the study relies on the Global Financial Development database.

Institution and infrastructure are expected to be positively related. This is because countries with better institutions are able to shape capital market development. Unemployment rate is the total number of unemployed people as a percentage of the total number of individuals in the labour force. We expect either a positive or a negative impact of trade openness on infrastructure. A

positive impact shows that countries with more trade openness may attract greater investment in infrastructure. However, a negative impact suggests that liberalization and deregulation may lead to a negative impact of trade openness on infrastructure. Moreso, broad money supply is expected to positively affect capital market development. This shows that countries with more money in circulation provide an incentive to improve capital market development.

#### 5.3.2.2 Interactions

According to Alonso et al. (2016), theoretical vicious life cycle of pension funds and infrastructural development, pension funds do not have a direct relationship with infrastructural development but establishe this relationship through a channel of which the capital market is one. We therefore investigate how pension funds and capital markets affect infrastructural development by including a multiplicative interaction term of the pension fund and capital market variables. This interactive term is included in the GMM framework as specified in Eqn (2):

$$\mathbf{ID}_{it} = \Theta_1 \mathbf{ID}_{it-1} + \Theta_2 \mathbf{PF}_{it} + \Theta_3 \mathbf{CM}_{it} + \Theta_4 (\mathbf{PF}_{it} * \mathbf{CM}_{it}) + \sum_{k=5}^{N} \theta_k \boldsymbol{C}_{it} + \boldsymbol{\sigma}_i + \mu_t + \varepsilon_{it} \qquad (2)$$

where $\mathbf{ID}_{it}$ is the infrastructural development of country *i* at time *t*; $\mathbf{ID}_{it-1}$ is the infrastructural development lag representing the initial condition; $\mathbf{PF}_{it}$ is pension fund assets; $\mathbf{CM}_{it}$ is capital market which is comprised of stock and bond markets; $\mathbf{PF}_{it} * \mathbf{CM}_{it}$ is the interactive term between pension funds and capital market; $\boldsymbol{C}_{it}$ is a vector of control variables; $(\Theta_1 \ldots\ldots \Theta_5 \ldots\ldots \Theta_N)$ are the coefficient parameters; $\boldsymbol{\sigma}_i$ is country-specific fixed effects; $\mu_t$ is time effects while $\varepsilon it$ is the idiosyncratic error term.

The study computes the models' net effects in order to interpret the data, which is in line with Asongu and Nwachukwu (2017). Unconditional and marginal effects are used to calculate net impacts, according to Asongu and Odhiambo (2019). This can be found in equation 3 below:

**Net Effect =>** $\frac{\partial Infrastructural\ Devt_{i,t}}{\partial Pension\ funds_{i,t}} = \theta_2 + \theta_4 Capital\ Market\ Devt_{it}$ **(3)**

Again, we control for Foreign Direct Investment (FDI), unemployment, money supply (broad money to GDP), and institutions, represented by an aggregate of six indicators (rule of law, government effectiveness, control of corruption, political stability, regulatory quality, and voice and accountability).

**Table 5.1**
***Definition of Variables:***

| VARIABLE | MEANING | MEASUREMENT |
|---|---|---|
| PF | Pension funds | Pension fund assets % GDP |
| CM | Capital Market | Stock Market capitalisation % GDP |
| | | Stock Market Total Value Traded % GDP |
| | | Corporate Bond Issuance %GDP |
| | | Government Domestic Bond %GDP |
| ID | Infrastructural Development | African Infrastructural Development Index |
| FDI | Foreign Direct Investments | Net Inflows as percentage of GDP |
| TRADE | The sum of imports and exports of goods and services | Sum of exports and imports of goods and services as % of GDP |
| UNEMPLOYMENT | Labour force without work but seeking for work | Unemployment, total (% of total labour force |
| BROAD MONEY | The sum of currency outside bank | Sum of currency outside bank as % of GDP |
| INSTITUTIONS | an aggregate of six indicators (rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability | |

### 5.3.3 Estimation Technique

Both equations 1 and 2 are estimated using the System Generalised Method of Moment (system GMM) proposed by Blundell and Bond (2000). One of the challenges that may arise in the specified model is the issue of endogeneity. Given the dynamic nature of the term and potential bi-causal relationship between certain explanatory variables and the dependent variable, traditional techniques such as both the Ordinary Least Squares (OLS) and fixed effects may not be suitable. To address this, the study adopts the dynamic system GMM approach. The adoption of the system GMM methodology in this study is an improvement over the different GMM proposed by Arellano and Bond. The system GMM is particularly advantageous because it addresses the issue of finite sample bias that can arise from weak instruments, particularly when unit roots are present. System GMM accomplishes this by introducing higher lags[6], beyond just the first lag (as in the case of Arellano-Bond GMM) as instruments for the lagged dependent variable. This ensures t there is zero correlation between the random component and the lagged dependent regressor. Furthermore, the system GMM corrects for any potential correlation between the unobserved country-specific effect and the difference variables. This correlation allows for the use of lagged first difference as instruments for levels. This quality makes it a more efficient estimator than the static fixed effect estimator (Baum & Rother, 2013). To ensure the robustness of the results, the study also conducted the Im, Pesaran and Shin (IPS) (2003) test for stationarity and the Sargan test for over-identification to investigate the validity of instruments. Additionally, the study corrected for autocorrelation by employing the Arellano and Bond (1991) test for serial correlation. Using the Discroll and Kraay (1998) correction approach, cross-sectional dependence among the variables

[6] The use of higher lags of the respondent variable as instruments hinges critically on the assumption of no autocorrelation in the initial disturbance term.

was eliminated. The estimations employed strong standard errors. There were additional robustness tests, as shown in the tables under Panel B; (*Tables 10, 11, 12, 13, and 14 in appendix*)

## *5.4 Discussion of Results*

This section of the study delves into the findings obtained from the empirical estimation. Firstly, the descriptive statistics will be discussed, followed by the correlation matrix and the regression results.

### 5.4.1 Descriptive Statistics

*Table 5.2* presents the descriptive statistics. Infrastructural development with a mean of 21.30 shows that there is still quite a significant gap to bridge since the index assigns values to quality of infrastructure in the country. Pension funds however had an average of 12.05 which indicates the majority of the funds received are from a few developed systems. Further, stock market capitalization, stock market total traded value, and government bonds had an average of 28.57, 8.54 and 25.93 respectively. This indicates relatively low values compared to the maximum values in the data. Corporate bond with a mean of 1.13 was relatively high compared to the maximum value of 3.81. FDI received an average of 5.12 which indicates low net of inflows and outflows. Trade also had a mean of 78.07 whilst unemployment was 8.63. Broad money and institutions had means of 39 and -0.64 respectively.

### 5.4.2 Correlation Results

*Table 5.3* lists the findings of the correlation matrix. The correlation results demonstrate that, overall, none of the variables are substantially connected with one another, though some of the correlations are not statistically significant. Since the correlation statistics simply reveal the relationship between two variables without accounting for the impact of additional variables, they

are not very informative concerning multicollinearity. The variance inflation factor results in *Table 5.4* however, show that the variables used for the estimation do not have multicollinearity with a mean of 1.46.

**Table 5.2**
***Descriptive Statistics***

| Variables | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Infrastructural Development | 676 | 21.297 | 18.233 | 1.12 | 94.11 |
| Pension Funds | 661 | 12.045 | 18.308 | 0.06 | 99.66 |
| Stock Market Capitalisation | 603 | 28.567 | 25.018 | 0.01 | 169.385 |
| Stock Market Traded Value | 656 | 8.535 | 17.409 | 0.016 | 123.151 |
| Government Bonds | 673 | 25.93 | 40.524 | 0 | 181.505 |
| Corporate Bond | 674 | 1.13 | 1.059 | -0.783 | 3.815 |
| FDI | 660 | 5.117 | 8.968 | -6.057 | 103.337 |
| Trade | 641 | 78.067 | 42.144 | 19.101 | 376.224 |
| Unemployment | 663 | 8.63 | 6.743 | 0.285 | 31.921 |
| Broad money | 628 | 38.998 | 30.702 | 0.032 | 251.618 |
| Institutions | 676 | -0.639 | 0.578 | -1.887 | 0.853 |

**Infrastructural development** is given by African Infrastructural Development Index, **Capital Market** is measured by Stock Market capitalization as a % of GDP, Stock Market Total Value Traded as as % to GDP, Corporate Bond Issuance as a % of GDP, Government Domestic Bond as a % to GDP, **Pension Funds** is given by Pension fund asset to GDP, **FDI** is Net Inflows as percentage of GDP, **Trade** is Sum of exports and imports of goods and services as % of GDP, **Unemployment** is Unemployment total (% of total labour force ), **Broad money** is Sum of currency outside bank as % of GDP, and **Institutions** is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability.

***Source: Author's own computation***

**Table 5.3**

***Pairwise correlations***

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Infrastructure Devt | 1.000 | | | | | | | | | | |
| (2) Pension funds | 0.074 | 1.000 | | | | | | | | | |
| | (0.059) | | | | | | | | | | |
| (3) Stock Mkt Cap | 0.157 | -0.177 | 1.000 | | | | | | | | |
| | (0.000) | (0.000) | | | | | | | | | |
| (4) Stock Mkt Tot Val Traded | 0.362 | 0.132 | 0.848 | 1.000 | | | | | | | |
| | (0.000) | (0.001) | (0.000) | | | | | | | | |
| (5) Government bonds | 0.082 | -0.096 | -0.018 | 0.120 | 1.000 | | | | | | |
| | (0.033) | (0.013) | (0.650) | (0.002) | | | | | | | |
| (6) Corporate bonds | 0.001 | 0.084 | 0.043 | -0.183 | 0.088 | 1.000 | | | | | |
| | (0.981) | (0.031) | (0.296) | (0.000) | (0.023) | | | | | | |
| (7) FDI | -0.040 | -0.029 | -0.054 | 0.048 | 0.033 | 0.163 | 1.000 | | | | |
| | (0.304) | (0.467) | (0.189) | (0.221) | (0.399) | (0.000) | | | | | |
| (8) Trade | 0.255 | -0.106 | 0.058 | 0.169 | 0.026 | 0.330 | 0.324 | 1.000 | | | |
| | (0.000) | (0.008) | (0.165) | (0.000) | (0.515) | (0.000) | (0.000) | | | | |
| (9) Unemployment | 0.465 | 0.302 | 0.030 | 0.186 | -0.089 | 0.077 | -0.062 | 0.304 | 1.000 | | |
| | (0.000) | (0.000) | (0.463) | (0.000) | (0.021) | (0.046) | (0.117) | (0.000) | | | |
| (10) Broad money | 0.661 | 0.046 | 0.191 | 0.192 | 0.014 | 0.169 | -0.074 | 0.227 | 0.296 | 1.000 | |
| | (0.000) | (0.251) | (0.000) | (0.000) | (0.731) | (0.000) | (0.066) | (0.000) | (0.000) | | |
| (11) Institutions | 0.423 | 0.068 | -0.117 | 0.117 | -0.088 | 0.046 | 0.076 | 0.196 | 0.321 | 0.281 | 1.000 |
| | (0.000) | (0.082) | (0.004) | (0.003) | (0.023) | (0.238) | (0.052) | (0.000) | (0.000) | (0.000) | |

***Source: Author's own computation***

**Table 5.4**
***Variance inflation factor***

| | VIF | 1/VIF |
|---|---|---|
| Stock market capitalization (SMC) | 2.179 | .459 |
| Stock market total value traded (SMTVT) | 2.104 | .475 |
| Trade | 1.56 | .641 |
| Corporate bond (CB) | 1.498 | .667 |
| Unemployment | 1.374 | .728 |
| Broad money | 1.21 | .826 |
| Pension funds | 1.207 | .828 |
| Institutions | 1.188 | .841 |
| FDI | 1.149 | .871 |
| Government Bonds (GB) | 1.103 | .906 |
| Mean VIF | 1.457 | . |

***Source: Author's own computation***

### 5.4.3 Empirical Results

The estimation results presented in *Table 5.5* reveal that the lag of infrastructure development was positive and highly significant in all models of capital market measure, which also justifies the use of the GMM model. This implies that previous development is likely to influence current development. Pension funds, on the other hand, was negative across all the measures of capital market. This implies that African pension fund managers have not come to appreciate the use of the funds for infrastructural development. Therefore, African countries that contribute more to pension funds invest the funds in other assets than infrastructure. This confirms the argument of Siemiatycki (2015) that African countries are still reluctant to adapt to the strategy of directing pension fund investment into infrastructure.

All measure of capital market development were positive indicating a positive influence of capital market on infrastructural development. This tells us that the stock market plays a significant role in infrastructural development in Africa. When the capital market develops, there is a spillover effect on the development of infrastructure, and Xueliang (2013) has confirmed this.

Control variables like FDI and Trade were negative across all models. On the other hand, Unemployment, Broad money, and Institutions were significantly positive across all the models.

In the interactive estimation in *Table 5.6*, the interactive effects were all positively significant. This implies that in the presence of the capital market, pension funds influence infrastructural development positively, however considering the net effects, the positive influence is reduced at higher levels of stock market traded value and government bonds whilst it increases for corporate bonds.

Trade was negatively significant on infrastructural development. Though one may expect that trade among African nations could bring development in infrastructure, this is not so. The results prove otherwise that trade actually reduces infrastructural development and it was the same across all models. This could mean that the sum of exports and imports of goods and services may exist in other sectors other than transport, ICT and energy which constitute infrastructure.

Unemployment, on the other hand, was significantly positive across all models. This could mean that the kind of infrastructural development in Africa may require high-level skills and specialisation, and becausea large percentage of people are unemployed, and in the informal sector, their services could not be employed in such areas. On the other hand, considering the large informal sector in Africa, constituting about 85% of the population, individuals who are considered unemployed could be developing themselves in a way that may contribute to infrastructural development. Take for instance MoMo (Mobile Money) vendors and the electricity distribution vendors, they are not considered formal workers but they contribute significantly to the development of energy and ICT and this could contribute to the positive relationship.

Broad money was also highly positively significant across all the models. This indicates that when money supply increases, it leads to infrastructural development in Africa compared to when there is no money in the system and people are holding on to their money.

FDI was negatively significant across models except stock market capitalisation. Increase in FDI does not bring about infrastructural development in Africa. This contradicts Collier (2014). It could mean that FDI may be channeled to other sectors other than transport, energy and ICT.

