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Investment Strategy and Financial Performance of Defined Contribution Pension Funds in Kenya

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Abstract

Pension funds are meant to enable pensioners to live quality life upon retirement by paying them retirement benefits. Financial performance of defined contribution pension funds in Kenya has continued to portray unimpressive trend despite positive targets set by the pension funds. Hence, the study examined the effect of investment strategy on 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. 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 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. The coefficient of determination increased from 57.76% to 65.47% when density of contributions interacted with long term investments, medium term investments, short term investments and alternative investments. 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.

Keywords: *Long term investments, medium term investments, short term investments, alternative investments, density of contribution, performance, defined contribution pension funds, Kenya.*

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1.0 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 contribute to social-economic development, strengthen monetary markets as well as 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 (DC) assets' growth continues to outnumber that of Defined Benefit (DB) 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 rose from 788.15 Billion in the year 2014 to 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).

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

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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 defined contribution 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). The nature of how defined contribution pension funds make contributions as well as their simplicity in administration has made them grow fast in Kenya (RBA, 2014).

1.1 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). Furtherance, 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).

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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.

1.2 Research Objectives

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.

2.0 Literature Review

2.1 Theoretical Literature Review

2.1.1 Systems Theory

This theory was promoted by Ludwig Bertalanffy in 1968. It suggests that organizations can be seen as systems that are open 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.

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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.

2.1.2 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. 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 (Jensen & Meckling, 1976). 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 (Jensen & Meckling, 1976). 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 agreement between the principal and the agent for a limited or unrestricted future 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 medium term investments variable. Much of this concept influences the administration options that call to be addressed and help to solve the challenges of the management and foster high performance. Additionally, it aids in defining the feature played by the board of directors in inspecting the representatives (supervisors) of the business. The board works as the oversight authority to make sure these supervisors do not infringe on the interest of financiers.

2.1.3 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. Markowitz (1952) contends that 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 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.

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. The theory underpinned the variable alternative investments. It articulates that a rational investor would choose not to invest in a certain asset portfolio if there exists another portfolio with a better risk-expected return profile at his disposal.

2.1.4 Fisher's Theory of Investment

The theory was advanced by Irving Fisher 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. For instance (Fromlet, 2001) reported the approach did not establish mechanisms to deal with the information asymmetry in which some of the information is only available within the organization and the management is not willing to expose it to the rest. Pompian and Longo (2004) revealed another weakness of the theory that it 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.

2.2 Empirical Literature Review

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 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.

Ammann and Ehmann (2017) conducted 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 geographical gap. 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.

Ferreira et al (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 established that liquidity constraints had been a major impediment to the development of the US pension industry and as a result, 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. 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 investors shifted to alternative investments because of low returns in traditional asset classes. They also revealed that alternative asset classes facilitated realizing their investment objectives and also to some extent, controlled risk. The study introduced a geographical gap because it was carried out in New Jersey State, whereas the current study was carried out in Kenya.

Ajibade and Jayeoba (2018) studied the impact of pension fund features on financial outcome in Nigeria. The study's objective was to establish 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 a 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.

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2.3 Conceptual Framework

This is a form of presentation that narratively or graphically explains the main concepts or variables in a study as well as the presumed relationship among them (Miles & Huberman, 1994). Figure 1 presents the conceptual framework

