Innovations

Examining the Role of Globalization and Financial Deepening on the Nigerian Stock Market: A Weighted Least Squares Approach

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Abstract: *Globalization and financial deepening are two vital phenomena impacting the modern economic landscape and rapidly improving the growth of countries on a global scale, through the instrument of the stock market. This study investigates the effect of globalization and financial deepening in the Nigerian stock market covering the period 1981 to 2022. The study deploys the weighted least squares approach based on the heteroscedasticity problem that is associated with the study data set. In addition to examining the impacts of globalization and financial deepening on the stock market, the study investigates explicitly the synergistic effect of globalization and financial deepening on the stock market as well as exploring the impacts of foreign direct investment, gross capital formation, inflation and interest rate on the stock market. The study outcomes reveal that globalization and financial deepening positively and significantly impact the stock market. In addition, the impact of globalization is also positive and significant in terms of financial deepening. Also, the impact of the interacted effect of globalization and financial deepening on the stock market is positive and significant. However, the effect of interest rate on the stock market is negative and significant. The study recommends the implementation of government policies to promote trade and improve the business environment to enhance the positive effects of globalization in the country. The study also suggests the implementation of policies to deepen the standard of financial institutions' operations and increase the variety of effective credit products made available to the private sector.*

Keywords: *Globalization, Financial Deepening, Stock Market, Foreign Direct Investment and Interest Rate*

JEL: F65; E44; G24; E02

1.0. Introduction

Globalization and financial deepening are two vital phenomena impacting the modern economic landscape and shaping financial systems on a global scale. The interphase of globalization and financial deepening with stock exchanges has gathered remarkable academic and policy interest based on the critical role that stock markets play in fostering economic growth, creating avenues for investment opportunities, and efficiently allocating resources in different countries around the world. Stock markets, as key components of financial systems, play a crucial role in mobilizing resources, facilitating capital allocation, and fostering economic growth. For the stock markets to perform their function effectively in the modern dispensation, the individual and joint interplay between globalization and financial development plays a pivotal role in shaping the trajectory of stock market performance and growth (Paesani & Rosselli, 2021).

Globalization refers to the increasing interrelationship of the global economy through international trade, investment flows, technology transfers and the flow of capital. Globalization facilitates more interdependence among stock exchanges in several ways, including the integration of international financial markets, allowing competition among investors in terms of liquidity, product pricing and financial investments (Petry, 2021). Also, globalization facilitates the adoption of modern technologies, efficient price discovery, high-frequency trading and greater transparency in transactions. Globalization has enhanced the increasing integration and interdependence of societies, cultures and economies through the flow of goods, services, information, technology and capital across borders. Over the years, globalization has positively influenced the liberalization of trade, the expansion of multinational corporations (MNCs) activities, and the deepening of transactions between global markets (Fuinhas, 2019). However, globalization has some drawbacks. Globalization can also bring challenges like dependency on foreign inputs and capital, susceptibility to external shocks, and septicity, which are effects of global financial crises.

Financial deepening denotes the process of increasing the availability, range, accessibility and efficiency of financial instruments, markets and institutions within an economy. Financial deepening indicates the development of a more effective, sophisticated, and comprehensive financial system that facilitates better information management, promotes savings, and allocates resources, and strongly supports the country's economic growth (Ahmad & Wu, 2022). Financial deepening facilitates the growth of the country's financial markets, strengthening households' and firms' access to improved financial products and providing available investors with more attractive and diverse investment opportunities. Financial deepening also enhances improved regulatory frameworks, efficient management skills, effective trading platforms, enhanced financial intermediation services, and enhanced risk

management systems that contribute to the robustness of stock exchanges. In addition, financial deepening drives the innovation of new financial instruments, such as bonds, derivatives, and exchange-traded funds, which are expected to attract a broader range of investors. The deepening process also facilitates the modernization and development of more financial institutions, such as banks, capital markets, credit unions, discount houses and microfinance institutions.

Several empirical studies support a strong relationship between globalization and financial deepening (Balcilar et al., 2019; Lotsi et al., 2024). Also, there are empirical studies that indicate a strong correlation between financial deepening and stock market development, as it supports market liquidity, efficiency, and resilience (Tiamiyu, 2022; Attah-Botchwey et al., 2022).

The interconnection between globalization and financial deepening creates a robust and dynamic environment for the operation of stock exchanges around the world. Globalization and financial deepening may harmonize to form the strong twin driving forces in the transformation of stock exchanges across the globe. As globalization spreads to open up the domestic markets to international investors, financial deepening picks up to ensure that these markets have the depth and breadth to absorb and efficiently allocate capital inflows (Santiago et al., 2020). Therefore, globalization intensifies the impact of financial deepening by enhancing cross-border capital flows, which facilitates investment opportunities and ensures market liquidity. Also, financial deepening assists in the mitigation of market volatility by diversifying the associated risks, and globalization often amplifies any market instability through the rapid transmission of external adverse shocks (Ffrench-Davis & Griffith-Jones, 2019).

Globalization and financial deepening have both combined to significantly affect the Nigeria's stock market over the recent years, influencing its features, development, performance, and resilience in different ways. For instance, the volume of FDI inflows into the economy increased dramatically from $542 million in 1981 to $1,190 million in 2001. In 2011, the volume of FDI went up to $8,841 million and later down to $3,313 million in 2021 (WDI, 2022). In a similar growth trend, the Nigerian stock market capitalization increased from N5 billion in 1981 to N662.5 billion in 2001. In 2011, the stock market capitalization was N10,275 billion and further to N42.054 billion in 2021 (CBN, 2022).

Like other stock markets around the world, the Nigerian Stock Market has had several problems in relation to globalization and financial deepening. For instance, the globalization links of the stock market to international financial markets have made it vulnerable to external shocks like the global financial crises and rapid changes in commodity prices (e.g., crude oil), as well as changes in foreign investors' sentiment. Also, there are records of capital flights that almost crashed the Nigerian stock market (Nwude, 2012). Also, portfolio investments constitute a

veritable source of liquidity for the Nigerian stock market. The sensitivity of the country's exchange rate fluctuations has destabilized the country's currency on a number of occasions, such as when a depreciation of the Naira has led to reduced foreign investment and adversely impacted the stock market prices.

