

Towards Financial Development in Nigeria: Does Central Bank Independence Matter?

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Abstract

The Nigerian financial sector remains shallow and inefficient compared to other emerging economies. The Central Bank of Nigeria, as the apex financial regulator, is responsible for ensuring monetary stability and promoting financial development. Concerns over its independence and limited literature on the link between Central Bank Independence and financial development motivate this study. Using multiple established indexes of Central Bank Independence, including Romelli, Grilli-Masciandaro-Tabelli, and Cukierman-Webb-Neyapti, over the period 1990 to 2022, and employing Dynamic Ordinary Least Squares and ECM models, the results show a significant positive relationship between Central Bank Independence and financial development in both the short and long run. Adjustment to long-run equilibrium after short-run (about 80%) shocks is high, and findings are robust under the ARDL methodology. Granger causality confirms that Central Bank Independence drives financial development. The study recommends revising CBN laws to strengthen its independence and enhance financial sector development in Nigeria.

Keywords: Central Bank of Nigeria; Central Bank Independence; Dynamic Ordinary Least Squares; Financial Development; Nigeria.

JEL Classification: C13, E17, E31, G20

I. INTRODUCTION

Financial development is key to economic growth and development, especially of developing and emerging economies (Edo et al., 2019; Henri et al., 2019; McKinnon, 1973; Shaw, 1973). Financial development, which encapsulates financial inclusion, deepening, and efficiency, bridges the savings-investment gap, widens the array of financial products and services across varying societal strata, and ensures efficient allocation of scarce financial resources (Abusomwan & Izevbigie, 2024).

Financial development hinges on a tripod of financial inclusion, financial deepening, and financial efficiency (Estrada et al., 2015). Financial inclusion describes how available and easily accessible basic formal financial services are to people living in a society. Increased inclusion stimulates savings and encourages investment for economic expansion (Kama & Adigun, 2013). Excluding some members of the society from the financial sector breeds financial dualism with its negative effects on monetary policy and economic management (Abusomwan, 2020). A measure of financial inclusion is the number of bank branches per 100,000 adults, and it is just 4.45 in Nigeria as of 2020. In comparison with some other lower medium-income countries in Sub-Saharan Africa (SSA), the value is below that of Kenya (4.67), Ghana (6.14), Egypt (6.76), and Morocco (24.17).

The second arm of financial development is financial efficiency, which explains the ability of financial intermediaries to mobilize savings from different sources and allocate the same to more productive activities in such a way that the entire economy benefits (Gulde et al., 2006). Bank net interest margin, which measures financial efficiency, has been on a steady decline in Nigeria since 2011. The value declined from 11.92% in 2011 to merely 3.61% in 2021 (World Bank, 2022).

Financial depth, which is the third component of financial development, measures the increase in availability of and accessibility to a range of financial assets and services. It reflects the size of financial institutions and markets in an economy and represents the financial sector relative to the overall economy (Abusomwan & Izevbigie, 2024;

World Bank, 2022). Because of its empirical utility, its size, and the relative availability of data, financial depth is usually used interchangeably with financial development. A mostly used index of financial depth is the private sector domestic credit to GDP ratio (Edo et al., 2019). This is the financial resources provided by deposit money banks to the private sector as a proportion of Gross Domestic Product (GDP). Again, with private sector domestic credit assuming a value of only 11.23% in 2020, Nigeria's financial system can best be described as shallow. Its value is below that of Ghana (12.19%), Egypt (27.16%), Kenya (32.01%), South Africa (62%), and Morocco (69.92%) in 2020 (World Bank, 2022).

The three components of financial development have continued to decline since 2007. Financial inclusion index declined from 6.27 to 4.45 for the period, 2007 and 2020, respectively. The financial deepening index declined from 20.78% to 12.23% for the 2007 and 2021 periods, and the financial efficiency index declined from 6.63% to 3.61% for the same period. The decline in financial development indices should call for concerns, given the roles financial systems play in the economy.

