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Research article

Contributory Pension Risks and Sustainability for Nigerian Economic Reliability

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Abstract

The study investigated empirically the contributory pension risks and sustainability for Nigerian economic reliability for eighteen years (2007-2024), anchoring the decision-making theory, financial Intermediation theory and life-cycle theory. The study population were 27 operators, and 27 selected operators as sample size as well. The ex-post facto and simple random sampling technique were adopted as the research design, and sampling technique respectively. The secondary data was used to collect the data from National pension commission (PENCOM) and Central Bank of Nigeria (CBN) statistical bulletin's annual reports. In addition, descriptive statistics and inferential Statistical techniques used, including Pearson Product Moment Correlation (PPMC) and multiple regression analysis (MRA) were used to analyze the data collected. The results revealed that total pension fund assets reveal statistically positive and significant with real gross domestic products. Though, public fund assets showed a negative and statistically significant with real gross domestic products. More so, both inflation rate and unemployment rate indicated positively and statistically insignificant with real gross domestic products. Among the three variables namely exchange rate, interest rate and government bond securities showed negatively and statistically insignificant association effect by the explained parameter. The recommendations suggested that there should be prudently investment strategies by PFAs and PFCs to ensure sustainable pension asset growth and economic stability. The PENCOM and CBN should strengthen regulation, supervision, and financial market stability to improve investment opportunities and risk management. Government should also support infrastructure financing and intensify public awareness to increase participation in the contributory pension scheme, especially among informal sector workers.

Keywords: Contributory Pension Risks; National Pension Commission; Nigerian Economy; Pension Reform Act 2014; Reliability

1. Introduction

Formally, the political and fiscal objectivity of pension system has efficiently made to attain its achievement to embrace the income-enhancement (Independent Evaluation Group [IEG], 2006) through which the retirees can appreciably enjoy their contributory pension plans as a welfare package within the societal environment (Madukwe et al., 2023). In developed countries, the believed norms are that aged population of aging citizen would retard to affect economic growth, which might result in decreasing gross domestic product (GDP) and GDP per capita as well as anticipated net income reduction for independent employees and pensioners. In other words, the aged people would endanger due to long-term unsustainable pension scheme, which might lead to costly and unproductive pay-as-you-go (contributory fund scheme) pension funding (Kune,

2011). The enjoyment of compulsory contributory pension scheme has been given to the eligible pensioner to easily save for their inactive benefits period (Ayuba et al., 2023) so as to contribute to long-run savings arrangement as well as stimulate securities market development (Madukwe et al., 2023).

The pension fund administrators and custodians have currently and worldwide been embraced the efficient management of pension system so as to be easily assessable for employees as a withdrawal or annuity funding sources for monetary fund's (Wilcox, 2006). Meanwhile, the directives were often stipulated that the contributory values from 7.5% each of employee's basic monthly remuneration by employees and employers into Retirement Savings Account were now increased to 8% and 10% respectively (National Pension Commission [PenCom], 2022). In fact, pension reform Act implemented and executed so that the administrative and managerial departments would restructure effectively and efficiently the shortcomings of the previous provisions as well as lack of adequate managerial administrative operations (Edogbanya, 2013).

Despite this, pension systems have led to become channels for unstable macroeconomics and economic growth constraint, as well as inadequately effective, efficient and equitable provider of pension income. In fact, Nigerian pensioners were restlessly active as a result of pension funds misappropriation and mismanagement (Fiiwe, 2020) by the Pension Fund Administrators (PFAs) and Pension Fund Custodians (PFCs) against the employees' services validity, leading to fundamental issues before and after the legislation of Pension Reform Act 2014 (Iyortsuum & Akpusugh, 2014). Likewise, the adoption of structural functionalism and survey research design were used to empirically examine the challenged administration of defined benefits in 1979 (Ayuba et al., 2023). Meanwhile, the inadequacy of retirees' preparedness for retirement plans has identified from the governmental officials, PFAs and PFCs' corruption, and other confrontational issues, which stand as the identified detriments to pension reformation systems (Haruna et al., 2021; Nweke, 2014). Although, the worldwide enhancement and support for pension system reformation by the World Bank in terms of lending operational activities, advisory and analytical services have now brought the equitable effectiveness and efficiency to pension system (IEG, 2006). Personal voluntary contributed funds now processed by public and private personnel (Federal Government of Nigeria [FGN], 2014).

The association of investment of pension funds and expansion of capital market had driven the academic curiosity on this research, which the assertion for funding pension plans growth would eventually be affecting the structural operations of the financial market dynamic importance (Tsado & Gunu, 2011; Umar & Emmanuel, 2012). IEG (2006), the Nigerian economy instability in conjunction with political instability, and inadequate economic growth made the collection of contributory enforcement funds to be satisfactorily paid. Afterward, the pensioners' retirement despite the undefined benefit program that was financed from the annual provisions of the national budgetary allocations and implementation for retirees (Adewale & Abiola, 2008) due to inadequately and untimely delayed of accumulated outstanding pension payments (PenCom, 2022).

Globally, provisions of the pension schemes are now alarming popularity between the public and private sectorial enterprises as well as the informal sector (Dahir-Umar, 2022), which these have previously gained little attention on how to strategically improve ways of funding for the pensioners. Although, life expectancy and government spending increment, and mismanagement of pension administrators and custodians have brought global issues in both private and public pension management system (Oloja, 2019). The economic operators namely individuals, organizations and governments can have accessibility, sharing and pooling of risks above a planned financial time for the market to be easily accessible to a wider length on financial instruments. The integration and direction of diversified

economies and financial resources respectively have played an adequate and significant responsibility by the capital market through capitalization of financial market and saving in self-liquidity profitable investment (Edogbanya, 2013).

Nonetheless, numerous empirical studies have examined the impact of contributory pension plans on the Nigerian capital market over an extended period (Odia & Okoye, 2012; Edogbanya, 2013). Their research focused on the economic growth (measured by Gross Domestic Product and Real Gross Domestic Product) in addition to the Contributory Pension Scheme (as measured by Pension Fund Assets and Total Pension Fund Assets). Nevertheless, this study makes an effort to close a sizable knowledge gap on the subject. This is due to the fact that the primary (focused) variables the Contributory Pension Scheme, represented by the Public Sector Pension Contribution Fund and the Private Sector Pension Contribution Fund and the controlled variables the exchange rate and the inflation rate have never been combined in a prior study. In addition, the Nigerian economy's expansion and development from real gross domestic products serve as the substitute for the country's capital market. Furthermore, by presenting more research that is recent on the topic, this study contributes to the body of knowledge. In light of these circumstances, the purpose of this study is to investigate the connection between Nigeria's contributory pension risks and Nigerian economic performance. Based on this, the specific objectives of the study are:

i. To examine the relationship between total pension fund assets and real gross domestic products.

ii. To identify the relationship between public fund assets and real gross domestic products.

iii. To assess the relationship between government bond securities and real gross domestic products.

