Development Stock Instruments and Nigerian Economy: A Dynamic Interactive Approach

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Abstract
This study examined the dynamic effects of development stock instruments on the Nigerian economy from 1981 to 2022. Financial contributions from savings-type institution (STI), insurance companies (ISC) and deposit money banks (DMBs) were employed as components of development stock instruments. Secondary data sourced from the statistical bulletin of Central Bank of Nigeria were used. Given the nature of study, we employed structural vector autoregressive (VAR) econometric method of data analysis. The result revealed mixed dynamic interactive effects between development stock instruments and Nigerian economy. It is therefore concluded that while accounting for feedback loops, lagged relationships and indirect effects within the system, development stock instruments from DMBs made significant contributed to the growth of the Nigerian economy, while those from STI and ISC failed to do same within the period of the study. The government should provide more bonds and infrastructure bonds that could enhance investor protection against mismanagement, offer tax exemptions on interest earned from development stocks to encourage investment. Also, the monetary authority should provide liquidity mechanisms that allow investors to easily trade or redeem these instruments. Government should focus on strengthening regulatory frameworks, promoting financial literacy, and encouraging the development of innovative insurance products to maximize these benefits and ensure sustainable economic growth. By so doing, development stock instruments can be made worthwhile tools for the Nigerian economy to grow.

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1. Introduction

In the world over, development stock instruments (DSIs) are financial instruments issued by governments, development banks, or other institutions to raise capital specifically for infrastructure, economic development, or social projects. These instruments are often used in emerging markets or for public-sector financing. They are vital for economic progress, investor diversification, and social development (World Bank, 2023; Central Bank of Nigeria, 2022: National Bureau of Statistics, 2022). DSIs have played a **crucial role** in financing **economic expansion, infrastructure, and sustainability initiatives** across the world.

Following this, World Bank Development Report reports that over three decades, DSIs have been in multiple perspectives - from global to national varieties. On international scales, DSIs are the U.S. Treasury Infrastructure Bonds (used to fund national infrastructure projects); India's Bharat Bond ETF (supports public sector infrastructure projects); China's Special Purpose Bonds (issued by local governments to finance infrastructure); Brazil's BNDES Bonds (issued by the National Bank for Economic and Social Development (BNDES) to fund national

projects. On continental perspective, DSIs include Multilateral Development Bank Bonds in form of World Bank Green Bonds (raise funds for environmental and climate-related projects); Asian Development Bank (ADB) Sustainable Bonds (use to support economic development in Asia; African Development Bank (AfDB) Social Bonds (used to finance healthcare, education, and poverty reduction programmes); and European Investment Bank (EIB) Climate Bonds (fund renewable energy and sustainable infrastructure).

At the national level, there are Municipal and State-Level Development Bonds in the categories of New York City Municipal Bonds (finance local infrastructure, transportation, and schools), Tokyo Metropolitan Government Bonds (used for urban development projects in Japan), and South Africa's Infrastructure Bonds (fund national road, water, and energy projects). On Public-Private Development Securities arrangement, the report further reveals that there are Public-Private Partnership (PPP) Bonds (issued jointly by governments and private entities for large projects), Renewable Energy Investment Bonds (companies like Tesla and Ørsted issue bonds to finance wind and solar energy projects), Social Impact Bonds (SIBs) (used to fund programs in education, healthcare, and job training, with returns based on performance outcomes) (World Bank, 2023).

Several developed and emerging economies have successfully utilized development stock instruments to finance infrastructure, promote economic growth, and social programmes. A case in point is the United States which has utilized Municipal Bonds for local development issued through the Municipal Bonds, Treasury Infrastructure Bonds, to fund transport systems, public housing, and schools in New York City and California. The country has equally utilized the Build America Bonds (BABs) programme of 2009 which has helped states to finance projects during the financial crisis, stimulating economic recovery (U.S. Department of Commerce (DOC), 2023 cited in Hailemariam & Guotai, 2024). These instruments have provided low-risk investment options while enhancing long-term infrastructure growth. Since 2020, Germany, through European Investment Bank (EIB) Green Bonds, issued and has been leveraging Green Bonds, Sustainability Bonds to fund climate-friendly projects like wind farms, electric railways, and sustainable housing. These investments have accelerated the country's energy transition (*Energiewende*), making Germany a leader in renewable energy (The Federal Statistical Office of Germany (*Destatis*), 2023 documented in Hailemariam & Guotai, 2024).

China experienced expansion in infrastructural facilities through Special Purpose Bonds (SPBs) and Belt and Road Initiative (BRI). This was done through issuing trillions of yuan in development bonds to finance highways, bridges, railways, and smart cities, boosting trade, intra and inter Connectivity – resulting to higher GDP growth and improved urbanization, making China the world's second-largest economy (International Monetary Fund Report, 2022; World Bank Development Report, 2022). As a developing economy, India issued and used Bharat Bond ETF, Green Bonds, as the country's first corporate bond fund, to finance infrastructure projects in energy production – making India a global leader in renewable energy (Reserve Bank of India (RBI), 2023). Development bonds have helped India achieve over 175 GW of renewable energy capacity (World Bank, 2023).

The Development Bonds for Economic Growth issued by the Brazilian Development Bank (BNDES) has financed transportation, agriculture, and industrial development, contributing to Brazil's economic expansion. Also, the country used The Minha Casa Minha Vida programme, funded by development bonds to build millions of affordable housing units

– which helped stabilize inflation and contribute to job growth in Latin America's largest economy (Brazilian Institute of Geography and Statistics (IBGE - Instituto Brasileiro de Geografia e Estatística, 2022; Central Bank of Brazil (Banco Central do Brasil – BCB, 2022). Within the African continent, the government and Development Bank of Southern Africa (DBSA) issue bonds to finance energy, water, and transport projects. In addition, the Green Bonds have supported renewable energy projects, reducing dependence on coal, and at the same time effectively utilized development funds for education and healthcare, improving access to basic services in the country.

In Nigeria, DSIs also known as government bonds, are fixed-interest debt instruments issued by the Central Bank of Nigeria on behalf of the Federal Government. The apex bank in Nigeria reported that long-term and interest-bearing securities of DSIs available in the capital market are Savings-Type Institutions (STI), Insurance Companies (ISC) and Deposit Money Banks (DMBs). These instruments are utilized to finance public infrastructure projects and other developmental initiatives (Olowe, 2009), and they play a crucial role in funding government expenditures that make direct contribution to Nigeria's Gross Domestic Product (GDP) (Neokosmidis, 2019).

Savings-Type Institutions (STIs) are financial institutions that primarily focus on mobilizing savings from individuals and businesses and channeling them into investments and loans. They play a crucial role in financial intermediation and economic development by promoting savings culture, providing credit facilities, and enhancing financial inclusion (CBN, 2024). They include contributions made through savings by microfinance banks, credit unions, development banks, savings and loans association, pension funds and post office savings banks. Saving-types institutions play pivotal role in Nigeria's economic development, significantly influencing the nation's real Gross Domestic Product (GDP) through financial intermediation, credit provision, employment generation, payment system facilitation and source of government revenue (Seven & Yetkiner, 2023; CBN, 2024).

Insurance companies (ISCs) in Nigeria contributes to the country's financial ecosystem, offering a range of products to mitigate risks for individuals and businesses. They offer policies that cover life insurance companies, general insurance companies, health insurance companies, reinsurance companies, microinsurance providers and takaful (Islamic insurance) companies. In this regard, the Nigeria Deposit Insurance Corporation (NDIC, 2024) reports that contributions of insurance companies to economic growth have been in the areas of risk management and financial stability, mobilization of long-term funds, employment generation, foreign direct investment (FDI) attraction, poverty alleviation, infrastructure development and improved business confidence. The Central Bank of Nigeria (2024) notes that the instruments that pass-through Deposit Money Banks (DMBs) contribute to financial intermediation, economic development, and monetary policy implementation in Nigeria. In addition, Nelson (2022) notes that the Commercial Banks accepts deposits, grants loans and advances, facilitates payments and foreign exchange transactions, provides financial intermediation, facilitates the implementation of monetary policy and wealth management as well as advisory services.

While development stock instruments are vital for financing government projects, but their direct impact on real GDP in Nigeria has not been felt as desired. Nurudeen (2019) points to the case that the abysmal performance of real GDP may not by unconnected with poor performance of capital market. Ezenwa and Chikezie (2020) attributed poor performance of

the Nigerian economy to a number of factors which Nigerian stock exchange is implicative. In 1981, development stocks stood at ₦3353.0 million, it ballooned to ₦34389 million in 2003. From 2002 to 2006, total insurance business investments, influenced the Nigerian real gross domestic products to the values of ₦36940.3 million, ₦74590.8 million, ₦121844.2 million, ₦216359.9 million and 329247.9 million, representing 47.9%, 35.95%, 63.35%, 77.88%, 52.17% increases respectively (CBN, 2023).