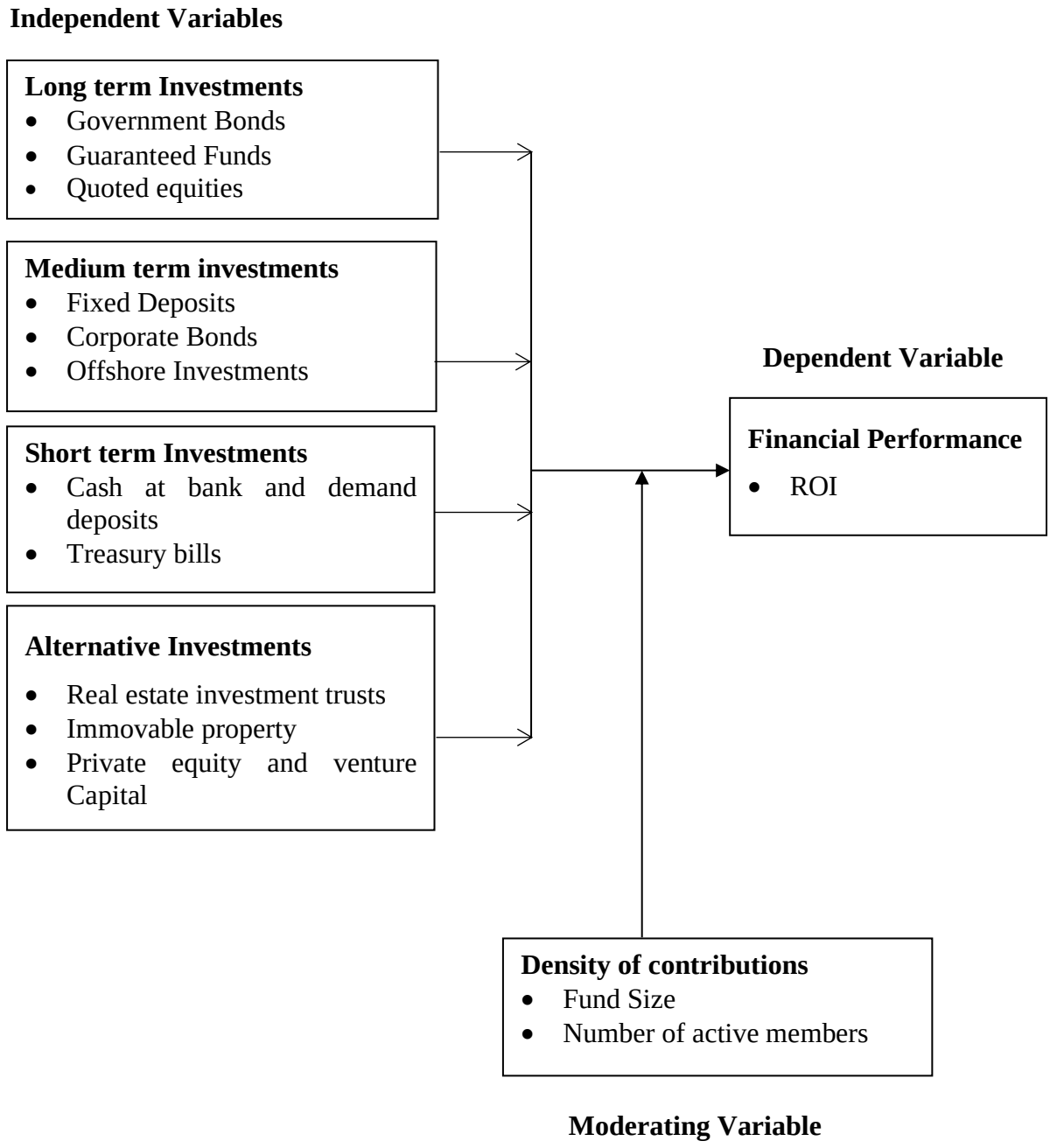

Figure 1: Conceptual Framework

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3.0 Research Methodology

The study adopted positivism philosophy approach. This philosophy is anchored on the belief that reality is actually steady. Descriptive research design was adopted in the study. The target 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. The sample size was 289 Pension funds in Kenya. The data collected was organized, coded and assessed using STATA software and a quantitative report was generated. The descriptive statistics (mean, mode and median) and inferential statistics (correlation and regression analysis) were applied in analyzing the quantitative report.

4.0 Research Findings and Discussions

4.1 Descriptive Statistics

The section provides statistics on the mean, minimum, maximum and standard deviation for each variable. The outcome is depicted in Table 1 below.

Table 1: Descriptive Statistics

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

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%).