Where the hypotheses are stated below as well based on stated objectives:

H01: There is no significant relationship between total pension fund assets and real gross domestic products.

H02: There is no significant relationship between public fund assets and real gross domestic products.

H03: There is no significant relationship between government bond securities and real gross domestic products.

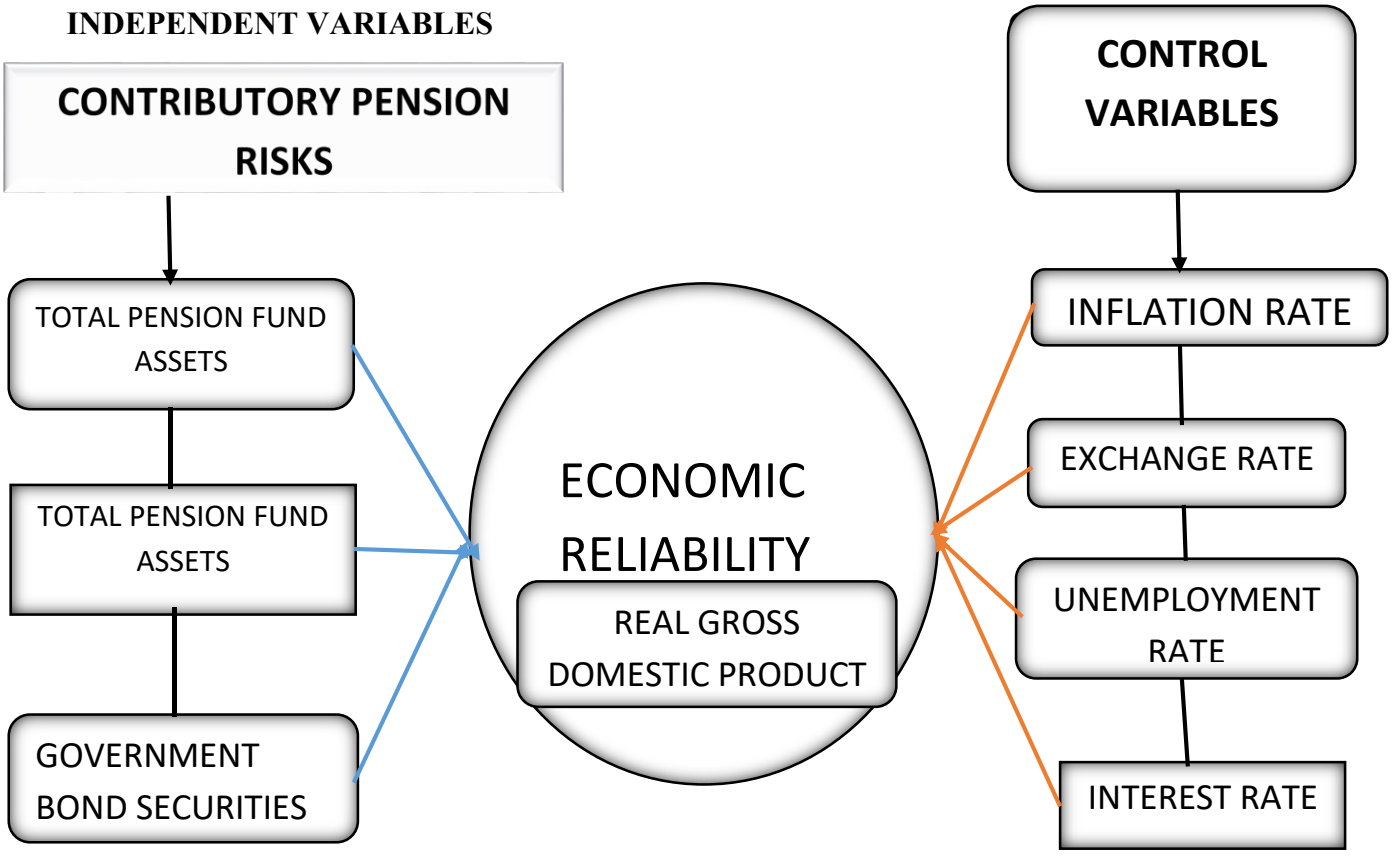

FIGURE 1: Conceptual Framework of Contributory Pension Risks and Sustainability for Nigerian Economic Reliability

2. Literature Review

2.1 Theoretical Review

2.1.1 Decision-Making Theory

The procedural and theoretical methods employed aim objectively and empirically for investigating the pension fund risks within the ambit of economy. Moreover, decision-making theory is the severity within the horizontal time. That is, the procedural step from human cognitive is an action or opinion course for various set of choices. In finance, decision-making in investment is the main modeling from the rational reasoning procedure, which defines the investors' willingness for inherent risk in investment so as to react on a particular return through the formalized model of Markowitz mean-variance in 1959, Sharp's Capital Asset Price in 1964 and Arbitrage Pricing model (Andersen, 2008). Meanwhile, the behavioral finance approach addresses the decision-making model as the description of how we do decide, how we should decide, and we do guide the decision-maker within the confining variables, which are termed as descriptive, normative and prescriptive analyzed techniques respectively (French & Gabrielli, 2005). Behavior has affected decision-making in finance. In 1950, psychological field has an effect on decision-making, which relates to bounded rational process within the psychological cognitive within the economics and finance. Sociological and psychological parameters in behavioral finance have influenced not only decision-making process but also financial markets (Andersen, 2008). However, the

rational and irrational approaches are sets of choices in terms of decision-making consequences, which describe as financial economics, and behavioral and psychological finance respectively. That is, people are having the perfect knowledge of the aftermath of their decision-making when making either rational or irrational decisions (Akinwale & Abiola, 2007; Pike & Neale, 2012).

