INVESTMENT STRATEGY AND FINANCIAL PERFORMANCE OF DEFINED CONTRIBUTION PENSION FUNDS IN KENYA

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D58/CTY/PT/28707/14

A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE OF KENYATTA UNIVERSITY

APRIL 2022
DECLARATION

This thesis is my original work and has not been submitted for a degree in any other university.

Signed .............................. Date........................................

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We confirm that the work in this thesis was done by the candidate under our supervision.

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School of Business
DEDICATION

I dedicate this thesis to my parents Mr. Stanley Muthinga and Mrs. Isabella Muthinga in appreciation of the support they have accorded me throughout my research work and for always encouraging me to keep strong in my pursuit for knowledge.
ACKNOWLEDGEMENT

To start with, I want to thank God for granting me unwarranted vigour, knowledge, ability and adequate resources to work on this thesis. I would also want to unequivocally express my gratitude to the supervisors, Mr. James Muturi and Dr. Eddie Simiyu for dedicating their time and effort towards this thesis and giving me professional advice and guidance throughout its development.

I also thank my parents Stanley and Isabella for offering me parental support throughout the study and acknowledge the great support received from my siblings Robert, James, Beatrice, Mercy and Lydia as well.
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OPERATIONAL DEFINITION OF TERMS

**Alternative Investments:** Is an asset class supplemental to the conventional asset classes which when included in a portfolio may provide broader asset diversification, reduce risk, and ultimately enhance portfolio returns. It includes real estate investment trusts, immovable property and private equity as well as venture capital.

**Asset Value:** Asset value is the total monetary value of all pension fund assets at a given period of time as determined by their market or fair value.

**Defined Benefit Pension Fund:** Is a pension plan in which the employer guarantees the employee a specified pension income on retirement that is computed using a predetermined formula that is pegged on the employee's final salary, accrual rate as well as number of years in the fund (pensionable service).

**Defined Contribution Pension Fund:** Refers to pension plan in which participants make individual contributions to their retirement plan accounts, usually via employee payroll deductions. In some instances, the pension fund sponsors also contribute a predetermined amount to add to the participants’ accounts. The retirement benefits are not guaranteed and depend on how the contributions are invested to yield returns.
**Density of Contributions:** Refers to the degree of contributions into the pension fund. This can be computed as the overall pension fund size divided by the number of active members contributing into the fund.

**Financial Performance:** Is an indicator of how pension funds yield incomes by investing the funds in various asset classes over a given time period.

**Fixed deposit:** Is an investment instrument offered by banks and non-banking financial institutions, where money is deposited for a period of time. It earns higher interest to investors compared to savings account.

**Fund size:** It entails the total value of pension fund assets as measured in terms of both invested and non-invested assets over a given period of time.

**Guaranteed Fund:** Is an investment in which the investor's principal amount is shielded from the losses.

**Investment Strategy:** Refers to the assortment of investment options adopted by defined contribution pension fund managers which acts as a determinant of the fund’s total assets investment mix and hence fund overall returns.

**Long term Investments:** These are investment instruments that mature in more than ten years. They include government bonds, guaranteed funds and quoted equities.
**Medium term investments:** Medium term investments are investments that can be redeemed within a period of three to ten years. They include fixed deposits, corporate bonds and offshore investments.

**Offshore Investment:** Refers to investment of funds in another country different from that of the country of residence of the investor.

**Pension fund:** Is a pension plan that allows employees, employers or both to make contributions on behalf of the employees when in service, such funds are consolidated and invested and the accruals made together with the principal amount paid back to individual members as retirement benefits.

**Private Equity:** A type of alternative investment where pension fund invests directly in private companies through purchase of stock or acquires control of public entities with the intention of having them delisted from public stock exchange hence making them private.

**Short term investments:** Short term investments are those investments that the investor can access quickly, have low risk, and will mature in the form of cash within a period of one year. They include cash at bank and demand deposits and treasury bills.

**Venture Capital:** A subset of private equity where pension funds invest in startup companies which have huge growth prospects with the
aim of recouping the invested capital and earning returns in future.

**ABBREVIATIONS AND ACRONYMS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>CLRM:</td>
<td>Classical Linear Regression Model</td>
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<td>DB:</td>
<td>Defined Benefit.</td>
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<td>DC:</td>
<td>Defined Contribution.</td>
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<tr>
<td>GDP:</td>
<td>Gross Domestic Product</td>
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<tr>
<td>IOPS:</td>
<td>Institute for Pension Supervisors</td>
</tr>
<tr>
<td>IPS:</td>
<td>Investment Policy Statement</td>
</tr>
<tr>
<td>KSH:</td>
<td>Kenyan Shillings</td>
</tr>
<tr>
<td>NACOSTI:</td>
<td>National Commission for Science, Technology, and Innovation</td>
</tr>
<tr>
<td>OECD:</td>
<td>The Organization for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PSC:</td>
<td>Public Service Commission</td>
</tr>
<tr>
<td>RBA:</td>
<td>Retirement Benefits Authority</td>
</tr>
<tr>
<td>REITs:</td>
<td>Real Estate Investment Trusts</td>
</tr>
<tr>
<td>ROA:</td>
<td>Return on Assets</td>
</tr>
<tr>
<td>ROE:</td>
<td>Return on Equity</td>
</tr>
<tr>
<td>ROI:</td>
<td>Return on Investment</td>
</tr>
<tr>
<td>UK:</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>USA:</td>
<td>United States of America</td>
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VIF: Variance Inflation Factor
Pension funds are meant to enable pensioners to live quality life upon retirement by paying them retirement benefits. In defined contribution pension funds, both the employer and employees contribute in accordance with the minimum standards as set by individual pension funds and the retirement benefits authority. Financial performance of defined contribution pension funds in Kenya has continued to portray unimpressive trend despite positive targets set by the pension funds. The study’s general objective was to establish the effect of investment strategy on financial performance of defined contribution pension funds in Kenya. The specific objectives were to assess the effect of long term investments, medium term investments, short term investments and alternative investments on financial performance of defined contribution pension funds in Kenya and to examine the moderating effect of density of contributions on the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. Systems theory view of pension funds, agency theory, portfolio theory and fisher’s theory of investment guided this study. Secondary data was used in the study; as collected from audited financial reports of the defined contribution pension funds in Kenya. Correlational research design and positivism research philosophy were adopted by this study. The target population comprised of 1172 registered defined contribution pension funds in Kenya as of December 2018. A sample size of 289 defined contribution pension funds were involved in the study and were selected by applying stratified random sampling method. The study applied descriptive statistics, correlation analysis and panel regression analysis to analyze panel data collected. Diagnostics tests were carried out to ensure legitimacy and validity of data collected and these included multicollinearity, autocorrelation, normality, heteroskedasticity, panel unit root and Hausman tests. For ethical and confidentiality purposes, the researcher ensured the data collected was solely for academics. The study established that a positive association exists between investment strategy and financial performance of defined contribution pension funds in Kenya. It concluded that investment strategy explained up to 57.76% of the variations in the return on investment. The regression analysis conducted found a significantly positive association between long term investments and return on investment. Medium term investments was also found to be positively and significantly connected to return on investment. There was also a significantly positive relationship between short term investments and return on investment. Alternative investments was found to be positively and significantly connected to return on investment. This implied that density of contributions moderated the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. The study recommended long term investments as the most ideal investment option for defined contribution pension funds because of its ability to generate the highest return on investment. Medium term investments was recommended as the second best investment option to be embraced by defined contribution pension funds because of its ability to yield good returns as well, second to long term investments. The next investment priority should be given to the alternative investments since it had the third highest regression of coefficients. The least investment option to be undertaken by defined contribution pension funds should be short term investments. The short term investments had lowest regression of coefficients which implied that it makes the least contribution to return on investment.
CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Pension funds are investment pools that pay for members’ commitments after retiring from active employment (Kigen, 2016). The funds have a great role to play in providing retirement benefits to families; funds for development to the government and capital to corporations (Autenne, 2017). They bring about social-economic development, strengthen monetary markets and advance financial security (Stalebrink, 2014). According to OECD (2014), millions of individuals in the world have pension funds as their primary source of retirement income. Funds received on retirement form 68% of the total retirees’ income in Kenya (RBA, 2016), 80% in France, 45% in Australia and 75% in South Africa (OECD, 2014). Kompa and Witkowska (2015) depicted that 82% of retired individuals in the USA rely on income from pension funds. The income replacement rate is expected to rise if pension funds are to be run efficiently through sound investment plans, which will yield better returns for pensioners (Dögüs, 2018).

Pension fund assets are known to be significant to an economy as portrayed by global indices. The fund assets account for 62% of total GDP in developed countries (Pandurics & Szalai, 2017). Pension fund assets in the world have seen a gradual average growth rate of 3.8% annually, over the period of study; China’s growth rate being the highest (20.3%), and Japan has the lowest (-5.4%) (Willis Towers Watson, 2017). Defined Contribution assets’ growth continues to outnumber that of Defined Benefit assets with 58% of global pension assets being attributable to DC pension funds compared to 31% DB pension funds (OECD, 2016). Over the past decade, the growth rate of DC pension assets has been at an average of
5.6%, compared to that of 2.6% for DB assets (Willis Towers Watson, 2017). An estimated USD 27.6 Trillion of Global Pension Assets in 2018 was reached by OECD Member countries, a 4.0% decrease since 2017. The USA has continued to provide a large market concerning pension assets, followed at a distance by UK and Japan. In total, they account for total assets of 77.3% in OECD Member Countries (OECD, 2019).

There is a rising trend of old-age poverty rate in the 21st Century. It is estimated to be at 2% in Netherlands, 3.8% in France, 4.1% in Norway, 4.6% in Denmark, 6.7% in Canada, 6.7% in Spain, 6.9% in Greece and Ireland, 9.3 in Sweden and 9.4 in Germany and Italy, 10.7% in Belgium, 13.4% in United Kingdom, 21.5% in United States, 23.4% in Switzerland and 33.4% in Australia (Willis Towers Watson, 2018).

The growth of Kenyan retirement pension fund assets went up from KSh. 788.15 Billion in 2014 to KSh. 1.16 Trillion in 2018, portraying an annual compound growth rate of 14.3% (RBA, 2019). The Retirement Benefits Authority has provided guidelines on the assets that DC pension funds should invest in as well as quantitative restrictions which should not be surpassed. These quantitative restrictions are government securities at 90%, guaranteed funds at 100%, quoted equities at 70%, fixed deposits at 30%, corporate bonds at 20%, offshore investments at 15%, unquoted shares at 5%, cash at bank and demand deposits at 5%, commercial papers at 10%, real estate and REITs at 30%, immovable property at 30%, private equity and venture capital at 10%, exchange-traded derivatives at 5% and any other asset at 10% (RBA, 2019).