With these contributions of stock market investments, one would have expected that real gross domestic product to perform well. However, the reverse is the case as real GDP, as a measure to economic growth, has not performed desirably well. Worthy mention is that in 1981, it was ₦15,258 billion in 1981, marginally increased to ₦23,688.28 billion in 2000 and ₦28,957 billion after two years, representing 55% and 22% respectively. In fact, between 2015 and 2022, Nigeria's real Gross Domestic Product (GDP) experienced notable fluctuations that reflected various economic challenges. It recorded 2.7% growth in 2015, contracted by 1.6% in 2016 and saw modest growth rates, with real GDP increasing from 0.8% in 2017, 1,9% in 2018 and 2.2% in 2019. The COVID-19 pandemic led to a 1.8% contraction in 2020, as global economic slowdowns and lockdown measures affected financial and real sectors of the economy. In 2021 and 2022, the economy rebounded with growth rates of 3.6% and 3.2%, respectively, attributed to the easing of COVID-19 restrictions and recovery in global oil demand (World Bank, 2023). These trends underscore the fact that the Nigerian economy has not grown up to 5% despite the successes recorded in the development stock instruments.

The literature indicates that effectiveness of development stock instruments is influenced by a combination of macroeconomic stability and robust institutional frameworks which resultantly impact on the economy. Vazakidis and Adamopoulos (2022) reported unidirectional causality from stock market developments and economic growth in Greece. Naik and Padhi (2020) significantly contributed to economic growth in sub-Sahara Africa. Hailemariam and Guotai (2024) documented that there is a statistically significant relationship between stock market development and economic growth, and Lahura and Vega (2017) reported that stock market development has a positive and significant effect on real economic activity in the long run in Nigeria. Evidence abound that stock market instruments impact significantly on real gross domestic products of developed and emerging economies. However, no study had delved into assessing the pass-through effects of development stock instruments on the Nigerian economy from 1981 to 2022. This is a gap our paper seeks to fill. The remaining parts of the paper is documented in four sections – literature review presented in section 2, methodology covered in section 3, results and discussion presented in section 4 and Section 5 is the concluding part.

2. Literature Review

Theoretical Review

***Acceleration Theory of Investment*:** This theory argues that an ideal capital stock determines investment and investments in stock market provides a distinctive viewpoint on how shifts in the pace of economic growth impact investment choices. According to the hypothesis, changes in economic production might result from investments in financial instruments and assets. For Neokosmidis (2019), the theory offers insights into how investment could accelerate economic expansion by amplifying the economic cycle. It is an economic concept that examines the connection between shifts in national income (output) and the ensuing differences in

investment levels, according to Bhowmik, *et. al.,* (2017). The principle basically says that when demand or income rises, investment expenditures can rise proportionately more.

The theory emphasizes the relationship between demand, investment, and economic cycles and offers a fundamental framework for comprehending how sensitive investment is to shifts in economic production (Adewoyin, 2014). Since the amount of investment in both financial and non-financial assets directly affect changes in economic output, the theory is incorporated into a number of macroeconomic models to predict investment behavior and comprehend economic dynamics. Empirical research on a nation's investment behavior (Atje & Jovanovic, 2013; Adebiyi, 2015; Anyanwu, 2018) showed that financial asset investments have a big impact on investment choices, which exacerbates the consequences of economic growth. The accelerator concept has been reexamined in recent studies to take into consideration the complexity of the current economy. Mamth and Srinivasan (2016), for example, extended the classic accelerator model by adding household investment and employment as stand-ins for economic activity. They found a positive relationship between household investment in homes and corporate investment in fixed assets, indicating that the accelerator effect is still useful for understanding economic dynamics.

The theory emphasizes how sensitive stock investments are to shifts in the pace of economic expansion. Businesses are more inclined to purchase stocks in order to profit from the rising market while the economy is growing. It acknowledges that investments are cyclical. Businesses typically make more aggressive stock investments during economic upswings in an effort to optimize profits during favorable market circumstances (Snyder, 2019). On the other hand, because of the greater uncertainty, stock investment may stall during economic downturns. It even goes so far as to imply that stock investments frequently follow market trends. A positive feedback loop that encourages more stock investments might further boost economic growth when positive economic signs are present.

The theory argues that changes in economic growth may cause equivalent changes in stock market activity. As investors modify their portfolios in reaction to shifting circumstances, quick changes in economic data may cause market volatility to rise (Tranfield, Denyer, & Smart, 2023). Behavioral aspects that impact investment decisions are also acknowledged by the theory. How companies and investors understand and respond to the signals given by stock market circumstances can be influenced by a number of factors, including investor confidence, market mood, and the assessment of economic data. Businesses and investors can use the Accelerator theory of stock investment as a lens to understand how the market reacts to shifts in economic growth.

The theory argues that investors can adjust their strategies to the current market dynamics and economic conditions in making better decisions. The theory's assumption of a constant capital-to-output ratio has been criticized for oversimplifying the complexities of investment decisions, which are influenced by a variety of factors beyond output changes, even though the accelerator theory offers a framework for comprehending investment fluctuations and economic growth. Additionally, the theory ignores the influence of credit market conditions and financial limitations, which can have a big impact on a company's ability to make investments.

***The Neo-Classical Theory of Stock Market Investments*:** This theory explicitly assumes profit/value maximization. The neoclassical theory of investment is a fundamental concept in

economics, especially in the field of macroeconomics. It is based on the principles of neoclassical economics, which emphasizes the role of individual rationality, market equilibrium, and the efficient allocation of resources. In the context of investment, Mishra (2020) provides that the neoclassical theory focuses on the decision-making process of firms and individuals regarding investments in physical capital. In the context of investment, the neoclassical theory focuses on the decision-making process of firms and individuals regarding investments in physical capital (Nelson, 2022).

The theory posits that firms invest in additional units of capital (machinery, equipment, etc.) as long as the marginal productivity of capital (MPK) is greater than the real interest rate. If the MPK is higher than the interest rate, investing in capital is profitable for the firm. According to the neoclassical theory, Eze, Ezenwa and Chikezie, (2020) argue that firms make investment decisions based on the expected future profits generated by the additional capital. Investments that are expected to yield positive returns are pursued. The theory assumes that individuals and firms have a time preference, meaning they prefer to consume goods and services in the present rather than in the future. Investment in stock involves sacrificing present consumption for future returns (Enisan & Olufisayo, 2013).

It argues that firms assess all available information and make investment choices that maximize their utility or profits given the constraints they face. While the neoclassical theory of investment provides valuable insights into the behavior of firms and individuals in the investment process, it has also been subject to criticism (Ezema, Okoye & Obinabo, 2019). Critics argue that it oversimplifies real-world complexities, ignores institutional factors, and does not adequately account for market imperfections and uncertainties, which are prevalent in actual economies. Despite these criticisms, the neoclassical theory of investment remains a foundational concept in economic theory. This informs the use of other theories of investment in stock as reported below.

The Tobin Theory of Stock Market Investments: This theory provides valuable insights into the decision-making process of investors in financial markets. Tobin's theory emphasizes the importance of diversification in an investor's portfolio. Diversifying investments across different assets and sectors can reduce risk, enhancing the overall stability of the portfolio. Tobin introduced the concept of liquidity preference, suggesting that investors often prefer more liquid assets over less liquid ones. This preference for liquidity influences investment decisions, especially in times of market uncertainty (Ezenwa & Chikezie, 2022). Tobin's theory assumes that investors behave rationally and that financial markets are generally efficient. Investors, according to this theory, make decisions based on available information and aim to maximize their utility or wealth.

Tobin's work has influenced economic policies, particularly in the areas of monetary and fiscal policy. His insights into investment behavior have implications for policy-makers striving to create stable and efficient financial markets. The theory emphasizing rational decision-making and portfolio diversification aligns with a long-term investment perspective. Investors following this theory are encouraged to consider the long-term value and stability of their investments.

While foundational, Tobin's theory has also faced criticism, particularly concerning the assumption of market efficiency. Modern financial theories, including behavioural finance, have added layers of complexity to the understanding of investment decisions. The Tobin's

theory of stock investment provides a valuable framework for understanding investor behavior, portfolio diversification, and the influence of liquidity in financial markets (Nelson, 2022). It forms a significant part of the broader landscape of investment theories, contributing to the ongoing discussion on rational decision-making and market dynamics

The theoretical framework between stock market investments and economic growth is a topic of great interest and complexity in the field of economics. On this basis therefore, this study anchors on four theories. The theoretical context is rooted in the fact that stock market investments impact consumer wealth, because when stock prices rise, individuals tend to feel wealthier and, therefore, may increase their spending (Adewoyin, 2014). This heightened consumer spending can stimulate economic growth by driving demand for goods and services. This re-enforces the argument that a thriving stock market provides companies with a favourable environment to raise capital through the issuance of stocks. With increased capital, businesses can invest in expansion, research, and innovation, fostering economic growth and job creation (Levine, 2021; Hopp, 2024).

Furthermore, stock market investments contribute to capital formation, which in turn, enhances productivity. A vibrant financial market attracts investors, including venture capitalists, to fund entrepreneurial ventures (Hussain, Murthy & Singh, 2019). These investments can spur innovation, leading to the development of new products and services, creating growth opportunities for both businesses and the economy. Bollerslev (2019) notes that the performance of the stock market influences investor confidence. Positive market trends can encourage more investments, both domestically and internationally, leading to economic expansion. A buoyant stock market can increase government revenue through capital gains taxes (Daniel, 2019). The government can then use these funds for public investments, infrastructure projects, and social welfare programs, directly contributing to economic growth. Investments in DSIs, when channeled into productive sectors of the economy, can facilitate long-term economic development.