2.1.2 Financial Intermediation Theory

The financial intermediation theory was propounded by Diamond and Dybvig in 1983, which the theory was reviewed by Allen and Santomero in 1998. The theory proposed that the real-world market characterized as the integration of transactional costa and asymmetric information, which these two concepts are the centralized as the control section of financial institutions especially insurance industry and banking industry as well as other financial institutions. Meanwhile, the stimulation of economic growth is necessary for intermediaries to have assisted, which this is not the resources' allocation from Pareto optimal. This model considered by Diamond and Dybvig in 1983 explained that the investors of financial institution especially the pension fund Administrators (PFAs) and pension fund Custodian (PFCs) are tended to be risk averse without having certainty about the time lag on the futuristic of the needed consumption.

2.1.3 Life-Cycle Theory

The theory of Life-Cycle postulated in 1950 by Modigliani and Brumberg, which asserted that the development of pension fund is categorized into three stages namely the stat-up stage, growth stage and maturity in respect with the managerial administration and funding demands. The managerial administration and funding demands of pension fund in accordance with the three stages connected to the development phases and the growth of economy (Ogonda & Okiakpe, 2022). The justification from this theory is that any active working employees from the economic parties (individuals, organization and government) must save during their productive working time in order to adequately sustain the consumption years after retirement. This theoretical view builds a foundational relevance for contributory pension scheme for periodic income stability, old-age dependent reduction, and promotional growth of long-run economic reliability.

2.2 Empirical Review

Abdullah et al. (2022) empirically opined that the effectiveness of contributory pension scheme and Nigerian economic growth. The study underpinned deferred wage theory, adopting ex-post facto approach, panel regression technique as research design and inferential statistics respectively. The conclusion of research indicated that pension fund assets and pension contribution /savings mobilized were positively non-significant impactful effect on the growth of economy. Therefore, the recommendations suggested, pension funds management should have more emphasized information on money market, government bond, real estate and investment trust to improve financially the Nigerian Gross Domestic Product (GDP). However, this would have prompted and reconciled the relationship between Pension Fund Administrators (PFAs) and Pension Fund Custodians for transparency and accountability to have existed within the system. However, the study relied on an ex-post facto design and secondary data, which may restrict the ability to capture current operational challenges and stakeholder perspectives within the pension system. Although, the panel regression technique is appropriate for analyzing relationships among variables, the study did not clearly indicate whether issues such as multicollinearity, heteroscedasticity, or endogeneity were tested and controlled. Third, the findings revealed a positive but non-significant effect of pension fund assets and pension contributions on economic growth, yet the study did not provide sufficient explanation for the weak statistical significance.

Madukwe and Okere (2022) asserted that the investigation of inflationary effect and pension fund investment in Nigerian federal government securities

13 years (2007-2019), adopting time series, ex-post facto, secondary data from National Pension Commission Annual Reports and Central Bank of Nigeria Statistical Bulletin, and ordinary least square (OLS) regression as research design and inferential statistics respectively. The outcomes showed that there was positively non-significant impactful association between inflation rate and invested pension fund assets in Nigerian Federal Government Securities. The research recommendations suggested that Nigerian Pension Industry should continue to advocate for monetary policy rate reduction to stabilize the Nigerian currency in order to enhance actual pension benefits' value. However, the study depended entirely on secondary data, which may not fully capture practical realities within the pension industry. More so, the use of Ordinary Least Squares (OLS) regression might have not adequately accounted for long-run economic dynamics and possible structural changes in Nigeria's economy during the study period. Third, the study focused only on inflation rate as the explanatory variable, while other macroeconomic factors such as interest rates, exchange rates, and government fiscal policies that could influence pension fund investments were not sufficiently considered.

Ogonda and Okiakpe (2022) opined that the examinational linkage of pension fund investment and the development of Nigerian economy for 17 years (2004-2020) as the time-series data, where immunization theory and life-cycle theory were established and adopted ex-post facto as the research design. The descriptive statistics, correlation, and Regression Model (Fixed/Random Effects) were adopted as the inferential statistical tools. The revealed results indicated that there was directly and indirect insignificant effect between federal government and money market securities and HDI respectively. Meanwhile, there was directly significant effect between quoted ordinary shares, and corporate debt securities and HDI. The recommendations suggested that there should more proactive investment of pension funds in ordinary shares and corporate debt securities, while money market instruments should be consciously unattended to with caution. However, the use of descriptive statistics, correlation analysis, and regression techniques also strengthens the analytical depth of the research. the use of Fixed/Random Effects regression is more suitable for panel data rather than pure time-series data, which raises concerns about model appropriateness. The use of Human Development Index (HDI) as a proxy for economic development may not fully capture the broader impact of pension fund investments on economic growth. The study does not clearly address issues such as stationarity, multicollinearity, or causality, which are important in time-series analysis and could affect the reliability of the findings.

Ayuba et al. (2023) empirically asserted that the eligible retired workers from the compulsorily contributory pension plan based on periodically regular payments should eligibly enjoy the saving contributions within 17 years. The study underpinned life0cycle theory, pooling theory and wage deferred theory. Although, the research employed using secondary data of National Pension Commission' Annual reports, and analyze through the Pareto chart analysis. This examined the contributory funds trends association between the total private and public pension fund assets. In addition, the sectorial invested funds after the 2014 Pension Reform enactment used as an indicator. However, the contributed valuable funds significantly declined from both the public sector and private sector during and after election, which observed that secured government bonds, as invested assets were concentrated more than other securities. The PenCom as the regulatory body should continuously give an adequately attentive enforcement on remittances as stipulated in the Act 2014 to serve regularly as spot-checks by pension commission defaulting employers. However, the study relied solely on secondary data obtained from the National Pension Commission Annual Reports, which may not adequately reflect the practical experiences of retirees, contributors, and pension administrators. More so, the use of Pareto chart analysis was largely descriptive and limited in

explaining causal relationships or testing statistical significance among the variables studied. Although, the study adopted life-cycle theory, pooling theory, and deferred wage theory, the linkage between these theories and the empirical findings was not clearly established.