Institutions was also highly significant across models. This indicates that in a strong institutional environment, there is much confidence in investing in infrastructural development compared to

when institutions are weak. This shows that regulations are very crucial in investing in infrastructural development, as confirmed in the works of (Inderst (2009), Della-Croce (2011), Arezki and Sy (2016) among others),

In addition, the results of the GMM estimation presented in *Table 5.6* indicate that when pension funds interacted with capital markets variables, it was significant for all except stock market capitalisation. This shows that capital market is a medium or channel through which pension funds can get to infrastructural development. It also confirms Alonso et al. (2016) model in Fig.5.1 that pension does not have a direct relationship with infrastructural development but rather, it passes through the medium of capital markets. It can be noticed that due to few infrastructure assets in the African capital markets, fund managers are not willing to invest much in the capital markets even if their characteristics align with the long-term nature of pension funds. Ultimately, they should be able to fulfil their obligation to their contributors. It is, however, not surprising that the institutional quality variable came out as positive, indicating that institutions play a crucial role in infrastructural development, as suggested by Sy (2017) and Onwuka and Nwafor (2017). Strong institutions will restrict investment in infrastructure more than weak ones because of the fear of not meeting their obligation towards contributors.

**Table 5.5**
***System GMM Estimation (Independent Effects)***

| Variables | (1) Model 1a | (2) Model 1b | (3) Model 1c | (4) Model 1d | (5) Model 1e |
|---|---|---|---|---|---|
| L.Infrastructure Devt | 0.929*** | 0.919*** | 0.924*** | 0.923*** | 0.926*** |
| | (0.0253) | (0.0292) | (0.0277) | (0.0279) | (0.0270) |
| Pension funds | -0.111*** | -0.0520* | -0.0304* | -0.0279* | -0.0987*** |
| | (0.0188) | (0.0276) | (0.0156) | (0.0151) | (0.0210) |
| Stock Market Capitalisation | 0.0848*** | | | | 0.117** |
| | (0.0215) | | | | (0.0466) |
| Stock Market Traded Value | | 0.0738** | | | -0.130 |
| | | (0.0356) | | | (0.147) |
| Corporate Bond | | | 0.0754* | | -0.433 |
| | | | (0.0389) | | (0.574) |
| Government Bond | | | | 0.0162* | 0.0119 |
| | | | | (0.00823) | (0.0102) |
| FDI | -0.0501 | -0.0761* | -0.0750* | -0.0807** | -0.0460 |
| | (0.0328) | (0.0400) | (0.0407) | (0.0408) | (0.0329) |
| Trade | -0.0328** | -0.0344** | -0.0338** | -0.0361** | -0.0277* |
| | (0.0149) | (0.0149) | (0.0147) | (0.0148) | (0.0147) |
| Unemployment | 0.704*** | 0.810*** | 0.839*** | 0.839*** | 0.703*** |
| | (0.114) | (0.113) | (0.115) | (0.111) | (0.119) |
| Broad money | 0.304*** | 0.314*** | 0.315*** | 0.313*** | 0.306*** |
| | (0.0339) | (0.0339) | (0.0335) | (0.0331) | (0.0328) |
| Institutions | 3.404*** | 3.714*** | 3.954*** | 4.101*** | 3.528*** |
| | (1.238) | (1.236) | (1.164) | (1.166) | (1.210) |
| Constant | 6.598*** | 7.060*** | 7.442*** | 7.097*** | 5.848*** |
| | (1.451) | (1.470) | (1.423) | (1.398) | (1.394) |
| Observations | 472 | 508 | 525 | 523 | 470 |
| Number of id | 45 | 47 | 47 | 47 | 45 |

| | | | | | |
|---|---|---|---|---|---|
| No. of instruments. | 17 | 17 | 17 | 17 | 20 |
| AR1 | 2.233 | 2.303 | 2.305 | 2.293 | 2.217 |
| P-value | 0.0256 | 0.0213 | 0.000 | 0.000 | 0.000 |
| Hansen's Test | 13.39 | 11.17 | 11.45 | 11.38 | 13.71 |
| P-value | 0.0992 | 0.000 | 0.0212 | 0.0219 | 0.0266 |
| F-test | 4384 | 3701 | 3751 | 3874 | 2558 |
| P-value | 0.000 | 0.192 | 0.177 | 0.181 | 0.0897 |

**Infrastructural development** is given by African Infrastructural Development Index, **Capital Market** is measured by Stock Market capitalization as a % of GDP, Stock Market Total Value Traded as as % to GDP, Corporate Bond Issuance as a % of GDP, Government Domestic Bond as a % to GDP, **Pension Funds** is given by Pension fund asset to GDP, **FDI** is Net Inflows as percentage of GDP, **Trade** is Sum of exports and imports of goods and services as % of GDP, **Unemployment** is Unemployment total (% of total labour force ), **Broad money** is Sum of currency outside bank as % of GDP, and **Institutions** is the aggregate of the six indicators from the World Governance Indicators, namely, rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability.

Robust Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

***Source: Author's own computation***

**Table 5.6**
***System GMM Estimation_ Interactions***

| VARIABLES | (6) Model 2a | (7) Model 2b | (8) Model 2c | (9) Model 2d |
|---|---|---|---|---|
| L.Infrastructure Devt | 0.928*** | 0.922*** | 0.919*** | 0.930*** |
| | (0.0257) | (0.0284) | (0.0293) | (0.0269) |
| Pension funds | -0.0714*** | -0.134*** | -0.105*** | -0.0830*** |
| | (0.0264) | (0.0163) | (0.0243) | (0.0170) |
| Stock Mkt Cap | 0.115*** | | | |
| | (0.0332) | | | |
| (Pension funds * Stock Mkt Cap) | -0.00453 | | | |
| | (0.00318) | | | |
| Stock Mkt Tot Val Traded | | -0.0559** | | |
| | | (0.0281) | | |
| (Pension funds * Stock Mkt Tot Val Traded) | | 0.00484*** | | |
| | | (0.000914) | | |
| Corporate bond | | | -1.469 | |
| | | | (0.924) | |
| (Pension funds * corporate bond) | | | 0.130** | |
| | | | (0.0515) | |
| Government bond | | | | -0.00907 |
| | | | | (0.0194) |
| (Pension funds * government bonds) | | | | 0.0246* |
| | | | | (0.0143) |
| FDI | -0.0484 | -0.0630* | -0.0763** | -0.0784** |
| | (0.0333) | (0.0347) | (0.0386) | (0.0394) |
| Trade | -0.0313** | -0.0297** | -0.0380** | -0.0365** |
| | (0.0147) | (0.0150) | (0.0152) | (0.0147) |
| Unemployment | 0.685*** | 0.744*** | 0.802*** | 0.812*** |
| | (0.117) | (0.114) | (0.111) | (0.114) |
| Broad money | 0.305*** | 0.310*** | 0.309*** | 0.312*** |

| | | | | |
|---|---|---|---|---|
| | (0.0344) | (0.0336) | (0.0334) | (0.0333) |
| Institutions | 3.430*** | 3.307*** | 3.470*** | 3.623*** |
| | (1.243) | (1.213) | (1.164) | (1.149) |
| Net effects | 0.0580 | -0.0301 | 3.2995 | -0.0436 |
| Constant | 6.370*** | 8.148*** | 8.440*** | 7.456*** |
| | (1.472) | (1.482) | (1.364) | (1.419) |
| Observations | 472 | 508 | 525 | 523 |
| Number of id | 45 | 47 | 47 | 47 |
| No. of instruments. | 18 | 18 | 18 | 18 |
| AR1 | -2.413 | -1.404 | -1.405 | -1.408 |
| P-value | 0.0158 | 0.0216 | 0.000 | 0.159 |
| AR2 | 2.239 | 2.298 | 2.188 | 2.224 |
| P-value | 0.251 | 0.160 | 0.194 | 0.262 |
| Sargan's Test | 51.3 | 31.2 | 31.5 | 34.3 |
| P-value | 0.22 | 0.32 | 0.287 | 0.12 |
| Hansen's Test | 13.74 | 11.30 | 11.15 | 13.06 |
| P-value | 0.0889 | 0.185 | 0.160 | 0.000 |
| F-test | 3932 | 40195 | 3225 | 5317 |
| P-value | 0.000 | 0.000 | 0.000 | 0.110 |

Robust Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

***Source: Author's own computation***

### 5.4.4 Temporal and Spatial Cross sectional Dependence Analysis:

Data with variables like regional (or spatial) variations were used in the study; these variables are crucial to the analysis's conclusion. These variances show that the data may contain some noise and dependencies in patterns. When compared to time series or spatial analysis alone, spatiotemporal analyses offer certain advantages. Given that the data was gathered over a long period of time (2005 to 2017) and across geographical locations (48 African countries), a cross-sectional dependence test was performed, and the results verified the presence of cross-sectional reliance (*see Tables 10 and 11*). *Table 14* illustrates how this was adjusted using the fixed effect Discroll-Kraay regression. The outcome serves as a robustness check and was in line with the GMM results.

### 5.4.5 Extended Discussion

The findings indicate a nuanced relationship between pension funds, capital markets, and infrastructural development in Africa. Specifically, while pension funds on their own do not directly contribute positively to infrastructure development, their interaction with capital markets plays a significant role in supporting infrastructure projects. This highlights the essential role that well-developed capital markets play in channeling pension fund investments towards infrastructure development.

Pension funds, by nature, are designed to provide long-term financial security for retirees. Their investment strategies typically prioritize safety, liquidity, and moderate returns to ensure the steady growth of retirement savings. Direct investment in infrastructure projects, which are often characterized by long gestation periods, high initial costs, and various risks (such as political, regulatory, and construction risks), may not align well with the primary objectives of pension funds.

Several factors contribute to the negative relationship between pension funds and direct infrastructure investments. Some of these are risk aversion, liquidity requirements, and regulatory constraints**.** Pension funds tend to be conservative in their investment choices, prioritizing stable and low-risk assets such as government bonds and stocks. Infrastructure investments are typically illiquid, making it difficult for pension funds to meet their liquidity needs. Regulations governing pension funds may limit their ability to invest heavily in infrastructure projects due to risk and liquidity considerations.

The positive and significant relationship observed between the interaction of pension funds and capital markets with infrastructural development underscores the importance of well-functioning capital markets. Capital markets serve as an effective intermediary, facilitating the flow of capital from pension funds to infrastructure projects. This can happen through various mechanisms: Infrastructure Bonds, Public-Private Partnerships (PPPs), and Infrastructure Funds. Capital markets provide a platform for issuing infrastructure bonds, which pension funds can purchase. These bonds are specifically designed to finance infrastructure projects and offer a relatively safer investment avenue for pension funds. Capital markets can facilitate PPPs, where private sector entities, including pension funds, invest in public infrastructure projects. These partnerships often come with risk-sharing arrangements and government guarantees that make infrastructure investment more attractive to pension funds. Specialized infrastructure funds listed on capital markets pool resources from multiple investors, including pension funds, and invest in diversified infrastructure projects. These funds offer pension funds an indirect way to invest in infrastructure while spreading risk across various projects.

The interaction between pension funds and capital markets is critical in supporting infrastructure development in Africa. While pension funds may not directly invest in infrastructure due to various

constraints, capital markets provide an effective channel to mobilize pension fund resources towards infrastructure projects. By strengthening capital markets and creating conducive investment environments, policymakers can harness the potential of pension funds to bridge the infrastructure gap and promote sustainable economic growth in Africa.

### *5.5 Conclusion and Policy Recommendations*

The results from the estimation show that capital market helps channel resources of pension funds to infrastructural development in Africa. Therefore, there is hope that pension funds can be used in bridging the infrastructural gap in Africa. Considering the large informal sector and the high rate of unemployment, it becomes difficult to improve infrastructural development in Africa. Policymakers can therefore look at how to integrate the informal sector or unskilled labour into infrastructural development in Africa. Again, since FDI is a major source of infrastructural development, according to Collier (2014), it could be one way of bridging the infrastructural gap in Africa. Governments could consider channeling some of the FDI into infrastructural development. The capital market offers a lot of investment portfolios for pension fund managers. Even though pension funds do not lead to infrastructural development directly, in the presence of capital market, pension fund is seen to be doing well. This is seen in the positive and significant coefficients of the interactive term. African governments should therefore focus on developing the capital markets since they offer a lot of opportunities for pension fund investments, and the spillover effect can be seen in the development of infrastructure. Again, strong institutions are needed for pension fund investment in infrastructure.

# Chapter Six

## Summary, Conclusion, Contributions and Recommendations

### *6.1. Introduction*

This final chapter provides the summary of the three empirical chapters, discusses their conclusions and their contributions to knowledge, provides some policy recommendations and then suggest some areas for future research.

### *6.2. Summary*

The thesis examined the role of institutional quality on the relationship between pension funds and capital market development in Africa. It further investigated the effect of the interactive role of pension funds and capital market on economic growth, as well as infrastructural development in Africa. The three (3) empirical papers were presented in chapter three, four, and five. These chapters sought to address the objectives of the study as follows: examine the role of institution on pension funds and capital markets development (chapter three); investigate how pension funds and capital market drive economic growth (chapter four); and examine the effects of pension funds and capital market on infrastructural development (chapter five).

Pension funds represent huge financial assets with the capacity to drive transformative changes in the capital market and promote economic growth as well as infrastructural development. The capital market is one medium where pension funds could be invested to bring about some of these transformations since it acts as an intermediary between surplus and deficit units. However, due to the crucial nature of pension funds, caution ought to be applied when investing such funds because it could be the only source of income for some retirees. In Chapter Three, therefore, the

study sought to examine the role of institutional quality on pension funds and capital market development. The study employed the system GMM technique of estimation for 48 African countries between the period of 1990 to 2017. Results showed that pension funds and institutional quality were negatively related to capital market development. The interaction between pension funds and institutional quality was also negative, suggesting that strong institutions are more likely to restrict investment in the capital market than weak ones. Again, the underdeveloped nature of most African markets could deter investors from investing in such. Additionally, the study examined the relationship between pension funds and institutional quality on the financial development variables and the results showed that pension funds and institutional quality positively influence financial development.