A robust stock market attracts foreign investments, fostering economic globalization. Increased international investments can boost trade and economic cooperation between countries, leading to shared economic growth. The relationship between DSIs and economic growth is intricate and multifaceted. A well-functioning stock market can be a catalyst for economic expansion, but it requires a balance of prudent policies, investor confidence, and regulatory oversight to ensure sustainable and inclusive growth for economies worldwide

Empirical Literature

Eze, Ezema and Okoro (2020) examined the effect of the Nigerian Stock Exchange on Economic Growth in Nigeria 1990-2015. Annual time series data of real gross domestic product (RGDP) as the dependent variable, and the independent variables include Domestic participation (DOP), Listed domestic companies (LDC), Turnover ratio of the stock market (TOR), and Value of shares traded to GDP ratio (VST). Using Autoregressive Distributed Lag Model (ARDL) and ARDL bounds test the results showed that there exists a long-run relationship among variables. Ezema, Okoye and Obinabo (2019) examined stock market and economic growth in Nigeria between 1970 and 2004. The study used GDP as the dependent variable and independent variables are stock market capitalization, stock price index, listed equities, and shares percentage of GDP and inflation rate. The study revealed that capital markets has not reached a level of development that would enable it to fulfill its main function in the economy.

Owen (2020) estimated economic growth and stock market development using empirical data from an institutionally distressed country between 1985 and 2018. GDP was used to measure growth, and the Central Bank of Nigeria (CBN), the Security and Exchange Commission Database, and the turnover ratio, market capitalization, and value of shares traded were used to surrogate the stock market and apply the ARDL Bound test methodology. The investigation's empirical findings support the notion that there is a long-term correlation between stock market growth and development. Similarly, albeit statistically insignificant, there was a positive correlation between the development and growth indicators of the stock market.

Dike (2016) looked closely at the connection between economic growth and the development of the equities market in a sample of African nations. Using annual panel data for the years 1990–2015 and a dynamic panel vector error correction model, this research examines the relationship among economic growth, banking development, and stock market development in a unified framework. The findings appear to indicate that the rise of the stock market contributes significantly to economic growth gains.

Boako and Alagidede (2024) estimated the causal relationship between stock market development and economic growth in African countries for the period of 1983 to 2023. Using RGDP as the dependent variable and independent variables were stock market capitalization, listed equities and Value of shares traded to GDP ratio (VST), they conducted an ARDL bounds test and a Granger Causality test based on VECM. The test results suggested that stock market development was co-integrated with and has a strong and positive long-run impact on economic growth in Egypt and South Africa. Granger causality test revealed a rather stifle relationship between stock market development and economic growth in Africa.

Seven and Yetkiner (2023) studied stock market development and economic growth in low, middle- and high-income countries for the period 1991 to 2011. The study used GDP as the dependent variable and the independent variables were market capitalization (MCP), all share index (ASI) and value of new shares (VNS) as proxy for stock market activities. Utilizing ARDL analysis revealed that positive association between stock market development and economic growth in middle- and high-income countries. Similarly, Nnakee, *et. al.,* (2024) studied the link between stock market development and economic growth in Nigeria. The study used cointegration, error correction mechanism and Granger causality techniques. The study used GDP as the dependent variable and the independent variables were market turnover ratio, market capitalization, value of traded shares and value of traded shares. They found evidence of a strong positive relationship between market turnover ratio and economic growth both in the long-run and short-run.

Sin-Yu and Iyke (2017) provided a comprehensive review of the literature on the determinants of stock market development reported that the determinants of stock market development can be broadly classified into two groups: macroeconomic factors and institutional factors. The theory and the empirics predict different ways in which macroeconomic factors affect stock market development. The real income and its growth rate foster stock market development, while the banking sector, interest rate and private capital flows can foster or inhibit it.

Afees and Kazeem (2020) examined the causal linkage between stock market and economic growth in Nigeria between 1970 and 2004. The study used GDP as the dependent variable and independent variables are stock market capitalization, listed equities, shares

percentage of GDP and inflation rate. Using Granger Causality test and OLS and reported that capital market development drives economic growth positively. Mishra (2020) examined the impact of capital market efficiency on economic growth of India using the time series data for the period of first quarter of 1991 to the first quarter of 2010. The study used GDP as the dependent variable and the independent variables were market capitalization, total market turnover and stock price index. The study employed OLS and reported a linkage between capital market efficiency and economic growth in India.

Alajekwu and Achugbu (2020) examined the role of stock market development on economic growth using time series data from 1994 to 2008. The study used GDP as the dependent variable and the independent variables were market capitalization; turnover ratio, and liquidity ratio. The study applied the ordinary least square techniques. They found that market capitalization had a weak negative correlation with economic growth, whereas turnover ratio was positively and significantly correlated with economic growth. Augustine and Salami (2020) examined the impact of stock market development on long-run economic growth for the period of 1980 to 2008. The study used gross domestic product as the dependent variable and the independent variables were market capitalization, turnover ratio, all share index. Using OLS the regression results showed that stock market size and turnover ratio are positive in explaining economic growth while stock market liquidity coefficient was negative in explaining long-run growth in Nigeria.

Using a Vector Error Correction Model (VECM), Vazakidis and Adamopoulos (2021) examined the causal relationship between stock market development and economic growth in Greece between 1978 and 2007. They found a unidirectional causal relationship between economic growth and stock market development, indicating that economic expansion has a positive impact on stock market performance. In their 2022 study, Naik and Padhi examined the relationship between stock market development and economic growth in emerging market economies using dynamic panel evidence. They discovered that there is a unidirectional causal relationship between stock market development and economic growth, which supports the supply-leading hypothesis.

Using the Generalized Method of Moments (GMM) for dynamic panel data, Hailemariam and Guotai (2024) examined the relationship between stock market development and economic growth in 10 developed and 17 emerging economies between 2000 and 2011. They found a statistically significant relationship between the two, both directly and indirectly, by encouraging investment behavior. Lahura and Vega (2017) used a Vector Autoregression (VAR) model with long-run limitations to investigate the relationship between Peru's stock market development and actual economic activity. The findings imply that, over time, the growth of the stock market has a favorable and noteworthy impact on actual economic activity.

The theoretical literature is a true reflection of the fact there are many theories that propounds a healthy and functional relationship between stock markets investments and economic growth. However, it is evident that all the studies in the body of existing literature made use of various theories but none combined the Accelerator Theory and Theory of Stock Market Investments to explain how activities of the markets can lead to economic growth – thereby linking same to Endogenous Growth Theory and Solow Growth Model. The review of empirical literature (Eze, 2020; Ezema, Okoye & Obinabo, 2019; Nurudeen, Wafure & Auta, 2019; Afees & Kazeem, 2020; Mishra, 2020). It is important to point out that none of these empirical works reviewed considered the development stock instruments on economic

growth with emphasis on examination of the dynamic effects of savings-type institutions, insurance companies and commercial banks on real gross domestic product in Nigeria from 1981 to 2023 using Unrestricted Vector Auto-Regression (UVAR) model.

3. Methodology

Ex-post facto research design of quasi experimental approach was adopted. This research design combines theoretical consideration (apriori criterion) with empirical observations to ascertain the relationship between the variables of interest. The study utilized secondary data obtained from Central bank of Nigeria. The variables of interest are Savings-Type Institutions (STI), Insurance Companies (ISC) and Deposit Money Banks (DMBs) as independent variable and Real Gross Domestic Product (GDP) as dependent variable. The model specification relies on the studies of Eze (2020), Boako and Alagidede (2024) and Seven and Yetkiner (2023) who modeled economic growth as a function of financial markets instruments.

The estimation procedures in this study were done in the order of pre-estimation tests (in form of descriptive statistics, correlation matrix, and unit root test), actual-estimation tests (included the short-run and long-run of ARDL test, and Granger causality test) and post-estimation tests (done in the manner of serial correlation, heteroscedasticity, normality, specification and stability tests.