Etim et al. (2023) asserted that the examination of contributory pension scheme's influence and development in Nigerian economy for 17 years (2004-2020). The study anchored deferred wage theory, using ex-post facto, Fully Modified Least Squares (FMOLS) Model and secondary data as research design, and inferential statistical tool respectively. The secondary data was collected from Central Bank Statistical Bulletin and National Pension Commission Annual Report. The results revealed that there was positively significant influence between the total pension funds, private sector pension funds and public sector pension, and per capita income. The Authors' recommendation suggested that government officials should adequately and timely ensure the remittance of payment as at when due in accordance with Pension Reform Act [PRA] 2014. However, the study relied solely on secondary data from the Central Bank of Nigeria and the National Pension Commission, which may limit the depth of analysis since no primary data was used to capture the experiences of contributors and pension administrators. The use of the deferred wage theory alone may not comprehensively explain all dimensions of pension scheme performance and economic development in Nigeria. Although the Fully Modified Least Squares (FMOLS) model is appropriate for long-run analysis, the study did not clearly address other macroeconomic factors that could influence per capita income, such as inflation, unemployment, or corruption.

Madukwe et al. (2023) postulated the investigation of contributory pension fund investment. This is effective in Federal Government Security on Nigerian Economy for 45 quarters (2010Q1-2021Q1). The study underpinned modern portfolio theory, using the time series data, ex-post facto, secondary data (Central Bank of Nigeria Statistical Bulletin, National Pension Commission's annual report and National Bureau of statistics) as well as Ordinary Least Square (Autoregressive Distributed Lag) as sampling tool, research design, as well as inferential statistics respectively. The analyzed findings revealed, there was non-significantly positive influenced effect between contributory pension fund investment, and inflation rate and Nigerian gross domestic product (GDP). The recommendation suggested that Federal, and State government officials, as well as both formal and informal privately commercial sectors should sensitize continuously for registering their employees. Under the umbrella of contributory pension scheme in order to financially increase the growth of the contributory pension funds' net asset values so as to have effect on financial intermediation as well as the growth of Nigerian economy. However, the study relied heavily on secondary data from official publications, which may not adequately capture practical challenges and behavioral factors affecting pension fund investment in Nigeria. More so, there appeared to be inconsistency in the methodology as the study mentioned both Ordinary Least Squares (OLS) and Autoregressive Distributed Lag (ARDL) techniques without clearly distinguishing their specific applications. In addition, the modern portfolio theory was adopted, the study did not sufficiently explain how diversification and risk-return tradeoffs influenced pension fund investment outcomes in the Nigerian context.

Mgbada et al. (2023) postulated the examination of the Nigerian pension scheme's effect and its economic growth for 15 years (2007-2021) and anchored unbalanced growth theory, adopting ex-post facto design and regression analytic statistics as the research design and inferential statistics (Auto-regression Distributed Lag [ARDL]) respectively from CBN statistical bulletin. The outcomes showed that there was positively and negatively significant associative effect between total pension funds contribution, and inflation rate and Gross Domestic Product (GDP) respectively. The recommendation

suggested that government officials should adequately assure proactive pension funds investment securities so as to assist the growth of Nigerian economy as well as initiating sound policies to reduce high level of inflationary rate. However, the study depended solely on secondary data from the Central Bank of Nigeria Statistical Bulletin, which may limit the comprehensiveness of the analysis due to the absence of primary data from pension stakeholders. Although, the Auto-Regressive Distributed Lag (ARDL) model was suitable for examining short-run and long-run relationships, but the study did not clearly explain whether diagnostic and stability tests were adequately conducted to validate the model. More so, the study considered only total pension fund contribution and inflation rate, while other important macroeconomic variables such as unemployment, interest rates, exchange rates, and government expenditure were not incorporated.

Olulu-Briggs (2023) asserted that pension assets investments' impact and the growth of Nigerian economy for 17 years (2004-2020) and endogenous growth theory, life0cycle theory, agency theory, signaling theory, pecking order theory and intermediation theory were adopted for this study. The use of ex-post facto and Ordinary Least Squares (OLS) Model were adopted as research design and inferential statistical tools respectively. Secondary data was used from Central Bank Statistical Bulletin and National Pension Commission Annual Report. The Causality test's results revealed that there was sensitivity during the government bond securities changes, which led to the variations in other securities namely real estate securities, money market investments, which this resulted to more negative responsiveness compare to positivity. The recommendations suggested that there should be a vigorous awareness from pension industrial officials so as to create registration from both private, public enterprises as well as informal sectors, which would positively affect the investible funds and innovative products development. However, the adoption of the Ordinary Least Squares (OLS) model for time-series data may be inadequate without addressing key econometric issues such as stationarity, autocorrelation, and cointegration, which can affect the validity of the results. Also, the study's explanation of causality results appears vague and difficult to interpret, particularly regarding the "negative responsiveness" of securities, thereby reducing clarity and practical understanding of the findings.

Muraina (2023) opined that pension fund administrators' (PFAs') financial performance and Nigerian economic growth for13 years (2009-2021) with the adoption of endogenous growth theory, where the population and sample size of the study were 22 PFAs and 4 selected PFAs respectively. The adoption of correlational approach and panel regression technique was used as research design and inferential statistics respectively. The discovery from the result showed that there was positively significant and negatively significant correlated between ROA and ROE, and Gross Domestic Product respectively. The reported recommendation suggested that National Pension Commission should prudently embark on formal and informal sectors' awareness to improve pension fund assets availability to b managing by Pension Fund Administrators for the betterment of Nigerian economy. However, the selection of only 4 PFAs out of 22 raised concerns about sample representativeness and possible selection bias, which might have weakened the generalizability of the findings. Also, the study appears to focus mainly on Return on Assets (ROA), Return on Equity (ROE), and Gross Domestic Product (GDP), thereby overlooking other important indicators of pension fund performance and economic growth such as investment returns, inflation, employment, or capital market development.

Nafiu et al. (2025) asserted that this study examines the growth efficiency of contributory pension funds on Nigerian economic performance of insurance industry from 2007 to 2021, anchoring decision-making theory and utilizing an ex-post facto research design and multiple linear regression analysis. The findings reveal a weak yet direct relationship between

growth efficiency of contributory pension funds and Gross Domestic Product (GDP of insurance industry), suggesting a positive but relatively minimal influence on economic growth. The growth of both public and private pension fund assets contributes to this impact. The study recommends that pension fund administrators and custodians prudently manage and invest pension fund assets in line with regulatory guidelines, focusing on profitable securities that can positively affect the insurance industry. By optimizing investment strategies, pension funds can enhance their contribution to Nigeria's economic growth and sustainability. However, the study appeared to use GDP of insurance rather that macroeconomic indicator to represent economic growth. In addition, there is also weakened relationship but strong policy recommendation. There is limited in scope and sample size adopted, the study did not explain the possible multicollineality, despite adopted multiple linear regression in terms of variance inflation factor (VIF) and tolerance values. The study anchored only decision-making theory, which this serves as theoretical weakness. The study did not consider other controlling variable such as inflation, interest rate, exchange and unemployment rate. Finally, the study only considered insurance industry among other financial institutions and non-financial institutions.