Furthermore, financial deepening has also created problems for the Nigerian stock market in the past years. The nature of financial deepening in Nigeria often leads to a lop-sided concentration of the country's resources within some sectors of the economy, such as large corporates. The concentration of resources in the hands of large corporations often leaves small and medium enterprises (SMEs) with little or no resources left in the Nigerian capital market. Also, the Nigerian financial markets have been accused of lacking in breadth and depth. Except in recent times, the market has been lacking in offering long-term funds to investors. The shortage of long-term funds had a negative impact on the performance of the stock exchange in Nigeria. On a general note, financial deepening can cause undue speculation in the stock markets. The Nigerian stock market downturns, including the crashes of the dot-com bubble (2000) and the 2008 global financial crisis, were driven by excessive speculation and unduly high levels of leverage. The worst crashes took the intervention of the country's central bank to mitigate the looming calamity. In addition, rapid financial deepening has a strong potential to trigger systemic risks often occasioned by market manipulation, fraud and insider trading in Nigeria (Nwachukwu, 2020). Such negative tendencies in the market can be mitigated with strong regulatory and supervisory oversight functions of the apex bank.

This research study focuses on the role of globalization and financial deepening on the Nigerian stock market is justified at this moment of the country's history based on the potential to enhance market efficiency, support the country's diversification exercise, promote economic growth, and address the unique challenges facing the country as an emerging market. In addition, several existing empirical studies have examined the relationship between globalization and the stock market (Alenoghena & Odior, 2014; Akinwale & Adekunle, 2019; Onyele & Ikwuagwu, 2020; Kalu et al., 2024). Also, there are many existing empirical studies on the relationship between financial deepening and the stock market (Yusuf et al., 2020; Godfrey & Agwu, 2020; Victoria & Alege, 2021; Tiamiyu, 2022; Attah-Botchwey et al., 2022). However, the existing empirical literature on the interconnection between globalization, financial deepening, and the stock market is scanty. In addressing the lacuna, this research study intends to examine the role of the nexus between globalization and financial deepening on the Nigerian stock market covering the period 1981 to 2022.

Therefore, we outline four research objectives to fill the literature gaps: First, we examine the relationship between globalization and the stock market. Second, we investigate the relationship between financial deepening and the stock market. Third, it will study the relationship between globalization and financial deepening.

Fourth, analyze the combined impacts of globalization and financial deepening on the Nigerian stock market. The remainder of this article is organized as follows. Section 2, discusses the review of empirical literature. Section 3 handles the Theoretical framework and methodology describing the data, model, and econometric technique used. Section 4 presents the empirical results, highlighting reports on the estimations while discussing the study's empirical findings. Finally, the section on conclusion and policy recommendation concludes the paper by highlighting the key theoretical and empirical contributions as well as the policy recommendations of the research study.

2.0. Review of Empirical Literature

The Nigerian stock market has evolved significantly over the past decades, driven by various economic and structural changes. Globalization and financial deepening have emerged as critical factors shaping the market's performance and resilience. This literature review synthesizes empirical studies that explore the nexus between globalization, financial deepening, and the Nigerian stock market to provide a comprehensive understanding of the dynamics and implications.

Globalization encompasses the increasing interconnectedness of economies through trade, investment, and capital flows. The Nigerian stock market, being a frontier market, has experienced both opportunities and challenges due to globalization. Several empirical studies investigated the effect of globalization on the stock market and found a positive impact of globalization on the stock market (Goel & Gupta, 2011; Alenoghena & Odior, 2014; Akinwale & Adekunle, 2019; Onyele & Ikwuagwu, 2020; Kalu et al., 2024). The proponents of the positive effect of globalization on the stock market believe that globalization improves access to global markets, increases capital flows through FDI and trading, and enhances market efficiency (Owolabi & Ajayi, 2013). Also, Adebiyi and Olowe (2016) highlighted the role of foreign portfolio investments in improving market efficiency and fostering innovation in the stock exchange. On the other hand, Kadandani and Yusuf (2019) found that globalization may have a negative impact on the stock market when the financial markets in the economy are underdeveloped. Also, Zaher and Buics (2022) found that the impact of financial globalization on stock market volatility is negative in the European Union countries. In addition, the study by Olubiyi (2023) finds a negative relationship between the US stock price and trade integration with Nigeria.

The second strand of empirical literature addresses the relationship between financial deepening and the stock market. Financial deepening refers to improvements in the provision of financial services and products, which enhances the efficiency, liquidity and inclusiveness of the financial system. Most of the empirical studies indicate a positive relationship between financial deepening and the stock market (Alenoghena et al., 2014; Taiwo et al., 2016; Yusuf et al., 2020;

Godfrey & Agwu, 2020; Victoria & Alege, 2021; Tiamiyu, 2022; Attah-Botchwey et al., 2022). The proponents of a positive relationship between financial deepening and the stock market believe that financial deepening can contribute to the stock market improvement through enhancement in savings, increased capital availability in the market, increased liquidity and enhanced inflow of funds from abroad. However, other empirical findings are at variance with the positive relationship between financial deepening and stock market development. For instance, Okeya and Dare (2020) found a considerable inverse relationship existing between broad money diversification and stock market development in Nigeria from 1981 to 2019. Also, Taiwo et al. (2016) found that the effect of financial deepening on stock market progress was not significant.

The third strand of literature focuses on the relationship between globalization and financial deepening. The empirical literature reviewed on the relationship between globalization and financial deepening is unanimous that globalization positively impacts financial deepening (Law et al., 2014; Kandil et al., 2015; Balcilar et al., 2019; Lotsi et al., 2024). The empirical studies in favour of a positive impact of globalization on financial deepening posit that globalization ensures the improved flow of financial resources, skills, financial infrastructure and management across borders from nations with an abundance of these inputs to nations with scarcity. In a slight variance, Ajayiand Musyimi (2022) opine that while the core variables of globalization like trade openness and foreign direct investment have positive effects on financial development, other non-core variables like exchange rate, inflation and interest rate have a negative relationship with financial development. In another related study, Mekuanent (2022) found that a U-shaped relationship exists between financial globalization and financial development in Africa. In explaining the U-shaped relationship, the author argued that at a lower level of financial globalization, there is a negative influence on financial development. However, beyond a point, financial globalization stimulates improvement in financial development.

The concluding part of the literature review concerns the nexus of the relationship between globalization, financial deepening and the stock market. The indications from existing literature portray very scanty evidence of empirical studies that investigate the nexus among the three variables. Therefore, this research study fills the existing lacuna by linking these three variables in an assessment of their relationship, hence contributing to filling the existing void in the literature.

3.0. Theoretical Framework and Methodology

3.1. Theoretical Framework

Two models have been adopted as the theoretical framework for this study. First is the World's System Theory and the second is the Capital Flow Theory.