Following previous studies, we adopted their equations with considerable modification and specified the functional relationship of the study as:

$$RGDP_t = \beta_0 + \beta_1 DSI_t + \mu_t \qquad 1$$

From equation 1, DSI is decomposed into *DES = Savings-Type Institutions (STI), Insurance Companies (ISC) and Deposit Money Banks (DMBs).* These variables are measured based on their contributions to financial institution and ultimately the Nigerian economy.
From equations 1 the linear relationship would be therefore, presented as follow

$$RGDP_t = \beta_0 + \beta_1 STI_t + \beta_2 ISC_t + \beta_3 DMB_t + \mu_t \qquad 2$$

Where: *β_0, is the intercepts or constant of the regression equation, β_1, β_2, β_3 are the slopes or coefficients of STI, ISC, and DMB in equation, 't'= is the time trend and μ_t is Stochastic error term.*
From equation 2 the Unrestricted Vector Auto-regressive (VAR) models are specified as follows:

$$\begin{bmatrix} RGDPt \\ STIt \\ ISCt \\ DMBt \end{bmatrix} = \begin{bmatrix} \pi 1 \\ \pi 2 \\ \pi 3 \\ \pi 4 \end{bmatrix} + \sum_{k=0}^{n} \binom{n}{k} \begin{bmatrix} \phi 11 & \phi 12 & \phi 13 & \phi 14 \\ \phi 21 & \phi 22 & \phi 23 & \phi 24 \\ \phi 31 & \phi 32 & \phi 33 & \phi 34 \\ \phi 41 & \phi 42 & \phi 43 & \phi 44 \end{bmatrix} \begin{bmatrix} RGDPt-1 \\ STIt-1 \\ ISCt-1 \\ DMBt-1 \end{bmatrix} + \begin{bmatrix} \lambda 1 \\ \lambda 2 \\ \lambda 3 \\ \lambda 4 \end{bmatrix} \qquad 3$$

Where; π_1, π_2, π_3 and π_4 are the vectors of constants; ϕ_{11} … ϕ_{44} are the coefficient of variables of the model while λ_1 to λ_4 are the vectors of error terms for the VAR Development Stock – Economic Growth Model.

The use of Unrestricted Vector Auto-regression (VAR) model approach was informed by the need to capture the dynamic effect of development stock instruments on real gross domestic products in Nigeria. In order to compliment the efficacy of the techniques, impulse

response function (IRFs) and variance decomposition (VDC) were equally adopted for the purposes of accounting for the feedback effects among variables. The key assumptions of a VAR model are stationarity, linearity, and a constant covariance matrix of the error terms. Additionally, VAR models assume that variables in the system have a contemporaneous effect on each other, capturing the dynamic interactions within the system.

A Vector autoregressive (VAR) model is useful when one is interested in predicting multiple time series variables using a single model. It could be interpreted by checking the model specification, examining the impulse response functions, evaluating the forecast error variance decomposition, conducting the Granger causality tests and performing the cointegration tests (Naik & Padhi, 2022). In order to ensure robust analysis, Engel-Granger static procedure was employed. Unlike the Engel-Granger static procedure, the Johansen Vector Auto-regressive (VAR) procedures allow no prior restrictions on the co-integration space. As suggested by Johansen and Juselius (1990 cited in Boako & Alagidede, 2024) after ascertaining the stationarity of the time series data, we test for co-integration among the series. Thus, co-integration indicates the presence of a linear combinations of non-stationary variables that are stationary and the variables does not have a mean (drift) to which it returns. The presence of co-integration however implies that a stationary long run relationship among the series is present. The procedure adopted in this study is a representation of the approach of analysis of multivariate co-integration systems developed and expanded by Johansen and Juseline (1990, 1992, and 1994 documented in Augustine & Salami, 2020) so as to determine the number of co-integration vectors using two statistic tests.

Beyond examining the dynamic effect of development stock instruments on real gross domestic product, it is also very crucial to investigate the casual relationship that may exist between them. For this reason, we employ the use of the most popular causality test; Granger Causality test introduced by Weiner in 1956. Granger Causality test uses the value of one variable to predict the future value of another variable. It determines if a variable is significant in forecasting another variable. To test the hypothesis X_t Granger cause Y_t, Y_t is regressed on the lagged values of Y_t and the values of X_t, and to test the hypothesis Y_t Granger cause X_t, X_t is regressed on the lagged values of X_t and the values of Y_t (Agbahoungba & Biao, 2019). The Granger causality test is mathematically expressed as:

$$X_t = \sum_{i=1}^{n} \alpha i \, Y_{t-1} + \sum_{j=1}^{n} \beta j \, X_{t-1} + U_{1t} \quad 4$$

$$Y_t = \sum_{i=1}^{m} \gamma i \, Y_{t-1} + \sum_{j=1}^{m} \delta j \, X_{t-1} + U_{2t} \quad 5$$

4. Results and Discussion

Presentation of Results of Pre-Estimation Tests

Table 1: Result Descriptive Statistics Test

	RGDP	STI	ISC	DMB
Mean	1.27E+13	1360830.	225225.8	11231898
Median	23688.28	1623800.	99400.00	2365455.
Maximum	1.64E+14	2458563.	1473000.	32504900
Minimum	13779.26	12200.00	2456.000	4000.000
Std. Dev.	4.19E+13	867981.5	442522.9	11985179
Skewness	3.122377	-0.498169	2.405864	0.257071
Kurtosis	10.95857	1.738142	7.021477	1.231366
Jarque-Bera	157.7676	3.985170	60.62604	5.229961
Probability	0.000000	0.136343	0.000000	0.073169
Sum	4.68E+14	50350702	8333353.	4.16E+08
Sum Sq. Dev.	6.31E+28	2.71E+13	7.05E+12	5.17E+15
Observations	37	37	37	37

Source: Authors' Computation

Table 1 presents the result of descriptive statistics test on the study variables (RGDP, STI, ISC and DMB). Real gross domestic product (RGDP) has the mean value of 1.27, median value of 23688.28, with maximum value of 1.64, minimum value of 13779.26, with standard deviation value of 4.19; it is positively skewed to the value of 3.122377 – meaning that the distribution is more peaked than normal. Since the kurtosis value (10.95857) which is greater than 2, the distribution is too peaked. The value of Jarque-Bera (157.7676) is greater than the 0.05 meaning that the data on series (RGDP) is normally distributed – indicating normality in the data analysis process. Saving time institutions (STI), has the mean value of 1360830, median value of 1623800, with maximum value of 2458563, minimum value of 12200.00, with standard deviation value of 8679815; it is negatively skewed to the value of -0.498169 – indicates that the data are skewed left and we mean that the left tail is long relative to the right tail. Since the kurtosis value (1.738142) which is less than 2. The value of Jarque-Bera (3.985170) is greater than the 0.05 meaning that the data on series (STI) is normally distributed – indicating normality in the data analysis process.

Development stock from the source of insurance companies (ISC), has the mean value of 225225.8, median value of 99400.00, with maximum value of 1473000, minimum value of 2456.000, with standard deviation value of 442522.9; it is positively skewed to the value of 2.405864 – meaning that the distribution is more peaked than normal. Since the kurtosis value (7.02477) which is greater than 2, the distribution is too peaked. The value of Jarque-Bera (60.62604) is greater than the 0.05 meaning that the data on series (ISC) is normally distributed – indicating normality in the data analysis process. The seventh variable, development stock from the source of deposit money bank (DMB), has the mean value of 11231898, median value of 2365455, with maximum value of 32504900, minimum value of 4000.000, with standard deviation value of 11985179; it is positively skewed to the value of 0.257071 – meaning that the distribution is more peaked than normal. Since the kurtosis value

(1.738142) which is less than 2. The value of Jarque-Bera (5.229961) is greater than the 0.05 meaning that the data on series (DMB) is normally distributed – indicating normality in the data analysis process.

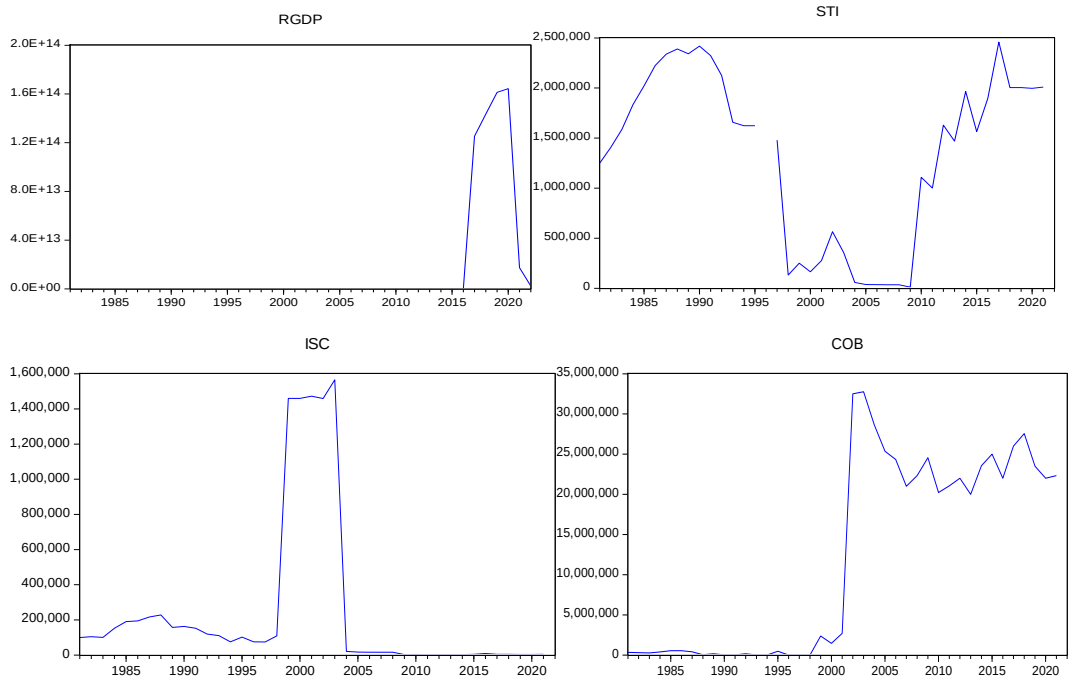

Figure 1: Trend Analysis of the Study Variables.
Source: Author's Design, 2024.