Results suggest that pension fund managers pay more attention to other financial assets, for instance, the money market, which provides fixed and reliable income than stocks, which are volatile. Since the money market is part of the financial system, the positive effect would have a positive influence on financial development. Aside South Africa, Botswana, and Namibia, most African countries have their asset allocations skewed toward fixed-income securities (Bright Africa Report, 2019).

Again, the study sought to investigate the effect of pension funds on economic growth using the capital market as a channel. Economic growth largely depends on the efficiency of the financial sector or activities within the financial sector. An important aspect of the financial sector is pension funds, which until recently have received little attention. Given the fact that pension funds accumulate huge assets and these assets could bring tremendous improvement in the growth of the economy, it becomes imperative to find a medium through which these funds can be used to bring about the growth of the economy. The capital market is one such medium and that is what the

study focused on in Chapter Four. By employing the dynamic GMM method of estimation utilizing data spanning 48 African countries from 1990 – 2017, findings suggest that the stock market positively affects economic growth, whereas pension funds negatively influence economic growth. However, there is a positive relationship between pension funds and capital market when they interact. These suggest that the presence of the capital market improves the relationship between pension funds and economic growth. In addition, the study found that the negative effect of the interaction between pension funds and capital market on economic growth is reduced at higher levels of stock market capitalization and corporate bonds whilst the positive effect is increased at stock market value traded and government bonds.

The third empirical paper examined pension funds, capital market, and infrastructural development in Africa. Infrastructural needs for Africa keep widening by the day, and governments on their own cannot finance these needs since their budgets are inadequate. Most of these developments were financed by multi-national companies and private donors but this came to a standstill when the Covid-19 pandemic set in and these supports were withdrawn. African governments now have to find innovative means to finance these needs since infrastructural development is crucial for economic growth. Infrastructural development and pension funds are both long-term and by matching these characteristics, pension funds could be a major source of funding to bridge the infrastructural deficit. If capital market could improve the relationship between pension fund and economic growth, from Chapter Four, then, there could be a possibility of improving infrastructural development too. The paper used a dataset of 48 African countries within the period of 2005 to 2017 due to the non-availability of data on the infrastructural development index variable. Using a GMM technique of estimation, the results show that even though pension funds have a negative relationship with infrastructural development, in the presence of capital market,

pension funds improve infrastructural development. This can be seen in the positive and significant coefficients of the interactive term.

### *6.3. Conclusion*

The thesis is made up of three (3) empirical papers that examined pension funds, institutional quality, and capital market development. In doing so, it first examined the role of institutional quality on pension funds and capital market development. The study again considered the impact of pension funds and capital market on economic growth. It further examined the effect of pension funds and capital market on infrastructural development.

**Objective one:**

In objective one, pension funds and institutional quality were negatively related to capital market development. However, when interacting pension funds with institutions, there was a positive and significant relationship between the interactive term and capital market development. The chapter therefore concludes that pension funds and institutional quality reduce capital market development. However, the presence of institutional quality reduces the negative influence of pension funds on the capital market. Stronger institutions are needed to safeguard the funds when investing in the capital market. Stronger institutions will restrict investment of pension funds in the capital markets than weaker ones.

**Objective two:**

Pension funds had a negative relationship with economic growth, however, the capital market on the other hand had a positive relationship with economic growth. The capital market, on the other hand, had a positive relationship with economic growth. This makes the capital market a good

medium to channel pension funds to bring about growth in the economy. This significant relationship is again reflected in the interaction between pension funds and capital market on economic growth. The chapter therefore concludes that pension funds may not directly influence economic growth. However, the presence of capital market improves the relationship between pension funds and economic growth. The negative effect of pension funds on economic growth is reduced at higher levels of capital market development.

**Objective three:**

Pension funds had a negative relationship with infrastructural development. Meanwhile, the capital market had a positive relationship with infrastructural development. The interaction between pension funds and capital market on infrastructural development was significant. This suggests that the presence of capital markets helps improve the relationship between pension funds and infrastructural development. The chapter concludes that pension funds do not directly affect infrastructural development in Africa. The presence of capital markets helps improve the relationship between pension funds and infrastructural development. And this confirms Alonso et al. (2016) pension funds infrastructural development vicious cycle.

Finally, even though pension funds may not directly affect capital market development, economic growth, and infrastructural development, stronger institutions will help alleviate the fear of fund managers who will at the end of the day invest in the capital market to bring about economic growth and infrastructural development. When institutions are stronger (better governance, control of corruption, and no rent-seeking behavior), prudent management of funds will improve economic growth and infrastructure development. As more individuals become conscious of life after retirement, they are likely to contribute more to pension schemes, which will cause financial deepening. If capital markets are well developed with a lot of assets to choose from, funds invested

in the local markets will spur the growth of the economy and also help bridge the infrastructural gap. Governments must therefore consider the development of the capital market a crucial thing. That notwithstanding, stronger institutions are also needed when investing funds of this nature.

### *6.4. Contributions to Knowledge*

The study makes a number of significant contributions to knowledge in terms of empirical literature and policy recommendations.

The study, which examined pension funds, institutional quality, and capital market development, contributed to the ongoing discussions on the application of some theories that underpin this nexus. The institutional theory emphasizes the role of institutions, regulations, and governance structures in shaping the development of the financial system. Institutions provide the necessary framework for economic transactions, ensure investor protection, and establish trust in the financial system. This thesis advances the discussion on the application of this theory by examining the role institutions play in the pension funds and capital market development nexus.

The economic growth theory, pioneered by Robert Solow, posits that technological progress is a primary driver of sustained economic growth. According to this theory, technological advancements and innovation lead to increased productivity, higher output, and improved living standards. Pension funds and capital markets play a critical role in facilitating economic growth by providing the necessary financial resources for innovation and technological advancements, which have become indispensable parts of today's infrastructure.

The financial intermediation theory focuses on the role played by financial institutions in facilitating the flow of funds from savers to borrowers. Pension funds, as institutional investors,

perform an intermediary function by channeling funds from pension contributors to investment projects. Again, capital markets also act as intermediaries between fund managers and investment projects. The study provides the theoretical link between pension funds and infrastructural development and growth of the economy as a whole by using the capital market as an intermediary.

As far as the researcher is concern, institutional quality has not been examined in relation to its role in the pension funds-capital markets development nexus. This present study makes an interesting contribution to understanding the moderating role played by institutional quality in the link between pension funds and capital market development in Africa.

Prior research has investigated the relationship between pension funds and economic growth using different channels but not with the use of capital market as a moderator. Since capital market development serves as an intermediary between pension funds and economic growth, it is imperative to examine the interactive effect of pension and capital market on economic growth. Given the important role capital markets play in driving growth, and the fact that pension funds contribute to capital market development, this study makes a novel contribution in increasing our understanding of these interrelationships.

Last but not least, previous studies have attempted to examine the relationship between pension funds and infrastructural development, and again, none have considered the interactive effect of pension funds and capital market on infrastructural development. Meanwhile, Alonso et al. (2016) who developed the pension funds and infrastructure theoretical life cycle did not empirically examine this relationship. However, since the capital market is a medium for channeling long-term funds from surplus units to deficit units, we examined the interactive effect of pension funds and

capital market on infrastructural development. This research serves as the first to examine this important inter-play.

### *6.5. Contribution to Practice (Policy Recommendations)*

One major drawback of pension fund investment in the capital market in Africa is the fact that the capital markets in Africa are not very developed. Many countries in Africa do not have a vibrant capital market except for South Africa, Namibia, and Egypt, and perhaps a few others. The results of this study show that capital markets play an integral role in economic growth as well as infrastructural development, therefore, African leaders must make developing the capital markets a priority. Larger and more developed capital markets could collaborate with less developed ones or consider integration of the African capital market.

**Objective One:**

The study identified a significant impact that institutional quality had on the relationship between pension funds and capital market development and therefore recommends that regulators and policymakers must put in place stronger institutions to suppress the risky behaviour of fund managers in the capital markets. Again, from the IOPS (2020) report, it was clear that investment into most asset classes is not restricted but needs a prudent person to do it. The study recommends that pension fund managers should be trained to carry out some of these prudent investments in order to meet future obligations towards the contributors. Thus, enhancing financial literacy among pension fund managers and stakeholders can lead to more informed investment decisions, aligning with broader economic growth objectives.

Because fund managers tend to focus more on the fixed-income market according to RisCura (2020), governments and policymakers must make it a point to harness the development of the capital markets to bring diversification in investment portfolios. This will improve the overall financial systems in African countries. Moreso, because the developed markets in Africa are but a few and vibrant trading is done only in these few markets, integration of the developed markets with the less developed ones could boost investor confidence and encourage more investments.

**Objective Two:**

African governments must harness the capital market development since it is one medium by which pension funds are used to bring about development in the economy. Results from the study indicate that capital markets improve the relationship between pension funds and economic growth in Africa. This suggests that African markets seem to follow the supply-leading hypothesis of growth therefore pension fund managers are more likely to invest more in developed markets

Policymakers and regulators must create a stable and conducive environment for capital market investment. This is because the long-term nature of the funds could cause the value of it be lost if the environment is not stable and this will defeat the purpose of the investment.

Firms that are into direct economic activities should be encouraged to enlist on the capital markets. Investment into such firms is likely to bring about direct development into the economy.

**Objective Three:**

Capital markets must be harnessed to encourage investment from pension funds. Strengthening capital markets in Africa will ensure that they can effectively mediate between pension funds and infrastructure projects.

Policymakers and African governments should create appropriate investment vehicles, increase collaboration, and introduce more infrastructure assets to bring diversification to fund managers. African governments and regulators must encourage investment into infrastructure by reviewing the current allocation of funds into infrastructure upwards. Strict supervision must be exercised in cases where funds are invested in infrastructure so as to protect policyholders from future losses resulting from unprofitable investments.

### *6.6. Suggested Areas for Future Research*

The study did not consider the various reforms that have taken place in different African countries, but it could affect the relationship between the variables, therefore future research could incorporate that. Other Studies can also look at markets in segments; that is: those at the early stage or the advanced stages of growth to determine how the various stages could affect growth of the economy. Again, due to the complexity of the data because of the different reforms in different African countries, the study made use of total pension assets. The total assets for pension funds included all forms of income coming in as pension. Future studies that will consider individual countries could research into the different incomes received from the different pension schemes and further investigate the exact percentages that go into the various asset classes. Lastly, this is a very interesting and novel study which current data could be used to confirm or otherwise the findings that were discovered and this will help make informed policy decisions.

## References

Abukari, K., & Otchere, I. (2020). Has stock exchange demutualization improved market quality? International evidence. *Review of Quantitative Finance and Accounting*, 55, 901-934.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American economic review*, *91*(5), 1369-1401.

AfDB. (2018). African Economic Outlook 2018. Abidjan: African Development Bank.

AfDB (2021). 'Africa Long-Term Finance Initiative: Annual Report 2020'. Abidjan: AfDB.

Agarwal, S., Driscoll, J. C., Gabaix, X., & Laibson, D. (2008). The age of reason: Financial decisions over the lifecycle. *NBER Working Paper*, (13191).

Agénor, P. R. (2010). A theory of infrastructure-led development. *Journal of Economic Dynamics and Control*, *34*(5), 932-950.

Aghion, P., & Howitt, P. (1990). A model of Growth Through Creative Destruction. *National Bureau of Economic Research.* WP/ 10.3386/w3223.

Agyemang, O.S., Gatsi J. G., & Abraham A. A. (2018). Institutional structures and financial market development in Africa, Cogent Economics & Finance, 6:1, 1488342, DOI: 10.1080/23322039.2018.1488342

Ajide, K. B. (2014). Quality of governance and stock market performance: The Nigerian experience. *Journal of Economics and Development Studies*, *2*(2), 501–522.

Ake, B., & Ognaligui, R.W. (2010). Financial Stock Market and Economic Growth in Developing Countries: The case of Douala Stock Exchange in Cameroon. *International Journal of Business and Management*, 5(5), pp. 82-88.

Alam, Md. S. & Hussein, M. A (2019). The Impact of Capital Market on the Economic Growth

in Oman, *Financial Studies*, ISSN 2066-6071, Romanian Academy, National Institute of Economic Research (INCE), "Victor Slăvescu" Centre for Financial and Monetary Research, Bucharest, Vol. 23, Iss. 2 (84), pp. 117-129

Alda, M. (2017). The Relationship Between Pension Funds and the Stock Market: Does the aeging population of Europe affect it? *International Review of Financial Analysis*, 49, 83–97.

Alesina, Alberto and La Ferrara, Eliana. (2005) Ethnic Diversity and Economic Performance. *Journal of Economic Literature* 43, 3: 762-800.

Alfen, H. W., & Weber, B. (2010). Infrastructure as an Asset Class: Investment Strategies, Project Finance and PPP. West Sussex, UK: Wiley

Alonso, J., Arellano, A., & Tuesta, D. (2015, June). Factors that impact on pension fund investments in infrastructure under the current global financial regulation. In Pension Research Council Symposium, Wharton School, University of Pennsylvania, Philadelphia.

Alper, A., & Verougstraete, M. (2018). Tapping capital markets and institutional investors for infrastructure development. MPDD Working Paper Series WP/18/04, *United Nations Economic and Social Commission for Asia and the Pacific* (ESCAP).

Amahalu, Nestor (2019). Pension Fund Asset Investment and Economic Growth in Nigeria. *Journal of Global Accounting*, Vol. 6 No. 2 September, 2019. ISSN: 1118-6828 , Available at SSRN: https://ssrn.com/abstract=3704413

Ameh, O. E., Ajie, H. A., & Duhu, I. G. (2017). Impact of contributory pension scheme on economic growth in Nigeria: An Empirical Analysis. *International Journal of Research in Humanities and Social Studies*, 4(6), 24-35.

Anago, C. J. (2021). Financing long-term infrastructure post-COVID-19: is pension funds an option for Africa? *Journal of Sustainable Finance & Investment*, 1-25.

Ando, A., & Modigliani, F. (1963). The" life cycle" hypothesis of saving: Aggregate implications and tests. *The American economic review*,*53*(1), 55-84.

Andonov, A., Kräussl, R., & Rauh, J. (2021). Institutional Investors and Infrastructure Investing. *The Review of Financial Studies*, 34(8), 3880-3934.

Andrews, A. and S. Wahba (2007). *Investing in Infrastructure: A Primer*, Infrastructure Paper Series, 2. New York: Morgan Stanley Partnership.