4.2 Correlation Analysis

Correlation analysis illustrates the association 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 2

Table 2: Correlation Analysis

Variables		ROI	Long Term investments	Medium Term investments	Short Term investments	Alternative Term investments
ROI	Pearson Correlation	1.0000				
	Sig. (2-tailed)	0.0000				
Long Term investments	Pearson Correlation	0.6802	1.0000			
	Sig. (2-tailed)	0.0000	0.0000			
Medium Term investments	Pearson Correlation	0.6178	0.4934	1.0000		
	Sig. (2-tailed)	0.0000	0.0000	0.0000		
Short Term investments	Pearson Correlation	0.6509	0.2639	0.4692	1.0000	
	Sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	
Alternative investments	Pearson Correlation	0.6275	0.3865	0.4533	0.4087	1.0000
	Sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	0.0000

The results from Table 2 revealed a significant and positive connection between long term investments and return on investment (r=0.6802, p=.0000). Medium term investments was found to have a significant and positive association with return on investment (r=0.6178, p=.0000). In addition, short term investments was found to be positively and significantly associated with return on investment (r=0.6509, p=.0000). Lastly, alternative investments was found to be significantly and positively associated with return on investment (r=0.6275, p=.0000). The results concur with the findings of Ammann and Ehmann (2017) who noted

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 and Elly (2018) established a robust positive correlation between immovable property and REITs and return on investment of pension funds. Moreover, Baker and Filbeck (2013) reported a significantly positive association between alternative investments and financial outcome of DC pension funds in New Jersey State.

4.3 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.

4.3.1 Multicollinearity Test

To check for multicollinearity in data collected, variance inflation factors (VIF) was used and the results were as highlighted in Table 3

Table 3: Multicollinearity Test

Variables	VIF	1/VIF
Long Term investments	5.96	0.167652
Medium Term investments	4.27	0.234258
Short Term investments	4.21	0.237326
Alternative investments	1.35	0.742820
Density of contributions	1.23	0.81278

From the results presented in Table 3, 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 indicate presence of multicollinearity. Multicollinearity leads to inflated standard errors and confidence intervals, resulting into unstable coefficients' estimates for individual predictors.

4.3.2 Autocorrelation Test

The Wooldridge test was adopted by the study to test 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 in Table 4

Table 4: Autocorrelation Test

Wooldridge test for autocorrelation
H0: no first-order autocorrelation
F (1, 282) = 6.110
Prob > F = 0.152

The null hypothesis assumed in this test was that there is no autocorrelation in the panel data used. Based on the outcome depicted in Table 4, the p-value was 0.152 suggesting that the F-

test, at 5% level, is not significant statistically. This inferred that the null hypothesis is accepted. The study therefore concluded that the residuals are not auto correlated.

4.3.3 Normality Test

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

Table 5: Normality Test

Variables	Observation	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
ROI	1,445	0.0000	0.0001	18.57	0.0701
Long Term investments	1,445	0.0000	0.4012	8.91	0.5960
Medium Term investments	1,445	0.0125	0.0001	20.01	0.9761
Short Term investments	1,445	0.0003	0.0146	29.96	0.2107
Alternative investments	1,445	0.3342	0.6816	9.44	0.0890
Density of contributions	1,445	0.0000	0.9136	8.32	0.1560

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

4.3.4 Heteroskedasticity Test

To check for heteroskedasticity, Breusch-Pagan test was applied. The null hypothesis stated that error terms are homoskedastic (have constant variance). If the p-value is below 0.05, the null hypothesis is rejected. The results of heteroscedasticity test are depicted in Table 6

Table 6: Heteroscedasticity Test

Breusch-Pagan test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROI
chi2 (1) = 111.000
Prob > chi2 = 0.4178

Based on results in Table 6, the p-value was 0.4178, which is more than 0.05. The null hypothesis was therefore not rejected, confirming absence of heteroskedasticity in the data used.

4.3.5 Panel Unit Root Test

To examine on stationarity of variables used, the researcher conducted unit root test while adopting Levi lechun test. The null hypothesis was stated as all panels have unit-roots. The reason of carrying out the test was to prevent spurious regression results from being acquired by utilizing non-stationary collection. Table 7 presents the findings of Panel Unit Root Test

Table 7: Panel Unit Root Test

Variables	Statistic(adjusted)	P-value	Comment
ROI	8.7494	0.000	Stationary
Long Term investments	9.1950	0.000	Stationary
Medium Term investments	4.035	0.004	Stationary
Short Term investments	9.9544	0.000	Stationary
Alternative investments	9.5825	0.000	Stationary
Density of contributions	3.001	0.017	Stationary

Going by the results presented in the table, the p-value of all the variables were less than 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 all variables used in the study did not have unit root. This implied that the results obtained were not spurious.