Table 1.1 on page 3 shows the overall pension industry investment portfolio over a 5-year period running from 2014 to 2018.
Table 1.1 Overall Industry Investment Portfolio (KSh Billion’s)

<table>
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<tr>
<th>Assets Category</th>
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<td>TOTAL</td>
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<td></td>
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<td>1166.5</td>
</tr>
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</table>

Source: (RBA, 2019)

On average, all categories of investments were within the statutory quantitative restrictions provided by the RBA. There was an increase in the investment portfolio across all the years with majority of investment funds put in government securities, quoted equities, immovable property and guaranteed funds. The asset diversification remained similar over the years with most of the asset classes recording minimal percentage increases or decreases.
The pension funds are at will to choose assets that they find best suitable to yield maximum returns, while following the funds’ fundamentals. Pension fund investments should therefore constitute a portfolio which is well-diversified (Chirchir, 2007).

Pension funds mostly give a large number of investment opportunities to its members ranging from conservative to aggressive investment strategies (Muia, 2015). Therefore, there should be stringent measures to reduce the old age poverty (OECD, 2010). Adequate retirement funds are therefore key to ensuring financial stability of the ageing population. More workers should be encouraged to save to grow the fund’s asset base while adopting sound investment strategies to guarantee them attractive retirement package (Musembi, 2014).

In Kenya, there is also the existence of National Social Security Fund, which is a public body that pays lump-sum amounts of benefits upon the retirement of its members (Mungai & Elly, 2018). It has an estimated membership of 800,000. A Mandatory monthly contribution of KSh 200 per employee is made to the fund for firms having more than five employees; this aimed at amassing the retirement savings for the employees (Mwachanya, 2015).

1.1.1 Investment Strategy

According to Stanko (2012), investment strategy can be defined as an array of investments made by pension funds. It refers to a procedure of decisions by pension fund managers that will take place during the investment. The investment strategy can be long term, medium term, short term or alternative (Owinyo, 2017).

Long term investments are investment instruments (government bonds and shares) that mature in more than ten years (Kiplagat, 2014). This category of investment is normally
chosen as an option when there is a great deal of time and there is no immediate requirement for the invested funds. According to Véron and Wolff (2016), long term investments can attract little amounts of earnings over the longer time period. The slow-but-steady speed of lasting investments permits a much higher level of security and also a much lower threat (Mutuku, 2011). The main components in the long term investments are equities, bonds and guaranteed funds and because of the higher risks involved in equity investment, the investors of pension funds anticipate for higher returns from this asset class in the long run (Brigham, Lumpkin, Payne & Zachary, 2014).

Medium term investments are investments that can be redeemed within a period of three to ten years (OECD, 2013). Medium term investments may comprise of corporate bonds and offshore investments considering their maturity period which usually lies between three and ten years (Muia, 2015). According to Mayo (2016), a medium term investment portfolio can also devote a few of the funding to revenue funds or perhaps growth funds to try and make the most of the additional time compared to a much shorter term profile where resource conservation is critical.

Short term investments refer to investments such as bank deposits and treasury bills that management holds to earn a quick return within the current accounting period usually a period of one year (Eaton & Nofsinger, 2011). Short term financial investments tend to have more significant risks, this resulting from higher fluctuation rates, compared to long term investments (Walker & Iglesias, 2010). While there is a great possibility that investors may make money under the volatile financial environment, the possibility of loss of funds cannot be overlooked at the same time. According to Buizer, Jacobs and cash (2016), investing in treasury bills is a good example of this category of investment and if timing is appropriately
done can make one an overnight millionaire. The ability of pension funds to settle the fund liabilities, including retirement benefits, as they fall due is dependent on their liquidity position and such position is greatly enhanced by short term investments since they are easily convertible into cash (RBA, 2015).

Alternative investments refer to a type of investment in unconventional asset classes such as REITs, Immovable property and precious metals and can also involve the financial assets like private equity, distressed securities as well as hedge funds (Baker & Filbeck, 2013). According to Grima, Romānova, Bezzina and Dimech (2016), an alternative investment is a type of investment where funds are invested in asset classes other than the conventional stocks, bonds and cash. Alternative investment assets are majorly held by institutional investors or certified high-net-worth personnel due to their intricate nature, lack of regulation as well as the degree of uncertainty (Martínez, 2015).

The density of contributions of a Pension fund a factor that significantly determines the performance of pension funds, and can be measured by the fund size as well as number of fund’s active members (Kigen, 2016). The amount of pension fund assets is the common way of estimating fund size, hence density of contributions and thus, pension fund assets are long term assets that arise from the pension contributions made by members towards their retirement (Karanja & Were, 2017).

1.1.2 Financial Performance

Financial performance can be described as a measure of financial wellness of an entity over a certain time period. It depicts the ability of an organization to fulfill its plans and operations in monetary terms (Disegni, Huly & Akron, 2015). Financial performance is well portrayed by an organization’s income, gains and appreciation in value of the shares as reflected in rise
in share price (Mwangi & Murigu, 2015). According to Nuhiu, Hoti and Bektashi (2017), the tools commonly used to measure financial performance are Return on Assets, Return on Equity and Return on Investment.

Return on assets refers to a measure that reveals the portion of gains an organization earns in regard to its total assets (Omitogun, Olanrewaju & Alalade, 2016). ROA is used in financial analysis as a measure of how effectively company’s assets have been employed and a higher ROA shows the organization’s effective use of its assets in honoring the financial obligations of its investors (Bidabad & Allahyarifard, 2019). Return on equity is used as an indicator of how efficiently an organization generates income from investments made in equity and is the result of the division between net income and shareholder’s equity (Israelov & Klein, 2016).

Return on investment is a proportion of net income and the cost of investment (Okoro, 2017). According to Shukeri, Shin and Shaari (2014), a high ROI implies that the financial investment gains compare positively to its cost. The study will use ROI to measure financial performance of DC pension funds as opposed to ROA and ROE because it will specifically focus on the invested assets and not the overall assets of DC pension funds. ROI is the best tool for measuring the rates of return on investment and a well-performing pension fund is one that is able to achieve high investment returns over its period of existence (Chen, Feldman & Tang 2015).

The assessment of the fund managers’ level of the ability to bring about return on investment proportionate to the assumed risk rate can be used as a measure of how well defined contribution pension funds have performed financially (Walker & Iglesias, 2010).

Table 1.2 on page 8 shows the overall return on investment of pension fund industry in Kenya against industry benchmark over the period between 2014 and 2018.
The industry benchmark for each year has been constructed by computing the average returns of the pension fund industry over a consecutive ten year period. The results indicate that in 2014 the overall returns from pension funds stood at 8.6% of the total investments. This was against the 7.5% industry benchmark. The year 2015 saw a sharp decrease in pension fund performance, at 1.9%, way below the industry benchmark of 9.0%. In the year 2016, there was a significant increase in returns to 4.2% followed by a decrease to 2.5% in 2017. This was against the industry benchmarks of 5.0% and 6.5% respectively. In the year 2018, there was an increase in pension fund performance to 3.8% against the industry benchmark of 6.5%. From these results, the overall pension fund returns have been rising and falling from year to year, rendering future financial performance unpredictable.

### 1.1.3 Defined Contribution Pension Funds in Kenya

A defined contribution pension fund is an employer-sponsored retirement arrangement where contributors’ accounts are set up for staff members and the benefits realized are based upon the funds credited to these accounts (through employer as well as employee payments) and any other investment returns that may accrue in the accounts thereof (Maalim, 2014).
defined contribution pension fund creates an avenue for members to save for their future financial needs upon retirement (RBA, 2018).

In Kenya, there are four components of pension plans which include: The National Social Security Fund, Civil Servants Pension Fund, Individual Retirement Fund and Occupational Retirement Pension Fund (RBA, 2014). Defined contribution pension funds are found under Occupational Retirement Pension plan and are funded through the employer and employee contributions (Muia, 2015).

Kenya has experienced a shift in Occupational Retirement Pension Fund from DB to DC where the number of DB pension fund has constantly reduced from 121 in 2014 to 85 in 2018 while DC pension funds being at 1172 (RBA, 2019). The increase in the adoption of DC pension fund design was due to the government intervention through a circular number 18 of 2010 which directed all public organizations to convert from DC to DB pension fund design by 1st of July 2011. This directive resulted from a review made to the public service retirement benefit funds after numerous challenges were noted then with DB pension funds (Mwachanya, 2015).

The accumulation of wealth in DB plans is sensitive to member experience in the labor market and to parameters used in planning whereas in DC plans, it is pegged on pensioner’s contribution behavior as well as how such funds are invested in the market (Muli and Jagongo, 2019). In defined contribution pension funds, a member makes contributions at a fixed rate while the employer also makes monthly contributions at a predetermined rate in order to ensure the adequacy of contributions for investment and ultimately for retirement benefits (Kigen, 2016).
contributions as well as their simplicity in administration has made them grow fast in Kenya (RBA, 2014).

1.2 Statement of the Problem

Financial performance of defined contribution pension funds in Kenya has continued to portray an unimpressive trend over the years against the industry expectation. This trend results partly from the unstable investment returns realized from asset classes as invested in the overall portfolio of various pension funds. A survey done by Zamara group revealed that pension funds’ overall returns stood at 1.9% of the total investments in the year 2015. This was a decrease from 8.6% in the year 2014. However, there was an increase in the year 2016, where the returns from pension fund investments was 4.2%. The returns in the years 2017 and 2018 were 2.5% and 3.8% respectively. The years that saw decline in pension fund performance was majorly attributed to the decrease in returns realized due to non-optimal portfolio performance as managed by fund managers.

The contemporary investment portfolio for DC pension funds in Kenya is seen to be highly concentrated in a few asset classes which are perceived to be the best performers in the investment market, while giving less attention to other available investment options (pension industry report, 2017). Overall, an ideal investment strategy would be the one that ensures pension fund investments are diversified in a manner that they can meet the targeted returns.

