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Effect of Pension Asset Investment Strategy on Development of Nigeria Capital Market a Time Series Analysis (2014 - 2022)

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Abstract
The study explores the impact of pension asset investment strategies on the development of Nigeria's capital market. Using an ex-post facto design and applying Ordinary Least Squares (OLS) methodology, the study examines the relationship between the key variables, which include Market Capitalization and the All-Share Index, over the period from 2012 to 2022. Relevant secondary data were gathered from various sources to achieve the study's objectives. The findings show that the Pension Fund Net Asset Value has a positive and significant influence on both Market Capitalization and the All-Share Index. Based on these results, it is recommended that PENCOM implement more comprehensive and expansive investment plans, enabling pension fund administrators to invest in infrastructure development, improve communication networks, and support the blue economy.

Introduction

Pension Fund Assets (PFA) refer to assets accumulated through pension contributions, with the primary goal of using these assets to finance pension plan benefits (Morina & Grima, 2021). In numerous countries, pension funds are key institutional investors, committing significant amounts of financial capital to stock markets and highly-rated private companies in global financial markets. According to OECD data, the 300 largest pension funds worldwide manage approximately $6 trillion in assets.

The Pension Act of 2014 sets out specific regulations for managing and investing pension funds and assets. Section 56 requires that all pension funds and assets be held by custodians authorized by the National Pension Commission. Section 82(2) emphasizes that investments of these funds must strictly follow the rules and guidelines established by the Commission. Additionally, Section 86 allows pension funds and assets to be invested in various approved instruments, including bonds, bills, and securities issued or guaranteed by the Federal Government, the Central Bank of Nigeria, state and local governments; corporate bonds and debt instruments listed on a registered stock exchange; shares of publicly traded companies; bank deposits and securities; investment certificates from closed-end or hybrid investment funds with a strong earnings history; units from open-end investment funds; real estate projects; specialized investment funds; and other financial instruments authorized by the Commission.

One of the key roles of the stock exchange is to gather surplus funds and channel them to the deficit sector, thereby accelerating investment. While the positive relationship between pension funds and capital markets in fostering favourable financial sector outcomes is clear in theory, the causality and developmental impact of this connection can often be misinterpreted or exaggerated. Consequently, current perspectives highlight an essential virtuous cycle that connects stock market development with the growth of banking and other financial intermediaries (Kenny and Moss, 1998).

In October 2023, the National Pension Commission (PenCom) reported a substantial increase in the net asset value of the pension industry within the Nigerian stock market, which rose to N1.39 trillion by the end of September 2023. This marks a significant growth of N478.8 billion from the N908 billion recorded at the start of the year. Essentially, Pension Fund Administrators (PFAs) boosted the value of their investments in the local stock market by an impressive 53% over nine months, driven by strong bullish trends in the market.

This positive trend closely mirrored the performance of the All-Share Index, which recorded a strong increase of 29.52% over the same period, primarily driven by active participation from domestic institutional investors. The rising involvement of the pension industry in the stock market was also reflected in the NGX Pension Index, which posted an impressive gain of 58.9%, closing the period at a notable 2,848.38 index points.

The Nigerian pension industry has seen significant expansion in recent years, largely due to various regulatory reforms implemented by PENCOM. These changes have led to a reduction in the number of Pension Fund Administrators (PFAs), mainly through mergers and acquisitions. During the first nine months of 2023, the industry's total assets grew substantially by N2.36 trillion, bringing the overall asset value to N17.35 trillion as of September 2023 a notable 15.75% rise from N14.99 trillion recorded at the end of December the previous year. Pension funds contribute to economic development by supporting GDP growth, encouraging savings, enhancing financial market development, reducing poverty in old age, and increasing demand for financial services (Njuguna, 2010). Similarly, Balogun (2006) and Ogumike (2008), as cited in Gunu and Tsado (2012), noted that the contributory pension scheme holds great potential for mobilizing savings to support economic growth.