3. Methodology

This study adopted an ex-post facto research design to examine the relationship between pension fund assets and Nigerian economic performance using historical data. The design was considered appropriate because it allows for the investigation of existing phenomena without manipulating the study variables. Secondary data were obtained from the annual reports of the National Pension Commission (PenCom) and the Central Bank of Nigeria (CBN) Statistical Bulletin. The data covered an eighteen-year period spanning from 2004 to 2021 and were analyzed as time-series data. The study population consisted of twenty-seven (27) licensed pension fund operators in Nigeria. Given the relatively small and manageable population size, a census approach was adopted, whereby all twenty-seven (27) operators were included in the study. Consequently, no sampling technique was required.

Data were collected exclusively from secondary sources, specifically PenCom annual reports and the CBN Statistical Bulletin. Both descriptive and inferential statistical techniques were employed in the analysis. Descriptive statistics were used to summarize and present the characteristics of the data, while inferential statistical tools, including the Pearson Product Moment Correlation (PPMC) and Multiple Regression Analysis (MRA), were utilized to examine the relationships among the study variables. Furthermore, multiple linear regression analysis was employed to assess the effect of total pension fund assets and public pension fund assets as well as government bond securities on Nigerian economic performance. This analytical approach enabled the study to determine the significance and extent of the contribution of pension fund assets to economic growth and development in Nigeria. The multiple linear regression models stated are specifically adopted from the previous researchers below from Nafiu et al., 2025; Mgbada et al., 2023.

$$RGDP = f(TPFA, PuFA, InFR, ExR, UnER, InTR, GBS) \quad ---------- 1$$

$$RGDP = \beta_0 + \beta_1 TPFA + \beta_2 PuFA + \beta_3 InFR + \beta_4 ExR + \beta_5 UnER + \beta_6 InTR + \beta_7 GBS + € \quad --2$$

Where;

RGDP = Real Gross Domestic Products
TPFA = Total Pension Fund Assets
PuFA = Public Fund Assets
InFR = Inflation Rate
ExR = Exchange Rate
UnER = Unemployment Rate
InTR = Interest Rate
GBS = Government Bond Securities
€ = Unexpected Variable

The coefficients of the variables ($\beta_0 - \beta_4$) measured by using the multivariate least square statistics. Meanwhile, Inflation rate and exchange rate indicated as the Intervening (control) variables.

4. Results and Discussion

A comparative table of Private and Public sector annual pension funds contribution and Inflation and Exchange rate from in the year 2004 - 2021 depicted trends in billions of naira.

Table 1: Public Fund Assets (PuFA) , Private Fund Assets (PrFA) , Total Pension Fund Assets (TPFA), Inflation Rate (InFR), Exchange Rate (ExR), Unemployment Rate (UnER), Interest Rate (InTR), Government Bond Securities (GBS) and Real Gross Domestic Products (RGDP) for 18 years (2007-2024)

YEAR	PuFA	PrFA	TPFA	InFR	ExR	UnER	InTR	GBS	RGDP
2007	80.63	68.34	148.97	5.39	125.83	3.79	9.19	279.74	43837.39
2008	99.28	80.81	180.09	11.58	118.57	3.79	6.68	350.82	46802.76
2009	137.10	91.21	228.31	12.54	148.88	3.76	18.18	498.88	50564.26
2010	162.46	103.03	265.49	13.70	150.30	3.74	1.07	829.20	55469.35
2011	228.92	119.53	348.45	10.80	153.86	3.77	5.69	1362.93	58180.35
2012	302.24	159.52	461.76	12.20	157.50	3.76	6.22	1459.62	60670.05
2013	278.50	225.42	503.92	8.50	157.31	3.71	11.20	1739.62	63942.86
2014	237.76	343.97	581.73	8.05	158.55	3.90	11.36	2398.15	67977.46
2015	200.05	358.91	558.96	9.01	192.44	4.13	13.60	3061,48	69780.69
2016	225.86	262.33	488.20	15.70	253.49	4.50	6.69	4427.31	68652.43
2017	257.11	353.73	610.84	16.50	305.79	4.83	5.79	5292.38	69205.69
2018	266.84	340.72	607.55	12.10	306.08	5.07	6.06	6313.10	70536.35
2019	331.56	369.13	700.69	11.40	306.92	5.21	4.52	7345.26	72094.09
2020	536..97	371.12	908.09	13.25	358.81	5.71	5.37	8200.75	70800.54
2021	491.75	387.40	880.66	16.95	401.15	5.40	-1.02	8833.89	73382.77
2022	533.81	504.17	1037.98	18.85	425.98	3.83	3.97	9644.19	75768.95
2023	714.88	604.28	1319.16	24.66	645.19	3.07	2.88	11920.70	77936.10
2024	715.54	653.84	1369.38	33.24	1478.96	3.05	2.88	14114.34	80606.53

Source: Central Bank of Nigeria, International Monetary Fund and International Financial Statistics, National Pension Commission and World Bank Group, 2026

4.1 Interpretation of Table

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Real Gross Domestic Products	18	43837.39	80606.53	65344.9233	10618.99267
Total Pension Fund Assets	18	148.97	1369.38	622.2350	360.71871
Public Fund Assets	18	80.63	715.54	322.2922	194.95469
Inflation Rate	18	5.39	33.24	14.1344	6.51707
Exchange Rate	18	118.57	1478.96	324.7561	319.19143
Unemployment Rate	18	3.05	5.71	4.1678	0.77294
Interest Rate	18	1.02	18.18	6.7983	4.45236
Government Bond Securities	18	279.74	14114.34	4892.9089	4293.51297