Anwar, S., & Cooray, A. (2012). Financial development, political rights, civil liberties and economic growth: Evidence from South Asia. *Economic Modelling, 29*(3), 974–981.

Araoye, F. Ebun, Ajayi, E. O. & Aruwaji, A. M., (2018). The Impact of Stock Market Development on Economic Growth in Nigeria. *Journal of Business and African Economy* Vol. 4 No.1. 1-15

Arellano, M. and S. Bond; 1991; Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations; *The Review of Economic Studies*; Vol. 58; pp277-297.

Arena, M. (2008). Does Insurance Market Activity Promote Economic Growth? A cross-country study for industrialized and developing countries. *Journal of Risk & Insurance*, 5(4),921-946.

Arestis, P., Demetriades, P.O., & Luintel, K.B. (2001). Financial Development and Economic Growth: The Role of Stock Markets. *Journal of Money, Credit and Banking*, 33(1), pp. 16-41.

Arezki, R., & Sy, A. (2016). Financing Africa's Infrastructure Deficit: From Development Banking to Long-term Investing. *Journal of African Economies*, *25*(suppl2), ii59-ii73

Asher, M., Vora, Y. & Maura, D. (2015). An Analysis of Selected Pension and Health Care Initiatives for Informal Sector Workers in India. *Social Policy & Administration, 49*(6), 738-751

Asiedu, E., & Lien, D. (2011). Democracy, Foreign Direct Investment and Natural Resources. *Journal of International Economics*, *84*(1), 99-111.

Asongu, S. (2011). Democracy and stock market performance in African countries. *African Governance and Development Institute WP/11/021*.

Asongu, S.A. (2012), Government quality determinants of stock market performance in African countries, *Journal of African Business*, Vol. 13 No. 3, pp. 183-199

Asongu, S. A., and Odhiambo, N. M., (2019c). "Insurance policy thresholds for economic growth in Africa", *The European Journal of Development Research*: Forthcoming.

Asongu, S. A., and Odhiambo, N. M., (2019d). "How enhancing gender inclusion affects inequality: thresholds of complementary policies for sustainable development", Sustainable Development: Forthcoming.

Asongu, S. A., and Nwachukwu, J. C., (2017). Foreign aid and inclusive development: Updated evidence from Africa, 2005–2012", *Social Science Quarterly*, 98(1), 282-298.

Babalos, V., & Stavroyiannis, S (2020). Pension Funds and Stock Market Development In OECD Countries: Novel Evidence From A Panel VAR. *Finance Research Letters*, 34, 101247 https://doi.org/10.1016/j.frl.2019.07.020

Barka, H. B., Kabuche, D., Kararach, A. G., & Tou, W. K. S. (2018). Financing Infrastructure in Africa: The Role of Pension Funds.

Barr, N. (2000). *Reforming pensions: Myths, truths, and policy choices*. IMF Working

Barr, N., & Diamond, P. (2006). The economics of pensions. Oxford review of economic policy, 22(1), 15-39.

Barro, J. Robert (1996). Determinants of Economic Growth: A Cross-Country Empirical Study. *NBER Working Paper*. No. 5698, 70.

Baum, A., Checherita-Westphal, C., & Rother, P. (2013). Debt and growth: New evidence for

the euro area. *Journal of international money and finance,32*, 809-821.

Bayar, Y. and Kilic, M. (2019) Pension funds and stock market development: evidence from OECD countries, *Int. J. Sustainable Economy*, Vol. 11, No. 3, pp.273–285.

Bayar, Y., Kaya, A., & Yıldırım, M. (2014). Effects of Stock Market Development on Economic Growth: Evidence from Turkey. *International Journal of Financial Research* Vol. 5, No. 1.

Bayar, Y., Gavriletea, M. D., Danuletiu, D. C., Danuletiu, A. E., & Sakar, E. (2022). Pension Funds, Insurance Companies and Stock Market Development: Evidence from Emerging Markets. Mathematics, 10(13), 2335.

Beck, T., Levine, R., & Loayza, N. (2000). Finance and sources of growth. *Journal of Financial Economics*, 58, 261-300.

Beck, T. & Levine, R. (2004) Stock Markets, Banks, and Growth: Panel Evidence. *Journal of Banking and Finance*, 28, 423-442. http://dx.doi.org/10.1016/S0378-4266(02)00408-9

Bekaert, G., Harvey, C.R., Lundblad, C., 2005. Does Financial Liberalization Spur Growth? *Journal of Financial Economics* 77, 3-55.

Bencivenga, V., & Smith, B. D (1991). Financial Intermediation and Endogenous Growth, *Review of Economic Studies*, 58:195-209.

Bijlsma, Michiel and Van Ewijk, Casper and Haaijen (2014). Ferry, Economic Growth and Funded Pension Systems. Netspar Discussion Paper No. 07/2014-030, Available at SSRN: https://ssrn.com/abstract=2470544 or http://dx.doi.org/10.2139/ssrn.2470544

Bijlsma, M., Bonekamp, J., van Ewijk, C., & Haaijen, F. (2018). Funded Pensions and Economic Growth. *De Economist*, 166(3), 337–362. https://doi.org/10.1007/s10645-018-9325-z

Bloom, D. E. & McKinnon, R. (2013), The Design and Implementation of Public Pension Systems in Developing Countries: Issues and Options, IZA Policy Paper No. 59

Blundell, R. W. & Bond, S. R. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics,* 87, 115–143.

Blundell, R., & Bond, S. (2000). GMM Estimation with Persistent Panel Data: An Application to Production Functions. *Econometric reviews*, *19*(3), 321-340.

Bolgorian, M. (2011). Corruption and stock market development: a quantitative approach, *Physica A* 390: 4514–4521. http://dx.doi.org/10.1016/j.physa.2011.07.024

Bouteska, A., Sharif, T., Abedin, M. Z., & Ghouli-Oueslati, J. (2023). Relocating Investments By Tunisian Insurance and Pension Funds Towards Alternative Assets Opportunities. *Journal of Policy Modeling*, 45(3), 609-629.

Brambor, J. (2006). Mathematical morphology algorithms for stream-oriented architectures (Doctoral dissertation, Paris, ENMP).

Bright Africa Pension Report (2019). Available at: www.riscura.com/wp-content/uploads/2021/03/Bright_Africa_Report_2019.pdf (accessed 27 November 2022).

Catalan, M., Impavido, G., Musalem, A., (2000) Contractual savings or stock markets development: which leads? *Journal of Applied Social Sciences Studies*, 120 (3), 445-87, 2000

Chang, T., Lee, C. C., & Chang, C. H. (2014). Does insurance activity promote economic growth? Further evidence based on bootstrap panel Granger causality test. *The European Journal of Finance*, *20*(12), 1187-1210.

Christian, M., & Wobiaraeri, O. (2016). Pension fund administration and infrastructure financing in Nigeria. British Journal of Economics, Management & Trade, 13(2), 1-13.

Coile c. Courtney (2015) Economic determinants of workers retirement decisions. Journal of economic surveys. Doi:10.1111/joes.12115

Collier, P. (2014). Attracting international private finance for African infrastructure. *Journal of*

*African Trade, 1*(1), 37-44.

Cooley, T. E, and Smith, B. D (1991). Financial Markets Specialization and Learning by Doing, Mimeo.

Cuevas, A., Gonzalez, M., Lombardo, D., & Lopez-Marmolejo, A. (2008). *Pension Privatization and country risk.* IMF Working Paper No. WP/08/195/. Washington DC: International Monetary Fund

Curak, M., Loncar, S. & Poposki, K. (2009), "Insurance Sector Development and Economic Growth in Transition Countries*", International Research Journal of Finance and Economics,* Vol. 34 No. 3, pp. 29-41.

Davis, E.P. 1995. Pension funds, retirement-income security and capital markets, an international perspective. Oxford: Oxford University Press.

Davis E. P.; 1998c; Linkage Between Pension Reform and Financial Sector Development; Working Paper PI-9909; the Pension Institute, City University; London.

Davis E P; 2000a; Pension Fund, Financial Intermediation and the New Financial Landscape; July; Discussion Paper PI-0010; The Pensions Institute, City University, London.

Davis, E. P.; 2003c; Pension Funds and European Financial Markets; Forthcoming in *Berichte and Studien*; Austrian National Bank.

Davis, E.P. 2005. The role of pension funds as Institutional Investors in Emerging Markets. Paper presented at Korean Development Institute Conference, March 2005.

Davis, P., (2006). Pension funding, productivity, ageing and economic growth. Presented at the Third Conference for the Monetary and Stability Foundation, Deutsche Bundesbank, Frankfurt, July.

Davis, E. P., & Hu, Y. (2004). Is there a link between pension-fund assets and economic growth? A cross-country study. Public Policy Discussion Papers 04-23. Economics and Finance Section, School of Social Sciences, Brunel University, London, ENGLAND.

Davis, E.P. & Hu, Y. (2005). Is there a link between pension fund assets and economic growth? A cross-country study. Working Paper No. 4/23, *Economics and Finance, Brunel University*.

Davis, E. P. & Hu, Y. (2006). Saving, Funding and Economic Growth. In G. Clark (ed.), Oxford Handbook of Pensions and Retirement Income. Oxford University Press.

Davis, E. P., & Hu, Y. W. (2008). Does funding of pensions stimulate economic growth? *Journal of Pension Economics & Finance, 7*(2), 221-249.

Daradkah D, Al-Hamdoun N. (2020). Pension funds, capital market development, and Macroeconomic variables: Evidence from Jordan. *J Public Affairs*. 2020; e2215. https://doi.org/10.1002/pa.2215

Durán-Valverde, F., J.F. Pacheco-Jiménez, T. Muzaffar, and H. Elizondo-Barboza (2019). 'Measuring Financing Gaps in Social Protection for Achieving SDG Target 1.3: Global Estimates and Strategies for Developing Countries'. Extension of Social Security Working Paper 73. Geneva: ILO.

Della Croce, R. (2011). Pension Funds Investment in Infrastructure: Policy Actions (OECD Working Papers on Finance, Insurance and Private Pensions No. 13). https://dx.doi.org/10.1787/8k327z9bbvmx-en

Della Croce, R. (2012). Trends in large pension fund investment in infrastructure. OECD Working Papers on Finance, Insurance and Private Pensions, 29. Paris: OECD Publishing.

Della Croce, R., Kaminker, C. and Stewart, F. (2011), The Role of Pension Funds in Financing Green Growth Initiatives", OECD Publishing, Paris.

Della Croce, R., and S. Gatti. 2015. International Trends in Infrastructure Finance. In Public

Private Partnerships for Infrastructure and Business Development, ed. S. Caselli, G. Corbetta, and V. Vecchi, 81–100. *New York: Palgrave Macmillan*

Della Croce, R. (2020). Pension Funds Investment in Infrastructure: Policy Actions (OECD *Working Papers on Finance, Insurance and Private Pensions* No. 13). https://dx.doi.org/10.1787/8k3272f8bnmx-en

Demirgüç-Kunt, A., & Huizinga, H. (1998). Determinants of commercial bank interest margins and profitability: some international evidence. *The World Bank Economic Review*, *13*(2), 379-408.

Demirguc-Kunt, A., & Levine, R., (1996), Stock Market Development and Financial Intermediaries: Stylized Facts, The World Bank Economic Review, 10, issue 2, p. 291-321, https://EconPapers.repec.org/RePEc:oup:wbecrv:v:10:y:1996:i:2:p:291-321.

Demirgüç-Kunt, A., & Levine, R. (2009). Finance and inequality: Theory and evidence. *Annu. Rev. Financ. Econ.*, *1*(1), 287-318.

Demirgüç-Kunt, A., Maksimovic, V., 1998. Law, Finance, and Firm Growth. *The Journal of Finance* 53 No. 6, 2107-2137.

Dhahri, S. and Omri, A. (2020), Foreign Capital Towards SDGs 1 & 2 – Ending Poverty and Hunger: The Role of Agricultural Production, Structural Change and Economic Dynamics, 53(1): 208–221.

Diamond, D. (1984). ‘‘Financial Intermediation and Delegated Monitoring’’ Review of EconomicStudies 51, 1984, 393–414.

Driscoll, J. and Kraay, A., (1998), Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data, The Review of Economics and Statistics, 80, (4), 549-560

Doytch, N & Narayan, S, 2016. Does FDI Influence Renewable Energy Consumption? An analysis of sectoral FDI impact on renewable and non-renewable industrial energy consumption, Energy Economics, *Elsevier*, vol. 54(C), pages 291-301.

Echekoba F. N., Ezu G. K. E., & Chinedu F. (2013). The Impact of Capital Market on The Growth of The Nigerian Economy Under Democratic Rule. *Arabian Journal of Business and Management Review (OMAN Chapter),* 3 (2).

Egbuna, N. E., Barry, A., Okorie, G., & Olaoye, O. J. (2018). Infrastructural financing using pension funds of the West African Monetary Zone's member states (No. 14). *WAMI Occasional Paper Series.*

Eichengreen, B., Luengnaruemitchai, P., 2004. Why Doesn't Asia Have Bigger Bond Markets? Hong Kong Institute for Monetary Research, Working Paper 24.

Eke P. O., Adetiloye K. A. & Taiwo N. J. (2018). Regulatory institutional quality and long-run primary capital market development: the Nigerian case, *Afro-Asian Journal of Finance and Accounting*, vol. 8(2), pages 167-189.

Enache, C., Milos, L.R., Milos, M.C. 2015. Pension reform and capital market development in Central and Eastern European Countries. *Economic Research. 28*(1): 75-84

Erol, T., & Ozuturk, D. D. (2011). An Alternative Model of Infrastructure Financing Based on Capital Markets: Infrastructure REITS (InfraREITs) in Turkey. *Journal of Economic Cooperation & Development,* 32(3).

Ertuğrul, H. M., & Gebeşoğlu, P. F. (2020). The effect of private pension scheme on savings: A case study for Turkey. *Borsa Istanbul Review*, *20*(2), 172–177. https://doi.org/10.1016/j.bir.2019.12.001

Estache A., Fay M. 2010. 'Current Debates on Infrastructure Policy.' In Spence M., Leipzoger D. (Eds), *Globalization and Growth Implications for a Post-Crisis World*, 151–193. Washington, DC: World Bank.