3.1.1. The World-Systems Theory

The World-Systems Theory (WST) was first developed by Immanuel Wallerstein (1974), a sociologist. The theory provides an extensive framework for comprehending the global trend in the inequalities in economic and political dispensations (Calhoun, 2023). World systems theory combines several disciplines in the analysis of world history and social change. The theory examines the interconnections between the different levels of the regional and interregional arrangement. The WST posits that the global system is categorized in terms of inequality and institutionalized exploitation. The broad regional classifications are the core, periphery, and semiperiphery groups. The grouping emphasizes how the classifications affect resources, capital flow and resources. Applying the WST to globalization, financial deepening, and stock market performance reveals perceptions of how the Nigerian stock market may rank in the global economic structure and the performance of the financial markets. During the period from the 1600s to the late 1800s, the countries situated in northwest Europe dominated in the core position. According to the ranking of the WST, African countries (including Nigeria) belong to the periphery region (Calhoun, 2023). Some other group, like the United States, changed their ordering, reclassifying to the core from the semiperiphery.

On the other hand, the group of the semi-autonomous Balkan states, which had achieved an earlier higher and more reputable status during the 19th Century, referred to as the Ottoman Empire crumbled and was relegated to the periphery from semiperiphery. The core regions were more economically stable with consistently higher wages and exhibited more innovative technology with specialized production techniques, dominating and exploiting both the semiperiphery and the periphery (Buchholz, 2018). The semiperiphery operates between the periphery and the core regions, showcasing a cocktail of the periphery and core attributes. Hence, the semiperiphery exploited the periphery and got exploited by the core. The peripheral regions were known for producing raw materials, paying low wages, and utilizing simple technology with a limited production range. The core region was known for exploiting both the semiperiphery and the periphery. World-systems theory has been criticized for a number of reasons. There is a focus on economics at the expense of culture and social class. The three-tier structure of the theory oversimplifies complex socio-economic interactions between countries, and the focus of the theory on the state is criticized for being too core-centric and state-centric.

3.1.2. The International Financial Integration Theory

International Financial Integration (IFI) Theory examines the interconnectedness of financial markets across countries and the implications of this integration on economies, investment, and financial stability. Von Furstenberg was one of the first authors to investigate the prerequisites for international financial integration (IFI) in his 1998 essay (Shad et al., 2018). The theoretical foundation of the IFI theory is based on the Law of One Price, the Feldstein-Horioka Puzzle, the Portfolio Theory and the Mundell-Fleming Model. It focuses on how capital flows, cross-border investments, and the removal of financial barriers create an interconnected global financial system. The theory focuses specifically on the integration of financial markets globally, driven by advances in technology, liberalization policies, and international cooperation (Haini, 2020). Global financial integration promotes financial development by enabling cross-border capital flows, enhancing liquidity, and diversifying financial risks. With greater mobility of capital, there is efficient allocation of capital resources as capital flows freely to regions with higher returns. With improved integration of international financial markets, there is better risk-sharing and portfolio diversification. The diversification of markets would reduce the country-specific risks, which may raise global exposure to risks. Financial theory requires the implementation of the risk-return mantra such that there is equalization of the cost of capital and the rates of return on investment across the globe. The convergence theory will come into operation as the emerging markets may benefit from FDI and portfolio inflows.

The stock market plays a pivotal role in international financial integration theory, serving as a conduit for capital inflows and outflows, risk sharing, portfolio investment and economic growth across borders (Calderón & Kubota, 2019). The IFI theory will expectedly benefit all the international parties and countries involved in cross-border transactions and, hence, improve financial deepening and the stock market. Also, emerging economies will expect to benefit from FDI financial flows, technology transfer, and expertise. The theory also guarantees the diversification of risk through access to the global credit markets. The integration process will emphasize the increased use of technology-based payment systems and innovations in financial products and services. The process will improve the skills and professionalism in the financial sector, increase the availability of credit and reduce financial transaction costs. The IFI theory has been criticized on several grounds. For instance, the theory will propagate financial crises across borders, as seen during the Global Financial Crisis (2008). Also, weak economies fall into the trap of overdependence on foreign capital, such that reliance on foreign investments may expose them to external shocks. In addition, the benefits of integration may be evenly shared in favour of developed economies over developing ones.

3.2. The Model Configuration

The dynamics of the relationship between globalization and stock market can be modeled based on the empirical postulations of Alenoghena & Odior (2014) and Kandil et al. (2015).The adapted model expresses Stock Market (SMC) as a function of globalization (GLOB), financial deepening (FDEEP), foreign direct investment (FDI), gross fixed capital formation (GFCF), inflation (INFL) and interest rate (INTR) as the independent variables.

The proxy adopted for globalization is trade openness and broad money supply is deployed as proxy for financial deepening. Hence, the expression of the variables in a functional form is shown in equation (1).

SMC = (GLOB, FDEEP, FDI, GFCF, INFL, INTR) - - - - - (1)

Equation (1) can be further modified to express the coefficients equation (2)

$$SMC_t = \beta_0 \cdot (GLOB_{it})^{\beta_1} \cdot (FDEEP_{2t})^{\beta_2} \cdot (FDI_{3t})^{\beta_3} \cdot (GFCF_{4t})^{\beta_4} \cdot (INFL_{5t})^{\beta_5} \cdot (INTR_{6t})^{\beta_6} \quad - \quad - \quad (2)$$

The next phase is to log-linearise Equation (2) to facilitate the ease of estimation. The process of log-linearization is logical to streamline the scales of the to minimize the data fluctuations. Hence:

$$LogSMC_t = \beta_0 + \beta_1 LogGLOB_{t1} + \beta_2 LogFDEEP_{t2} + \beta_3 LogFDI_{t3} + \beta_4 LogGFCF_{t4} + \beta_5 LogINFL_{t5} + \beta_6 LogINTR_{t6} + \mu_t \quad - \quad - (3)$$

In the current form, equation 3 can be used to assess the effects of globalization and financial deepening on the Nigerian Stock Market. There is a modification of equation (3) to examine the effect of globalization on financial deepening as follows:

$$LogFDEEP_t = \beta_0 + \beta_1 LogGLOB_{t1} + \beta_2 LogSMC_{t2} + \beta_3 LogFDI_{t3} + \beta_4 LogGFCF_{t4} + \beta_5 LogINFL_{t5} + \beta_6 LogINTR_{t6} + \mu_t \quad - \quad - (4)$$

Equation (4) examines the effect of globalization on financial deepening. The final recalibration of equation (3) is as follows:

$$LogSMC_t = \beta_0 + \beta_1 LogGLOB_{t1} + \beta_2 LogFDEEP_{t2} + (\beta_3 LogGLOB * LogBMON_{t5} + \beta_4 LogFDI_{t4} + \beta_5 LogGFCF_{t5} + \beta_6 LogINFL_{t6} + \beta_7 LogINTR_{t7} + \mu_t \quad - \quad (5)$$

Equation (5) is configured to assess the interactive effect of globalization and financial deepening on the stock market.