Valid N (listwise)	18	N/A	N/A	N/A	N/A

Source: Authors' Computation, 2026

Table 2, the summary of the descriptive statistical analysis presents the five economic parameters within an 18-observation as years, where the outcomes of the minimum, maximum, mean and standard deviation assisted to describe the distribution and variability of the observations. The Real Gross Domestic Products (RGDP) reveals the mean of 65344.92, where the minimum and maximum range from 43,837.39 to 80,606.53. The variation of RGDP is 10,618.99. The result indicates that there is relatively high spread as revealed from the standard deviation, which means there is notable fluctuations in economic output because of high output fluctuations. The minimum value is lesser than the maximum with 54.28 percent, which indicates as changes in production and growth during the year. The Total pension fund assets (TPFA) indicate the mean of 622.24, where a minimum of 148.97 and a maximum of 1,369.38 revealed with s standard deviation of 360.72 as high relative to the mean value. This shows a substantial variation with strong growth in pension assets over time. The public fund assets (PuFA) reveals the mean of 322.29, where the minimum and maximum range from 80.63 to 715.54. The variation of PuFA is 194.95. The result indicates that there is reflective spread from standard deviation different from mean, which this indicates as gradual increment accumulation of public pension-related investment. The inflation rate (InFR) reveals the mean of 14.13%, where the minimum and maximum range from 5.39% to 33.24%. The variation of InFR is 6.52%, which indicates moderate volatility in price levels. Meanwhile, the wide range between minimum and maximum values indicates as relative price stability with high inflation. The exchange rate (ExR) reveals the mean of 324.76, where the minimum and maximum range from 118.57 to 1478.96. The variation of ExR is 319.19, which indicates as extreme fluctuation in the value of domestic currency because exchange rate instability. The unemployment rate (UnER) reveals the mean of 4.17% with 3.05% and 5.71% as minimum and maximum percentage respectively. There is indication that 0.77% of standard deviation reveals that unemployment is relatively remained stable. The interest rate shows average of 6.80% with 1.02% and 18.18% as minimum and maximum percent respectively, where the standard deviation of 4.45% reveals as moderate variability in monetary policy. Finally, the government bond securities show a mean value of 4,892.91 with a minimum of 279.74 and a maximum of 14,114.34. meanwhile, the standard deviation of 4,293.51 indicates as significant expansion and fluctuations I government bond market.

Table 3: Correlation Analysis

		Real Gross Domestic Products	Total Pension Fund Assets	Public Fund Assets	Inflation Rate	Exchange Rate	Unemployment Rate	Interest Rate	Government Bond Securities
Real Gross Domestic Products	Pearson Correlation	1	0.896**	0.812**	0.630**	0.636**	0.209	-0.411	0.867**
	Sig. (2-tailed)	N/A	0.000	0.000	0.005	0.005	0.405	0.090	0.000
	N	18	18	18	18	18	18	18	18
Total Pension Fund Assets	Pearson Correlation	0.896**	1	0.973**	0.804**	0.813**	-0.014	-0.481*	0.966**
	Sig. (2-tailed)	0.000	N/A	0.000	0.000	0.000	0.958	0.043	0.000
	N	18	18	18	18	18	18	18	18
Public Fund Assets	Pearson Correlation	0.812**	0.973**	1	0.810**	0.796**	-0.041	-0.536*	0.934**
	Sig. (2-tailed)	0.000	0.000	N/A	0.000	0.000	0.871	0.022	0.000
	N	18	18	18	18	18	18	18	18
Inflation Rate	Pearson Correlation	0.630**	0.804**	0.810**	1	0.910**	-0.273	-0.523*	0.826**
	Sig. (2-tailed)	0.005	0.000	0.000	N/A	0.000	0.273	0.026	0.000
	N	18	18	18	18	18	18	18	18
Exchange Rate	Pearson Correlation	0.636**	0.813**	0.796**	0.910**	1	-0.248	-0.415	0.835**
	Sig. (2-tailed)	0.005	0.000	0.000	0.000	N/A	0.321	0.086	0.000
	N	18	18	18	18	18	18	18	18
Unemployment Rate	Pearson Correlation	0.209	-0.014	-0.041	-0.273	-0.248	1	-0.159	0.111
	Sig. (2-tailed)	0.405	0.958	0.871	0.273	0.321	N/A	0.529	0.662
	N	18	18	18	18	18	18	18	18
Interest Rate	Pearson Correlation	-0.411	-0.481*	-0.536*	-0.523*	-0.415	-0.159	1	-0.556*
	Sig. (2-tailed)	0.090	0.043	0.022	0.026	0.086	0.529	N/A	0.017
	N	18	18	18	18	18	18	18	18
Government Bond Securities	Pearson Correlation	0.867**	0.966**	0.934**	0.826**	0.835**	0.111	-0.556*	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.662	0.017	N/A
	N	18	18	18	18	18	18	18	18

Source: Authors' Computation, 2026

Table 3, this reveals to present a Pearson correlation matrix that shows the strength and relationship directions among the following, Total pension fund assets (TPFA), public fund assets (PuFA), inflation rate (InFR), exchange rate (ExR), unemployment rate (UnER), interest rate (InTR) and government bond securities (GBS) with real gross domestic

products (RGDP). There is strong positive and statistically significant relationship among TPFA, PuFA, InFR, ExR and GBS with RGDP with the following values R = 0.896 & p = 0.000; R = 0.812 & p = 0.000; R = 0.630 & p = 0.005; R = 0.636 & p = 0.005; and R = 0.867 & p = 0.000 respectively. Only the UnER and InTR reveal a weak and statistically insignificant with Real gross domestic products (RGDP) with the value of R = 0.209 & p = 0.405 and R = -0.411 & p = 0.090 respectively. More so, there is strong positive and statistically significant relationship between PuFA, InFR, ExR and GBS with TPFA with the following values R = 0.973 & p = 0.000; R = 0.804 & p = 0.000; R = 0.813 & p = 0.000 and r = 0.966 & p = 0.000 respectively. Only the UnER reveals an extremely negative and statistically insignificant with TPFA with the value of R = -0.014 & p = 0.958, but InTR reveals a weak and statistically significant with TPFA with R = -0.481 & p = 0.043. In addition, PuFA reveals a strong positive and statistically significant association with InFR, ExR and GBS, showing R = 0.810 & p = 0.000; R = 0.796 & p = 0.000 and r = 0.934 & p = 0.000 respectively. Although, UnER indicates extremely negative and insignificant relationship with PuFA, while InTR averagely reveals negative and statistically significant relationship with PuFA, showing R = -0.536 & p = 0.022. Furthermore, InFR reveals a strong positive and statistically significant association with ExR and GBS, showing R = 0.910 & p = 0.000; R = 0.826 & p = 0.000 respectively. Meanwhile, UnER indicates negative and insignificant relationship with InFR, while InTR moderately reveals negative and statistically significant relationship with InFR, showing R = -0.523 & p = 0.026. Nevertheless, ExR reveals a strong positive and statistically significant association with GBS, showing R = 0.835 & p = 0.000, but UnER indicates negative and insignificant relationship with ExR, and InTR averagely reveals low and statistically in significant relationship with ExR, showing R = -0.415 & p = 0.086. More so, UnER reveals negative and statistically insignificant relationship with InTR, showing r = -0.159 & p = 0.529 and positive and significant relationship with GBS showing R = 0.111 & p = 0.662. Finally, there is moderate negative and statistically significant relationship between InTR and GBS with the values R = -0.556 and p = 0.017.