The panels in Figure 1 shows high presence of shocks and fluctuations which makes it possible to have unit root issues.

Table 2: Result Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	At Level			1st Difference			2nd Difference			OI	Remarks
	t-stat	CV at 5%	Prob.	t-stat	CV at 5%	Prob.	t-stat	CV at 5%	Prob.		
RGDP	0.5864	-3.5266	0.5648	-1.6588	-3.5334	0.0760	-5.5689	-3.5578	0.0001	*I*(2)	Stationary at 2nd Diff
STI	-1.1142	3.5331	0.9132	-8.3500	-3.5403	0.0000	-12.8218	-3.5485	0.0000	*I*(1)	Stationary at 1st Diff
ISC	-1.1306	-2.9350	0.6946	-6.0214	-2.9369	0.0000	-10.4828	-2.9390	0.0000	*I*(1)	Stationary at 1st Diff
DMB	-2.3150	-3.5266	0.4166	-5.8920	-3.5298	0.0001	-7.6625	-3.5366	0.0000	*I*(1)	Stationary at 1st Diff

CV = Critical Value. OI = Order of Integration
Source: Author's Computation, 2024.

Given the observed fluctuations and random variations in the study variables as evident in Figure 1 a unit root test was conducted on the study variables to ensure their stability, stationarity and order of integration in the analysis of the impact of development stock instruments on the performance of the Nigerian economy from 1981 to 2022. The result of test as reported in Table 3 revealed that real gross domestic product (RGDP) is stationary at second difference and integrated of order two [$I(2)$]; established as a point where the value of t-stat (-5.5689) is less than critical value of -3.5578. The variables of development stock such as saving type institutions (STI), insurance companies (ISC) and deposit money bank (DMB) are found to ne stationary at first difference and integrated of order one [$I(1)$] established at t-stat values -8.3500, -6.0214 and -5.8920 are less than the critical values at 0.05 alpha level.

Having established stationarity in all the study variables at different integrating orders, it becomes more convenient to take decision on the choice of method of study. Ordinary given the mixed order of integration, one would have thought that the employment of auto-regression distributive lag (ARDL) method would have relatively suitable. However, the nature volatility inherent in the study variables as exemplified in Figure 1 above calls for a method of data analysis that is capable of addressing the issues of such shocks in the data series. This informs the use of Unrestricted Vector Auto-Regression (UVAR) technique in accounting for the impact of stock market investment instruments on the performance of the Nigerian economy from 1981 to 2022.

Table 3: Result of Unrestricted Vector Auto-Regression (UVAR) Test

Variables	RGDP	STI	ISC	DMB	Variables	RGDP	STI	ISC	DMB
RGDP	0.372455	-0.201224	-0.058513	1.156116	ISC(-1)	0.000622	-0.068462	0.765431	0.437086
(-1)	(0.36136)	(0.48396)	(0.39697)	(0.71375)		(0.16557)	(0.22174)	(0.18188)	(0.32703)
	[1.03069]	[-0.41579]	[-0.14740]	[1.61978]		[0.00376]	[-0.30875]	[4.20837]	[1.33655]
	0.043965	-0.030774	-0.001423	-0.040833	ISC(-2)	-0.047224	-0.102264	-0.053485	-0.260702
	(0.10992)	(0.14721)	(0.12075)	(0.21711)		(0.16161)	(0.21644)	(0.17754)	(0.31921)
RGDP(-2)	[0.39997]	[-0.20904]	[-0.01178]	[-0.18807]		[-0.29221]	[-0.47248]	[-0.30126]	[-0.81671]
	-0.029852	0.564843	-0.175420	-0.439452	DMB(-1)	0.041072	-0.118080	-0.025034	0.458829
	(0.13461)	(0.18028)	(0.14788)	(0.26588)		(0.09292)	(0.12444)	(0.10207)	(0.18353)
STI(-1)	[-0.22176]	[3.13312]	[-1.18626]	[-1.65281]		[0.44202]	[-0.94887]	[-0.24525]	[2.50002]
	-0.009381	0.257587	0.111303	0.106559	DMB(-2)	0.027503	0.124537	-0.188630	0.266423
	(0.13813)	(0.18500)	(0.15175)	(0.27284)		(0.09486)	(0.12704)	(0.10420)	(0.18736)
STI(-2)	[-0.06791]	[1.39238]	[0.73348]	[0.39056]		[0.28994]	[0.98031]	[-1.81020]	[1.42199]
C	18.21021	11.39206	8.782276	-28.10924					
	(9.92337)	(13.2899)	(10.9011)	(19.6002)					
	[1.83508]	[0.85720]	[0.80563]	[-1.43413]					

R-squared	0.433517	0.682061	0.883944	0.813371	Adj. R-squared	0.287328	0.600012	0.853994	0.765209
Sum sq. resids	16.42559	29.46096	19.82191	64.08004	S.E. equation	0.727913	0.974861	0.799635	1.437741
F-statistic	2.965452	8.312879	29.51405	16.88816	Log likelihood	-38.95677	-50.64127	-42.71571	-66.18261
Akaike AIC	2.397838	2.982064	2.585786	3.759131	Schwarz SC	2.777836	3.362061	2.965783	4.139128
Mean depended	31.12551	13.46732	10.65662	14.39041	S.D. dependent	0.862253	1.541414	2.092698	2.967153

Determinant resid covariance (dof adj.): 0.482249
Determinant resid covariance: 0.173972
Schwarz criterion: 12.92264

Log likelihood: -192.0529
Akaike information criterion11.40265

Note: VAR Lag Order Selection Criteria is 1

Source: Author's Composition, 2024.

Table 3 presents the result of the analysis used to ascertain the dynamic interactive effect of development stock instruments on the Nigerian economy, from 1981 to 2022. The analysis was done on the assumption that the variables used (RGDP, and development stock instruments - STI, ISC and DMB) in the system have a contemporaneous effect on each other that enables capturing the dynamic interactions within the system. From the result of coefficients reduced-form VAR, RDGP in lag one [RGDP(-1)] has a positive coefficient (0.372455) with itself and deposit money bank (DMB) at 1.156116, but negative coefficient values with saving-type institutions (STI) and instrument from insurance companies (ISC) at values of -0.201224 and -0.058513 respectively.

This implies that real gross domestic product (RGDP) positively relates current observations with past observations of itself and DMB, but negatively affect STI and ISC in the lag one period in the system. This means that a one-unit increase in STI and ISC would result in a 0.20-unit and 0.05-unit decrease in RGDP, but one unit increase in DMB would result in 1.16-unit increase in RGDP in the short-term of lag one – holding all other variables constant. Within the same system in lag two, [RGDP(-2)], RGDP has a positive coefficient 0.043965 with itself, but negative coefficient values with STI (-0.030774), ISC (-0.001423) and DMB (-0.040833). This implies that real gross domestic product (RGDP) positively relates current observations with past observations of itself and past observations; but negatively affect STI, ISC and DMB in the lag two period in the same system. This means that a one-unit increase in STI, ISC and DMB would result in a 0.03-unit, 0.00-unit and 0.04-unit decrease in RGDP in the short-term of lag two – holding all other variables constant.

Saving type institution as an instrument of development stock, has negative coefficient with RGDP at the value of -0.029852, maintains a positive value of coefficient (0.564843) with itself, negative coefficient values of -0.175420 and -0.439452 with ISC and DMB respectively. This implies that saving type institution (STI) as an instrument of development stock negatively relates current observations with past observations with RDGP, ISC and DMB, but positively relates with its current observation with past observation in the lag one period in the same system. This means that a one-unit increase in RGDP, ISC and DMB would result in a -0.03-unit, -0.18-unit and 0.44-unit decrease in STI in the short-term of lag one – holding all other variables constant.

On the lag two of bond equation [STI(-2)], it is evident that STI has negative coefficient with RGDP at the value of -0.009381, but maintains positive coefficient values of 0.257587 with itself, 0.111303 and 0.106559 with ISC and DMB respectively. This implies that saving type institution as an instrument of development stock (STI) negatively relates current observations with past observations with RDGP, but positively relates with its current observation and past observation with ISC and DMB in the lag two period in the same system. This further means that a one-unit increase in RGDP would result in a 0.01-unit decrease in STI; but a one-unit increase in ISC and DMB would result to 0.11-unit and 0.11 increase in STI in the short-term of lag two – holding all other variables constant.

Instruments from insurance companies [ISC(-1)] has positive coefficient with RGDP with itself and at the values of 0.000622, 0.765431 and 0.437086 respectively, but maintains negative coefficient with STI at -0.068462. This implies that insurance companies as an instrument of development stock (ISC) positively relates current observations with past observations with RDGP, itself and DMB, but negatively relates its current observation with past observation with STI in the lag one period in the same system. This means that a one-unit

increase in RGDP, ISC and DMB would result in a 0.00-unit, 0.77-unit and 0.44-unit increase in STI in the short-term of lag one – holding all other variables constant.