Other studies conducted in the past by the Retirement Benefits Authority (RBA) and Alexander Forbes show that Kenyans were retiring with only 22% of their pre-retirement salaries. This is way below the recommended income replacement rate of 75% (RBA, 2018). Furthermore, a survey conducted in 2018 by Enwealth Financial Services in partnership with Strathmore University indicates that 86% of working Kenyans risk sinking into poverty upon
retirement. The number of employees above 50 years of age has also been increasing every year, being at 37% in 2018 from 20% in 2014, (PSC, 2018). These employees will retire by the year 2027 and need to lead financially stable and self-reliant lives. It is therefore very important to have a sound investment mix for defined contribution pension funds that will yield maximum returns to meet the retirement needs of this class of people (Mungai, 2017).

Whereas it is a common understanding that pension funds are invested to yield returns for the benefit of retirees, little study exist on how best these funds can be invested to give maximum returns, while focusing on all the asset classes listed by RBA. Most scholars have only contextualized their theoretical apprehension of the effect of investment strategy on financial performance but not its practicability on the defined contribution pension funds in Kenya. Other scholars have only focused on a few selected asset classes leaving out the rest which may influence financial performance as well. This study sought to establish the effect of investment strategy on financial performance of defined contribution pension funds in Kenya with density of contributions as the moderator. Key focus was on how best DC pension funds should be invested and managed to realize the best returns.

1.3 Objectives of the Study

The study’s general objective was to determine the effect of investment strategy on financial performance of defined contribution pension funds in Kenya.

The specific objectives of the study were derived as:

i. To establish the effect of long term investments on financial performance of defined contribution pension funds in Kenya.
ii. To determine the effect of medium term investments on financial performance of defined contribution pension funds in Kenya.

iii. To explore the effect of short term investments on financial performance of defined contribution pension funds in Kenya.

iv. To investigate the effect of alternative investments on financial performance of defined contribution pension funds in Kenya.

v. To examine the moderating effect of density of contributions on the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya.

1.4 Research Hypotheses

i. \( H_{0.1} \): Long term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

ii. \( H_{0.2} \): Medium term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

iii. \( H_{0.3} \): Short term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

iv. \( H_{0.4} \): Alternative investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

v. \( H_{0.5} \): Density of contributions does not moderate the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya.
1.5 Significance of the Study

This study will be significant to researchers and academicians who seek to comprehend how pension funds can best be invested to earn adequate returns to finance the retirees’ livelihoods. The Retirement Benefits Authority may be interested in knowing the implication of changes in the level of funds availed to pension funds and how the same are invested and therefore the usefulness of this study will surface.

Pension fund contributors, managers, sponsors, and workers’ representatives or trade unions will be interested in knowing the degree of financial viability of DC pension funds. The policy makers will also be great beneficiaries of this study since the findings will be used for policy and strategy development. Such policies and strategies will then guide the pension fund industry and RBA to adopt the right investment strategies that will ensure better financial performance of DC pension funds.

1.6 Scope of the Study

This research only explored on how investment strategy impacts the financial performance of defined contribution pension funds in Kenya. The intriguing variables were long term investments, medium term investments, short term investments, alternative investments, density of contributions and financial performance. Target population was 1172 registered defined contribution pension funds in Kenya as of December 2018. Secondary data was used covering the period between 2014 and 2018. This period was selected because it is when most of the pension funds had fully adopted the defined contribution pension fund design as per the government intervention through a circular number 18 of 2010 which directed all public organizations to convert from DC to DB pension fund design. This period had also
seen pension funds file returns with a clear laid down framework, as put forward by RBA. This would ensure fineness of the information relayed to the regulator and hence accuracy and completeness of the data collected for the study.

1.7 Organization of the Study

The chapter one of this research embarked on study background, problem statement, objectives, hypotheses, significance, scope and limitations of the study. Chapter two focused on literature review and conceptual framework while chapter three focused on research methodology. Chapter four covered the study findings and discussions and then the fifth chapter entailed research summary, conclusion and recommendations.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter entails a highlight of scholarly literature which relates investment strategy and its influence on financial performance of DC pension funds. Theoretical and empirical literature were represented in this chapter. The conceptual framework was also laid down.

2.2 Theoretical Literature Review

Four theories with relevance to study objectives were reviewed in this section and they are systems theory, agency theory, portfolio theory and fisher’s theory of investment.

2.2.1 Systems Theory

This theory was promoted by Ludwig Bertalanffy in 1968. It suggests that entities can be perceived as open systems since they consist of small units that are merged to form the entity (Bertalanffy, 1968). Entities depend upon their surrounding for the numerous crucial resources: consumers that purchase the services or product, vendors who avail materials and workers who provide the workforce (Bertalanffy, 1968). The theory further establishes that firms adjust accordingly to changes in their operating environment.

Nevertheless, systems theory has some inherent weaknesses. According to Zahariadis (2019), the argument tends to offer suggestions which are general in nature. This shortage of specificity translates to inefficacy when used in some particular scenarios. Other scholars argue that the theory allows for practitioners to apply a wide range of solutions and techniques instead of sticking to one potentially effective strategy (Levy, 2000). Rutan, Rock and Shay (2014) slammed the theory for not having the ability to offer a solitary practical
concept by itself but instead relying on connections to get coherence. Strauss (2002) also criticized the theory by establishing that the theory does not clearly establish the different aspects of human interactions in different scenarios.

Nonetheless, the theory was applicable to the study as it provided an elaborate explanation of making long term investments as a saving tool for financial resources, and also the aspect of accomplishing more with limited financial resources as well as prudent use of budgets. In concurrence with the systems theory approach, the efficiency of the DC pension fund in the study will be viewed as the funds’ potentiality to maximize their financial outputs and optimize the overall gains to members. In pursuit of this systems theory approach, the efficiency of DC pension funds was conceptualized as the fund’s capability to maximize its fund value as well as pension benefits by utilizing the limited financial inputs (investment funds and contributions) available to them. This theory informed the variable long term investments.

2.2.2 Agency Theory

Jensen and Meckling advanced this theory in 1976. It emphasized on the effect that managerial decisions have on performance of organizations. This theory reports that, in some cases, the agent may act contrary to the principal’s ultimate interest, majorly when both parties are utility maximizers (Panda & Leepsa, 2017). The theory dictates that the agent should at all times act as per the principal’s best interest but in practice, they have their own interests which they try to achieve and such interests may not coincide with those of the principal (Wright, Mukherji, & Kroll, 2001). The theory establishes that when control in the institution is different, the managers may become self-centered and self-indulgent, with minimal attention paid to the shareholders’ interests (Rashid, 2015). The concept further
established that the splitting up of ownership and control in an entity may lead to managers going after different goals instead of those set by the entity.

Despite the fact that agency theory is known to be very pragmatic and robust, it has its share of criticism from scholars as well. Panda and Leepsa (2017) criticizes the theory as one that pursues lawful consensus between principal and the agent for a limited or unrestricted duration which is not certain. Additionally, Arthurs and Busenitz (2003) establish that the concept envisages that contracting can get rid of agency problem, but in practice this is not true due to existence of other hindrances such as information asymmetry, fraud and budgetary issues.

This theory was appropriate for the study and it underpinned the medium-term investments variable. The theory largely associates itself with scenarios whereby a party (agent) is engaged by a different party (principal) to take actions on its behalf. Comparatively, defined contribution pension funds in Kenya are mandated to make investment decisions and take actions on behalf of the pensioners. The principal is required to be knowledgeable on the agent's actions to make it easier to mitigate agency opportunism as it binds him (the agent) to act and behave in favour of the principal's interests.

2.2.3 Portfolio Theory

Markowitz put forward this theory in the year 1952. He argued that various classes of assets can be brought together for investment in order to minimize portfolio risk or achieve additional returns with reduced risk. The whole collection of investments needs to be put into consideration since there is a way their returns interact and such interaction is critical in determining the performance of a firm. According to Markowitz (1952), a positive correlation prevails between the rates of return of different assets and their risk levels. The
portfolio’s expected rate of return and the resultant risk measure were derived by Markowitz. He also derived the formula for working out the portfolio variance which emphasized on the need to diversify investments in order to lower the total portfolio risk as well as the aspect of effective diversification.

This theory attempts to subscribe to the fact that selection of various portfolio assets should be done meticulously to ensure maximum returns for a particular risk level or minimum risk for a particular level of expected returns (Fabozzi, Gupta, & Markowitz, 2002). Similarly, bringing together diverse investment options for the defined contribution pension funds whose returns are not perfectly positively connected influences the returns. The theory aids DC pension funds in setting out investment options in terms of inherent risks and expected returns, deciding on resource allocation among various classes of investments, reconciling risks and returns and evaluating performance.

Nonetheless, the theory faces criticism from scholars. For instance, Fabozzi, Gupta and Markowitz (2002) criticized the theory because it assumes presence of normal distribution of the return on an asset within an asset class. Also, according to Mangram (2013), past performance is never a guarantee for the future performance. Lubatkin and Chatterjee (1994) argues that the assumption that securities of any size can be traded is wrong because some securities have the least order sizes that cannot be split any further.

Thus, the theory’s relevance to the study was evident and it underpinned the variable alternative investments. It articulates that a rational investor would choose not to invest in a particular asset portfolio if there exists another portfolio with a better risk-expected return profile at his disposal.
2.2.4 Fisher’s Theory of Investment

Irving Fisher advanced this theory in 1906. According to the theory, firm’s investment decision is an inter-temporal problem. The aggregation of assets depends on how investments of various securities are managed in order to meet the set investment goals for investors’ benefits.

However, the theory faces criticism from scholars. Fromlet (2001) criticizes the theory as failing to have mechanisms of dealing with information asymmetry whereby there could be some information which is available only within the entity and management is unwilling to disclose it elsewhere. Pompian and Longo (2004) argued that the theory was only concerned with ways of improving investor attraction towards various investment options. It had no contribution on how to deal with adverse effects of over investing in various assets.

This theory relates to the research study since among all the institutional financiers in capital markets, pension funds are on the frontline. The rates of interest, hence pension benefits, are determined by how fast assets appreciate in value which is dependent on how well the investments are managed. The theory therefore informed all the study variables.

2.3 Empirical Literature Review

The section focused on studies done abroad and locally in relation to investment strategy and financial performance. Studies that relate each independent variable to financial performance were considered.