Where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 \& \beta_7$ are the coefficients to be estimated in Equation 3 to 5 and μ_t is the stochastic error term that is associated with the models.

Furthermore, the apriori expected signs of the models are for equations (3 & 4): $\beta_1 > 0; \beta_2 > 0; \beta_3 > 0; \beta_4 > 0; \beta_5 > 0; \& \beta_6 < 0$.

For Equation (5), the apriori signs may be stipulated as: $\beta_1 > 0; \beta_2 > 0; \beta_3 > 0; \beta_4 > 0; \beta_5 > 0; \& \beta_6 > 0; \beta_7 < 0$.

Therefore, the parameter > 0 implies a positive relationship between the dependent and independent variables. Also, < 0 means a negative relationship between the dependent and independent variables.

3.3. Estimation Procedure

The estimation procedure for this study consists of four steps. The first step is the stationarity test, which determines the order of integration of the variables using the ADF statistic and the Phillip-Perron test. The second step is the cointegration test using the Engel-Granger Cointegration Single Equation test. The third step is the determination of the lag structure and the heteroscedasticity status of the data. The fourth step is the regression impact analysis using the Weighted Least Squares Regression (WLS) approach.

The WLS approach is adopted for this study since the preliminary analysis of the data reveals the existence of heteroscedasticity. The WLS model normalizes the data by weighing all the variables in the data to minimize the scales of fluctuations. If the existence of heteroscedasticity is confirmed, the WLS approach version of the Generalized Linear Model (GLM) constitutes a veritable method of modifying the data to obtain estimators that are Best Linear Unbiased Estimates (BLUE). Hence, the study models for heteroscedasticity to achieve more efficient estimates by adopting the WLS approach. The WLS impact estimation process is executed by performing a regression analysis, which deploys the weighted independent and dependent variables to downplay values of the sum-of-squared residuals (Benisch et al., 2021). In a more general procedure, the GLS equation may be written as:

$$S(\beta) = \sum_{t}^{i} w_t^2 (y_t - x_t'\beta)^2 \quad - \quad - \quad - \quad (6)$$

Equation (6) is designed with respect of the k-dimensional vector of the parameters of β. Observing the matrix notation and let W become a diagonal matrix that comprising the scaled w along the main diagonal with zeros elsewhere. Also, let y and X be regular matrices that is associated with the right-hand and the left-hand variables. Hence, the WLS estimator may be configured as:

$$b_{WLS} = (X'W'WX)^{-1}X'W'W_y \quad - \quad - \quad - \quad (7)$$

With the required adjustments, the covariance matrix becomes

$$\widehat{\sum}_{WLS} = S^2(X'W'WX)^{-1} \quad - \quad - \quad - \quad (8)$$

Hence, the weighted summarized coefficients are based on the residuals that are fitted using the weighted data as follows:

$$\tilde{\mu}_t = w_t(y_t - x_t)^i b_{WLS} \quad - \quad - \quad - \quad (9)$$

In the application of the weighted least squares model to the model in this study, we have

$$SMC_t = \beta_0 + \beta_1 GLOB_{t1} + \beta_2 FDEEP_{t2} + \beta_3 FDI_{t3} + \beta_4 GFCF_{t4} + \beta_5 INFL_{t5} + \beta_6 INTR_{t6} + \mu_t$$

The weighted least squares approach requires the assumption that the heteroscedastic variance σ_i^2 are known. Therefore, assign a weight (could be value of an independent variable) and divide equation (9) by σ_i and obtain equation (10) as follows:

$$\frac{SMC_t}{\sigma_i} = \beta_0\left(\frac{1}{\sigma_i}\right) + \beta_1\left(\frac{GLOB_t}{\sigma_i}\right) + \beta_2\left(\frac{FDEEP_t}{\sigma_i}\right) + \beta_3\left(\frac{FDI_t}{\sigma_i}\right) + \beta_4\left(\frac{GFCF_t}{\sigma_i}\right) + \beta_5\left(\frac{INFL_t}{\sigma_i}\right) + \beta_6\left(\frac{INTR_t}{\sigma_i}\right) + \mu_t \quad - \quad - \quad - \quad (10)$$

Equation (6) can now be summarized in the final form of equation (7) as follows:

$$SMC_t^* = \beta_0^* + \beta_1^* GLOB_t^* + \beta_2^* FDEEP_t^* + \beta_3^* FDI_t^* + \beta_4^* GFCF_t^* + \beta_5^* INFL_t^* + \beta_6^* INTR_t^* + \mu_t^* \quad - \quad - \quad - \quad (11)$$

The starred variables in equation (11) are the transformed variables based on the division by the known weight σ_i. The starred variables now comprise of data that is homoscedastic hence, making it possible for the application of the least squares regression analysis. The starred notations comprising of $\beta_1^*, \beta_{2,}^* \beta_3^*$, β_4^*, $\beta_5^* and \beta_6^*$ are the coefficients of the transformed model and clearly distinguishes from the regular OLS parameters$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 and \beta_6$. The model transformation is based on the division by the standard error which makes it to become homoscedastic.

3.4. Sources of Data and Variable Description

Variable	Description and Measurement	Source
SMC	Stock Market Capitalization. This is the percentage change in the market value of listed equities on the domestic stock exchange at the end of every year, measured as a ratio to the GDP. Market Capitalization refers to the share price times the number of shares outstanding for each company.	CBN
GLOB	Globalization uses Trade Openness as proxy. It is a measure of participation of a country in international trade. The variable is measured by the ratio of the value of imports and exports of a given country to its domestic product.	WDI
FDEEP	Broad money (proxy for Financial Deepening) refers to the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government. Taken as percentage of GDP	CBN
INTR	Lending rate is the bank rate that usually meets the short- and medium-term financing needs of government and the private sector (Lending rate/Monetary Policy Rate).	WDI
FDI	Foreign direct investment are the net inflows of	WDI

	investment to acquire a lasting management interest (10, percent or more of voting stock) in an enterprise operating in an African Country. Estimated as share of GDP.	
INFL	Inflation is measured by changes in consumer prices at annual % change	WDI