On the lag two of stock equation [STI(-2)], it is evident that STK has negative coefficient with RGDP, itself, ISC and DMB values of -0.047224, -0.102264, -0.053485 and -0.260702. This implies that insurance companies as an instrument of development stock (ISC) negatively relates current observations with past observations with RDGP, itself, STI and DMB in the lag two period in the same system. This means that a one-unit increase in RGDP, STI and DMB would result in a 0.05-uni, 0.10-unit and 0.26-unit decrease in STI short-term of lag two – holding all other variables constant. Deposit money bank [DMB(-1)] has positive coefficient values of 0.04072, -0.118080, -0.025034 and 0.458829 with RGDP, STI and ISC and itself respectively. This implies that deposit money bank as an instrument of development stock (DMB) positively relates current observations with past observations with RDGP and itself, but otherwise with STI and ISC. This means that a one-unit increase in RGDP would result in a 0.04-unit increase in DMB, but one unit increase in STI and ISC would respectively bring about 0.12-unit and 0.03-unit increase in DMB in the short-term of lag one – holding all other variables constant.

On the lag two of equity equation [DMB(-2)], it is evident that DMB has positive coefficient with RGDP, STI and itself at the values of 0.027503, 0.124537 and itself, but maintains negative coefficient value of -0.188630 with ISC. This implies that deposit money bank (DMB) as an instrument of development stock positively relates current observations with past observations with RDGP, STI and itself, but negatively relates with its current observation with ISC in the lag two period in the same system. This means that a one-unit increase in RGDP and STI would respectively result in a 0.03-unit and 0.12 in DMB; but a one-unit increase in ISC would result to 1.19-unit decrease in DMB in the short-term of lag two – holding all other variables constant.

The result further reveals that r-square (R^2) values of RGDP, STI, ISC and DMB in the same single system model are 0.433517, 0.682061, 0.883944 and 0.813371 individually. This means that STI, ISC and DMB jointly explain about 43 per cent variations that occurs in RGDP; RGDP, ISC and DMB jointly explain about 68 per cent variations that occurs in STI; RGDP, STI and DMB jointly explain about 88 per cent variations that occurs in ISC; and RGDP, STI and ISC jointly explain 81 per cent variations that occurs in DMB within the system of equation.

From the result there are mixed dynamic interactive effects between development stock instruments and real gross domestic product in Nigeria in the single model. Specifically, saving type institution and insurance companies have negative interactive effect on real gross domestic products; deposit money bank has negative effect on real gross domestic product in the lag one period, while in the lag two period, saving type institution, insurance companies and deposit money banks have negative effect on real gross domestic product. Real gross domestic product, insurance companies and deposit money banks assert negative effect on saving type institution in lag one period; while in lag two, real gross domestic product has negative effect on saving type institution, while insurance companies and deposit money banks expressed positive effect on saving type of institution.

From real gross domestic product and deposit money bank, insurance companies received positive effect whereas saving type of institution affected it negatively in lag one period. In the lag two period, real gross domestic product, saving type institution and deposit money banks assert negative effect on insurance companies. Real gross domestic product affirms positive effect on deposit money bank in time lag one period; where saving type

institution and insurance companies have negative effect on deposit money bank in lag one period. However, in the lag two, real gross domestic product and saving type of insurance have positive effect on deposit money bank, while insurance companies have negative effect on deposit money bank within the same single model. The mixed dynamic interactive effects as reported in the above table are partly fueled by the effects of residuals from the series used in the study. To this effect, it becomes imperative to account for residual correlation matrix as reported in TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTtable 4:

Table 4: Result of Residual Correlation Matrix

	RGDP	STI	ISC	COB
RGDP	1	-0.0127	-0.0250	0.0696
STI	-0.0127	1	0.3688	0.1539
ISC	-0.0250	0.3688	1	0.3930
DMB	0.0696	0.1539	0.3930	1

Source: Author's Composition, 2024.

Table 4 details the result of residual correlation matrix analysis conducted to establish the nature of residual correlation or relationship between the actual value of a response variable and the predicted value of that variable based on the VAR system model. From the results, the errors in RGDP and, STI and ISC are negatively correlated; whereas DMB maintains a negative correlation with RGDP. But a positive residual correlation exists between STI and, ISC and DMB; and ISC and DMB are positively correlated. The result reveals that the deviations from the mean of each variable is close to zero and as such suggest close interactions. This result suggests that there is evidence of more positive interactions among the variables used to address the research question two, than more negative interactions.

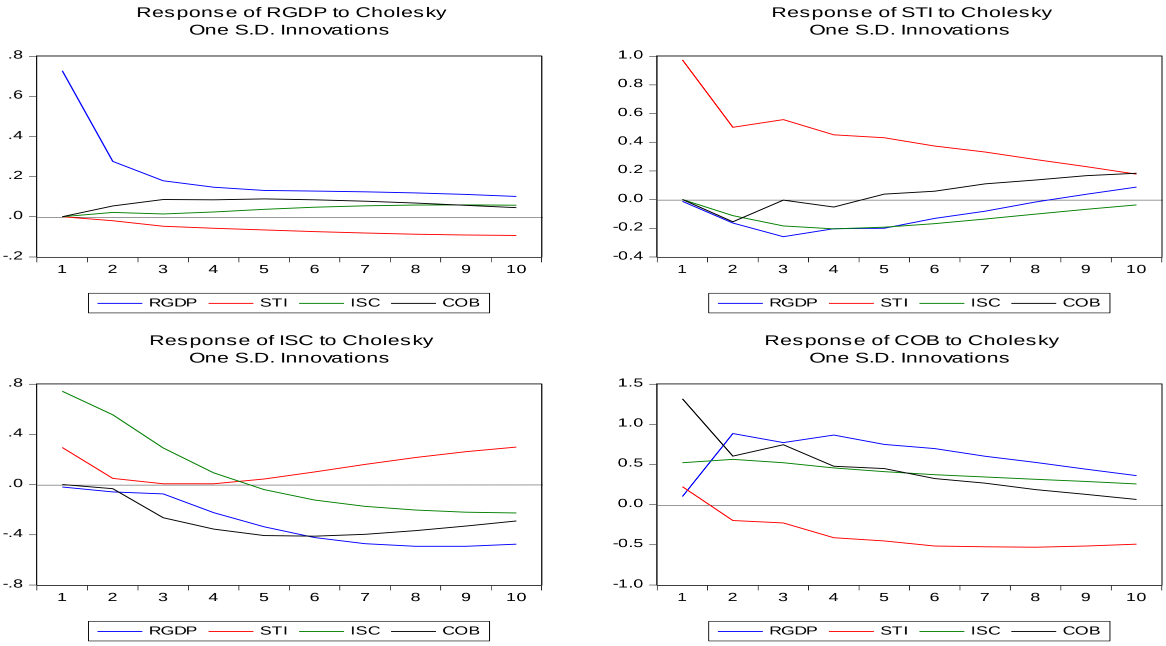

Figure 2: Graphs of Impulse Response Function of Study Variable

Figure 2 of the study provides an impulse response function (IRF) of the reaction of a dynamic system of the impact of development stock on the Nigerian economy. All the variables are endogenously determined – showing how a variable influences another variable and the effect that comes with it through a dynamic path. The IRF shows the response of variables (RGDP, STI, ISC or DMB) to a shock over time. From the first panel of Figure 2, it is evident that RGDP responds to sharp shocks from STI, ISC and DMB in the first, second, third and fourth quarters of Cholesky one standard deviation innovation. This is expressed in a vector moving-average (VMA) representation that reveals how shocks from STI, ISC and DMB affect RGDP in subsequent periods.

The IRF further shows the response of variables (STI, RGDP, ISC and DMB) to a shock over time. It is evident that STI responded to sharp shocks from RGDP, ISC and DMB in the first to ninth quarters of Cholesky one standard deviation innovation. This is expressed in a vector moving-average (VMA) showing how shocks from RGDP, ISC and DMB affect STI in subsequent periods. The figure also revealed the responses of variables (ISC, RGDP, STI and DMB) to a shock over time. It is seen that ISC responded to sharp shocks from RGDP, STI and DMB in the first to fifth quarters of Cholesky one standard deviation innovation. This is expressed in a vector moving-average (VMA) showing how shocks from RGDP, STI and DMB affect ISC in subsequent periods.

ISC as one of the instruments of development stock responded mostly to sharp shocks from STI than RGDP and DMB. This implies that ISC mostly responded to shocks from STI than those from RGDP and DMB within the period of study. It is equally revealed that DMB response to shocks from RGDP, STI and ISC from the first second quarter; thereafter, it started to fall sharply to the third quarter and continued up to the tenth quarter. It is evident from the impulse response function that RGDP is considered to have more strength in the relationships within the range between one and ten timing and duration of responses of one standard deviation innovations within the same system of model.