Farayibi, A. O. (2016). The funded pension scheme and economic growth in Nigeria. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2836965

Fashola, B. (2016). The Nigerian Pension Industry Strategy Implementation Roadmap Retreat Pulse. ng. Financial Sector Regulators. 2020. The Kenya Financial Sector Stability Report, Issue No 11.

Financial Deepening and Macro Stability; *IMF Policy Paper* 2012

Financial Services Board (FSB). (1959–2016). *Annual reports of registrar of pension funds*. Pretoria. Accessed online 6 March 2015 from https://www.fsb.co.za/communication/reports.htm

Financial Sector Regulators. (2020). *The Kenya financial sector stability report* (Issue No. 11).

Findlay, S., & Moran, M. (2019). Purpose-washing of impact investing funds: motivations, occurrence and prevention. *Social Responsibility Journal*, *15*(7), 853-873

Foster V, (2016) Africa's Infrastructure; Five years on. World Bank Blogs: https://blogs.worldbank.org/en/africacan/africas-infrastructure-five-years-on (Retrieved on 02/09/2021)

Gaies, B., Goutte, S., & Guesmi, K. (2020). Does financial globalization still spur growth in emerging and developing countries? Considering exchange rates. *Research in International Business and Finance*, *52*, 101113.

Ghana Statistical Service Survey GLSS (2010). The Ghana Statistical Service website.

Goldsmith, R. W. (1969). Financial Structure and Development, Yale Uni. *Press, New Haven*.

Goodfellow, T. (2020). Finance, infrastructure and urban capital: The political economy of African 'gap-filling'. *Review of African Political Economy*, *47*(164), 256-274.

Government Employees Pension Fund (GEPF). 2020 Annual Report (https://www.gepf.gov.za/who-is gepf/), accessed on 2 August 2021.

Greenwood, J., & Jovonovic, B (1990). Financial Development, Growth and the Distribution of Income. *Journal of Political Economy*, 98:1076-1107.

Grossman, G., and Helpman, E (1991). Quality Ladders in the Theory of Economic Growth, *Review of Economic Studies*, 58:43-61.

Gunu, U., & Tsado, E. (2012). Contributory pension system as a tool for economic growth in Nigeria. *International Journal of Business and Behavioral Sciences*, *2*(8), 6-13.

Gupta, K. L. (1984). Finance and Economic Growth in Developing Countries. London: Croom-Helm "Aggregate Savings, Financial Intermediation and Interest Rate," *Review of Economics and Statistics*, 69:303-311.

Gupta, S., & Sharma, A. K. (2022). Evolution Of Infrastructure as An Asset Class: A Systematic Literature Review and Thematic Analysis. *Journal of Asset Management,* 23(3), 173-200.

Guven, M. (2019). Extending pension coverage to the informal sector in Africa.

Haiss, P., & Sümegi, K. (2008). The relationship between insurance and economic growth in Europe: a theoretical and empirical analysis. *Empirica*, *35*, 405-431.

Hall, E. Robert and Jones Charles (1999). Why Do Some Countries Produce So Much More Output Per Worker than Others. *Quarterly Journal of Economics* 114, (1)83-116.

Hall, B. H., & Lerner, J. (2010). The financing of R&D and innovation. In *Handbook of the Economics of Innovation* (Vol. 1, pp. 609-639). North-Holland

Hauner, D. 2008. Macroeconomic Effects of Pension Reform in Russia. IMF Working Paper. WP/08/201

Havemann, T., Negra, C., & Werneck, F. (2022). Blended finance for agriculture: exploring the constraints and possibilities of combining financial instruments for sustainable transitions.

In *Social Innovation and Sustainability Transition* (pp. 347-358). Cham: Springer Nature Switzerland.

Hendricks, F. (2008). The private affairs of public pensions in South Africa. *United Nations Research Institute for Social Development, Social Policy and Development Programme Paper*, (38).

Herring, R.J., Chatusripitak, N., 2001. The Case of the Missing Market: The Bond Market and Why It Matters for Financial Development. Financial Institutions Center at The Wharton School, Unpublished Working Paper.

Ho, S. & Odhiambo, N. (2012). Stock Market Development and Economic Growth in Hong Kong: An empirical investigation. *International Business & Economics Research Journal*, 11(7), 795-808

Holzmann, R. (1997). Pension reform, financial market and economic growth, preliminary evidence from Chile. *Staff Papers (International Monetary Fund)*, *44* (2), 149–178. https://doi.org/10.2307/3867541

Holzmann, R. (1999). The World Bank Approach to Pension Reform [Social Protection Discussion Paper Series No. 9807]. Washington DC: The World Bank.

Hooper, V., Sim, A.B. and Uppal, A. (2009), Governance and stock market performance, *Economic Systems*, Vol. 33 No. 2, pp. 93-116, doi: 10.1016/j.ecosys.2009.03.00.http://www.pwc.lu/en/asset-management/docs/pwc-am-africa-2020.pdf.

Hu, Y. 2005. Pension reform, economic growth and financial development – An empirical study. Economics and Finance Working Paper No 05-05, Brunel University.

Hu, Y. (2012). Growth of Asian Pension Assets: Implications for Financial and Capital Markets. Working Paper Series. No 360. Asian Development Bank Institute.

Hu Z, Zhang W, Yang L (2010). Institutional Environment, Technical Efficiency and Regional Economic Growth Differences. *Journal of Public Management* 2:84–93

Hujo, K. (Ed.). (2014). *Reforming pensions in developing and transition countries*. Springer.

Hyun, S., Park, D., & Tian, S. (2017). Infrastructure bond markets development in Asia: Challenges and solutions. Global Economic Review, 46(4), 351-371.

Hyun, S., Park, D., & Tian, G. (2018). Determinants of public–private partnerships in infrastructure in Asia: Implications for capital market development. *Asian Development Bank Economics Working Paper Series*, (552).

Ikikii, S.M., & Nzomoi, J.N. (2013). An Analysis of The Effects of Stock Market Development on Economic Growth in Kenya. *International Journal of Economics and Finance*, 5(11), 145- 151.

ILO (2010a). World Social Security Report 2010–11: Providing Coverage in Times of Crisis and Beyond. Geneva: ILO.

ILO (2017). World Social Protection Report 2017–19: Universal Social Protection to Achieve the Sustainable Development Goals. Geneva: ILO.

ILO (2021). 'World Social Protection Report 2020–22: Social Protection at the Crossroads—in Pursuit Of a Better Future'. Geneva: ILO.

Im, K. S., M. H. Pesaran, and Y. Shin. 2003. Testing for Unit Roots in heterogeneous panels. *Journal of Econometrics* (115): 53–74.

Impavido, G., Musalem, A. R. and Tressel, T. (2003), The Impact of Contractual Savings Institutions on Securities Markets, mimeo, The World Bank, January 2003

Impavido, G., Musalem, A.R. 2000. Contractual savings, stock, and asset markets. Working Paper 2490. World Bank Policy Research.

Inderst, G., (2009). Pension fund investment in infrastructure. OECD Work. Pap. Insur. Priv. Pensions 32

Inderst, G. (2010). Pension fund investment in infrastructure: What have we learnt? *Pensions: An International Journal*, *15*(2), 89-99.

Inderst, G., (2014). Pension Fund Investment in Infrastructure: Lessons from Australia and Canada. *Rotman International Journal of Pension Management,* Vol. 7, No. 1, 2014, Available at SSRN: https://ssrn.com/abstract=2449777

International Labour Organisation 2018b. Women and men in the informal economy: A statistical picture. *Third edition* (Geneva).

International Labour Oraganisation ILO (2020) Promoting employment and decent work in a changing landscape. International Labour Conference, 109th session 2020. ISBN 978-92-2-132387-7 (Web pdf)

International Labour Oraganisation ILO (2019) World Employment and Social Outlook: Trends 2020 International Labour Office – Geneva: ILO, 2020, ISBN 978-92-2-031407-4 (web pdf)

International Monetary Fund (2012). Financial Deepening and Macro Stability; IMF Policy Paper 2012

Jain, P. K., Kuvvet, E., & Pagano, M. S. (2017). Corruption's impact on foreign portfolio investment. *International Business Review*, *26*(1), 23-35.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm. *Managerial Behavior, Agency Costs and Ownership Structure*.

Jones, A.W., Hiller, B.T., (2010), Achieving Scale in Investment: Global Risk and Opportunity

from Climate Change‟ Paper No. WP/00/139.

Juergens, F., & Galvani, F. (2020). Why social pensions? Achieving income security for all in older age. London: HelpAge International.

Juvonen, K., Kumar, A., Ayed, H. B., & Marin, A. O. (2019). Unleashing the Potential of institutional investors in Africa. African Development Bank.

Kajwang, B. (2022). Role of pension management on economic growth: A review of literature. *International Journal of Research in Business and Social Science* (2147- 4478), 11(6), 635–641. https://doi.org/10.20525/ijrbs.v11i6.1948

Kenya National Bureau of Statistics (KNBS) FinAccess Report 2019 https://www.fsdkenya.org/wpcontent/uploads/2019/04/2019-FinAcces-Report-Web-05-JAN-2020.pdf

Kim, H.S. 2010. Spillover Effects of Pension Funds on Capital Markets – The Mechanism and Preconditions. Working Paper. Bank of Korea.

King, R.G., Levine, R., 1993. Finance and Growth: Schumpeter May Be Right. The Quarterly *Journal of Economics*, August 1993, 717-737.

Klapper, L., Sulla, V., & Vittas, D. (2004). The development of mutual funds around the world. *Emerging Markets Review*, *5*(1), 1-38.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: Cross-country tests using alternative institutional measures. *Economics & Politics*, 7(3), 207–227.

Kuluratne, C. (2002). An Examination of The Impact of Financial Deepening on Long-Run Economic Growth: An Application of a VECM Structure to A Middle-Income Country Context. *South African Journal of Economics*, 70(4), 300-319.

Kwena, Rose & Turner, John. (2013). Extending Pension and Savings Scheme Coverage to the Informal Sector: Kenya's MBAO Pension Plan. *International Social Security Review*. 66(2), 79-99.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of political economy*, *106*(6), 1113-1155.

Le, T. H., Kim, J., & Lee, M. (2016). Institutional quality, trade openness, and financial sector development in Asia: An empirical investigation. *Emerging Markets Finance and Trade*, *52*(5), 1047-1059.

Levine, R. (2005). Finance and growth: theory and evidence. *Handbook of economic growth*,*1*, 865-934.

Levine, R., & Renelt, D. (1992). A sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review, 82(4):942-963*

Levine, R., & Zevorse, S. (1996). Stock Market Development and Long Run Growth. Policy Research Working Paper 1582, Retrieved November 15, 2013.

Levine, R. & Zervos, S. (1998). Stock markets, banks and economic growth. The American Economic Review, 88(33), 537-558.

Liu, G.C., Lee, C.C. and Lee, C.C. (2016), "The Nexus Between Insurance Activity and Economic Growth: A Bootstrap Rolling Window Approach", *International Review of Economics and Finance*, Vol. 43, pp. 299-319.

Manasseh, C.O., Mathew, T.E. and Ogbuabor, E.J. (2017), Investigating the nexus between institutional quality and stock market development in Nigeria: an autoregressive distributed lag (ARDL) approach, *African Development Review*, Vol. 29 No. 2, pp. 272-292.

McKenzie, B. (2021). New Dynamics. Shifting Patterns in Africa's Infrastructure Funding. OECD (2023), Infrastructure investment (indicator). doi: 10.1787/b06ce3ad-en (Accessed on 12 April 2023)

McKinnon, R. (1973). Money and Capital in Economic Development. Washington: Brookings Institute.

Meng, C., & Pfau, W. (2010). The Role of Pension Funds in Capital Market Development (GRIPS Discussion Paper No. 10–17). National Graduate Institute for Policy Studies. https://econpapers.repec.org/paper/ngidpaper/10-17.htm

Miloş, L. R. (2012). Spillover effects of pension funds on capital markets: The EU-15 countries case. Annals of the Constantin Brâncuşi,4,164-170.

Mo, I. (2017). The Impact of Capital Market Development on Economic Growth among MENA Region Countries. Faculty of Technology Management and Business. University Tun Hussein Onn Malaysia.

Modigliani, F., & Brumberg, R. (1954). Utility Analysis and the Consumption Function: An Interpretation of Cross Section Data, Post Keynesian Economics.*Franco Modigliani*,*1*, 388-436.

Moleko, N., & Ikhide, S. (2017). Pension Funds Evolution, Reforms and Trends in South Africa. *International Journal of Economics and Finance Studies*, 9(2), 134-151.

Moleko, N. (2019). Pension fund reform towards development of national economy: a South African case study (Doctoral dissertation, Stellenbosch: Stellenbosch University).

Morina, F. and Grima, S. (2021), "The Performance of Pension Funds and Their Impact on Economic Growth in OECD Countries*", Özen, E., Grima, S. and Gonzi, R.D. (Ed.) New Challenges for Future Sustainability and Wellbeing (Emerald Studies in Finance, Insurance, and Risk Management), Emerald Publishing Limited, Leeds, pp. 17-47. https://doi.org/10.1108/978-1-80043-968-920211003

Muhammad, M. A. (2015). Privatization And State-Owned Enterprises Performance: The Case of Nigeria.

Munnell, A. H. (1992). Current taxation of qualified pension plans: Has the time come?.*New England Economic Review*, 12-26.

Musawa, N., & Mwaanga, C. (2017). The Impact of Pension Funds' Investments on the Capital

Market—The Case of Lusaka Securities Exchange. *American Journal of Industrial and Business Management,7*(10), 1120-1127.

Nageri, K. I., Adekunle, A. T., & Muritala, T. A. (2019). Pension Fund and Capital Market Development in Nigeria: ARDL Bound Testing Approach. 4(1), 17.

National Treasury. 1998. Department of National Treasury, Republic of South Africa *Annual Report1998.http://www.treasury.gov.za/publications/annual%20reports/national%20treasury/default.aspx*

National Treasury 1999. Department of National Treasury, Republic of South Africa *Annual Report1999.http://www.treasury.gov.za/publications/annual%20reports/national%20treasury/default.aspx*

National Treasury. (2004). *Retirement Fund Reform:A Discussion Paper.* Pretoria: National Treasury.