In literature, factors that determine financial development includes financial openness (McKinnon, 1973; Shaw, 1973), increases in real GDP (Edo et al., 2019), trade openness (Ganiyu et al., 2018; Mlachila et al., 2016), internet adoption (Edo, et al., 2019), inflation (Bittencourt, 2011), foreign direct investment (Abusomwan and Izevbigie, 2024; Henri, et al., 2019; Islam, et al., 2021) and institutional variables (Aluko & Ibrahim, 2020; Nurbayev, 2017).

The role of Central Bank independence is beginning to gain momentum in empirical economic analyses especially with the recent availability of data (Darwanto, 2020; Dudchenko, 2020; Cukierman et al., 1992; Garriga, 2016; Garriga & Rodriguez, 2020). The Central Bank in any economy is the apex regulatory monetary and financial institution with the main responsibility of monetary and financial management (Abusomwan, 2019). Given their strategic functions in the economy, it is expected that Central Banks should not be tied to the aprons of the political class and by extension, the executive arm of government. Lately, the independence of the financial and monetary ombudsman in Nigeria seems to be questionable. This is evident in the manner and procedure of the abrupt removal of successive CBN Governors in Nigeria by the politicians. Not long after the current democratic administration was inaugurated, the CBN Governor was removed in June 2023 on the grounds of lack of Central Bank Independence (CBI). Issues revolving around the Central Bank's direct involvements in agricultural financing such as the Anchor Borrowers Scheme, the implementation of the ways and means to facilitate the Federal Governments unlimited desire for deficit financing, ballooning inflation, lack of transparency in the administration of the CBN, the naira redesign policy prior to the 2023 general elections and the interest of the erstwhile CBN governor, Mr. Godwin Emefiele, in participating in the elections under the platform of the ruling party while still in office were explained as the reasons for his removal (Adaji, 2024; Adetayo, 2023; Fisayo-Bambi, 2023). Interestingly, while the main reason for his removal was ascribed to lack of CBI, the process of his removal also seemed to buttress further dimensions of lack of CBI (Obiezu, 2025). In a similar manner, his predecessor, Mr. Lamido Sanusi was removed from office unceremoniously in February 2014 before the expiration of his tenure. His accusations of financial recklessness and misconduct came when he cried foul of unremitted oil revenue of about \$20 billion despite being named the governor of the year by Banker magazine in 2010. His removal had grave implications for foreign exchange, bond and money market performances at the time.

The seemingly growing lack of CBI in Nigeria and the dearth of literature in the CBI-financial development nexus necessitated this study (Okorie, 2021; Swinburne and Branco, 1991). The study is unique because it utilizes known metrics of central bank independence, namely the Romelli CBI index (Romelli, 2022), Grilli, Masciandaro and Tabelli CBI index (Grilli, Masciandaro & Tabellini, 1991), Cukierman, Webb and Neyapti CBI unweighted index (Cukierman, et al., 1992), Cukierman, Webb and Neyapti CBI weighted index (Cukierman, et al., 1992) and Romelli's monetary policy and conflict resolution dimension of CBI index (Romelli, 2022) to develop five robust long run and short run dynamic models to examine the impact of CBI on financial development in Nigeria. For the sake of data availability and the peculiarity of the estimation technique adopted by this study (Dynamic OLS), the financial depth components of financial development is examined, hence the use of private domestic credit to GDP ratio as the explained variable and the metric for financial development (Also see Chee-Hong, 2024; Edo et al., 2019; Estrada et al., 2015; Henri et al., 2019). Also, from the other variables found to determine financial development, financial openness and political right (institutional control) are utilized as the control variables for the study.

The study is structured in six sections. Section 1 is the introduction. In Section 2, the literature on the relationship between CBI and financial development are reviewed. The model and data are presented in Section 3.

Section 4 deals with the presentation of the empirical results. Policy recommendations of the study are presented in Section 5, while Section 6 concludes the study.