Table 5: Result of VAR Variance Decomposition on RGDP, STI, ISC and DMB

Variance Decomposition of RGDP						Variance Decomposition of STI					
P	**S.E**	**RGDP**	**STI**	**ISC**	**DMB**	**P**	**S.E**	**RGDP**	**STI**	**ISC**	**DMB**
1	0.727913	100.0000	0.000000	0.000000	0.000000	1	0.974861	0.016073	99.98393	0.000000	0.000000
2	0.780769	99.37702	0.064153	0.078806	0.480021	2	1.126161	2.130324	94.96361	0.998982	1.907079
3	0.807271	97.91049	0.405278	0.105226	1.579005	3	1.296147	5.617623	90.18075	2.761102	1.440526
4	0.827196	96.40930	0.860475	0.182637	2.547590	4	1.403533	6.891387	87.26540	4.475738	1.367478
5	0.845629	94.66269	1.422982	0.363318	3.551005	5	1.494773	7.866787	85.25087	5.613642	1.268704
6	0.863930	92.89463	2.099883	0.649382	4.356109	6	1.556385	7.965756	84.38173	6.343863	1.308651
7	0.881718	91.16679	2.864501	1.006022	4.962688	7	1.602948	7.765988	83.83531	6.696238	1.702459
8	0.898456	89.55819	3.702197	1.387136	5.352482	8	1.636025	7.466156	83.38412	6.816287	2.333442
9	0.913583	88.09795	4.576439	1.756707	5.568903	9	1.662181	7.280810	82.68363	6.774044	3.261520
10	0.926781	86.79996	5.455010	2.091711	5.653323	10	1.684404	7.360181	81.62305	6.645947	4.370821
TQ	**8.473246**	**936.87702**	**21.450918**	**7.620945**	**34.051126**	**TQ**	**14.43741**	**60.361085**	**873.5524**	**47.125843**	**18.96068**

Variance Decomposition of ISC						Variance Decomposition of DMB					
P	**S.E**	**RGDP**	**STI**	**ISC**	**DMB**	**P**	**S.E**	**RGDP**	**STI**	**ISC**	**DMB**
1	0.799635	0.062275	13.58033	86.35740	0.000000	1	1.437741	0.484436	2.395903	13.20217	83.91749
2	0.977293	0.396381	9.342960	90.14684	0.113818	2	1.889891	22.16825	2.478278	16.56212	58.79135
3	1.056233	0.833886	8.001747	84.78710	6.377262	3	2.246329	27.49318	2.777722	17.12628	52.60282
4	1.140326	4.555552	6.867840	73.40219	15.17441	4	2.530159	33.36834	4.845116	16.75943	45.02711
5	1.257877	10.89443	5.764685	60.42849	22.91239	5	2.745082	35.78693	6.823652	16.47246	40.91696
6	1.398436	17.96075	5.183278	49.67228	27.18369	6	2.920779	37.31128	9.127018	16.17787	37.38384
7	1.546288	23.98303	5.307725	41.89329	28.81595	7	3.058982	37.88059	11.26315	16.00992	34.84634
8	1.690058	28.57092	6.065320	36.52051	28.84325	8	3.170335	38.01819	13.29207	15.89753	32.79221
9	1.823271	31.81792	7.272029	32.83412	28.07593	9	3.257362	37.84354	15.09872	15.84154	31.21620
10	1.942786	34.00449	8.760491	30.28480	26.95022	10	3.324892	37.50537	16.68813	15.80792	29.99858
TQ	**13.632203**	**153.07963**	**76.146405**	**586.32702**	**184.4469**	**TQ**	**26.58155**	**307.86011**	**84.789759**	**159.85724**	**447.4929**

S.E = Standard Error. RDGP = Real Gross Domestic Product. STI = Savings Type Institutions. ISC = Insurance Companies. DMB = Deposit Money Bank, P = Period. TQ = Total Quarters

Source: *Author's Computation, 2024*

Table 5 presents the result of the variance decomposition otherwise known as forecast error variance decomposition on a single system model that contains real gross domestic products (RGDP) and development stocks instruments such as saving type institutions (STI), insurance companies (ISC) and deposit money bank (DMB). Variance decomposition analysis allows partitioning of total variance in outcome variables – RGDP, STI, ISC or DMB. Such partitioning allows identifying variable that explains a significant portion of the variation in other variables. Variance decompositions reveal the effect of one endogenous variable on other endogenous variables within a given single system of equation. From the result, about 8.47 of a forecast error in RGDP can be explained by STI, ISC and DMB after ten quarters.

On the other hand, 14.5 forecast error in STI can be explained by RGDP, ISC and DMB; 13.63 forecast error in ISC can be attributed to RGDP, STI and DMB and 26.58 forecast error in DMB can be explained by RGDP, STI and ISC within the same single system of model. The result indicates that the amount of information each of the variables contributes to the other variables in the auto-regression are 8.47, 14.44, 13.63 and 26.58 for RGDP, STI, ISC and DMB respectively. This further implies that DMB receives the highest amount of the forecast error variance of each of the variables that can be explained by exogenous shocks to the other variables as the impulses propagate the system for each period. This is followed by STI, ISC and RGDP in the same single system model, as evident in figure 3.

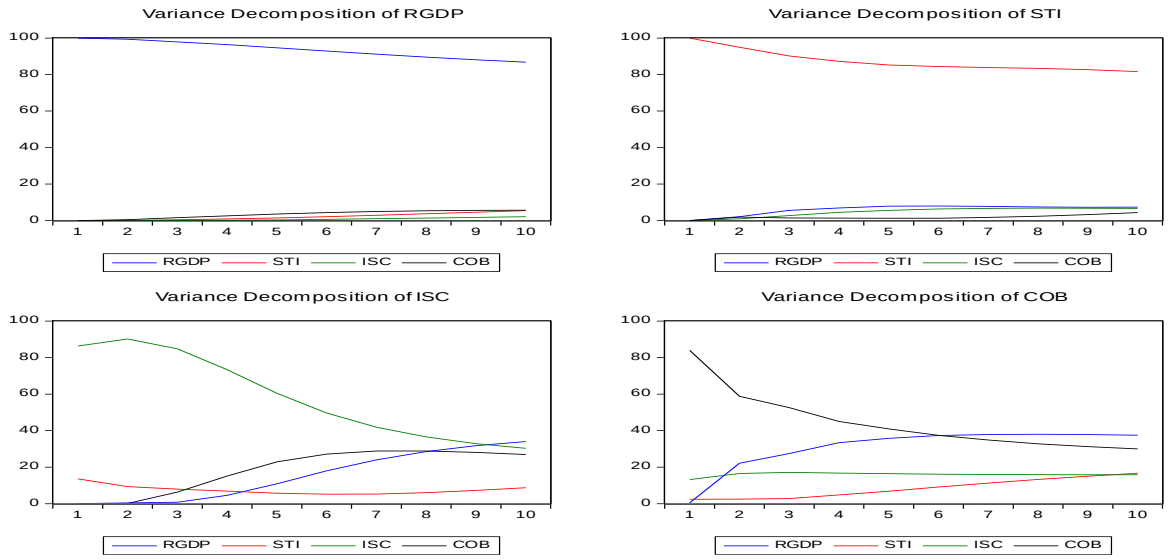

Figure 3: Combined Graphs Variance Decomposition

Table 6: Presentation of Result of Johansen Unrestricted VAR Cointergration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.429212	42.44698	47.85613	0.1466
At most 1	0.223415	20.57825	29.79707	0.3845
At most 2	0.176421	10.71716	15.49471	0.2295
At most 3	0.077532	3.147403	3.841466	0.0760

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*
Source: Author's Computation, 2024.

Table 6 details the result of Johansen Unrestricted VAR Cointergration Rank Test conducted using RGDP, STI, ISC and DMB as endogenous variables. From the result, it is apparent to report that the single system model has no cointegrating equation; because their trace statistic values 42.44698, 20.57825, 10.71716 and 3.147403 are less than their 5% critical values of 47.85613, 29.79707, 15.49471 and 3.841466 respectively, and their respective probability values are not significant at the same level of significance. Having established the presence of no cointegrating equations, we therefore argue that the null hypothesis of no long-run significant dynamic interactive effect of development stock instruments on the Nigerian economy is retained at 0.05 level.

Table 7: Result of Result of VAR Granger Causality Test

Dependent Variable: RGDP				Remarks	Dependent Variable: STI				Remarks
Excluded	Chi-sq	Df	Prob.		Excluded	Chi-sq	Df	Prob.	
STI	0.186445	2	0.9110	STI, ISC and DMB	RGDP	0.386375	2	0.8243	RGDP, ISC and
ISC	0.280798	2	0.8690	do not Granger	ISC	1.892261	2	0.3882	DMB do not
DMB	0.819631	2	0.6638	cause RGDP	DMB	1.115535	2	0.5725	Granger cause STI
Dependent Variable: ISC				**Remarks**	**Dependent Variable: DMB**				**Remarks**
Excluded	Chi-sq	Df	Prob.		Excluded	Chi-sq	Df	Prob.	
RGDP	0.030371	2	0.9849	RGDP and STI do	RGDP	3.060356	2	0.2165	RGDP, STI and ISC
STI	1.482221	2	0.4766	not Granger Cause	STI	4.594702	2	0.1005	do not Granger
DMB	7.141852	2	0.0281	ISC, but DMB does	ISC	2.095838	2	0.3507	cause DMB

Source: Author's Computation, 2024.