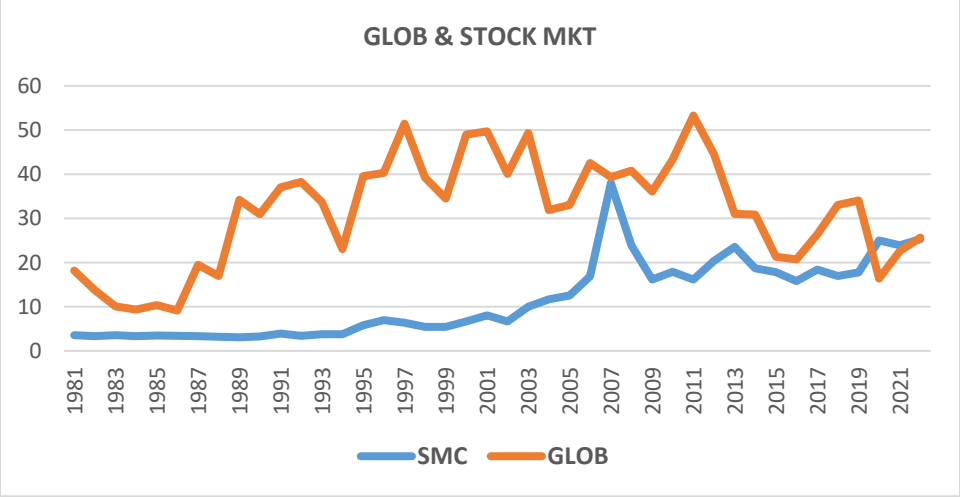
The sources of data for this research study comprises the Central Bank of Nigeria Annual Statistics and the World Development Index (WDI) covering the period 1981 to 2022.

4.0. Analysis and Presentation of Results

4.1. Trend Analysis

The trend in globalization and the Nigerian stock market for this study commenced in 1981 (shown in Figure 1). While globalization was generally unstable, the stock market trend was much more stable except for the period of a spike in 2008. At the end of the spike, there was a Nigerian stock market crash in 2008. That was the highest point on the stock market trend in Nigeria for the period of study. Despite the unstable trend in the country's globalization trend, the highest point in globalization was in 2011 for the period of study. The two variables were generally on an upward trend for the period of study in a way that globalization appeared to drag the stock market along.

Figure 1. Globalization and the Stock Market

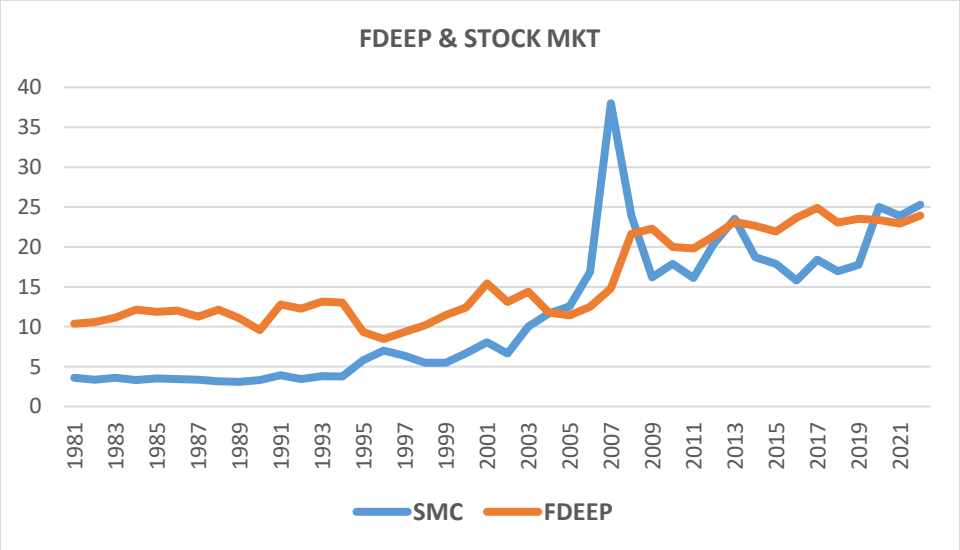


Source: Authors' Compilation from WDI 2022 and CBN 2022

The analysis of the trend between financial deepening and the stock market is presented in Figure 2. While the stock market generally showed an upward trend

throughout the period, it showed a peak in 2008. The year 2008 witnessed a crash in the Nigerian stock market. However, the market picked up an upward trend in 2012. Also, financial deepening was on an upward trend throughout the data set. Although financial deepening also exhibited an unstable trend, it appeared to be dragged along by the trend in the stock market. Both the stock market and financial deepening maintained a positive trend throughout the data set.

Figure 2. Financial Deepening and the Stock Market



Source: Authors' Compilation from CBN 2022

4.2. Descriptive Statistics

This sub-section of the study analyses the statistical attributes of the variables used in the study. The characteristics of the variables presented include the mean, maximum values, standard deviation, skewness, kurtosis, Jarque–Bera and probability. The results are presented in Table 2. The means of stock market capitalization, trade globalization, foreign direct investment, financial deepening, gross fixed capital formation, inflation and interest rate are 11.59, 31.53, 1.44, 15.62, 35.57, 18.95 and 17.32, respectively. Also, the maximum values related to the variables are 38.01, 53.28, 5.79, 24.89, 89.39, 72.84 and 31.65, respectively, for the variables as presented. On the other hand, the associated minimum values of the variables are 3.09, 9.14, -0.04, 8.46, 14,17, 5.39 and 8.92 for stock market capitalization, globalization, foreign direct investment, financial deepening, gross fixed capital formation, inflation and interest rate respectively. In the same order, the standard deviations for the variables are 8.65, 12.31, 1.24, 5.45, 18.74, 16.46, and 4.82. On the skewness of the data, all the variables are positively skewed except for globalization, which is negatively and moderately skewed. The kurtosis of the data shows that except for globalization and financial deepening, all other variables

score above the threshold of 3, indicating that the general data is leptokurtic, that is, thin base and high top. On the overall shape of the data, the Jarque-Bera values indicate that four variables (stock market capitalization, globalization, financial deepening and interest rate) have values that accept the null hypothesis of a normal distribution. Therefore, the data has a normal distribution. In addition, the study period for the variables covers from 1981 to 2022, making 42 observations.