2.3.1 Long Term Investments and Financial Performance

A study was done by Gonzalez, van Lelyveld and Lucivjanska (2018) on pension fund equity and performance in Netherlands. The study sought to understand how pension plan fund
equity performance is affected by a pension fund's activity, that is, just how much the fund diverges in its stock allotment from the ideal behavior of pension fund, and whether the pension fund makes use of short or long term mispricing opportunities as determined by stockholding period. It was established that long term investments had no influence on performance of pension funds. This study posed a geographical gap since it was conducted in Netherlands.

Owinyo (2017) conducted a research to assess the determinants of financial outcome of pension funds in Kenya. The study explored impact of the determinants as well as stakeholders’ perception regarding these determinants on pension funds’ financial outcome. The study established that investing in guaranteed funds, quoted equity and government securities does not affect the financial outcome of pension funds. This study put forward a conceptual gap given that it looked at determinants and the perception of stakeholders in regard to the financial outcome of pension funds.

Enrique, Olga, Searle and Stewart (2017) did a study on the effect of shifting regulation on long term investments of defined contribution pension funds in OECD member countries. It explored the effect of DC pension fund members shifting their fund allocation to lifelong investments. The study concluded that there was a greater movement of DC pension funds towards long term investments and this shift was driven largely by improved financial outcome of long term investments in comparison to medium and short term investments. This study posed a conceptual gap because it examined the impact of shifting regulation on long term investments in OECD member countries.

Ammann and Ehmann (2017) conducted a research on financial outcome of Swiss pension funds. This study established that sound investment strategy is of key importance to high
investment returns of pension funds in Switzerland. It deduced that pension funds with an investment portfolio composed of 50% or higher investments in long term government securities and listed stocks yielded the best return on investment. Since this study was done in Switzerland, it posed a contextual gap.

Mutuku (2011) conducted a study on the portfolio structure and risk-return tradeoff amongst fund administration firms in Kenya. This study investigated the association that exists in the composition of a portfolio and the risk-return tradeoff amongst the fund administration firms. The geometric method was used in determining percentage rate of returns. The study concluded that investment in listed equities and government bonds had low risks and good returns. The study brought forth a contextual gap having been conducted on fund administration firms rather than the individual pension funds as focused by the current study.

Besides, a study was conducted by Nguthu (2009) on impact of asset allocation on returns level of retirement benefit funds in Kenya. 40 segregated occupational pension funds in the country formed the sample size and regression analysis method was applied in analyzing the returns. It was found that 62.4% of the variance in pension fund investment returns is explained by the investment policy adopted by the pension funds. A conceptual gap was posed by the study since it looked at the proportion of influence the overall asset portfolio had on the differences in portfolio returns. The current study looked at investment strategy and its effect on financial performance on DC pension funds.

2.3.2 Medium Term Investments and Financial Performance

A research was done by Tonks (2016) on pension fund administration and investment outcome in United Kingdom. The study established that the worth of pension plan funds would rise periodically as a result of payments made by pensioners as well as return on
investment realized. These returns are dependent on the investment approach as well as portfolio choices of fund managers. The study further concluded that investment in corporate bonds and unlisted shares was critical in determining the pension funds’ investment performance. This study was done in the United Kingdom thus presenting a contextual gap against the current research which was conducted in Kenya.

Kupčík and Gottwald (2016) did a study on pension fund performance of insurance and private pensions across the OECD member countries. Its main objective was to make a comparison on the investment performance between insurance and privately managed pension funds across these countries. The research indicated that pension funds which were privately managed were capable of acquiring risk premium as opposed to medium term investment options. The study also revealed that investment restrictions imposed by several countries had a negative influence on the pension funds’ financial performance. A geographical gap was posed by the study as it was done in OECD member countries, whereas this study was done in Kenya.

A research was performed by Muia (2015) on effect of asset allocation on financial outcome of pension funds in Kenya. The researcher sought to assess the contribution made by different asset classes to the overall pension funds’ financial outcome. The research study established that investments in unquoted equities, fixed deposits and offshore investments had favorable effect on the return on investment of pension funds. This research presented a conceptual gap since it concentrated on asset allocation and not the investment strategy as per the current study.
2.3.3 Short Term Investments and Financial Performance

A study was done by Mwachanya (2015) on the impact of asset allocation on financial performance of pension funds in Kenya. It sought to determine whether asset allocations as selected by pension fund trustees were critical in increasing the wealth of pensioners in Kenya. The study found that cash and treasury bills were the most liquid of all asset classes and had lower rates of return compared to other asset classes. The study brought forth a conceptual gap as it concentrated on asset allocation whereas the current study focused on overall investment strategy.

Ferreira, Keswami, Miguel and Ramos (2013) did a cross-country study on determinants of mutual fund performance. The study focused on evaluating factors that determine the financial outcome of mutual funds in 27 countries. It was intimated that liquidity constraints posed a major impediment to development of the US pension industry and consequently, short term investments in treasury bills and bank deposits were critical. Better financial performance was reported in countries where pension fund managers had invested in short term assets. The study brought forth a conceptual gap since it examined the determinants of mutual fund performance rather than the investment strategy.

Antolin, Payet and Yermo (2010) conducted a research on the default investment strategy in defined contribution pension funds across the OECD member countries. The study sought to assess how default investment strategies affect the retirement income outcomes of DC pension funds. The study found that short term investments increase the financial outcome of DC pension funds. It also established that government regulations and competition are the factors that influence fund managers to focus on short term investments to yield better
returns. A geographical gap was brought forth by this study as it was carried out in OECD member countries whereas the current study was done in Kenya.

2.3.4 Alternative Investments and Financial Performance

Mungai and Elly (2018) examined the influence of alternative investments on financial performance of pension funds in Kenya. REITs, immovable property, personal equity fund and venture capital were used as alternative investments. The study found to exist a robust positive association between immovable property and REITs and return on investment of pension funds. Private equity and venture capital, however, revealed a negative association with the return on investment of pension funds. The study brought forth a conceptual gap because it concentrated on alternative investments only, whereas the current study focused on various investments.

Kiplagat (2014) researched on effect of asset allocation on financial performance of pension funds in Kenya. The research concluded that of all the asset classes allowed by RBA, investment in real estate had the most influence on financial outcome of pension funds. The research presented a conceptual gap since it concentrated on asset allocation rather than investment strategy.

Baker and Filbeck (2013) studied the effect of alternative investments: instruments, benchmarks and strategies on financial performance of pension firms in New Jersey State. There was found to exist a robust positive connection between alternative investments and financial outcome of pension firms in New Jersey. The study results posited that fund managers shifted to alternative investments because of unattractive incomes in conventional asset classes. It also revealed that alternative asset classes led to risk control and realization
of investment goals. The study introduced a contextual gap because it was carried out in New Jersey State, whereas the current study was carried out in Kenya.

2.3.5 Density of Contributions and Financial Performance

Gathogo (2019) did a study on trustee-related determinants of financial returns on registered occupational pension funds in Kenya. The study attempted to show any causal effect that existed between the cost of operations, asset allocation, contributions density, and risk preferences on financial outcome of the occupational pension funds, with pension regulatory framework as the moderating variable. The study revealed that the asset allocation and contribution density had a high positive association with the financial returns of registered occupational pension funds. This study introduced a conceptual gap since density of contributions was used as an independent variable. The current study adopted density of contributions as a moderating variable.

Ajibade and Jayeoba (2018) studied the impact of pension fund features on financial outcome in Nigeria. The study’s objective was to assess the impact that features of some selected pension funds in Nigeria had on the financial outcome. Density of contributions, fund age and idle contributions were used as independent variables. It was found that density of contributions, fund age and idle contributions had robust effect on financial outcome of pension funds. Having been carried out in Nigeria, the study brought forth a geographical gap.

Nyangeri (2014) studied the effect of firm characteristics on financial performance of pension funds in Kenya. This study focused on determining the influence that membership age, fund design and density of contributions had on financial outcome of pension funds. There was found to exist, among other factors, a significantly positive connection between
density of contributions and return in investment of pension funds. The study presented a conceptual gap since density of contributions was used as an independent variable, whereas the current study adopted density of contributions as a moderating variable.

### 2.4 Summary of Literature Review

Table 2.1 depicts the literature in summary form as well as the research gaps therein.

**Table 2.1: Summary of the Literature and Research gaps**

<table>
<thead>
<tr>
<th>Researcher(s) &amp; Year</th>
<th>Study Objective</th>
<th>Key Findings</th>
<th>Research Gaps</th>
<th>Addressing the Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathogo (2019)</td>
<td>Trustee-related determinants of financial returns on registered occupational pension funds in Kenya.</td>
<td>Asset allocation and contribution density had a high positive association with financial returns of registered occupational pension funds</td>
<td>This study introduced a conceptual gap since density of contributions was used as an independent variable.</td>
<td>The study focused on short term, medium term, long term and alternative investment strategies with Density of contributions as the moderating variable.</td>
</tr>
<tr>
<td>Owinyo (2017)</td>
<td>Determinants of financial outcome of pension funds in Kenya.</td>
<td>Investing in guaranteed funds, quoted equity and government securities does not affect the financial outcome of pension funds</td>
<td>The study presented a conceptual gap.</td>
<td>The independent variables used were short term, medium term, long term and alternative investments</td>
</tr>
<tr>
<td>Ammann and Ehmann (2017)</td>
<td>Financial outcome of Swiss pension funds</td>
<td>Pension funds that had an investment portfolio composed of 50% or higher investments in long term government securities and listed stocks yielded the best return on investment.</td>
<td>Since this study was done in Switzerland, it posed a contextual gap.</td>
<td>The study was done in Kenya</td>
</tr>
<tr>
<td>Authors</td>
<td>Title</td>
<td>Findings</td>
<td>Contextual gap</td>
<td></td>
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<td>-----------------------</td>
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<td>--------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Tonks (2016)</td>
<td>Pension fund administration and investment outcome in United Kingdom</td>
<td>Investment in corporate bonds and unlisted shares was critical in determining the pension funds’ investment performance.</td>
<td>The study was done in United Kingdom.</td>
<td></td>
</tr>
<tr>
<td>Muia (2015)</td>
<td>Effect of asset allocation on financial outcome of pension funds in Kenya</td>
<td>Unquoted equities, fixed deposits and offshore investments had favorable effect on the return on investment</td>
<td>A conceptual gap was put forward by the study since it concentrated on asset allocation rather than the investment strategy.</td>
<td></td>
</tr>
<tr>
<td>Kiplagat (2014)</td>
<td>Effect of asset allocation on financial performance of pension funds in Kenya</td>
<td>Of all the asset classes allowed by RBA, investments in real estate had the most influence on financial outcome of pension funds</td>
<td>A conceptual gap was put forward by the study since it concentrated on asset allocation rather than the investment strategy.</td>
<td></td>
</tr>
<tr>
<td>Baker and Filbeck (2013)</td>
<td>Effect of alternative investments: instruments, benchmarks and strategies on financial performance of pension firms in New Jersey State</td>
<td>There was a robust positive connection between alternative investments and financial outcome of pension firms</td>
<td>The study introduced a contextual gap because it was carried out in New Jersey State.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Researcher (2021)
2.5 Conceptual Framework

This is a form of presentation which narratively or figuratively exhibits key concepts or variables in a study along with their assumed relationship (Miles & Huberman, 1994). Figure 2.1 presents the conceptual framework.