Ngare, E., Nyamongo, E. M., & Misati, R. N. (2014). Stock Market Development and Economic Growth in Africa. *Journal of Economics and Business*, 74, 24–39.

Nigerian Pension Commission 2019 Annual Report. https://www.pencom.gov.ng/wp content/uploads/2020/10/APPROVED-2019-ANNUAL-REPORT-FINAL-DRAFT.pdf.

North, D. (1990), Institutions, Institutional Change and Economic Performance, Cambridge University Press, Cambridge.

Nwanne, T. F. I. (2015). Impact of contributory pension scheme on economic growth in Nigeria. Global Advanced Research *Journal of Management and Business Studies*, 4(8), 333-337. http://garj.org/garjmbs/index.htm

Odundo, E. (2004). Supervision of a Public Pension Fund: Experience and Challenges in Kenya. Public Pension Fund Management, 281.

OECD (2015), Opportunities and constraints of market-based financing for SMEs, OECD report

to G20 Finance Ministers and Central Bank Governors, September 2015, https://www.oecd.org/finance/financial-markets/Opportunities-and-Constraints-of-Market-based-Financing-for-SMEs.pdf

OECD (2021), Pension Markets in Focus 2021, www.oecd.org/finance/pensionmarketsinfocus.htm

OECD (2023), Pension Markets in Focus 2022, www.oecd.org/finance/pensionmarketsinfocus.htm

Onwuka, I. O., &. Nwafor, M. C. (2018). Tackling infrastructural gap in Nigeria: The pension fund option. *Applied Economics and Finance*, *5*(2).

Osaze, B. E (2000). The Nigeria Capital Market in the African and Global Financial System. Benin City: Bofic Consults Group Limited.

Oyedele, J. B. (2014). Infrastructure investment and the emerging role of institutional investors: The case of pension funds and sovereign wealth funds. *Academic Journal of Interdisciplinary Studies*, 3(1), 43-54.

Pagano, M. 1993. Financial Markets and Growth. *European Economic Review*. 37. pp 688-726

Paklina, N., & Stanko, D. (2021). Supervision of infrastructure investments by pension funds (IOPS Working Papers on Effective Pensions Supervision, No. 36). *International Organisation of Pension Supervisors.*

Patrick, H., (1966). Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change*, 14(2), 174–189.

Poirson, H. 2007. Financial market implication of India's pension reform. Working Paper 07/85. Asia and Pacific Department. International Monetary Fund.

Poterba, J. M. (2001). Demographic structure and asset returns. *Review of Economics and Statistics*, *83*(4), 565-584.

Pradhan, R.P., Arvin, M.B., Bennet, S.E., Nair, M., & Hall, J.H. (2016). Bond Market

Development, Economic Growth and Other Macroeconomic Determinants: Panel VAR Evidence. *Asia Pacific Financial Markets*, 23,175-201.

PwC (PricewaterhouseCoopers). (2015). Africa asset management 2020. http://www.pwc.lu/en/asset-management/docs/pwc-am-africa-2020.pdf.

PwC (2020). Africa Capital Markets Watch 2019. https://www.pwc.co.za/capitalmarketswatch

Queen, S. K, (2015). The Impact of Capital Markets on The Economic Growth in South Africa. *Journal of Governance and Regulation*, Vol. 4, No., (1), 154-163

Raisa, M. 2012. Spillover effects of pension funds on capital markets: The EU-15 countries case. *Academica Brancusi*, *Economy Series,4*, 164-170.

Rajan, R. G., & Zingales, L. (1998). Financial Dependence and Growth. *American Economic Review*, American Economic Association, vol. 88(3), 559-586.

Ray, S., & Bisbey, J. (2020). Financing infrastructure in Asia through bonds and capital markets. *Journal of Infrastructure, Policy and Development*, 4(1), 87-120.

Rhodes, M., & Natali, D. (2003). *Welfare regimes and pension reform agendas*. Presented at "Pension reform in Europe: Shared problems, sharing solutions", London School of Economics and Political Science.

Rigobon, Roberto and Rodrik Dani (2005). Rule of Law, Democracy, Openness, and Income: Estimating the Interrelationships. *Economics of Transition*, 13, (3), 533-564.

RisCura (2020). Bright Africa Pension Report 2019. Available at: www.riscura.com/wp-content/uploads/2021/03/Bright_Africa_Report_2019.pdf (accessed 27 November 2022).

Regan, M. (2017). Capital markets, infrastructure investment and growth in the Asia Pacific region. International Journal of Financial Studies, 5(1), 5.

Robinson, J. (1952). The Generalization of the General Theory," in J. Robinson (ed.), The Rate of Interest and Other Essays. London: MacMillan.

Saadaoui, Z. (2014) Business Cycle, Market Power and Bank Behaviour in Emerging Countries. International Economics, 139, 109-132. http://dx.doi.org/10.1016/j.inteco.2014.04.001

Sabariah, N. & Norhafiza N. (2016). The Impact of Capital Market on Economic Growth: A Malaysian Outlook. *International Journal of Economics and Financial Issues,* Vol.6 No. (S7), 259- 265.

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy policy*, *38*(5), 2528-2535.

Sadorsky, P. (2011). Financial Development and Energy Consumption in Central and Eastern European frontier economies. *Energy policy*, *39*(2), 999-1006.

Sanusi, K.A., and F.M. Kapingura (2021). Pension Funds as Fuel for Overall Investment Level and Economic Growth: An Empirical Insight from South African Economy. *Cogent Business & Management* 8(1): 1935661. https://doi.org/10.1080/23311975.2021.1935661

Sawant, R. J. (2010). Infrastructure Investing: Managing risks & rewards for pensions, insurance companies & endowments. John Wiley & Sons.

Schmidt-Hebbel, K. 1995. Colombia's Pension Reform: Fiscal and Macroeconomic Effects. World Bank Discussion Papers. WDP 314.

Schmidt-Hebbel, K. 1999. Does Pension Reform Really Spur Productivity, Saving and Growth. Washington, DC: The World Bank.

Seliverstova, M., & Grigorieva, E. (2019). Financing Infrastructure in Russia by Raising Funds from Private Pension Funds. International Multidisciplinary Scientific GeoConference: SGEM, 19(6.3), 451-457.

Shaw, E. S. (1973). Financial Deepening and Economic Development. Oxford University Press, New York.

Sial, A. W., Talib, N., Ashkanani, F. A., & Alam, M. A. (2015). Demutualization of stock exchanges: A corporate blessing in disguise for stock market growth. *Strategic Change*, 24(4), 389-400.

Siemiatycki, M. (2015). Canadian pension fund investors in transport infrastructure: A case study. *Case Studies on Transport Policy*,*3*(2), 166-175.

Sinai, A., & Stokes, H. H (1972). Real Money Balances: An Omitted Variable in the Production Function? *Review of Economics and Statistics*.

Skerrett, K. (2018). Pension funds, privatization, and the limits to "Workers Capital". *Studies in Political Economy*, *99*(1), 20-41.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.

Soumaré, I. (2020). Innovations in equity and stock market financing. Background Paper for Economic Report on Africa 2020, UNECA Spierdijk, L., & Zandberg, E. (2010). Funding of Pensions and Economic Growth: Are They Really Related? (SSRN Scholarly Paper ID 1754494). Social Science Research Network. https://doi.org/10.2139/ssrn.1754494

Soumaré, I., Kanga, D., Tyson, J., & Raga, S. (2021). Capital market development in sub Saharan Africa: Progress, challenges and innovations. Joint FSD Africa and ODI working paper. London: Overseas Development Institute.

Spears, A. (1992). The Role of Financial Intermediation in Economic Growth in Sub-Saharan Africa. *Canadian Journal of Development Studies*, 13:361-380.

Stern, N. (1989). The Economics of Development: A Survey. *The Economic Journal*, 100:597-685.

Stewart, F., and J. Yermo (2009). Pensions in Africa. Working Paper on Insurance and Private Pensions 30. Paris: OECD. https://doi.org/10.1787/227444006716

Stewart, F., & Yermo, J. (2012). "Infrastructure Investment in New Markets: Challenges and Opportunities for Pension Funds," *OECD Working Papers on Finance, Insurance and Private Pensions 26*, OECD Publishing.

Stewart, F., Despalins, R., & Remizova, I. (2017). Pension Funds, Capital Markets, and the Power of Diversification (Policy Research Working Paper No. 8136). World Bank, Washington, DC. DOI: https://doi.org/10.1596/1813-9450-8136

Stroup, Michael (2007). Economic Freedom, Democracy, and the Quality of Life. *World Development* 35, (1), 52-66.

Strumskis, M., & Balkevičius, A. (2016). Pension fund participants and fund managing company shareholder relations in Lithuania second pillar pension funds. *Intellectual Economics,10*(1), 1-12.

Sy, A. N. R. (2017), Leveraging Pension Funds for Financing Infrastructure Development in Africa, Africa Growth Initiative, Brookings Institution.

The World Bank 2018. Retrieved from http://www.worldbank.org/en/topic/financialsector/brief/pension-funds

Thom, M. 2014. The impact of pension funds on stock market development in South Africa and policy implications. Unpublished Masters thesis. University of Stellenbosch Business School.

Torbira, L. Lenee & Joshua O. (2017). Capital Market Development and Economic Growth: Evidence from the MINT Countries. *Journal of Economics and Sustainable Development*, Vol.8, No. (2), 68-107

Tun W. U. (1972), Financial lntermediation and National Savings in Developing Countries, (New York: Praeger

UN/DESA (2007) Development in an Ageing World. World Economic and Social Survey 2007, New York: United Nations.

United Nations (2019a). Financing for Sustainable Development Report 2019. New York: United Nations, Inter-agency Task Force on Financing for Development. Available at: https://developmentfinance.un.org/fsdr2019 (accessed 27 November 2022).

United Nations 2019b. World Economic Situation and Prospects 2019 (New York, Department of Economic and Social Affairs)

Uthoff, A, (2006). Gaps in the welfare State and reforms to pension systems in Latin America. Social Development Division of ECLAC. *Cepal Review*, 89, 9-36.

Van der Merwe, T. 2004. "The occupational pillar of the South African pension system." *Development Southern Africa*, Vol. 21, No. 2. pp. 303–327.

Vittas, D. 1999. Pension Reform and Capital Market Development: "Feasibility" and "Impact" Preconditions. Published paper delivered at OECD conference "Privatization and Capital Market Development. 21-22 September 1999, Paris.

Walker, E. and Lefort, F. (2002), ―Pension Reform and Capital Markets: Are There Any (Hard) Links? Social Protection Discussion Paper Series, The World Bank, February 2002.

Ward, D., & Zurbruegg, R. (2000). Does Insurance Promote Economic Growth? Evidence from OECD Countries. *The Journal of Risk and Insurance*, *67*(4), 489–506. https://doi.org/10.2307/253847

Watson, W. T. (2018). Higher turnover rate in Malaysian Financial Services industry, Towers Watson Survey Finds-Willis Towers Watson.

World Bank (1994), "Averting the Old Age Crisis; Policies to Protect the Old and Promote Growth", The World Bank, Washington DC.

World Bank Group Annual Report (2017), End Extreme Poverty; Boost Shared Prosperity. World Bank Group

World Bank Report (2020), World Development Indicators, World Bank, Washington D. C.

Xueliang Z. (2013) Has Transport Infrastructure Promoted Regional Economic Growth?— With an Analysis of the Spatial Spillover Effects of Transport Infrastructure, *Social Sciences in China*, 34:2, 24-47, DOI: 10.1080/02529203.2013.787222

Yartey, C. A., & Adjasi, C. K. (2007). Stock Market Development in Sub-Saharan Africa: Critical issues and challenges. International Monetary Fund

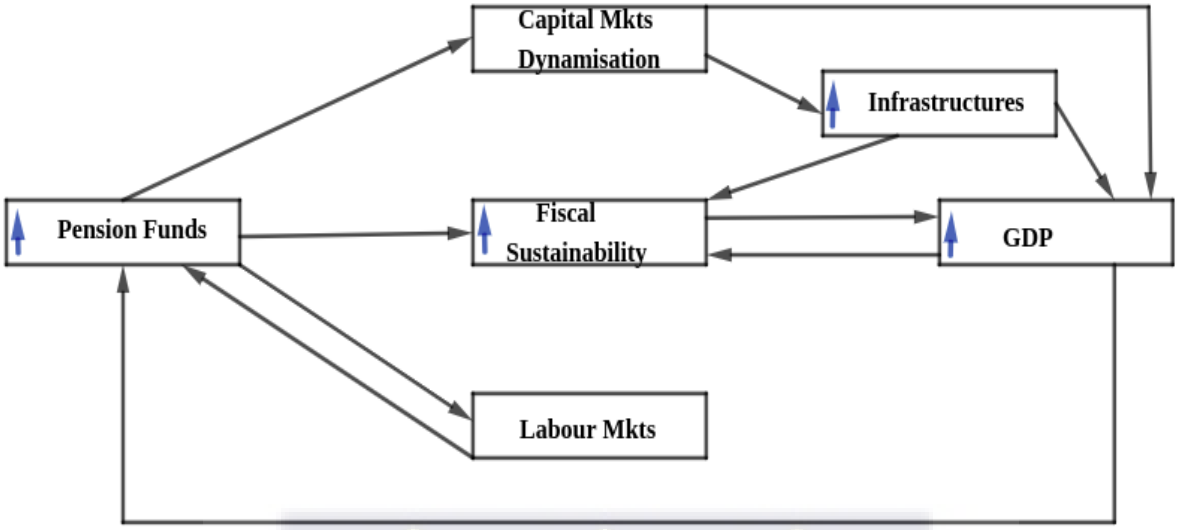
Zandberg, E., & Spierdijk, L. (2013). Funding of Pensions and Economic Growth: Are They Really Related? *Journal of Pension Economics and Finance*, 12(2), 151–167, doi:10.1017/ S1474747212000224

Zhou, J., Zhao, H., Belinga, T., & Gahe, Z.S.Y. (2015). Macroeconomic Determinants of Stock Market Development in Cameroon. *International Journal of Scientific and Research Publications, 5*(1).