Table 4: Regression Model

					Change Statistics		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	0.968[a]	0.937	0.892	3484.2080	0.937	21.130	0.000

a. Predictors: (Constant), Government Bond Securities, Unemployment Rate, Interest Rate, Exchange Rate, Inflation Rate, Public Fund Assets, Total Pension Fund Assets

Source: Authors' Computation, 2026.

Table 5: Regression Coefficients

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	23113.002	11684.619		1.978	0.076		
	Total Pension Fund Assets	86.819	18.070	2.949	\4.805	0.001	0.017	59.499
	Public Fund Assets	-71.651	21.494	-1.315	-3.334	0.008	0.041	24.588
	Inflation Rate	422.196	390.673	0.259	1.081	0.305	0.110	9.078
	Exchange Rate	-2.513	7.551	0-.076	-0.333	0.746	0.123	8.134
	Unemployment Rate	4706.097	1910.272	0.343	2.464	0.033	0.328	3.053
	Interest Rate	-214.301	269.654	-0.090	-0.795	0.445	0.495	2.019
	Government Bond Securities	-2.454	1.341	-0.992	-1.830	0.097	0.022	46.407

a. Dependent Variable: Real Gross Domestic Products

Source: Authors' Computation, 2026.

Table 4, the model summary reveals that R-value of 0.968 indicates a strongly extreme overall relationship among the predictors namely total pension fund assets (TPFA), public fund assets (PuFA), inflation rate (InFR), exchange rate (ExR), unemployment rate (UnER), interest rate (InTR) and government bond securities (GBS) with real gross domestic products (RGDP). Likewise, the regression (R^2) value of 0.937 indicates that there is highly exceptional strong explanatory model. That is, this

means that 93.70% of the variation in real gross domestic products (RGDP) is explained by TPFA, PuFA, InFR, ExR, UnER, InTR and GBS. In addition, the Adjusted Regression (R^2) value indicate robustness with the confirmatory value of 0.892, which explains about 89.2% of RGDP variation. However, F-statistic shows that the model is statistically significant as an overall with F-value and p=value of 21.13 and 0.000 respectively.

However, the Table 5 reveals the estimated regression model, which is stated below:

$$RGDP = 23113.002 + 86.819(TPFA) - 71.651(PuFA) + 422.196(InFR) - 2.513(ExR) + 4706.097(UnER) - 214.301(InTR) - 2.454(GBS)$$

This indicates as regression model from regression coefficients as individual effects. That is, the constant is statistically positive and insignificant with B-value and p-value of 23113.002 and 0.076 respectively. More so, the TPFA is statistically positive and significant with B-value, Beta value, t-value and p-value of 86.819, 2.949, 4.805 and 0.001 respectively. In addition, the PuFA is statistically negative and significant with B-value, Beta value, t-value and p-value of -71.651, -1.315, -3.334 and 0.008 respectively Furthermore, the InFR is statistically positive and insignificant with B-value, Beta value, t-value and p-value of 422.196, 0.259, 1.081 and 0.305 respectively. Also, the ExR is statistically negative and insignificant with B-value, Beta value, t-value and p-value of -2.513, -0.076, -0.333 and 0.746 respectively. Likewise, the UnER is statistically positive and insignificant with B-value, Beta value, t-value and p-value of 4706.097, 0.343, 2.464 and 0.033 respectively. Nevertheless, the InTR is statistically negative and insignificant with B-value, Beta value, t-value and p-value of -214.301, -0.090, -0.795 and 0.445 respectively. Finally, the GBS is statistically negative and insignificant with B-value, Beta value, t-value and p-value of -2.454, -0.992, -1.830 and 0.097 respectively.

4.2 Hypothesis Testing

Table 3 explains the relationship between independent variable and dependent variable, which is the formation of three hypotheses below:

Hypothesis One

H01: There is no significant relationship between total pension fund assets and real gross domestic products.

There is strong positive and statistically significant relationship among TPFA and RGDP with the value of R = 0.896 & p = 0.000. This indicates that total pension fund assets estimate a strong significant relationship with real gross domestic products

Hypothesis Two

H02: There is no significant relationship between public fund assets and real gross domestic products.

There is strong positive and statistically significant relationship PuFA, with RGDP, revealing values of R = 0.812 & p = 0.000. This indicates that public fund assets estimate a strong significant relationship with real gross domestic products.

Hypothesis Three

H03: There is no significant relationship between government bond securities and real gross domestic products.

There is strong positive and statistically significant relationship between GBS and RGDP with the value of R = 0.867 and p = 0.000. This indicates that government bond securities estimate a strong significant relationship with real gross domestic products.

4.3 Discussion of Findings

Generally, the findings show that total pension fund assets reveal a positively significant influence on Real Gross Domestic Products (RGDP), in which a unit increase in total pension fund assets leads to an approximately increase units of 89.82 in RGDP, holding other variables constant This is similar to the study of Nafiu et al. (2025); Etim et al. (2023); Mgbada et al. (2023); but differs from the study of Madukwe et al. (2023); Abdullah et al. (2022); Madukwe and Okeke (2022). Public fund Assets, in addition, show a negative and statistically significant relationship with RGDP, which suggests that an increase in Public Fund Assets is related with a decrease in RGDP. That is, the allocation of public