**Figure 2.1 Conceptual Framework**

**Independent Variables**

**Long term Investments**
- Government Bonds
- Guaranteed Funds
- Quoted equities

**Medium term investments**
- Fixed Deposits
- Corporate Bonds
- Offshore Investments

**Short term Investments**
- Cash at bank and demand deposits
- Treasury bills

**Alternative Investments**
- Real estate investment trusts
- Immovable property
- Private equity and venture Capital

**Dependent Variable**

**Financial Performance**
- ROI

**Density of contributions**
- Fund Size
- Number of active members

**Moderating Variable**
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter elaborates on methodology adopted in conducting the research. It focuses on the research philosophy and design, target population, research sample, and data collection method and analysis.

3.2 Research Philosophy

Padilla-Díaz (2015) characterizes research philosophies/paradigms as a way of examining social phenomena and attempt an explanation from the understandings achieved. Creswell & Clark (2017) refer to research paradigms as philosophical alignments regarding the globe as well as the nature that a scientist gives study. The research study approach connects to the foundation of expertise, after which essential presumptions and the proneness of research is based. There are two major research philosophies; positivism (scientific) as well as phenomenology (interpretivism) (McLachlan & Garcia, 2015). The positivist approach to research argues that knowledge is founded on facts in which no abstractions or individual’s subjectivity is considered.

This study adopted positivism philosophy approach. This philosophy is anchored on the credence that reality is actually steady. This reality can be objectively observed and expressed without having to interfere with the phenomenon being investigated (Mkansi & Acheampong, 2012).
3.3 Research Design

Research design is a structure adopted to generate answers to the researcher's concerns. It can be illustrated as a plan for collecting, measuring and analyzing data (Cooper & Schindler, 2014). There are four major research designs namely descriptive, correlational, exploratory and causal designs (Creswell, 2017). The study adopted a correlational research design. This design allows the researcher to assess the relationships between variables without having to control or manipulate any of them (Patten & Newhart, 2017). The researcher considered correlational research design as suitable for the study since it covers a wide range of variables and enhances understanding of the independent and dependent variables (Cooper & Schindler, 2011). Thus, the correlational research design was the most relevant in examining the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya.

3.4 Empirical Model

A multiple regression model was adopted by the study. Multiple regression model extends to several explanatory/independent variables (Catalina, Iordache, & Caracaleanu, 2013). The model is anchored on the assumptions that there is a linear relationship between independent and dependent variables and that independent variables are not too highly correlated (Osborne & Waters, 2002).

The regression model was as shown below

\[ \text{ROI}_{it} = \alpha + \beta_1X_{1it} + \beta_2X_{2it} + \beta_3X_{3it} + \beta_4X_{4it} + \varepsilon \]  \hspace{1cm} (3.1)

Where;
ROI$_{it}$ = Return on Investment of firm $i$ at time $t$ depicted by Net Return on Investment /Total Investments

$X_{1it}$ = Long term investment (Long term investments /pension fund total assets value) for fund $i$ at time $t$;

$X_{2it}$ = Medium term investment (Medium term investments /pension fund total assets value) for fund $i$ at time $t$;

$X_{3it}$ = Short term investment (Short term investments /pension fund total assets value) for fund $i$ at time $t$;

$X_{4it}$ = Alternative investment (Alternative investments /pension fund total assets value) for fund $i$ at time $t$;

$\alpha$ = Constant term;

$\beta_1, \beta_2, \beta_3, \beta_4$ = Coefficients of regression

Subscript $i$ = Pension Funds

Subscript $t$ = Years

$\varepsilon$ = Error term.

In addition, the density of contributions was used as a moderating variable. Moderating variable refers to a variable that strengthens, diminishes, negates, or alters the connection between independent and dependent variables (Purnomo & Widianingsih, 2012). It can as well change the direction of the relationship between independent and dependent variables. The effect of the moderation was put into test using Baron and Kenny's (1986) approach. The
moderating variable, density of contributions, was represented by “M,” and the regression model after interaction was;

\[ \text{ROI}_{it} = \alpha + \beta_1 X_{1it} \cdot M + \beta_2 X_{2it} \cdot M + \beta_3 X_{3it} \cdot M + \beta_4 X_{4it} \cdot M + \varepsilon \]

Where;

\( \text{ROI}_{it} \) = Return on Investment of fund \( i \) at time \( t \) depicted by Net return on Investment/Total Investments

\( X_1 \) = Long term investments

\( X_2 \) = Medium term investments

\( X_3 \) = Short term investments

\( X_4 \) =Alternative investments

\( \alpha \) = Constant term;

\( \beta_1, \beta_2, \beta_3, \beta_4 \) = Regression Coefficients

Subscript \( i \) = Pension Funds

Subscript \( t \) = Years

\( \varepsilon \) = Error term

\( M \) = Moderating Variable (Density of Contributions)

3.5 Operationalization and Measurement of Variables

The dependent variable was financial performance of DC pension funds in Kenya as measured by ROI while the independent variables were long term, medium term, short term
and alternative investments with density of contributions as the moderating variable as depicted in table 3.1

**Table 3.1 Operationalization and Measurement of Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalization</th>
<th>Measurement</th>
<th>Hypothesized Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long term investments</strong></td>
<td>Independent Variable</td>
<td>• Government Bonds</td>
<td>• Total value of government bonds/ fund’s asset value</td>
<td>Positive/negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Guaranteed Funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quoted equities</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medium term investments</strong></td>
<td>Independent Variable</td>
<td>• Fixed Deposits</td>
<td>• Total value of fixed deposits/ fund’s asset value</td>
<td>Positive/negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Corporate Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offshore Investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Short term investments</strong></td>
<td>Independent Variable</td>
<td>• Cash at bank and demand deposits</td>
<td>• Total value of cash at bank and demand deposits/ fund’s asset value</td>
<td>Positive/negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Treasury bills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Alternative investments | Independent Variable | • Real estate investment trusts  
  • Immovable property  
  • Private equity and venture Capital | • Total value of REITs/ fund’s asset value  
  • Total value of immovable property/ fund’s asset value  
  • Total value of private equity and venture Capital/ fund’s asset value | Positive/negative |
|--------------------------|---------------------|-------------------------------------------------|-------------------------------------------------|----------------------|

| Density of Contributions | Moderating Variable | • Fund Size  
  • Number of active members | • Fund Size/ Number of active members | Positive/negative |
|--------------------------|---------------------|-----------------------------------|-----------------------------|----------------------|

| Financial Performance | Dependent Variable | • ROI  
  • Net Return on Investment/ Total Investments | | Positive/negative |
|-----------------------|-------------------|-----------------------------------------------|----------------|----------------------|

**Source: Researcher (2021)**

### 3.6 Target Population

The targeted population was 1172 registered DC pension funds in Kenya as of December 2018 (RBA, 2019). The period under study was between 2014 and 2018. This period was chosen to give the current representation of the population.

### 3.7 Sample Size and Sampling Technique

Sampling refers to the process involved in obtaining the sample for the study that represents the whole population (Schindler & Cooper, 2011). Guassora, Malterud, & Siersma (2016) described a sample as subset of the whole population. The researcher applied Fisher’s formula to determine sample size as shown hereunder.
\[ n = \frac{z^2p (1-p)}{d^2} \]

(Fisher, 2006)

Where;

\[ n = \text{sample size} \]

\[ z = \text{Standard ordinary deviate confidence level value, for example 95 percent confidence level} = 1.96. \]

\[ d = 95 \text{ per cent margin of error or accuracy level or 0.05 Confidence Level} \]

The sample is thus reached accordingly:

\[ n = \frac{(1.96^2)(0.5)(1 - 0.5)}{(0.05)^2} \]

\[ n = 384 \]

The sample is again adjusted, due to the fact that the total number of DC pension funds in Kenya is under 10,000. The formula below is used to make the adjustment:

\[ n_0 = \frac{n}{1 + ((n - 1)/ N)} \]

\[ n_0 = 384/(1 + ((384 - 1)/1172)) \]

\[ n_0 = 289 \text{ Defined Contribution Pension Funds} \]

Thus, the sample size was 289 defined contribution pension funds in Kenya and the study applied stratified random sampling technique to get the sample. Stratified random sampling is a sampling technique that involves dividing the population into smaller subgroups (strata) based on their characteristics or attributes (Rahi, 2017). The study's population was divided
into four strata based on their total asset values. The four strata were: Defined contribution pension funds in Kenya with total assets below KSh 100M, between KSh 100M and KSh 200M, between KSh 200M and KSh 500M and above KSh 500M. Random selection technique was applied to select 25% of DC pension funds from every stratum forming a sample size of 289 pension funds. This technique ensured that each category and the possible DC pension funds were equally likely to be selected and included in the study.

3.8 Data Collection Instruments

The study reviewed panel secondary data to assess the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya covering a 5 year period commencing from 2014 to 2018. An excel data collection instrument (contained in Appendix III) was used as checklist to ensure that all relevant data was collected and accurately recorded for the study.

3.9 Data Collection Procedures

A work plan was developed by researcher to extract data relating to investment strategy and financial performance of defined contribution pension funds as measured using Return on Investment. Relevant data utilized in this research was gathered from annual reports and audited financial statements as maintained by fund managers of DC pension funds and the RBA.

3.10 Data Analysis

The data collected was organized, coded and assessed using STATA software and a quantitative report was generated. The quantitative report was analyzed by applying descriptive statistics (mean, mode and median) and inferential statistics (correlation and
regression analysis) and presented in tables. Hausman test was done to examine whether to adopt the random effect or fixed effect model. Other diagnostic tests were conducted as well.