4.3.6 Hausman Test

In analyzing panel data, the researcher considers which model to apply; either fixed or random effects. The researcher applied the Hausman test to examine the coefficient estimates of the models. Table 8 presents the Hausman Test results.

Table 8: Hausman Test

Variables	(b) Fixed	(B) Random
Long Term investments	0.0137991	0.013349
Medium Term investments	0.0042777	0.009199
Short Term investments	0.0053286	0.006582
Alternative investments	0.0026177	0.002617
Density of contributions	0.0009832	0.001874

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

Prob>chi2 = 0.057

The null hypothesis of the test stated that random effects model was appropriate in the study. The hypothesis was tested using the p-value. As per results above, the p-value was 0.057 which was higher than 0.05. The study therefore failed to reject the null hypothesis which indicated that random effects model was the most appropriate to be adopted in the study.

4.3 Model Regression Analysis

The relationship between variables was sought by the researcher and the discussion of panel regression analysis is presented below.

4.3.1 Panel Regression Analysis without Moderation

The researcher conducted panel regression analysis to determine the relationship 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 9

Table 9: Panel Regression Analysis

ROI	Coef.	Std. Err.	z	P>z
Long term investments	0.01403	0.00151	9.27000	0.00000
Medium term investments	0.00936	0.00079	11.89000	0.00000
Short term investments	0.00312	0.00124	2.51000	0.01200
Alternative investments	0.00656	0.00167	3.94000	0.00000
_cons	-0.17292	0.00728	-23.74000	0.00000
R squared=	**0.5776**			
F (4, 1445) =	**1284.05**			
Prob=	**0.0000**			

The model was;

$Y= -0.17292 +0.01403X_1+0.00936X_2+0.00312X_3+0.00656X_4$

The results presented in table 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 t-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) (β=0.01403, p=0.000); as evidenced by t-calculated value of 9.27000 which was higher than t-critical value of 1.96. This implied that a unit increase in long term investments would cause a 0.01403 units rise 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) (β=0.00936, p=0.000); as depicted by t-calculated value of 11.89000 which was higher than t-critical value of 1.96. This implied that a unit increase in medium term investments would cause a 0.00936 units rise 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) (β=0.00312, p=0.0120); as was depicted by t-calculated value of 2.51000 which was higher than t-critical value of 1.96. This implied that a unit increase in short term investments would cause a 0.00312 units rise in ROI, while other factors remain unchanged. The outcome is in tandem with a study by Antolin, Payet and Yermo (2010) which found that short term investments increase the financial performance of DC pension funds. Mwachanya (2015) contented that cash, treasury bills and commercial paper 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) (β=0.00656, p=0.000); as was depicted by t-calculated value of 3.94000 which was higher than t-critical value of 1.96. This implied that a unit increase in alternative investments would cause a 0.00656 units rise in ROI, while other factors remain unchanged. The outcome concurs with Baker and 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.

4.3.2 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 10 depicts the outcome.

Table 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	0.0000
Medium term investments* Density of Contributions	0.0068	0.0012	5.9200	0.0000
Short Term investments* Density of Contributions	0.0061	0.0012	5.1000	0.0000
Alternative Investments * Density of Contributions	0.0156	0.0024	6.4900	0.0000
_cons	-0.5023	0.0212	-23.7500	0.0000
R-Squared=0.6547				

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 t-calculated value of 9.6200 which was higher than t-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 t- calculated value of 5.9200 which was higher than t-critical value of 1.96. The interaction between short term investments and density of contributions was significantly positively connected to the financial performance (ROI) (β =0.0061, p=0.000). This was depicted by t-calculated value of 5.1000 which was higher than t-critical value of 1.96. Lastly, the interaction between alternative investments and density of contributions was significantly positively connected to the financial performance (ROI) (β =0.0156, p=0.000). This was depicted by t-calculated value of 6.4900 which was higher than t-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.

5.0 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.

6.0 Recommendations

This study recommended 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 recommended 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 recommended 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 recommended 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 recommended 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 recommended 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.

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