Literature Review

Hryckiewicz (2009) investigates the relationship between the growth of institutional assets, investment behavior of institutional investors, and stock market performance in several developing European countries. The study finds that institutional investors play a key role in boosting capital market activity, largely by increasing demand for domestic securities. Furthermore, the research suggests that in countries where institutional investors are actively involved in corporate governance, their presence can lower firms' capital costs and positively impact stock market capitalization. Utilizing the GMM method on a panel of eight Central and Eastern European developing nations from 1995 to 2006, the study concludes that institutional growth—particularly through pension funds established via pension reforms—has a strong and positive effect on the development of security markets.

Meng and Pfau (2010) explore how pension funds (PF) influence the development of both stock and bond markets. The study categorizes countries into two groups based on their level of financial development to determine if the effects are more pronounced in financially advanced nations. The findings reveal that, across all countries, pension fund assets have a positive long-term impact on stock market liquidity and depth, as well as on the depth of private bond markets. In the short term, countries with more developed financial systems tend to experience clearer and more significant benefits from the expansion of pension funds, whereas such advantages are less evident in nations with lower financial development.

Liang and Bing (2010) conducted an empirical study using U.K. time-series data from 1970 to 2008 to examine the link between pension fund (PF) management and financial market development. The results of the Granger causality test indicate that the expansion of pension funds positively contributes to the advancement of financial markets. Additionally, co-integration tests reveal a long-term equilibrium relationship between the growth of pension funds and financial market development. Their impulse response analysis further supports the finding that capital market development and pension fund investments positively influence each other over time.

Zandberg and Spierdijk (2010) found no indication that pension fund accumulation contributes to increased economic growth in either OECD or non-OECD countries. Their study highlights that the primary drivers of pension asset levels are capital market returns and demographic shifts. When these two factors are accounted for in their regression analysis unlike in prior studies they found no significant link between pension funding and economic growth.

Islam and Osman (2011) apply co-integration and error correction techniques to examine the causal link between the growth of non-bank financial intermediaries (NBFIs), including pension funds, and per capita economic growth in Malaysia from 1974 to 2004. Using data from the Central Bank of Malaysia, individual NBFI sources, and International Financial Statistics, the study finds a one-way long-term causal relationship from NBFIs to economic growth per capita. This indicates that the development of NBFIs has played a role in driving changes in Malaysia's real per capita GDP.

Gurowa and Usman (2021) explore the relationship between pension fund investment and economic growth in Nigeria. The study aims to assess the connection between these two variables using secondary data analyzed through a multiple regression model. The results indicate that, although there is a positive correlation, pension contributions do not have a statistically significant impact on economic growth. This may suggest that a key issue with Nigeria's contributory pension scheme is the limited range of viable investment opportunities available to Pension Fund Administrators (PFAs). The study recommends expanding the investment options for pension funds to prevent overconcentration in a narrow set of asset classes, which could reduce potential returns.

Methodology

Research Design

This study used an ex-post facto research design, as it relies on existing data rather than collecting new data specifically for the purpose of the study.

Population of the Study

The target population for this study is the operations of the National Pension Commission.

Sources and Method of Data Collection

Secondary data were used for this study, sourced from the annual reports and accounts of the National Pension Commission, as well as from the database of the Nigerian Stock Exchange Limited (NGX Pension Index).

Method of Data Analysis

The study employs multiple regression analysis using the Ordinary Least Squares (OLS) technique, which is effective for estimation. Various statistical and econometric tests will be conducted to assess the regression results.

Model Specification

Based on the literature and theoretical framework of this study, the model aims to examine the effect of Pension Fund investments on stock market capitalization in Nigeria. The independent variable, Pension Fund investment (PFIs), is represented by the amount of Pension Funds invested in the capital market. The dependent variable, representing capital market development, is measured by stock market capitalization.

The study's variables include capital market performance indicators (market capitalization, Nigerian Stock Exchange, and All Share Index) and Pension Fund Assets. Pension funds' investments are assessed using the total value of pension fund assets. The econometric models of the study are mathematically presented as follows:

$$MCAP_t = \gamma_0 + \gamma_1 PFNAV_t + \mu_t \quad \text{i}$$

$$ASI_t = \gamma_0 + \gamma_1 PFNAV_t + \mu_t \quad \text{ii}$$

Where; $PFNAV_t$ is the Pension Fund Net Asset Value at time t;

$MCAP_t$ is the Total Market Capitalization

in time t;

ASI_t is the total Nigeria All Share Index at time t;

γ_0 is the intercept, $\gamma_1$is the coefficient and μ_t is the stochastic error term/disturbances.