3.11 Diagnostic Tests

The data collection methods should be able to generate data which is relevant and accurate, to ensure legitimacy and validity of information yielded. The diagnostic tests conducted were as discussed below.

3.11.1 Multicollinearity Test

To check for multicollinearity in data collected, variance inflation factors was used whereby severe multicollinearity is portrayed by a VIF of greater than 10. Conducting a regression model without taking into account the aspect of multicollinearity would result into undefined regression coefficients as well as countless standard errors while presence of imperfect multicollinearity would lead to huge standard errors.

3.11.2 Autocorrelation Test

To have the issue of autocorrelation addressed, the researcher conducted a Woodridge test. The null hypothesis assumed that there is no autocorrelation in the panel data used. In the event that autocorrelation was identified, then the feasible generalized least squares estimation would have been employed.

3.11.3 Normality Test

The normality assumption \( (u_t \sim N(0, \sigma^2) \) was adopted so as to conduct single or joint hypothesis testing in regard to the model parameters (Brooks, 2008). The Skewness-Kurtosis test for normality was done to determine if the data was normally distributed.
3.11.4 Heteroscedasticity Test

With panel data being used for the study, the suspicion of the existence of heteroscedasticity would arise. Heteroscedasticity refers to a scenario whereby data lacks constant error variance over a particular time period (Gujarati, 2003). According to CLRM, the error term has a constant variance (homoscedastic). The data which does not have a constant variance is regarded as heteroscedastic. Failure to account for heteroscedasticity when using a regression model would result into biased parameter estimates. Breusch-Pagan/ Cook-Weisberg test was conducted to address the issue.

3.11.5 Panel Unit Root Test

To examine on stationarity of variables used, the researcher conducted unit root test while adopting Levi lechun test. This had an objective of preventing spurious regression results from being acquired by utilizing non-stationary collection.

3.11.6 Hausman Test

In analyzing panel data, the researcher considers which model to apply; either fixed or random effects. To decide on this, the researcher applied the Hausman test to examine the coefficient estimates of the models.

3.12 Ethical Considerations

Stringent ethical measures were observed all over this study. Formal authority was acquired by researcher from the university to proceed with research work. Also, the researcher sought approval from NACOSTI in order to conduct the study. Data collected was used purposively for academics and the findings of the study reported with objectivity and integrity.
CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This segment brings out the study outcome and discussions thereof. It includes descriptive statistics, correlation and regression analysis, diagnostics tests and hypotheses testing.

4.2 Descriptive Statistics

The segment expounds on descriptive statistics for return on investment, total long term investments, total medium term investments, total short term investments, total alternative investments and density of contributions. The section provides statistics on the mean, minimum, maximum, standard deviation and coefficient of variation for each variable. The outcome is depicted in table 4.1 below.

Table 4.1 Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Long Term</td>
<td>1,445</td>
<td>65,700,000</td>
<td>45,000,000</td>
<td>1,161,276</td>
<td>3,490,000,000</td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Medium Term</td>
<td>1,445</td>
<td>47,400,000</td>
<td>32,400,000</td>
<td>973,419</td>
<td>103,000,000</td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Short Term</td>
<td>1,445</td>
<td>3,974,370</td>
<td>2,452,138</td>
<td>1,170,981</td>
<td>12,600,000</td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Alternative</td>
<td>1,445</td>
<td>30,600,000</td>
<td>24,500,000</td>
<td>4,844,958</td>
<td>91,100,000</td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density of contributions</td>
<td>1,445</td>
<td>3,003,919</td>
<td>1,564,945</td>
<td>968</td>
<td>57,700,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROI</td>
<td>1,445</td>
<td>0.0659</td>
<td>0.0199</td>
<td>0.0067</td>
<td>0.1011</td>
</tr>
</tbody>
</table>

Source: Research Data (2021)
Long term investments (government bonds+ guaranteed funds+ quoted equities) recorded minimum and maximum values of KSh 1,161,276 and KSh 3,490,000,000 respectively. The mean value was KSh 65,700,000 and standard deviation of 45,000,000. This signified that most defined contribution pension funds in Kenya held long term investments valued at KSh 65,700,000.

The medium term investments (fixed deposits+ corporate bonds+ offshore investments) was found to have a mean value of KSh 47,400,000 and standard deviation of 32,400,000. The minimum and maximum values were recorded as KSh 973,419 and KSh 103,000,000 respectively. This signified that most defined contribution pension funds in Kenya held medium term investments of about KSh 47,400,000.

The mean value of the short term investments (cash at bank and demand deposits+ treasury bills) was found to be KSh 3,974,370 and standard deviation of 2,452,138. The minimum value recorded was KSh 1,170,981 and a maximum of KSh 12,600,000. This suggested that most defined contribution pension funds in Kenya held short term investments of about KSh 3,974,370.

The mean value of alternative investments (REITs+ immovable property+ private equity and venture capital) was recorded as KSh 30,600,000 with a minimum of KSh 4,844,958 and a maximum of KSh 91,100,000. The standard deviation was 24,500,000. The results implied that most defined contribution pension funds held alternative investments of about KSh 30,600,000.

The mean value of the density of contributions (fund size/number of active members) was found to be 3,003,919 KSh/active member with a minimum of 968 KSh/active member and a maximum of 57,700,000 KSh/active member. The standard deviation was 1,564,945. The
results signified that majority of defined contribution pension funds in Kenya had the density of contribution of about 3,003,919 KSh/active member.

Lastly, the mean value of ROI was found to be 0.0659, with 0.0067 and 0.1011 as the lowest and highest values respectively. This intimated that most of the defined contribution pension funds in Kenya had ROI of about 0.0659 (6.59%).

4.3 Correlation Analysis

Correlation analysis illustrates the relationship portrayed by research variables. The association between long term investments, medium term investments, short term investments, alternative investments and return on investment (ROI) is depicted in table 4.2
Table 4.2: Correlation Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>ROI</th>
<th>Long Term investments</th>
<th>Medium Term investments</th>
<th>Short Term investments</th>
<th>Alternative Term investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>Pearson Correlation</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Term investments</td>
<td>Sig. (2-tailed) Pearson Correlation</td>
<td>0.0000</td>
<td>0.6802</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Medium Term investments</td>
<td>Sig. (2-tailed) Pearson Correlation</td>
<td>0.0000</td>
<td>0.6178</td>
<td>0.4934</td>
<td>1.0000</td>
</tr>
<tr>
<td>Short Term investments</td>
<td>Sig. (2-tailed) Pearson Correlation</td>
<td>0.0000</td>
<td>0.6509</td>
<td>0.2639</td>
<td>0.4692</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>Sig. (2-tailed) Pearson Correlation</td>
<td>0.0000</td>
<td>0.6275</td>
<td>0.3865</td>
<td>0.4533</td>
</tr>
</tbody>
</table>

Source: Research Data (2021)

The results from this table revealed a significantly positive connection between long term investments and return on investment ($r=0.6802$, $p=.0000$). Medium term investments had a significantly positive association with return on investment ($r=0.6178$, $p=.0000$). In addition, short term investments was positively and significantly connected with return on investment ($r=0.6509$, $p=.0000$). Lastly, alternative investments was found to be significantly positively associated with return on investment ($r=0.6275$, $p=.0000$). The results agree with the findings of Ammann and Ehmann (2017) who intimated that pension funds with an investment portfolio composing of 50% or higher investments in long term government securities and
listed stocks yielded the best return on investment. Mutuku (2011) revealed investment in listed equities and government bonds has low risks and good returns in the long run. Mungai & Elly (2018) established a robust positive correlation between immovable property and REITs and return on investment of pension funds. Moreover, Baker & Filbeck (2013) reported a significantly positive association between alternative investments and financial outcome of DC pension funds in New Jersey State.

### 4.4 Diagnostics Tests

The section consists of the diagnostics tests. Particularly, the diagnostic tests done were multicollinearity, autocorrelation, normality, heteroskedasticity, unit root test and Hausman test for random and fixed effects.

#### 4.4.1 Multicollinearity Test

To check for multicollinearity in data collected, variance inflation factors (VIF) was used and the results displayed in table 4.3

**Table 4.3: Multicollinearity Test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Term investments</td>
<td>5.96</td>
<td>0.167652</td>
</tr>
<tr>
<td>Medium Term investments</td>
<td>4.27</td>
<td>0.234258</td>
</tr>
<tr>
<td>Short Term investments</td>
<td>4.21</td>
<td>0.237326</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>1.35</td>
<td>0.742820</td>
</tr>
<tr>
<td>Density of contributions</td>
<td>1.23</td>
<td>0.81278</td>
</tr>
</tbody>
</table>

*Source: Research Data (2021)*
From the results, the VIF values of all variables were below 10 which depicts absence of multicollinearity. According to Strijov and Katrutsa (2017), the values of VIF above 10 indicates multicollinearity is present. This leads to inflated standard errors and confidence intervals, resulting into unsteady coefficients’ estimates for the respective predictors.

### 4.4.2 Autocorrelation Test

Wooldridge test was adopted by the study to check for autocorrelation in the data used. Notably, this test sought to examine if residuals were serially correlated overtime or not, and the outcome is provided below.

**Table 4.4: Autocorrelation Test**

<table>
<thead>
<tr>
<th>Wooldridge test for autocorrelation</th>
</tr>
</thead>
<tbody>
<tr>
<td>H0: no first-order autocorrelation</td>
</tr>
<tr>
<td>F (1, 282) = 6.110</td>
</tr>
<tr>
<td>Prob &gt; F = 0.152</td>
</tr>
</tbody>
</table>

**Source: Research Data (2021)**

The null hypothesis stated that there is no autocorrelation in the panel data used. Based on the outcome, the p-value was 0.152 suggesting that the F-test, at 5% level, is not significant statistically. This denotes that the null hypothesis is accepted. The study therefore inferred that the residuals are not auto correlated.

### 4.4.3 Normality Test

Skewness and Kurtosis test was applied to check for normality of the variables under study. The null hypothesis was that observations are not normally distributed. If p-value is below
0.05, then the null of normality, at 5% confidence level, is not accepted. Table 4.5 is a presentation of normality test.