Table 2. Descriptive Statistics

	SMC	GLOB	FDI	FDEEP	GFCF	INFL	INTR
Mean	11.594	31.531	1.440	15.624	35.571	18.947	17.324
Median	7.520	33.390	1.079	12.899	33.119	12.942	16.922
Maximum	38.014	53.278	5.791	24.895	89.386	72.836	31.650
Minimum	3.085	9.136	-0.039	8.464	14.169	5.388	8.917
Std. Dev.	8.646	12.312	1.243	5.450	18.741	16.455	4.817
Skewness	0.872	-0.229	1.738	0.485	1.110	1.877	0.357
Kurtosis	3.161	2.145	6.157	1.545	4.031	5.437	3.601
Jarque-Bera	5.365	1.644	38.577	5.354	10.478	35.058	1.527
Probability	0.068	0.440	0.000	0.069	0.005	0.000	0.466
Sum	486.946	1324.287	60.484	656.219	1493.984	795.758	727.622
Sum Sq. Dev.	3065.139	6215.128	63.331	1217.951	14399.680	11101.400	951.221
Observations	42	42	42	42	42	42	42

Authors, Computation

4.2. Correlation Matrix of Regressors

Table 3 shows the results of the correlation analysis for all the study variables. The results show that there is no high correlation among the variables except for broad money supply and stock market capitalization, which is casually correlated with a positive value of 0.56. Therefore, the abridged level of correlation for all the variables shows that they do not suffer from multicollinearity.

Table 3. Correlation Matrix

	SMC	GLOB	FDI	FDEEP	GFCF	INFL	INTR
SMC	1						
TRADE	0.1846	1					
FDI	-0.1032	0.3253	1				
BMON	0.5630	0.0063	-0.1533	1			
GFCF	-0.4923	-0.5010	-0.1211	-0.6677	1		
INFL	-0.3666	-0.0413	0.4472	-0.2848	0.2079	1	
INTR	-0.1768	0.6106	0.5856	-0.1681	-0.2970	0.3694	1

Authors, Computation

4.3. Stationary Test

The stationary test is conducted using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron tests for the study. The results of the unit root tests are presented in Table 4. The values of the t-statistics for all the variables became more significant than the test critical values at 1%, 5% and 10% at the first difference I (1). The probability values at the first difference being less than 0.05 confirm the stationarity of all the variables at the level of integration. In the joint stationarity test results, the Fisher Chi-square value is 76.26 with an associated probability of zero, and the Choi Z-statistic value is -6.84 with a probability of zero also. Therefore, the unit root test shows that all the variables are integrated at first difference [I (1)].

Table 4. Stationarity Test

Null Hypothesis: Series has a unit root								
Series: SMC, GLOB, FDI, FDEEP, GFCF, INFL, INTR								
Method		ADF - Fisher Chi-Square			Phillips-Perron Test			
Series	t-Stat	Prob	Order of Integration	Max Lag	t-Stat	Prob	Order of Integration	Max Lag
SMC	-7.2075	0.0000	I(1)	1	-7.8756	0.0000	I(1)	1
GLOB	-7.8324	0.0000	I(1)	1	-7.8756	0.0000	I(1)	1
FDI	-6.7825	0.0062	I(1)	1	-8.4000	0.0000	I(1)	1
FDEEP	-5.8757	0.000	I(1)	1	-5.8773	0.000	I(1)	1

		0				0		
GFCF	-5.8286	0.0055	I(1)	1	-6.7041	0.0076	I(1)	1
INFL	-6.6815	0.0082	I(1)	1	-5.7041	0.0076	I(1)	1
INTR	-7.0032	0	I(1)	1	-7.0127	0	I(1)	1
	1% level	-3.606			1% level	-3.6056		
	5% level	-2.937			5% level	-2.9369		
	10% level	-2.607			10% level	-2.6069		

Authors, Computation

4.4. Lag Selection Criterion

The lag selection result for the study is shown in Table 5. Most of the criteria (LR, SC and HQ) highlight lag1 as the preferred lag for the estimation process. Hence, lag 1 is adopted for the test requiring the stipulation of lag for processing.

Table 5. Lag Selection

VAR Lag Order Selection Criteria						
Endogenous variables: SMC GLOB FDI FDEEP GFCF INFL INTR						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-835.6468	NA	1.38E+10	43.21265	43.51124	43.31978
1	-699.3454	216.6842*	1.63E+08	38.73566	41.12437*	39.59271*
2	-648.7714	62.24495	1.94E+08	38.65494	43.13376	40.2619
3	-576.8305	62.71766	1.27e+08*	37.47849*	44.04742	39.83537
* indicates lag order selected by the criterion						

Authors, Computation

4.5. Engle-Granger Cointegration Test

The Engle-Granger cointegration test is conducted, requiring all the variables to be declared as endogenous to facilitate the examination of a possible long-run equilibrium relationship among them. The result of the Enge-Granger cointegration test is presented in Table 6.

Table 6. Engle-Granger Cointegration Test

Series: LSMC LGLOB LBMON LFDI LGFCF LINFL LINTR								
Null hypothesis: Series are not cointegrated								
Automatic lags specification based on Schwarz criterion (maxlag=1)								
Dependent	tau-statistic	Prob.*	z-stat	Prob.*				
LSMC	-3.3488	0.7318	-19.2962	0.6632				
LTRADE	-5.8262	0.0253	-35.9093	0.0367				
LFDEEP	-3.2049	0.7876	-17.3947	0.7626				
LFDI	-4.7200	0.1778	-29.5880	0.1598				
LGFCF	-2.2346	0.9806	-11.2838	0.9626				
LINFL	-5.0734	0.1033	-53.4446	0.0000				
LINTR	-5.7860	0.0274	-35.1628	0.0447				
		LSMC	LTRADE	LBMON	LFDI	LGFCF	LINFL	LINTR
Rho – 1		-0.4706	-0.8758	-0.4243	-0.7217	-0.2752	-0.8730	-0.8576
Rho S.E.		0.1405	0.1503	0.1324	0.1529	0.1232	0.1721	0.1482
Residual variance		0.0701	0.0557	0.0200	0.3233	0.0225	0.2528	0.0174
Long-run residual variance		0.0701	0.0557	0.0200	0.3233	0.0225	0.5921	0.0174
Number of lags		0	0	0	0	0	1	0
Number of observations		41	41	41	41	41	40	41
Number of stochastic trends**		7	7	7	7	7	7	7
**Number of stochastic trends in asymptotic distribution								

Authors, Computation

The normalized auto-correlation coefficient (referring to the z-statistic), together with the Engle-Granger tau-statistic (t-statistic), jointly reject the null hypothesis of no cointegration amid the variables at the 5% significance level. The estimated probability values are conducted, deploying MacKinnon's reaction to the superficial simulation results. Taking account of the sample size and the assessed probabilities of all the variables, the critical values identify the presence of seven cointegrating equations at the 10% level of significance, adopting the tau-statistic and z-statistic (t-statistic) estimates. Therefore, the tests establish the existence of long-run equilibrium cointegrating relationship among the variables: stock market capitalization, trade openness, foreign direct investment, broad money supply, gross fixed capital formation, inflation and interest rate.