Data Presentation And Discussion Of Results

In this section, we present the data and results of the regression analysis on the Effect of Pension Asset Investment Strategy on the Development of the Nigerian Capital Market, using the Ordinary Least Squares (OLS) technique. Additionally, we include the outcomes of other statistical measures such as correlation, R^2, Adjusted R^2, t-statistic, and F-statistic. Table 1 displays the raw data used for the analysis.

Table 1

Year	MCAP	PFNAV	ASI
2012	222.77	1,099.01	31,450.8
2013	223.51	1,529.63	20,827.2
2014	382.13	2,029.77	24,770.5
2015	320.05	2,450.38	20,730.63
2016	364.06	3,153.12	28,079
2017	592.16	4,057.44	40,000
2018	542.29	4,611.62	34,657.15
2019	519.79	5,302.89	28,642.25
2020	500.43	6,164.77	26,874.62
2021	672	7,514.26	38,243.19
2022	649.21	6,960.11	31,430.50

Source: CBN Statistical Bulletin (2022EDITION), Pencom Annual Report and Authors Computation.

Note: **MCAP**=total market capitalization, **PFNAV**=the Pension fund Net asset Value, ***ASI*** = the total Nigeria All Share Index.

Descriptive analysis

Descriptive statistics provide an overview of the mean, maximum, and minimum values of the variables used in this study, along with their standard deviations. Table 2 presents the descriptive statistics for the variables analyzed in this research. The analysis of all variables was conducted using the "E-view" software over an eleven-year period (2012 – 2022).

.**Table 2.** Descriptive Statistics of the variables

	MCAP	PFNAV	ASI
Mean	412.3409	3520.734	32024.14
Median	382.1300	3153.120	28642.25
Maximum	672.0000	7514.260	57990.20
Minimum	196.5600	815.1800	20730.63
Std.Dev.	163.0541	2196.506	10690.36
Skewness	0.070665	0.423544	1.271443
Kurtosis	1.693106	2.007341	4.177521
Jarque-Bera	0.791976	0.780509	3.599211
Probability	0.673015	0.676885	0.165364
Sum	4535.750	38728.07	352265.5
Sum Sq. Dev.	265866.5	48246378	1.14E+09
Observations	11	11	11

E-view Output (2023)

Table 2 displays the descriptive statistics of the capital market variables and pension fund investments in Nigeria from the first quarter of 2012 to the last quarter of 2022. The table reveals that the total market capitalization (equity) has an average of 4.12% of GDP, with a standard deviation of 163.0541 and a range between the minimum value of 196.5600 and the maximum value of 672.0000 of GDP. Despite the wide range between the minimum and maximum, the standard deviation suggests stable performance, indicating that the data is not widely dispersed from the mean value. Regarding another measure of capital market performance, the table reports a mean of 2748.497 of GDP, a standard deviation of 1862.291, and minimum

and maximum values of 5724.330 and 279.9800 of GDP, respectively. Additionally, Table 4.2 illustrates that pension fund investments (PFNAV) over the period have an average value of 3520.734 of GDP, with a standard deviation of 2196.506 and a range from 815.1800 to 7514.260 of GDP. This signifies a significant increase in pension fund assets during the period, growing from 815.18 of GDP in 2008 to 7514.260 in the last quarter of 2022.

Regression Analysis

In regression analysis, the primary objective is to estimate the relationship between the dependent and independent variables. This is accomplished by calculating the coefficients for each independent variable in the model. The sign of these coefficients reveals the nature of their relationship with the dependent variable, while the magnitude of the coefficients indicates the extent of the dependent variable's response to changes in the independent variables.