**Table 4.5: Normality Test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Pr(Skewness)</th>
<th>Pr(Kurtosis)</th>
<th>adj chi2(2)</th>
<th>Prob&gt;chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>1,445</td>
<td>0.0000</td>
<td>0.0001</td>
<td>18.57</td>
<td>0.0701</td>
</tr>
<tr>
<td>Long Term investments</td>
<td>1,445</td>
<td>0.0000</td>
<td>0.4012</td>
<td>8.91</td>
<td>0.5960</td>
</tr>
<tr>
<td>Medium Term investments</td>
<td>1,445</td>
<td>0.0125</td>
<td>0.0001</td>
<td>20.01</td>
<td>0.9761</td>
</tr>
<tr>
<td>Short Term investments</td>
<td>1,445</td>
<td>0.0003</td>
<td>0.0146</td>
<td>29.96</td>
<td>0.2107</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>1,445</td>
<td>0.3342</td>
<td>0.6816</td>
<td>9.44</td>
<td>0.0890</td>
</tr>
<tr>
<td>Density of contributions</td>
<td>1,445</td>
<td>0.0000</td>
<td>0.9136</td>
<td>8.32</td>
<td>0.1560</td>
</tr>
</tbody>
</table>

*Source: Research Data (2021)*

The table results reveal that p values for all variables were above 0.05 which implied that data used was normally distributed.

**4.4.4 Heteroskedasticity Test**

To check for heteroskedasticity, Breusch-Pagan test was applied. The null hypothesis stated that error terms are homoskedastic (have constant variance). The null hypothesis is rejected if p-value is below 0.05. The heteroscedasticity test results are expressed in table 4.6.
Table 4.6: Heteroscedasticity Test

Breusch-Pagan test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of ROI

$\text{chi2} (1) = 111.000$

$\text{Prob > chi2} = 0.4178$

Source: Research Data (2021)

Based on results in table 4.6, the p-value was 0.4178, which is above 0.05. The null hypothesis was therefore not rejected, confirming absence of heteroskedasticity in the data used.

4.4.5 Panel Unit Root Test

To examine on stationarity of variables used, the researcher conducted a unit root test while adopting Levi lechun test. The rationale of conducting the panel unit root test was because the study adopted the multiple regression model. Moreover, another reason for carrying out the test was to prevent spurious regression results from being acquired by utilizing values that are non-stationary. The null hypothesis was stated as all panels have unit roots. The findings are exhibited in Table 4.7
Table 4.7: Panel Unit Root Test

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Statistic(adjusted)</th>
<th>P-value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>8.7494</td>
<td>0.000</td>
<td>Stationary</td>
</tr>
<tr>
<td>Long Term investments</td>
<td>9.1950</td>
<td>0.000</td>
<td>Stationary</td>
</tr>
<tr>
<td>Medium Term investments</td>
<td>4.035</td>
<td>0.004</td>
<td>Stationary</td>
</tr>
<tr>
<td>Short Term investments</td>
<td>9.9544</td>
<td>0.000</td>
<td>Stationary</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>9.5825</td>
<td>0.000</td>
<td>Stationary</td>
</tr>
<tr>
<td>Density of contributions</td>
<td>3.001</td>
<td>0.017</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Source: Research Data (2021)

Going by the results above, the p-values of all variables were below 0.05. Thus, all the variables are stationary which means that there is absence of unit roots at 5% significance level. It can therefore be deduced that unit roots were absent in all variables used in the study. This implied that the results obtained were not spurious.

4.4.6 Hausman Test

In analyzing panel data, the researcher considers which model to apply; either fixed or random effects. Hausman test was applied to examine the coefficient estimates of the models and the results expressed in Table 4.8
Table 4.8: Hausman Test

<table>
<thead>
<tr>
<th>Column</th>
<th>(b)</th>
<th>(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed</td>
<td>Random</td>
</tr>
<tr>
<td>Long Term investments</td>
<td>0.0137991</td>
<td>0.013349</td>
</tr>
<tr>
<td>Medium Term investments</td>
<td>0.0042777</td>
<td>0.009199</td>
</tr>
<tr>
<td>Short Term investments</td>
<td>0.0053286</td>
<td>0.006582</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>0.0026177</td>
<td>0.002617</td>
</tr>
<tr>
<td>Density of contributions</td>
<td>0.0009832</td>
<td>0.001874</td>
</tr>
</tbody>
</table>

\[
\text{chi2}(5) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 103.49
\]

\[
\text{Prob}>\text{chi2} = 0.057
\]

Source: Research Data (2021)

The null hypothesis stated that random effects model was appropriate in the study. The hypothesis was tested using the p-value. As per the results above, the p-value was 0.057, above 0.05. Thus, the study failed to reject the null hypothesis, which intimated that random effects model was the most appropriate to be adopted in the study. The random effects model allows the researcher to look at variables that vary over time and those that do not while the fixed effects model only looks at the constant variables/values (Kartikasari, 2017). Also, the random effects model is able to give an estimate of the variables concurrently as opposed to the fixed effects model which gives an estimation of the parameter for each unit, thus increasing the standard errors of the coefficient estimates (Zulfikar, 2019).
4.5 Model Regression Analysis

The relationship between variables was sought by the researcher and the discussion of panel regression analysis is presented below. The interpretation of the regression results was done based on the Hausman test for random effects model.

4.5.1 Panel Regression Analysis without Moderation

The researcher conducted panel regression analysis to determine the association between long term investments, medium term investments, short term investments and alternative investments on financial performance (return on investment). The panel regression analysis results are illustrated in table 4.9.

Table 4.9: Panel Regression Analysis

<table>
<thead>
<tr>
<th>ROI</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>z</th>
<th>P&gt;z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term investments</td>
<td>0.01403</td>
<td>0.00151</td>
<td>9.27000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Medium term investments</td>
<td>0.00936</td>
<td>0.00079</td>
<td>11.89000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Short term investments</td>
<td>0.00312</td>
<td>0.00124</td>
<td>2.51000</td>
<td>0.0120</td>
</tr>
<tr>
<td>Alternative investments</td>
<td>0.00656</td>
<td>0.00167</td>
<td>3.94000</td>
<td>0.0000</td>
</tr>
<tr>
<td>_cons</td>
<td>-0.17292</td>
<td>0.00728</td>
<td>-23.74000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R squared= 0.5776  
F (4, 1445) = 1284.05  
Prob= 0.0000

Source: Research Data (2021)

The model was;

\[ Y = -0.17292 + 0.01403X_1 + 0.00936X_2 + 0.00312X_3 + 0.00656X_4 \]
The results presented in table 4.9 show that long term investments, medium term investments, short term investments and alternative investments explain 57.76% of the variations in the financial performance (return on investment) of defined contribution pension funds in Kenya. The overall model was statistically significant because the p-value was 0.0000, which was smaller than the z-critical value of 1.96 at 5% confidence level. In addition, the $F_{calculated} = 1284.05$ was larger than the $F_{critical} = 3.96$ at 5% confidence level.

The regression analysis shows that long term investments has a positive and significant effect on financial performance (return on investment) ($\beta=0.01403, p=0.000$); as evidenced by z-calculated value of 9.2700 which was higher than z-critical value of 1.96. This implied that a one shilling increase in long term investments would cause a 0.01403 shilling increase in ROI, while other factors remain unchanged. This outcome agrees with findings of Enrique et al. (2017), who deduced that there was a more significant movement of DC pension funds towards long term investments due to high returns realized. Mutuku (2011) contended that investment in listed equities and government bonds had low risks and good returns in the long run.

Medium term investments was significantly positively related to financial performance (return on investment) ($\beta=0.00936, p=0.000$); as depicted by z-calculated value of 11.8900 which was higher than z-critical value of 1.96. This implied that a one shilling increase in medium term investments would cause a 0.00936 shilling increase in ROI, while other factors remain unchanged. The results agree with Tonks (2016) who concluded that investment in corporate bonds and unlisted shares was critical in determining the pension funds’ investment performance. The study by Muia (2015) concluded that investments in
unquoted equities, fixed deposits and offshore investments had a favorable effect on the return on investment of pension funds in Kenya.

Short term investments was significantly positively related to financial performance (return on investment) ($\beta = 0.00312, p = 0.0120$); as was depicted by $z$-calculated value of 2.51000 which was higher than $z$-critical value of 1.96. This implied that a one shilling increase in short term investments would cause a 0.00312 shilling increase in ROI, while other factors remain unchanged. The outcome is in tandem with a study by Antolin, Payet & Yermo (2010) which found that short term investments increase the financial performance of DC pension funds. Mwachanya (2015) contented that cash and treasury bills were the most liquid of all asset classes and had lower rates of return compared to other asset classes.

Alternative investments is significantly positively related to financial performance (return on investment) ($\beta = 0.00656, p = 0.000$); as was depicted by $z$-calculated value of 3.94000 which was higher than $z$-critical value of 1.96. This implied that a one shilling increase in alternative investments would cause a 0.00656 shilling increase in ROI, while other factors remain unchanged. The outcome concurs with Baker & Filbeck (2013) who found to exist a robust positive connection between alternative investments and the financial outcome of pension firms in New Jersey State. Kiplagat (2014) contended that investment in real estate was most critical in influencing the financial performance of pension funds in Kenya.

4.5.2 Moderation Effect of Density of Contributions

The study sought to examine the moderating effect of density of contributions on the relationship between investment strategy and financial performance as measured by return on investment. Table 4.10 depicts the outcome
Table 4.10: Moderation Effect of Density of Contributions

| ROI                                                                 | Coef.  | Std. Err. | z       | P>|z| |
|--------------------------------------------------------------------|--------|-----------|---------|-----|
| Long Term Investments* Density of Contributions                     | 0.0158 | 0.0016    | 9.6200  | 0.000 |
| Medium term investments* Density of Contributions                   | 0.0068 | 0.0012    | 5.9200  | 0.000 |
| Short Term investments* Density of Contributions                    | 0.0061 | 0.0012    | 5.1000  | 0.000 |
| Alternative Investments * Density of Contributions                  | 0.0156 | 0.0024    | 6.4900  | 0.000 |
| _cons                                                              | -0.5023| 0.0212    | -23.7500| 0.000 |

R-Squared=0.6547

Source: Research Data (2021)

After moderation, the model was as follows;

Y= -0.5023+0.0158X_1+0.0068X_2+0.0061X_3+0.0156X_4

The results from the table shows that the R^2 increased from 57.76% to 65.47% after moderation. This implied that density of contributions moderated the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. The results also indicated that the interaction between long term investments and density of contributions was significantly positively connected to the financial performance (ROI) (β =0.0158, p=0.000). This was depicted by a z-calculated value of 9.6200 which was higher than z-critical value of 1.96.