Table of 4.7 details the result of VAR Granger causality test conducted on the variables used to address research question two on the dynamic interactive effect of development stock instruments on the Nigerian economy. The result reveals that within the single system of the model development stock instruments from saving type institution (STI), insurance companies (ISC) and deposit money banks (DMB) do not Granger cause real gross domestic product (RGDP) established on the basis that none of their probability values is significant. Further, real gross domestic product, insurance companies and deposit money bank do no Granger cause saving type institution, real gross domestic product and saving type institution do not Granger cause insurance companies, but deposit money bank does; and none of real gross domestic product, saving type institution and insurance companies Granger cause deposit money bank within the same singer system of equation. It implies that: there is no Granger causality between RGDP and, STI, ISC and DMB; there is no Granger causality between

STI and, RGDP, ISC and DMB; there is no Granger causality between ISC and, RGDP and STI, but a uni-directional Granger causality exists between STI and DMB; and there is no Granger causality between DMB and, RGDP, STI and ISC.

Table 8: Results of Post Estimation Tests

VAR Residual Normality Tests								VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)	
Com-ponent	Variable	Skewness		Kurtosis		Jarque-Bera			
		Value	Prob.	Value	Prob.	Value	Prob.	Chi-sg	Prob.
1	RGDP	-4.333317	0.0000	25.71735	0.0000	985.3145	0.0000	220.7661	0.0010
2	STI	0.739942	0.0561	7.004301	0.0000	30.37414	0.0000		
3	ISC	-0.618833	0.1101	5.149165	0.0055	10.25121	0.0059		
4	DMB	0.350578	0.3654	3.584859	0.4502	1.389467	0.4992		

Source: Author's Computation, 2024.

The results of post estimation test reported in Table 8 details the VAR residual normality and VAR residual heteroskedasticity tests conducted in real gross domestic products and development stock instruments such as saving type institution, insurance companies and deposit money bank. On the system model real gross domestic product is found to be significant given the probability values of skewness, kurtosis and Jarque-Bera because their values are less than 0.05 level of significance. For saving type institution, only kurtosis and Jarque-Bera are significant while skewness is not. Insurance companies is found significant with respect to kurtosis and Jarque-Bera, but fail to maintain the same status with skewness, and lastly, deposit money bank is not found to be significant within the same single system equation.

This could be attributed to deposit money bank contribution to development stock instrument is dependent on received and earned incomes (financial data) of individuals which is often skewed rather than symmetrically distributed, especially in developing and underdeveloped economies. Again, DMB data experienced structural breaks from 1994 to 1997 before the sharp increase from 1998 – which accounted for non-constant variance overtime, presence of extreme outlier and does not exhibit stationarity at level. On the strength of this, the data was logged and *winsorized* in order to ensure policy robustness of the results

On the other hand, the VAR residual heteroskedasticity test reveals that probability value of the test is significant – suggesting that the assumption of homoscedasticity is not retained. These results reveal that only three of the variables are found to be significant at one point or another. This implies that the residual of the three variables are adjudged to be normally distributed; and as such their stochastic disturbance is evenly distributed and would not have significant effect on the study variables as well as the result of the study.

Discussion of Findings

The analysis was done on the assumption that the variables used (RGDP, and development stock instruments - STI, ISC and DMB) in the system have a contemporaneous effect on each other that enables capturing the dynamic interactions within the system. From the result there is convenient to report that there is mixed dynamic interactive effects between

development stock instruments and real gross domestic product in Nigeria in the single model. Specifically, saving type institution and insurance companies have negative interactive effect on the Nigerian economy; deposit money bank has negative effect on real gross domestic product in the lag one period, while in the lag two period, saving type institution, insurance companies and deposit money bank have negative effect on real gross domestic product. Real gross domestic product, insurance companies and deposit money banks assert negative effect on saving type institution in lag one period; while in lag two, real gross domestic product has negative effect on saving type institution, while insurance companies and deposit money banks expressed positive effect on saving type of institution.

From real gross domestic product and deposit money bank, insurance companies received positive effect whereas saving type of institution affected it negatively in lag one period. In the lag two period, real gross domestic products, saving type institution and deposit money banks assert negative effect on insurance companies. Real gross domestic product affirms positive effect on deposit money bank in time lag one period; where saving type institution and insurance companies have negative effect on deposit money bank in lag one period. However, in the lag two, real gross domestic product and saving type of insurance have positive effect on deposit money bank, while insurance companies have negative effect on deposit money bank within the same single model.

ISC as a variable mostly responded to shocks from STI than those from RGDP and DMB within the period of study. It is equally revealed that DMB response to shocks from RGDP, STI and ISC from the first second quarter. It is evident from the impulse response function that RGDP is considered to have more strength in the relationships within the range between one and ten timing and duration of responses of one standard deviation innovations within the same system of model. The variance decomposition test reveals that DMB receives the highest amount of the forecast error variance of each of the variables that can be explained by exogenous shocks to the other variables as the impulses propagate the system for each period.

This is followed by STI, ISC and RGDP in the same single system model. The null hypothesis that sought to establish whether there is no long-run significant dynamic interactive effect of development stock instruments on real gross domestic product in Nigeria is retained. Further, there is no Granger causality between RGDP and, STI, ISC and DMB; none between STI and, RGDP, ISC and DMB; between ISC and, RGDP and STI, but a uni-directional Granger causality exists between STI and DMB; and however, none between DMB and, RGDP, STI and ISC.

Eze, Ezema and Okoro (2020) examined the effect of the Nigerian Stock Exchange on Economic Growth in Nigeria 1990-2015. Annual time series data of real gross domestic product (RGDP) as the dependent variable, and the independent variables include Domestic participation (DOP), Listed domestic companies (LDC), Turnover ratio of the stock market (TOR), and Value of shares traded to GDP ratio (VST). Using Autoregressive Distributed Lag Model (ARDL) and ARDL bounds test the results showed that there exists a long-run relationship among variables. Ezema, Okoye and Obinabo (2019) examined stock market and economic growth in Nigeria between 1970 and 2004. The study used GDP as the dependent variable and independent variables are stock market capitalization, stock price index, listed equities, and shares percentage of GDP and inflation rate. The study revealed that capital markets has not reached a level of development that would enable it to fulfill its main function in the economy.

Lending support to the findings of our study, Owen (2020) who estimated economic growth and stock market development using empirical data from an institutionally distressed country between 1985 and 2018 reported there is a long-term correlation between stock market growth and development. Similarly, albeit statistically insignificant, there was a positive correlation between the development and growth indicators of the stock market; stock market contributes significantly to economic growth gains (Dike, 2016). Boako and Alagidede (2024) maintained that stock market development was co-integrated with and has a strong and positive long-run impact on economic growth in Egypt and South Africa.

5. Conclusion and Policy Recommendations

In the world over, the stability and soundness of any financial system goes a long way to determine the resilient of such country. This is because financial assets play a pivotal role in the modern economy, offering a range of benefits to individuals, businesses, and the broader society. As a catalyst to economic growth of any country, development stock instruments provide both small and large businesses with a platform to raise capital by issuing stocks and bonds. Stock markets serve as a conduit for money and liquidity, which are necessary for economic growth and stability. No doubt, to sustain economic growth and development, seamless commerce, investments, and capital raising skills of investors, institutions, and governments are required. However, such benefits of stock markets have not been fully harnessed; hence calling for attentions. It is on this premise that this study examined the dynamic interactive effects of development stock instruments on the performance of Nigerian economy from 1981 to 2022.

The study was guided by an objective which sought to establish the dynamic interactive effects of development stock instruments on real gross domestic product in Nigeria. This means that the effects capture how one variable influence another while accounting for feedback loops (bidirectional causality), lagged relationships, and indirect effects within the system. Further, a change in one variable can have both direct effects (on another variable in the system) and indirect effects (via other variables) and incorporates past values (lags) of variables – suggesting that the effect of a shock today may persist over several future periods. Increase in development stock instruments facilitates improvement infrastructural landscape of the country and ultimately growth the Nigerian economy; and increased growth in real gross domestic growth has a pass-through effect on development stock instrument. This is so because, since all variables interact dynamically over time, the mixed interactive effects refer to this complex, intertwined relationship where variables influence each other directly and indirectly.

Accordingly, it is recommended that government should focus on strengthening regulatory frameworks, promoting financial literacy, and encouraging the development of innovative insurance products to maximize these benefits and ensure sustainable economic growth. The Nigerian government can also support development stock instruments by providing government bonds and infrastructure bonds that could enhance investor protection against mismanagement, offer tax exemptions on interest earned from development stocks to encourage investment. Also, the monetary authority should provide liquidity mechanisms that allow investors to easily trade or redeem these instruments. The legal framework that established development stock instrument should be strengthened and made more robust to encourage insurance, trading and settlement of development stocks. By so doing, development stock instruments can become a more worthwhile tools for the Nigerian economy to grow.

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