Zubair, A.K. (2016) Effects of Pension Funds' Investments on Capital Market Performance in Nigeria. *International Journal of Economics and Business Management*, 2, No. 9

## Appendix:

***Figure 1: Pension Funds and Infrastructure: The Theoretical Vicious Circle***




***Source: Alonso et al (2016)***

***Table 1: Variables and Their Measurements***

| **VARIABLE** | **MEANING** | **MEASUREMENT** | **Source (1990-2017)** |
|---|---|---|---|
| PF | Pension Funds | Pension fund assets % GDP | Global Financial Development of the World Bank, collected from OECD, AIOS, FIAP and national sources |
| CM | Capital Market | Stock Market capitilisation % GDP | WDI |
| | | Stock Market Total Value Traded % GDP | |
| | | Corporate Bond Issuance %GDP | |
| | | Government Domestic Bond %GDP | |
| INSTITUTIONS | an aggregate of six indicators (rule of law, government effectiveness, control of corruption, political stability, regulatory quality and voice and accountability | Average of the six indicators | World Governance Indicators |
| EG | Economic Growth | Real GDP pc | WDI |

| | | | |
|---|---|---|---|
| ID | Infrastructural Development | African Infrastructural Development Index | AfDB (2005 – 2017) |
| FDI | Foreign Direct Investments | Net Inflows as percentage of GDP | WDI |
| TRADE | The sum of imports and exports of goods and services | Sum of exports and imports of goods and services as % of GDP | WDI |
| UNEMPLOYMENT | Labour force without work but seeking for work | Unemployment, total (% of total labour force | WDI |
| POPULATION | Total population | Log of populatio | WDI |
| BROAD MONEY | The sum of currency outside bank | Sum of currency outside bank as % of GDP (M2/GDP) | WDI |
| INFLATION | Consumer Price index | Consumer Price Index | WDI |
| INTEREST RATE | Real interest rates | Real interest rate as % GDP | WDI |
| IMPORTS | Imports of goods and services | Imports of goods and services as %of GDP | WDI |
| SAVINGS | Gross National Savings | Gross National Savings as % of GDP | WDI |
| GDP | Real GDP pc | Real GDP pc | WDI |

***Table 2: Total pension funds in selected African countries from 2015 to 2020.***

| Country | Unit | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|
| Angola | US Dollar, Millions | 1,761 | 897 | 903 | 765 | 877 | 865 |
| Botswana | US Dollar, Millions | | | 8,310 | 7,523 | 8,768 | |
| Egypt | US Dollar, Millions | 5,512 | 2,665 | 3,598 | 3,965 | 4,873 | 5,635 |
| Ghana | US Dollar, Millions | 1,231 | 1,617 | 2,496 | 2,700 | 3,138 | 3,823 |
| Kenya | US Dollar, Millions | 7,957 | 9,588 | 10,463 | 11,452 | 12,811 | |
| Malawi | US Dollar, Millions | 456 | 523 | 727 | 944 | 1,154 | 1,320 |
| Mauritius | US Dollar, Millions | 482 | 528 | 633 | 189 | 1,517 | |
| Namibia | US Dollar, Millions | | 10,008 | 12,496 | 11,628 | 12,196 | 12,112 |
| Nigeria | US Dollar, Millions | 26,913 | 20,213 | 24,560 | 28,136 | 33,284 | 32,299 |
| South Africa | US Dollar, Millions | 259,622 | 302,975 | 346,106 | 312,355 | | |
| Tanzania | US Dollar, Millions | 4,115 | 4,155 | 4,444 | | | |
| Zambia | US Dollar, Millions | 562 | 634 | 752 | 689 | 616 | |

***Source: OECD 2021***

***Table3:Stock Market Capitalization of some selected African countries from 2015 to 2020.***

| Country | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| South Africa | 212.27 | 293.99 | 322.71 | 213.74 | 272.3 | 313.46 |
| Morocco | 45.39 | 55.73 | 61.13 | 51.72 | 54.57 | 57.16 |
| Mautitius | 61.91 | 61.87 | 73.48 | 69.44 | 61.34 | 56.37 |
| Kenya | | | | | | 21.26 |
| Tunisia | 19.26 | 19.05 | 21.16 | 19.51 | 20.36 | 20.16 |
| Namibia | | 21.8 | 22.61 | 17.99 | 20.8 | 17.68 |
| Ghana | | | | | | 13.2 |
| Nigeria | 10.27 | 7.36 | 9.9 | 7.94 | 9.8 | 13.09 |
| Ivory coast | 27.27 | 25.78 | 24.2 | 14.57 | 13.84 | 11.95 |
| Egypt | 16.76 | 10.02 | 19.75 | 16.82 | 14.58 | 11.32 |
| Tanzania | | | | | | 10.39 |
| Algeria | 0.09 | 0.26 | 0.21 | 0.21 | | |

***Source: World Bank 2020***

*Note: Definition: market capitalization (also known as market value) is the share price is the number of outstanding shares (including their several classes) for listed domestic companies. Investment funds, units trusts, and companies whose only business goal is to hold shares of other listed companies are excluded. Data are end-of-year values*

***Table 4: PPG, bonds, (NFL current US$) of some selected African countries from 2015 to 2020.***

| Country | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| Angola | 1500000000 | 0 | | 3500000000 | 2000000000 | 0 |
| Cote d'Ivoire | 1000000000 | 136377000 | 1135786000 | 1927785000 | 403923000 | 477999000 |
| Congo, Rep. | -18156000 | -22695000 | -27234000 | -27234000 | -27234000 | -27234000 |
| Egypt, Arab Rep. | 1500000000 | -1250000000 | 6400000000 | 5867975000 | 7886633000 | 2646242000 |
| Gabon | 500000000 | | -18129000 | -14000000 | | 250000000 |
| Ghana | 1000000000 | 750000000 | | 1228079000 | 2716802000 | 2520558000 |
| Guinea-Bissau | 7755000 | -481000 | 40638000 | 28197000 | 29482000 | 86296000 |
| Kenya | | | 2000000000 | 1350000000 | 0 | |
| Morocco | 1109584000 | 0 | 0 | 0 | 1239283000 | 3000000000 |
| Nigeria | 0 | 0 | 4800000000 | 4868352000 | | 0 |
| Senegal | | 1100000000 | 2181255000 | 0 | -103803000 | |
| Tunisia | 1000000000 | 500000000 | 1259654000 | 590627000 | 48741000 | -706588000 |
| South Africa | -10098663000 | 10089142000 | 10816818000 | -3677962000 | 11687000000 | -3679884000 |

*Source: WDI 2020*

***Panel B: Further Robustness checks for Chapter Four:***

***Table 5: Cross-Sectional Dependence Test***

| Variable | Statistic | P-value |
|---|---|---|
| Pension Funds | 68.415 | 0.0000 |
| Stock Market Capitalisation | 59.203 | 0.0000 |
| Stock Market Traded Value | 69.710 | 0.0000 |
| Government Bond | 67.715 | 0.0000 |
| Corporate Bond | 71.223 | 0.0000 |
| Financial Development | 29.171 | 0.0000 |
| Foreign Direct Investment | 71.403 | 0.0000 |
| Inflation | 74.751 | 0.0000 |
| Trade | - | - |

***Source: Author's own computation***

***Table 6: Other Diagnostic Tests:***

| **Test** | **Statistic** | **P-value** |
|---|---|---|
| Hausman | 67.93 | 0.0000 |
| Breusch-Pagan test for heteroskedasticity | 4279.74 | 0.0000 |
| Pesaran Cross Sectional test in residuals | 7.982 | 0.0000 |

***Source: Author's own computation***

***Table 7: Pooled OLS Results***

| Infrastructural Development | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| Pension Funds | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| | (0.860) | (0.914) | (0.738) | (0.376) | (0.543) |
| Stock Market Capitalisation | 0.002 | | | | 0.004** |
| | (0.078) | | | | (0.000) |
| Stock Market Traded Value | | -0.009 | | | -0.014*** |
| | | (0.034) | | | (0.005) |
| Government Bond | | | 0.001*** | | 0.001*** |

| | | | | | |
|---|---|---|---|---|---|
| | | | (0.000) | | (0.000) |
| Corporate Bond | | | | -0.064*** | -0.057*** |
| | | | | (0.000) | (0.001) |
| Constant | 6.818*** | 6.854*** | 6.757*** | 6.907*** | 6.834*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

(*** p<0.01, ** p<0.05, * p<0.1)

***Source: Author's own computation***

***Table 8: Fixed Effects Results***

| Infrastructural Developent | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 |
|---|---|---|---|---|---|
| Pension Funds | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| | (0.887) | (0.956) | (0.701) | (0.337) | (0.466) |
| Stock Market Capitalisation | 0.001 | | | | 0.004*** |
| | (0.117) | | | | (0.000) |
| Stock Market Traded Value | | -0.011** | | | -0.018*** |
| | | (0.013) | | | (0.000) |
| Government Bond | | | 0.001*** | | 0.001*** |
| | | | (0.000) | | (0.000) |
| Corporate Bond | | | | -0.066*** | -0.058*** |
| | | | | (0.000) | (0.000) |
| Constant | 6.822*** | 6.857*** | 6.762*** | 6.924*** | 6.848*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

(*** p<0.01, ** p<0.05, * p<0.1)

***Source: Author's own computation***

***Table 9: Discroll-Kraay Test***

| Infrastructural Development | Mode 11 | Model 12 | Model 13 | Model 14 | Model 15 |
|---|---|---|---|---|---|
| Pension Funds | -0.005** | -0.006*** | -0.007*** | -0.003** | -0.002 |
| | (0.025) | (0.004) | (0.002) | (0.018) | (0.377) |
| Stock Market Capitalisation | 0.014*** | | | | 0.004* |
| | (0.000) | | | | (0.052) |
| Stock Market Traded Valuee | | 0.011** | | | 0.093*** |
| | | (0.025) | | | (0.000) |
| Government Bond | | | -0.001** | | -0.000 |
| | | | (0.011) | | (0.988) |
| Corporate Bond | | | | -0.165*** | -0.172*** |
| | | | | (0.000) | (0.000) |
| Constant | 5.303*** | 5.452*** | 5.521*** | 5.477*** | 5.423*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

(*** p<0.01, ** p<0.05, * p<0.1)

***Source: Author's own computation***

***Panel B: Further Robustness Checks for Chapter Five:***

***Table 10: Cross-Sectional Dependence Test***

| Variable | Statisctic | P-value |
|---|---|---|
| Pension Funds | 122.565 | 0.0000 |
| Stock Market Capitalisation | 112.874 | 0.0000 |
| Stock Market Traded Value | 121.997 | 0.0000 |
| Government Bond | 124.186 | 0.0000 |
| Corporate Bond | 119.180 | 0.0000 |
| Institutional Quality | 112.543 | 0.0000 |
| Foreign Direct Investment | - | - |
| Trade | - | - |
| Unemployment | 124.424 | 0.0000 |

***Source: Author's own computation***

***Table 11: Other Diagnostic Tests:***

| Test | Statistic | P-value |
|---|---|---|
| Hausman | 29.33 | 0.0006 |
| Breusch-Pagan test for heteroskedasticity | 1.4e+05 | 0.0000 |
| Pesaran Cross Sectional Dependence test in residuals | - | - |

***Source: Author's own computation***

***Table 12: Pooled OLS Results***

| Infrastructural Development | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| Pension Funds | -0.017 | 0.027 | 0.026 | 0.028 | -0.013 |
| | (0.669) | (0.498) | (0.482) | (0.458) | (0.073) |
| Stock Market Capitalisation | 0.028 | | | | 0.095** |
| | (0.497) | | | | (0.048) |
| Stock Market Traded Value | | -0.099 | | | -0.358*** |
| | | (0.281) | | | (0.008) |
| Government Bond | | | -0.006 | | -0.002 |
| | | | (0.616) | | (0.911) |
| Corporate Bond | | | | -2.668*** | -3.263*** |
| | | | | (0.000) | (0.000) |
| Constant | 19.804 | 20.48 | 19.587 | 22.364 | 23.553 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

*** p<0.01, ** p<0.05, * p<0.1

***Source: Author's own computation***

***Table 13: Fixed Effects***

| Infrastructural Development | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 |
|---|---|---|---|---|---|
| Pension Funds | -0.011 | 0.012 | 0.014 | 0.012 | -0.011 |
| | (0.785) | (0.770) | (0.7110) | (0.750) | (0.781) |
| Stock Market Capitalisation | -0.001 | | | | 0.064 |
| | (0.988) | | | | (0.201) |
| Stock Market Traded Value | | -0.345*** | | | -0.443*** |
| | | (0.004) | | | (0.003) |
| Government Bond | | | -0.001 | | 0.004 |
| | | | (0.9510) | | (0.791) |
| Corporate Bond | | | | -3.580*** | -4.197*** |
| | | | | (0.000) | (0.000) |
| Constant | 21.548 | 23.726 | 20.778 | 24.976 | 27.503 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

*** p<0.01, ** p<0.05, * p<0.1

***Source: Author's own computation***

***Table 14: Discroll-Kraay Test***

| Infrastructural Development | Model 11 | Model 12 | Model 13 | Model 14 | Model 15 |
|---|---|---|---|---|---|
| Pension Funds | -0.118*** | -0.034 | -0.023 | -0.032 | -0.110*** |
| | (0.010) | (0.316) | (0.492) | (0.405) | (0.005) |
| Stock Market Capitalisation | 0.103*** | | | | 0.163** |
| | (0.000) | | | | (0.022) |
| Stock Market Traded Value | | 0.121*** | | | -0.173 |
| | | (0.001) | | | (0.398) |
| Government Bond | | | 0.023 | | 0.020 |
| | | | (0.199) | | (0.186) |
| Corporate Bond | | | | 0.489 | 0.219 |
| | | | | (0.191) | (0.581) |
| Constant | 17.458 | 18.177 | 18.116 | 18.488 | 15.721 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls | YES | YES | YES | YES | YES |

*** p<0.01, ** p<0.05, * p<0.1

***Source: Author's own computation***

*Table 15: Trend of infrastructure financing in Africa by sources, 2012-2016 (Billions of United States dollars)*

| Source | 2012 | 2013 | 2014 | 2015 | 2016 | Average |
|---|---|---|---|---|---|---|
| **African Government** | 26.3 | 30.5 | 43.6 | 24.0 | 26.3 | 30.1 |
| **Donors(ICA members)** | 18.7 | 25.3 | 18.8 | 19.8 | 18.6 | 20.2 |
| **MDBS and other bilateral** | 1.7 | 2 | 3.5 | 2.4 | 3.1 | 2.5 |
| **China** | 13.7 | 13.4 | 3.1 | 20.9 | 6.4 | 11.5 |
| **Arab Countries** | 5.2 | 3.3 | 3.4 | 4.4 | 5.5 | 4.4 |
| **Private sector** | 9.5 | 8.8 | 2.9 | 7.4 | 2.6 | 6.2 |
| **Total** | **75.1** | **83.3** | **75.4** | **78.9** | **62.5** | **75.0** |