4.6. Result of Heteroscedasticity Test

The result of the test for heteroscedasticity is shown in Table 7. The Breusch-Paga-Godfrey test for heteroscedasticity shows that the observed R-squared and the F-statistic have probabilities of 0.037 and 0.046, respectively. The value of the probability estimates is less than 0.05, such that we reject the null hypothesis that the data is free from heteroscedasticity. With the presence of heteroscedasticity in the study data, the use of the normal OLS regression procedures for analysis of the data will not produce efficient regression coefficients as the associated standard error will be biased. Therefore, with the presence of heteroscedasticity, the regular regression estimator will not be BLUE. The presence of heteroscedasticity in the data justifies the adoption of the Weighted Least Squares (WLS) approach in this study. Therefore, the WLS approach will correct the heteroscedasticity in the data so that the regression analysis performed will produce BLUE estimates.

Table 7. Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Series: LSMC LGLOB LFDEEP LFDI LGFCF LINFL LINTR			
F-statistic	2.5591	Prob. F(6,35)	0.0368
Obs*R-squared	12.8072	Prob. Chi-Square(6)	0.0462
Scaled explained SS	12.4265	Prob. Chi-Square(6)	0.0531

4.7. Examination of the effects of Globalization and Financial Deepening on the Nigerian Stock Market.

The result of the assessment of the effects of globalization and financial deepening on the Nigerian stock market is depicted in Table 8. From the table, the impact of globalization, financial deepening, gross fixed capital formation and interest rate are significant in affecting the Nigerian stock market. On the other hand, the effect of foreign direct investment and inflation are both negative but not significant in affecting the Nigerian stock market. From the result, the interpretation shows that if globalization, broad money supply and gross fixed capital formation increase by one per cent, Nigeria's Stock market performance will increase by 0.62%, 0.74% and 0.83%, respectively. On the other hand, if foreign direct investment, inflation and interest rate increase by one per cent, Stock Market Performance will decline by 0.002%, 0.033% and 1.07%, respectively.

Table 8. Effects of Globalization and Financial Deepening on Stock Market Performance

Dependent Variable: LSMC				
Method: Weighted Least Squares				
Dispersion computed using Pearson Chi-Square				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
LGLOB	0.6186	0.1820	3.3994	0.0007
LFDEEP	0.7423	0.2768	2.6811	0.0073
LFDI	-0.0017	0.0882	-0.0188	0.9850
LGFCF	0.8343	0.2101	3.9704	0.0001
LINFL	-0.0327	0.0903	-0.3627	0.7169
LINTR	-1.0713	0.3228	-3.3184	0.0009
C	4.0590	1.8277	2.2209	0.0264
Mean dependent var	2.1570	S.D. dependent var		0.7956
Sum squared resid	3.8157	Log likelihood		-9.5548
Akaike info criterion	0.7883	Schwarz criterion		1.0779
Hannan-Quinn criter.	0.8945	Deviance		3.8157
Deviance statistic	0.1090	Restr. Deviance		25.9526
LR statistic	203.0522	Prob(LR statistic)		0.0000
Pearson SSR	3.8157	Pearson statistic		0.1090
Dispersion	0.1090			

Authors, Computation

It is essential to underscore the fact that while the effects of globalization and financial deepening are positive and significant on the stock market that of foreign direct investment is negative and not significant. The only variable that goes contrary to expectation is foreign direct investment. The negative elasticity adversely impacts the capital market, perhaps because, as a developing country, foreign investors repatriate earnings from the market on a regular basis.

4.8. Examining the effect of Globalization on Financial Deepening

The result of an examination of the effect of globalization on financial deepening is presented in Table 9. The effect of globalization and stock market performance has a positive and significant impact on Nigeria's financial deepening. On the other hand, the effects of gross fixed capital formation have a negative and significant impact on financial deepening. More specifically, an increase in globalization and stock market performance will be followed by a rise in financial deepening by 0.23% and 0.23%, respectively. While foreign direct investment has a negative impact on financial deepening, the effect is not significant. Also, while the effects of inflation and interest rates on financial deepening are positive, the effect is not significant. The critical point to note in this result is that globalization has a positive and significant impact on Nigeria's financial deepening.

Table 9. Effect of Globalization on Financial Deepening

Dependent Variable: LFDEEP				
Method: Weighted Least Squares				
Dispersion computed using Pearson Chi-Square				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
LGLOB	0.2307	0.1100	2.0972	0.0360
LFDI	-0.0241	0.0489	-0.4941	0.6212
LSMC	0.2296	0.0856	2.6811	0.0073
LGFCF	-0.3272	0.1294	-2.5283	0.0115
LINFL	0.0595	0.0493	1.2075	0.2272
LINTR	0.0270	0.2058	0.1313	0.8955
C	3.8619	0.8675	4.4517	0.0000
Mean dependent var	2.6912	S.D. dependent var		0.3405
Sum squared resid	1.1801	Log likelihood		15.0894
Akaike info criterion	-0.3852	Schwarz criterion		-0.0956

Hannan-Quinn criter.	-0.2791	Deviance	1.1801
Deviance statistic	0.0337	Restr. Deviance	4.7538
LR statistic	105.9903	Prob(LR statistic)	0.0000
Pearson SSR	1.1801	Pearson statistic	0.0337
Dispersion	0.0337		

Authors, Computation

4.9. Investigating the combined effects of Globalization and Financial Deepening on the Nigerian Stock Market Performance

This section is designed to investigate the synergistic effects of globalization and financial deepening on the stock market in Nigeria. The result of the analysis is presented in Table 10. The result from the table shows that the interactive effects of globalization and financial deepening on the stock market are positive. More precisely, when the interactive impact of globalization and financial deepening increases by one per cent, the stock market will also increase by 1.45%, indicating that a carefully planned policy is required to enjoy the full benefit of the combined effects. It means that when the positive impact of globalization is combined with the positive effect of financial deepening, the overall synergistic effects of the two variables become even more significant in positively impacting the Nigerian stock market. Also, in the interaction of the variables, the positive synergistic effect of globalization and financial deepening on stock market development suggests that financial deepening constitutes the veritable conduit through which globalization positively impacts the Nigerian stock market.