Test of Hypothesis

H_{01}: Pension Fund investments have no significant effect on the stock market capitalization in Nigeria. MCA

$Pt= \gamma_0 + \gamma_1 PFNAVt + \mu_t$

Where:

MCA Pt = Total Market Capitalization in time t PFNA

Vt=Pension Fund Net Asset Value at time t γ_0 = the intercept of the regression line

γ_1= the slope of the regression li line

μ_t = Stochastic error term

A Priori Theoretical Expectation

From economic theoretical expositions and conventions, we expect: $\gamma_1 > 0$ and the result of the estimated regression model is presented below:

$MCAP\ t=\gamma_0+\gamma_1 PFNAVt+\mu_t$

MCAP t=172.9802+0.067986PFNAV

Dependent Variable:MCAP Method:

Least Squares Sample: 2012-2022

Includedobservations:11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	172.9802	40.70276	4.249839	0.0021
PFNAV	0.067986	0.009936	6.842464	0.0001
R-squared	0.838765	Mean dependent var		412.3409
Adjusted R-squared	0.820851	S.D. dependent var		163.0541
S.E. of regression	69.01438	Akaike info criterion		11.46947
Sum squared resid	42866.86	Schwarz criterion		11.54182
Log likelihood	-61.08210	Hannan-Quinn criter.		11.42387
F-statistic	46.81931	Durbin-Watson stat		1.804023
Prob (F-statistic)	0.000075			

E-view output

The coefficient of determination (R^2) is 0.8388, indicating that approximately 83.88% of the changes in market capitalization can be attributed to variations in the independent variable, pension fund asset value. The remaining 16.12% is explained by other factors captured in the model's error term. This suggests that the model is a strong fit, meaning the regression line closely matches the observed data. A standard error test was conducted to evaluate the precision and reliability of the parameter estimates. Since the standard error is less than half the size of the parameter estimates, and the associated p-values confirm statistical significance, the pension fund asset value is considered a significant predictor.

To check for autocorrelation, the Durbin-Watson statistic was used, yielding a value of 1.804, which is close to 2 indicating no autocorrelation in the residuals. The F-statistic is 46.8193 with a corresponding p-value of 0.000075, which is below the 0.05 threshold, confirming that the model as a whole is statistically significant.

The regression intercept is 172.9802, meaning that if pension fund asset value remains constant, market capitalization would be approximately 172.98. The coefficient for the Pension Fund Net Asset Value (PFNAV) is 0.06799, suggesting a positive relationship specifically, a one-unit increase in PFNAV is associated with an approximate 6% rise in market capitalization. This supports the theoretical expectation that higher PFNAV contributes to greater market capitalization. Therefore, the null hypothesis that pension fund investments do not significantly affect stock market capitalization in Nigeria is rejected, affirming that growth in the pension fund sector positively influences market capitalization.

Findings

The study employed Ordinary Least Squares (OLS) regression to analysed the effect of Pension Fund Net Asset Value (PFNAV) on Market Capitalization (MCAP) and the All-Share Index (ASI) from 2012 to 2022. The findings revealed that PFNAV had a positive and significant effect on both MCAP and ASI. Specifically, the regression results showed an R-squared value of 0.8388, indicating that about 83.88% of the changes in Market Capitalization were explained by variations in PFNAV. The coefficient of PFNAV was positive (0.067986), suggesting that an increase in pension fund investments leads to growth in market capitalization. Furthermore, the F-statistic was highly significant (p-value = 0.000075), confirming the validity of the model, while the Durbin-Watson statistic (~1.8) indicated the absence of autocorrelation in the residuals. Descriptive analysis also showed that pension fund investments grew substantially during the study period, providing long-term funds to the Nigerian capital market. Additionally, pension reforms and regulatory improvements spearheaded by the National Pension Commission (PENCOM) contributed to the increased investment of pension funds in the Nigerian Stock Exchange, thereby supporting capital market expansion.

Conclusion

Pension funds have a strong positive influence on the development of the Nigerian capital market. The growth in pension fund assets has enhanced the availability of long-term investment funds, increased financial competition, induced financial innovation, and improved corporate governance within the market. However, the impact of pension funds varies depending on the level of financial market development in the country. Overall, pension reforms in Nigeria have boosted market capitalization, supported broader financial market development, and helped channel unvested and excess liquidity into productive investments such as stocks, bonds, and real estate. The study recommends that the National Pension Commission (PENCOM) should develop a more robust investment framework, encouraging diversified investments into sectors like infrastructure, communication, and the blue economy to further enhance capital market growth and stability.

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