***Note:Abbreviations ICA, Infrastructure Consortium for Africa; MDB, multilateral development bank***

***Sources: African Development Bank (2018)***

*Table 16: Explicit infrastructure investment limits by pension funds in selected IOPS jurisdictions*

| Jurisdiction | Description |
|---|---|
| **Australia** | No restrictions. Prudent person rule applies1 |
| **Canada (Alberta, New Brunswick, Ontario)** | In Alberta, general investment limits and a concentration limit 10% apply. In some Canadian jurisdictions, there are no quantitative limits. However, investments of the pension plan must be prudent, and must be made in accordance with the Plan's Statement of Investment Policies and Goals. At the Federal level, the general investment limits apply (prudent person rule, 10% concentration limit and 30% votes limit if applicable) |
| **China** | 30% (infrastructure investments are currently classified as "real estate assets") |
| **Croatia** | Transferable securities issued for the financing of infrastructure projects: 55%, 35% and 10%, respectively, for mandatory pension funds categories A, B, and C. An additional limit for funds A and B of investing up to 25% in a single investment project. Funds C can invest only in debt transferable securities issued for the financing of infrastructure projects. |
| **Israel** | No restrictions |
| **Kazakhstan** | No restrictions |
| **Kenya (explicit infrastructure limits)** | Infrastructure bonds issued by the government and public bodies: 90% |
| **Mexico (explicit infrastructure limits)** | Listed equity: 50% (from Seed Fund to SB80-84, the most aggressive), 40% (SB75-79), 35% (SB70-74), 30% (SB65-69 and SB60-64), 10% (SB55-59) and 0% (Income Fund, the most conservative). Unlisted equity investments or loans are not allowed. Corporate bonds: 100%, with issuer limits depending on credit rating: for a Mexican issuer 5% (AAA), 3% (AA), 2% (A), and 1% for BBB (local credit rating). For state-owned companies (Pemex and CFE) 10%. For an international issuer 5% (global credit rating BBB- or higher). Infrastructure bonds ("Trust Certificates"): from 20% to 40%, depending on the fund. Structured instruments (capital development certificates, CKDs and investment project certificates, CERPIs): from 10% to 20%. Mexican |

| | |
|---|---|
| | real estate investment trusts (FIBRAs) and energy and infrastructure investment trusts (FIBRA-Es): from 5% to 10% |
| **Nigeria (explicit infrastructure limits** | Unlisted infrastructure funds (bond and equity): 10% (Fund I), 5% (Fund II), not allowed (Fund III), not allowed (Fund IV), 5% issuer concentration limit, 20% issue limit. Infrastructure bonds (private listed): 25 % (Fund I), 20% (Funds II and Fund III), 10% (Fund IV), issue concentration limit: 7.5% (Funds I and II), 5% (Funds III and IV), issue limit (based on credit rating): BBB – 25%, A - 30%, AA and above – 35%. |
| **The Netherlands** | No restrictions. Prudent person rule applies |
| **Romania** | 15% (infrastructure project companies, established according to the Government Emergency Ordinance no. 39/2018 regarding the publicprivate partnership or specialized investment funds in infrastructure only) |
| **Switzerland** | 10% |

*Note: if not stated otherwise, "limits" relate to maximum value of pension fund assets/investment.*

***Source: IOPS 2020***

***Table 17: Investment in foreign infrastructure by pension funds in selected IOPS jurisdictions***

| Jurisdiction | Is infrastructure investment abroad allowed? |
|---|---|
| **Australia** | Yes, no restrictions. Prudent person rule applies |
| **Austria** | Yes, via direct debt and equity investments and through investment funds. 30% limit applies for investment in foreign currencies. If hedged, transactions can be attributed as euro denominated. |
| **Bulgaria** | Yes, but only in bonds issued by banks from the EU that have at least 50% state ownership and meet licence requirements. Investment limits 10% for mandatory pension funds. No quantitative limit for voluntary pension funds. |
| **Canada (Alberta, New** | Yes, no restrictions in addition to prudent person rule and the general |

| | |
|---|---|
| Brunswick, Ontario) | investment restrictions. |
| **Chile** | Yes, via equity or debt instruments, investment or mutual funds and alternative investments (through co-investment, private equity or private debt). No infrastructure-specific limits exist but for each fund there are structural limits per type of investment, restrictions per group of investments and specific limits per investor |
| **China** | Yes, with upper limit to foreign investments of funds in tax deferred pension insurance common account. |
| **Colombia** | Yes, via private equity funds (PEF) but with restrictions – administrator headquarter must be domiciled in an investment grade jurisdiction, has AUM above 1bn USD, its manager must have at least 5 years of experience of managing the fund's underlying assets, fund's prospect must specify its investment objectives, policies, and risk administration procedures. Via concessionaires' debt or equity – similar requirements as above, bonds with investment grade from an international credit rating agency. |
| **Croatia** | No. |
| **Czech Republic** | Yes, but max. 5%, in securities traded on a regulated market |
| **Egypt** | No. |
| **Ghana** | Yes, but subject to prior approval by the President of the Republic through the Ministry of Finance. |
| **Hong Kong (China)** | Yes, but max 70% (min. 30% of total funds must be held in HK dollars). |
| **Hungary** | Yes, but with general asset class and concentration limits |
| **Iceland** | Yes, via equity and debt, but only if issued in OECD or EU/EEA and meeting 10% concentration limits. |
| **Israel** | Yes, no restrictions. |
| **Jamaica** | Yes, but max 20% and only via instruments issued in a recognised jurisdiction (Canada, US, and the UK). Excess over 20% needs to get approval from the Bank of Jamaica. |
| **Kazakhstan** | Yes, via infrastructure bonds, no specific limits for foreign infrastructure investment, but issuer credit rating requirements (for A and above: up to 3% of total pension assets, for BBB+/- up to 2%, for BB+/- up to 1.5%.) |
| **Kenya** | No. |
| **Liechtenstein** | Yes, but 30% general foreign currency investment limit. |
| **Mauritius** | Yes, but 70% general foreign investments limit. |
| **Mexico** | general foreign investments limit. |

| | |
|---|---|
| | Mexico<br>Yes, via stocks, bonds, Investment Project Certificates (CERPIs), or Special Purposes Acquisition Company (SPAC) but with 20% general limits for foreign assets and 30% general limits for foreign currency |
| **Morocco** | es, but 5% general foreign investment limit plus general asset class limits. |
| **Namibia** | Yes, via listed instruments but max. 55% in total due to general asset class limits or sub-limits. General limits are: 55% for listed foreign equity (taking into consideration the 45% domestic asset requirement), 50% for foreign bonds, 2.5% for unlisted equities and infrastructure loans (the limit for "other assets"). |
| **Nigeria** | Yes, via infrastructure funds 5% if direct investment (min. 60% of the infrastructure fund must be invested in projects within Nigeria for it to qualify for pension fund investment) |
| **North Macedonia** | Yes, via allowed publicly traded instruments but geographical restrictions and general investment limits apply. Mandatory and voluntary pension funds can invest in bonds and other securities issued by foreign governments and central banks from EU or OECD countries; and securities issued by non-state foreign companies, banks or investment funds from EU or OECD countries. Voluntary pension funds can also invest in other debt securities issued by the European Central Bank, European Investment Bank, the World Bank; as well as debt securities issued by non-state foreign companies or banks, shares issued by foreign companies or banks or participation units, shares and other securities issued by investment funds from EU or OECD countries. |
| **The Netherlands** | Yes, no restrictions. Prudent person rule applies |
| **Peru** | Yes, mainly via debt instruments and foreign infrastructure funds. Foreign general limits by the Central Reserve Bank (operational limit 50%) and the Congress (legal limit 50%). Operational limit is the one in force and cannot exceed legal limit. Limits in alternative assets are 15% and 20% for funds type 2 and type 3, respectively. Funds type 0 and type 1 are not allowed to invest in alternative assets. |
| **Romania** | No for mandatory funds.<br>Yes, for voluntary funds, via listed equities, bonds and investment fund units. General foreign investment limit 30%. |
| **Switzerland** | Yes, but max. 10%. General foreign exchange limit on unhedged foreign currencies 30%. |
| **Turkey** | No |
| **Uganda** | Yes, but max. 80% via Treasury Bonds of the East African Community (Burundi, Kenya, Rwanda, South Sudan, Tanzania, Uganda) only. Any |

| | |
|---|---|
| | other foreign investment is not allowed. |
| **Zimbabwe** | No (except a few external funds). |

***Note: "general" limits relate to any type of investment, not specifically infrastructure.***
***Source: IOPS(2020)***

### *Table 18: Infrastructure investment by pension funds in selected IOPS jurisdictions (as % of assets under management), 2018 or most recent years available)*

| Jurisdiction | **Listed equity (total)** | **range of asset allocation** observed | **Unlisted equity (total)** | **range of asset allocation** observed | **Infra debt (total)** | **range of asset allocation observed** |
|---|---|---|---|---|---|---|
| **Australia** | 1% | 0-12% | 4% | 0-22% | | |
| **Austria** | <5% | 0-5% | | | <1% | 0.1-2.6% |
| **Chile** | | | 0.09% | | 0.4% | |
| **Iceland** | | | 0.4% | | 2.3% | |
| **Israel*** | 0.2/0.0% | | | | 0.2/0.0% | |
| **Kazakhstan** | | | | | 0.14% | |
| **Mexico**[30] | 0.01% | | | | 7.5% | |
| **Morocco** | 2.7% | | 1.5% | | | |
| **Nigeria** | 0.33% | | 0.36% | | 1.55% | |
| **Peru** | 1.89% | | 1.34% | | 4.90% | |
| **Russia**** | 0.9%/2% | | | | 10.1%, 6.2% | |

***Note: (*) Old and new pension funds, figures are provided in total for both types of pension funds, domestic/foreign investments, (**) Data for mandatory and voluntary pension arrangements, respectively.***
***Source: IOPS (2020).***

*Table 19: Regulatory changes to facilitate infrastructure investments by pension funds*

| Jurisdiction | Regulatory changes |
|---|---|
| **Canada** | Concentration limits calculated at market value of a pension plan's assets instead of book value.<br>Implementation of the Canada Infrastructure Bank (CIB) to promote infrastructure projects deemed to be in the public interest |
| **Chile** | Law of 2017 allowing pension funds to invest in alternative assets, including infrastructure |
| **China** | Supervisory regulation of 2016 facilitating infrastructure investments by pension funds and supervisory notices expanding the investment scope, including infrastructure products. |
| **Colombia** | Law of 2012 setting up the definition of PPPs and their main required features.<br>Decree of 2014 setting up investment limits in private equity funds and Decree of 2015 setting up conditions for such investments via PPPs. |
| **Croatia** | Recent amendment of pension law broadening the possibility to invest in infrastructure projects.<br>Infrastructure projects were segregated as a special asset class, and consequently, there is no longer an obligation for such securities to be listed on the regulated market. |
| **Egypt** | Project of a law on supervision to deal with investment management, including non traditional investments. |
| **Israel** | Investment cost cap does not apply in case of infrastructure investments. |
| **Mexico** | Recent structural reforms in the energy sector and regulatory changes in the investment regime of pension funds facilitating and giving incentives for infrastructure investment. Recently added the possibility for funds to invest in foreign infrastructure via investment project certificates (CERPIs).<br>35% limit of investment on the total issuance amount by a single pension fund was removed, setting instead a limit of 50% of the value of the project and 80% of the value of the project for small capital development certificates (CKDs) and CERPIs.<br>Nevertheless, since the transition from Basic Funds to TDFs, two funds (those for the eldest workers) out of 10 are no longer allowed to acquire new instruments of this type. Also, investments in a single issuance of structured instruments cannot exceed 3% of total AUMs of the SB[23]. |
| **Namibia** | Requirement to invest in unlisted instruments by pension funds of at least 1.75% of |

| | |
|---|---|
| | assets. |
| **Nigeria** | The revised regulation on Investment of Pension Assets provided thresholds and conditions for investment of pension funds in infrastructure projects which were hitherto not available. |
| **Peru** | Supervisory regulations to include financial securities related to direct infrastructure (2012), allowing investment in plain vanilla instruments without obtaining prior authorisation from the supervisor (2014), and allowing investment in foreign alternative infrastructure funds (2018). |
| **Romania** | The Governance ordinance (2019) specified infrastructure as an asset class and allowed (from February 2020) mandatory pension funds to invest up to 15% of their total assets in equities and debt instruments issued by companies organized as PPPs or in infrastructure investment funds. |
| **Russia** | Pension funds allowed to acquire non-rated bonds of concessioner. |
| **Switzerland** | Dedicated infrastructure investment category (10% limit) was introduced in 2020; previously infrastructure belonged to alternative investment category (15%) |
| **Turkey** | Plans to require pension funds to invest part of their portfolios in non-traditional assets, including infrastructure projects. |

***Source: IOPS (2020)***

***Table 20: List of selected African Countries for the study.***

| Selected African countries for the study | | | | |
|---|---|---|---|---|
| Algeria | Congo, Rep. | Guinea Bissau | Namibia | Tunisia |
| Angola | Côte D'Ivoire | Kenya | Niger | Uganda |
| Benin | Djibouti | Lesotho | Nigeria | Zambia |
| Botswana | Egypt, Arab Rep. | Liberia | Rwanda | Zimbabwe |
| Burkina Faso | Equatorial Guinea | Libya | Sao Tome and Principe | |
| Burundi | Eritrea | Madagascar | Senegal | |
| Cabo Verde | Eswatini | Malawi | Seychelles | |
| Cameroon | Ethiopia | Mali | Sierra Leone | |
| Central African Republic | Gabon | Mauritania | South Africa | |
| Chad | Gambia | Mauritius | Sudan | |
| Comoros | Ghana | Morocco | Tanzania | |
| Congo, Dem. Rep. | Guinea | Mozambique | Togo | |