The interaction between medium term investments and density of contributions was significantly positively connected to the financial performance (ROI) (β =0.0068, p=0.000). This was depicted by z- calculated value of 5.9200 which was higher than z-critical value of
1.96. The interaction between short term investments and density of contributions was significantly positively connected to the financial performance (ROI) ($\beta =0.0061$, $p=0.000$). This was depicted by $z$-calculated value of 5.1000 which was higher than $z$-critical value of 1.96.

Lastly, the interaction between alternative investments and density of contributions was significantly positively connected to the financial performance (ROI) ($\beta =0.0156$, $p=0.000$). This was depicted by $z$-calculated value of 6.4900 which was higher than $z$-critical value 1.96. The findings concur with Gathogo (2019), who concluded that the density of contributions significantly influenced the financial returns of registered occupational pension funds in Kenya. Nyangeri (2014) contended that a strong positive correlation exists between density of contributions and return in investment of pension funds in Kenya.

4.6 Hypotheses Testing

The study tested the following hypotheses as depicted in tables 4.9 and 4.10.

**$H_0$:** Long term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

Hypothesis testing was done by applying the panel regression model and ascertained using the $p$-value. The acceptance/rejection criterion was to reject null hypothesis ($H_0$) if $p$-value is below 0.05 and fail to reject the $H_0$ if $p$-value is above 0.05. Going by results presented in table 4.9, the $p$-value was 0.000. The null hypothesis was therefore rejected. The study concluded that long term investments had significant effect on financial performance of defined contribution pension funds in Kenya.
**H₀-2:** Medium term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

Hypothesis testing was done by applying the panel regression model and ascertained using the p-value. The acceptance/rejection criterion was to reject null hypothesis (Ho) if p-value is below 0.05 and fail to reject the Ho if p-value is above 0.05. Going by results presented in table 4.9 the p-value was 0.000. The null hypothesis was therefore rejected. The study concluded that medium term investments had significant effect on financial performance of defined contribution pension funds in Kenya.

**H₀-3:** Short term investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

Hypothesis testing was done by applying the panel regression model and ascertained using the p-value. The acceptance/rejection criterion was to reject null hypothesis (Ho) if p-value is below 0.05 and fail to reject Ho if p-value is above 0.05. Going by results presented in table 4.9 the p-value was 0.0120. The null hypothesis was rejected. Thus, short term investments had significant effect on financial performance of defined contribution pension funds in Kenya.

**H₀-4:** Alternative investments has no significant effect on financial performance of defined contribution pension funds in Kenya.

Hypothesis testing was done by applying the panel regression model and ascertained using the p-value. The acceptance/rejection criterion was to reject null hypothesis (Ho) if p-value is below 0.05 and fail to reject Ho if p-value is above 0.05. Going by results shown in table 4.9
the p-value was 0.000. The null hypothesis was rejected. Thus, alternative investments had significant effect on financial performance of defined contribution pension funds in Kenya.

**H0-5:** Density of contributions does not moderate the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya.

Hypothesis testing was done by applying the panel regression model and ascertained using the p-value and R-squared (R2). The acceptance/rejection criterion was to reject null hypothesis (Ho) if p-value is below 0.05 and fail to reject Ho if p-value is above 0.05. Going by the results presented in table 4.10, the p-values after interaction with all the independent variables remained below 0.05. Moreover, the coefficient of determination (R2) increased from 57.76% to 65.47% after the density of contributions interacted with independent variables. The null hypothesis was therefore rejected. It was deduced that density of contributions moderated the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter comprises of summary of the study findings, conclusion, recommendations, suggested areas for further research and limitations of the study.

5.2 Summary of the Findings

The study objective was to assess the effect on investment strategy on financial performance of defined contribution pension funds in Kenya. The objectives and hypotheses of the study informed the findings.

The first objective of the study was to establish the effect of long term investments on financial performance of defined contribution pension funds in Kenya. The panel regression results explicated that long term investments (government bonds, guaranteed funds and quoted equities) was positively and significantly connected to financial performance of defined contribution pension funds in Kenya.

The second objective was to determine the effect of medium term investments on financial performance of defined contribution pension funds in Kenya. The results found to exist a significantly positive connection between medium term investments (fixed deposits, corporate bonds and offshore investments) and financial performance of defined contribution pension funds in Kenya.

The third objective was to explore the effect of short term investments on financial performance of defined contribution pension funds in Kenya. The correlation results showed that a significantly positive association exists between short term investments (cash at bank
and demand deposits and treasury bills) and financial performance of defined contribution pension funds in Kenya.

The fourth objective was to investigate the effect of alternative investments on financial performance of defined contribution pension funds in Kenya. A significantly positive relationship was found to exist between alternative investments (REITs, immovable property, private equity and venture capital) and financial performance of defined contribution pension funds in Kenya.

The fifth objective was to examine the moderating effect of density of contributions on the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. The study found that the density of contributions moderated the relationship between investment strategy and financial performance. The interaction between the density of contributions and investment strategy on financial performance was found to be positive and significant.

5.3 Conclusion

The study concluded that independent variables taken into account could only explain up to 57.76% of the variations in financial performance of defined contribution pension funds in Kenya. A significantly positive relationship was found to exist between long term investments, medium term investments, short term investments and alternative investments and financial performance of defined contribution pension funds in Kenya.

Based on the study findings, long term investments was found to have the most effect on financial performance of defined contribution pension funds in Kenya. This was because it had the highest regression coefficient value of 0.0140. Medium term investments was found
to have the second most effect on the financial performance of defined contribution pension funds, with regression coefficient value of 0.0094. Alternative investments was the third variable with the most effect on financial performance of defined contribution pension funds, with regression coefficient value of 0.0066. Short term investments was found to have the least effect on financial performance of defined contribution pension funds, with regression coefficient value of 0.0031.

The study also concluded that density of contributions was a good variable in moderating the relationship between investment strategy and financial performance of defined contribution pension funds. The coefficient of determination (R-squared) increased significantly when the density of contributions interacted with investment strategy.

5.4 Recommendations

This study recommends that the defined contribution pension funds in Kenya should consider investing in various investment options available based on the actual returns realized. Most of the pension funds should be put in long term investments (government bonds, guaranteed funds and quoted equities). It is the primary role of DC pension fund managers to ensure that pension funds are invested in assets which can yield maximum returns. Therefore, the study recommends long term investments as the most ideal investment option for DC pension funds because of its ability to generate the highest return on investment.

The second priority of DC pension fund investments should be given to medium term investments (fixed deposits, corporate bonds and offshore investments) since it was found to have the second highest regression of coefficients after long term investments. The study recommends medium term investment strategy for DC pension funds that wish to form a
more diversified investment portfolio. This is because it can yield good returns, second to long term investments.

The third priority of DC pension fund investments should be given to alternative investments (REITS, immovable property and private equity and venture capital). This is because it was found to have the third highest value of regression of coefficients. The study recommends that fund managers of DC pension funds should only invest in alternative investments when they want to have a wider and more diversified investment portfolio of assets. However, it should be given less weight compared to long term and medium term investments.

The least investments to be undertaken by defined contribution pension funds in Kenya should be short term investments (cash at bank and demand deposits and treasury bills). The short term investments had the lowest regression coefficients which implies that it made least contribution to return on investment as compared to long term, medium term and alternative investments. The study recommends that DC pension fund managers should least consider short term investments as an investment option when making investment choices. In fact, they should put funds in short term investments merely to maintain the liquidity position of pension funds so as to pay any liabilities as they fall due.

The study also recommends that the National Treasury through its policy statements need to develop policies that will make short term investments more attractive for investment. This is by creating an environment that will ensure that more returns are realized by investing in these investments. The National Treasury should also come up with mechanisms of enhancing corporate governance in the pension fund industry and ensure that DC pension funds are well protected from embezzlement or misuse by the officials.
The Retirement Benefits Authority also needs to develop strategies and a robust framework that will make defined contribution pension funds more sustainable in the long run. The RBA should also consider reviewing some of the quantitative restrictions put on various asset classes which act as impediment to DC pension fund managers in making their investment decisions. This is due to the fact that these quantitative restrictions were developed 20 years ago and there has been a lot of changes in the pension fund industry since then. Therefore, some of the restrictions available may not represent the industry’s investment needs at the present.

5.5 Limitation of the Study

Some pension funds were unwilling to provide their financial reports for fear of exposing the financial performance of the funds to the outside public. The researcher gave an assurance to the specific pension funds that confidentiality will be observed while handling the information provided and that it would be used for research only. Besides, sourcing for the data from RBA or specific pension funds required prior authorization. The researcher sought for the NACOSTI’s research license and also acquired research recommendation letter from the university before proceeding for data collection. This assisted in data collection authorization process.

5.6 Suggestions for Further Study

The study found that the independent variables taken into account could only explain up to 57.76% of the return on investment of defined contribution pension funds in Kenya. Thus, the study suggests more studies on other factors affecting the financial performance of the defined contribution pension funds in Kenya. Future studies can also examine the effect of leadership styles and transparency on the financial outcome of the defined contribution
pension funds in Kenya. The study also suggests another study to be conducted among other pension funds in Kenya. This will be significant in comparing the results with the findings of this study and also for identification of more research gaps to allow for further research to be conducted in future.
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APPENDICES

Appendix I: Researcher’s Introduction Letter

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GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Our Ref: D58/CTY/PT/28707/2014          DATE: 26th October, 2020

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. MUTHINGA LINUS KINUYA –
REG. NO. D58/CTY/PT/28707/14

I write to introduce Mr. Muthinga Linus Kinyua who is a Postgraduate Student of
this University. He is registered for a M.Sc. degree programme in the Department
of Accounting & Finance.

Mr. Muthinga intends to conduct research for a M.Sc. thesis Proposal entitled,
“Investment Strategy and Financial Performance of Defined Contribution Pension
Funds in Kenya.”

Any assistance given will be highly appreciated.

Yours faithfully,

[Signature]

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL
Appendix II: Research Permit

This is to certify that Mr. Linus Kiayua Mutwiga of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: INVESTMENT STRATEGY AND FINANCIAL PERFORMANCE OF DEFINED CONTRIBUTION PENSION FUNDS IN KENYA for the period ending: 24/November/2021.

License No: NACOSTI/P/28/7988

705054
Applicant Identification Number

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