pension assets may not be efficiently contributing to economic reliability. This is different from the study of recent researcher (Nafiu et al., 2025; Etim et al., 2023). The inflation rate coefficient is positive but statistically insignificant. Therefore, inflation does not significantly influence RGDP within the time under study. This is not similar to the study of Etim et al. (2023); Mgbada et al. (2023); Maduke and Okeke (2022) but same with the study of Madukwe et al. (2023). Meanwhile, Exchange rate has a negative but insignificant effect on RGDP, which indicates fluctuations in exchange rate not explaining the variations in economic reliability. Most of the previous studies namely Ayuba et al. (2023); Nafiu et al. (2025) and others were not considered exchange rate as controlling variable. More so, unemployment rate has a positive and statistically significant association with RGDP, indicating the contradiction sign on conventional economic expectations in terms of structural issues in the economy. Most of the previous studies namely Ayuba et al. (2023); Nafiu et al. (2025); Maduke and Okeke (2022) were not considered exchange rate as controlling variable. Interest rate shows a negative and insignificant effect on RGDP, indicating that the variabilities of interest rate do not significantly affect the economic reliability within the model. Most of the previous studies namely Ayuba et al. (2023); Nafiu et al. (2025) and others were not considered exchange rate as controlling variable. Government Bond securities also indicates negative relationship with RGDP, but the effect is not statistically significant. This means that government bond securities do not significantly affect economic reliability, but different from previous researcher (Olulu-Briggs, 2023). Furthermore, the collinearity statistics reveal the severe multicollinearity presence among some independent variables namely Total Pension Fund Assets, Pubic Fund Assets and Government Bond Securities from their Variance Inflation Factor (VIF) because they exceed the acceptable threshold of ten (10). Although, their tolerance values are very low, which this indicates high inter-correlation among the variables. These may affect the reliability and stability of the regression coefficients.

Likewise, the Strongly positive from R-square value as well as the significant of F-change has made the assertion to be suggested that the model employed may have good fitness for the data, which indicates that the model may be sufficiently captured the data. The incremental outcome registration across the Nigerian industries to partake in pension funds scheme has brought the economy to be sustainably reliable. Despite, the controllable parameters (inflation rate, exchange rate, unemployment rate and interest rate) have increasingly geometric on the economic sustainability as one of the fiscal and monetary policies' tools to drive the economy (Madukwe & Okere, 2022; Mgbada et al., 2023; Olulu-Briggs, 2023; Ayuba et al., 2023).

5. Conclusions

This study examined the influence of pension fund assets on Nigeria's economic performance, using Real Gross Domestic Product (RGDP) as a proxy for economic performance. The findings revealed that total pension fund assets exert a positive and statistically significant influence on RGDP, indicating that the growth of pension fund assets contributes meaningfully to economic performance in Nigeria. This suggests that the accumulation and investment of pension funds have the potential to stimulate economic activities and support sustainable economic growth.

However, the study found that public pension fund assets have a negative and significant relationship with RGDP, implying that increases in public pension assets are associated with a decline in economic performance. This outcome raises concerns regarding the efficiency of public pension fund allocation and investment strategies. Furthermore, inflation rate, exchange rate, interest rate, and government bond securities were found to have statistically insignificant effects on RGDP, suggesting that their contributions to economic performance during the study period were limited. Conversely,

unemployment rate exhibited a positive and significant relationship with RGDP, a result that contradicts conventional economic expectations and may reflect structural peculiarities within the Nigerian economy. With these assertion, regulatory authorities and pension fund administrators should improve the allocation and management of public pension fund assets by directing investments toward productive sectors of the economy that can generate higher returns and stimulate economic growth. The National Pension Commission (PenCom) should intensify efforts to expand pension scheme participation across both formal and informal sectors to increase pension asset accumulation and deepen the contribution of pension funds to economic development. Pension fund administrators should diversify investment portfolios beyond government securities into infrastructure projects, corporate bonds, equities, and other productive investments that can enhance economic performance while maintaining acceptable risk levels. Policymakers should periodically review pension investment guidelines to ensure that pension assets are optimally utilized to support national development objectives without compromising contributors' funds. Given the unexpected positive relationship between unemployment and RGDP, government agencies should investigate the underlying structural factors responsible for this outcome and implement policies that promote productive employment and inclusive economic growth. Although inflation, exchange rate, and interest rate were not statistically significant in the model, monetary and fiscal authorities should continue implementing policies that ensure macroeconomic stability, as these variables remain important determinants of investment decisions and economic sustainability. Future researchers should consider alternative model specifications, variable transformations, or advanced econometric techniques to address multicollinearity issues and improve the robustness and reliability of empirical results. Government should create a conducive regulatory environment that enables pension funds to participate safely in long-term infrastructure financing, thereby enhancing economic productivity, job creation, and sustainable development.

6. Recommendations

Based on the outcomes, contributory pensions fund risks have revealed positively, strongly, and significantly effects on Nigerian economic reliability. This brings a proposition for recommendations as suggestions below.

6.1 Promotion of Prudent and Professional Pension Fund Investment Strategies

Both PFAs and PFCs should have adopted prudent and professional investment strategies in order to prioritize profitable and low-risk investment securities so that sustainable growth of pension assets and economic stability might have set in.

6.2 Placement and Monitoring Supervisory Mechanisms

The PenCom should have strengthened to placing and monitoring the supervisory mechanisms that would ensure compliance with investment guidelines, accountability, transparency and effectiveness in risk management in pension fund operations.

6.3 Enabling Environment for Long-Term Infrastructure Financing Investment

Government should create an enabling environment for pension funds to participate safely in long-term infrastructure financing for sustainable economic growth.

6.4 Deepened Stabilization of Nigerian Financial Market Development

Policymakers namely PenCom and CBN should have deepened and stabilized Nigerian financial markets in order to create much more profitably secure investment opportunities for pension funds participants.

6.5 Consistent Public sensitization and enlightenment campaigns

Public sensitization and enlightenment campaigns should be intensified in order to encourage greater participation in the contributory pension scheme

especially among the informal sector workers.

7. Limitations and Further Research

Nevertheless, the study is subject to different limitations encountered, which should be put into considerations during the interpretation of findings.

7.1 Scope of Data Collection

The study mainly focuses on Public Funds Assets, Private Fuds Assets and two macroeconomic variables, which these may not capture other variables from the industry as well as other macroeconomic variables. These variables might act as intervening factors that might influence the results.

7.2. Adoption of Secondary Data

This study mainly relied on ready-made data from 2004 to 2021 without considering the recent data because the data were not published on the regulatory website. This may result to prospective biases in data collection as well as inconsistencies in parameters measurement.

7.3 Shortcomings of Microsoft Excel Usage for Analyzing Data

The Microsoft Excel has a widening scope in analysing data because of its user-friendly and access interface. Despite these, it cannot be used for handling large datasets, in which SPSS can be adopted for handling big datasets.

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