Table 10. The interacted effects of Globalization and Financial Deepening on Stock Market Performance

Dependent Variable: LSMC				
Method: Weighted Least Squares				
Dispersion computed using Pearson Chi-Square				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
LGLOB	4.4503	1.1102	4.0085	0.0001
LFDI	-0.0792	0.0802	-0.9878	0.3232
LFDEEP	5.6931	1.4401	3.9532	0.0001
LTRADE*LFDEEP	1.4504	0.4159	3.4870	0.0005
LGFCF	-0.7637	0.1841	-4.1481	0.0000
LINFL	-0.0556	0.0789	-0.7048	0.4810
LINTR	-1.4316	0.2995	-4.7799	0.0000
C	-8.1777	3.8533	-2.1223	0.0338

Mean dependent var	2.1570	S.D. dependent var	0.7956
Sum squared resid	2.8106	Log likelihood	-3.2431
Akaike info criterion	0.5354	Schwarz criterion	0.8664
Hannan-Quinn criter.	0.6567	Deviance	2.8106
Deviance statistic	0.0827	Restr. deviance	25.9526
LR statistic	279.9516	Prob(LR statistic)	0.0000
Pearson SSR	2.8106	Pearson statistic	0.0827
Dispersion	0.0827		

Authors, Computation

4.10. The Regression Specification Error Test

Ramsey's (1969) Regression Specification Error Test (RESET) is adopted in this research study to assess for the functional misspecification that is often linked with models that were evaluated similarly. The RESET test result is presented in Table 11 of this study. RESET assessment is specifically designed to perceive the presence of any neglected nonlinearities in an estimated econometric model. In a more specific situation, RESET will establish whether the nonlinear mixture of the explanatory variables will explain the variation in the dependent variable and, hence, establish whether the model is mis-specified.

The discussion in Table 10 shows the results of the RESET test of all the variables in the models where stock market capitalization (model 3) and financial deepening (model 4) were adopted as dependent variables. The test outcome concerning model 3 (with a stock market capitalization as a dependent variable) presents values of probability values of t-statistic and F-statistic as 0.2838 and 0.2574, respectively. The null hypothesis stipulating the non-existence of the omitted variable becomes accepted since the probability values from the test are more significant than 0.05. Similarly, the test outcome with model 4 (with financial deepening as the dependent variable) has probability values of t-statistic and F-statistic as 0.19 and 0.19, respectively. Also, with the estimated probability values greater than 0.05, the null hypothesis highlighting the non-existence of omitted variables cannot be rejected. Consequently, the two models are well-specified.

Table 11. Reset Test

Ramsey RESET Test				Ramsey RESET Test			
Specification: SMC GLOB FDI FDEEP GFCF INFL INTR				Specification: GLOBFDEEP FDI SMC GFCF INFL INTR			
Omitted Variables: Squares of fitted values				Omitted Variables: Squares of fitted values			
	Value	df	Probability		Value	Df	Probability
t-statistic	1.0890	34	0.2838	t-statistic	1.3372	34	0.1900
F-statistic	1.1859	(1, 34)	0.2574	F-statistic	1.7882	(1, 34)	0.1900
Likelihood ratio	1.1859	1	0.2762	Likelihood ratio	1.7882	1	0.1811

Authors, Computation

5.0 Conclusions and Recommendations

This research study examines the effect of globalization and financial deepening on the Nigerian stock market performance covering the period 1981 to 2022. The study analyzes the relationship among the variables, globalization, financial deepening, stock market capitalization, gross capital formation and interest rate. The Weighted Least Squares (WLS) approach was deployed for analysis based on the problem of heteroscedasticity that is associated with the data.

The study has been able to draw specific conclusions based on the empirical findings from the WLS analysis. First, the study established the positive and significant relationship between globalization and stock market performance. The positive relationship between globalization and the stock market is based on the studies by Oluwole (2014), Haghiet al. (2015) and Onyele & Ikwuagwu (2020). Therefore, globalization can increase the financial and capital inflows into a nation with a virile stock market and positively impact the growth and diversification of the stock market. Second, this study found that the relationship between the stock market and financial deepening is positive and significant. Several empirical studies have supported the positive relationship between financial deepening and stock market performance (Alenoghena et al., 2014; Yusuf et al., 2020; Attah-Botchwey et al., 2022). The improvement in the financial deepening of an economy indicates a diversification in the nation's money and capital market transactions and trading instruments.

Hence, improvement in financial deepening expands the facility's capacity and traded instruments in the stock exchange at any point in time. The third finding in this study is the negative and insignificant relationship between foreign direct investment (FDI) and the stock market. Some studies have findings that support the negative relationship between FDI and the stock market (Ramirez, 2014; Omodero & Ekwe, 2017; Onyele & Ikwuagwu, 2020). The study notes the negative and significant effect of interest rate on the stock market. The fourth finding is the positive and

significant effect of globalization on Nigeria's financial deepening. In support of this claim, there are existing studies with empirical evidence in support of the positive relationship between globalization and financial deepening (Kandil, 2015; Katircioğlu & Zabolotnov, 2019; Aluko & Opoku, 2022). The positive relationship between globalization and financial deepening can be explained as globalization is an important factor in stimulating funds inflows and institutional reforms in developing countries like Nigeria in a way that promotes financial deepening and economic growth. The final study outcome is the positive and significant effect of the interacted coefficient of globalization and financial deepening on stock market development. Hence, an appropriate blend of globalization and financial development will combine to positively impact the growth and development of the Nigerian Stock Market.

Furthermore, the full results show that globalization positively impacts financial deepening and the Nigerian stock market. Therefore, while the World System theory does not apply in Nigeria, the International Financial Integration theory fully applies to the country.

Based on the findings of this study, the following recommendations are suggested in this study. Since globalization has benefitted Nigeria in terms of improving financial deepening and developing the stock market, the government should implement policies that will further improve globalization so that the country can take maximum advantage of this phenomenon. The new policies in this direction will foster more excellent trade agreements to improve the existing trade flows with the rest of the world. The effort to improve trade will see the country signing more trade agreements with the more advanced countries that would improve the flow of financial resources and technology into the country. Second, the government must improve policies to attract more capital inflows from the rest of the world, taking steps to improve the business environment more concretely and automate the stock market architecture and transactions. The policies to improve the business environment entail the review of existing policies to reduce the bureaucratic bottlenecks that international investors face in the course of FDI and portfolio investment.

Furthermore, another set of suggested policies should concern the improvement of financial deepening activities in terms of enhancing financial service delivery through the banks and other financial agencies to facilitate the improvements in the availability of quality financial products and credit to the private sector. The government should take steps to strengthen the quality of institutions and legal environment to foster better consumer and property rights while empowering the oversight function on banking service delivery. Finally, the government must upgrade the macroeconomic environment and social infrastructure to enhance private sector participation in the capital formation process as a way of enhancing

the contributions of globalization, financial deepening and capital market activities to the economic growth and development of the country.

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