II. LITERATURE REVIEW

Advocacy for central bank independence dates back to 1824 when David Ricardo recommended full independence of the apex regulatory financial institution, the National Bank (Afolabi & Abumere, 2016). According to Bibow (2002), the importance of preserving unimpaired authority in the executive officials of the central bank cannot be overemphasized because their duty is to take broad and not always commercial views on policy positions. The Government is seen as welfare maximizer (focusing on output and employment) while the monetary authority seeks to maximize the 'social' welfare of the people (focusing on price stability). Inflation reduces the real wage element in the cost of production and then improves employment. Continuous increase in prices above the expected rate make rational expectation wage setters incorporate the expected inflation rate into their nominal wage demands. With information symmetry of the public of the main objective function of the monetary authority, which equates marginal gains with the costs from inflation, and given the nature of ex-post positive inflation, which maximizes welfare, there will invariably be inflation bias. Therefore, to prevent positive rates of inflation that generate costs, Hayo and Hefeker (2001) advocate the need to commit the monetary authority to a non-inflationary monetary policy by appointing someone whose preferences differ from those of welfare maximization to social welfare maximization, hence the necessity for CBI.

Akinci, Akinci and Yimaz (2015) identified three areas where CBI may matter for the freedom and stability of the financial system. First, CBI guarantees independence from political pressures from outside, which helps the central banks to be more decisive and prompt in taking decisions that will avert financial distress. Second, the time inconsistency problem in financial stability policy making is adequately resolved with CBI, and finally, CBI ensures that the problem of using financial crisis as a political tool for re-electioneering of the incumbent government is prevented. Alesina and Summers (1993) posited that independent central banks promote economic and financial stability through the reduction of risk premia inherent in interest rates. Central bank characteristics have the potentials of influencing financial development (Tayssir & Feryel, 2018).

Economic and political independence of the central bank matters in monetary policy (Debelle, 1996). Whereas economic independence is the ability of central banks to autonomously determine the use and choices of monetary policy instruments without governmental interventions, political independence describes the autonomous goal-setting ability of the central bank without the intervention of the government (Alesina & Grilli, 1992). The free lunch hypothesis states that CBI (economic and political) engenders social benefits reflected in low inflation without apparent cost (in terms of macroeconomic performance, such as lower growth or higher output volatility) (Debelle, 1996; Grilli, Masciandaro, & Tabellini, 1991). According to Rogoff (1985), monetary policy should be delegated to independent Central Bank. Independent Central Banks can focus on their primary responsibility of ensuring price stability without interference from the politicians who are mostly interested in the short-term boosting of output and employment in order to win elections. To do these, they have an unending appetite for enhanced government spending, which usually results in a budget deficit necessitating deficit financing through increased debt and/or printing more money, which in turn exacerbates price instability and inflationary pressures in the economy.

Iksan and Konishi (2022) posit that CBI consists of four components, including the central bank CEO, central bank objectives, policy formulations, and central bank lending limit policies. The central bank CEO deals with the appointment of central bank governors, the capacity of the governor to hold other offices and determination of the governing periods, and the dismissal of the central bank governor/governance. Central bank objectives relate to whether there is a single objective for the central bank, such as price stability, or the central bank is saddled with several objectives. Policy formulation refers to who formulates monetary policy, who takes the final decision on the policy directions, and the involvement of the central bank in the formulation of fiscal policy. The central bank lending limit policies reveal the limitations on the government's access to central bank lending.

According to Ingves et al. (2018), global attention to Central Bank Independence (CBI) resurfaced in the 1990s with the realization that the contributions of central banks to economic development hinge on its freedom through adequate legislation by elected representatives and its distance from the political system. They further opined that public confidence in the central bank and the overall financial system is engendered through the central bank's independence. However, there seems to be a global research bias for the CBI-inflation relations. Most studies relate

CBI to inflation and have mostly found a negative nexus between CBI and inflation (Abusomwan & Aghomo-Omon, 2024; Badea, 2018; Bandaogo, 2021; Bodea & Hicks, 2015; Borrero, 2001; Darwanto, 2020; Jacome and Piekagura, 2022; Lybek, 1999; Oloni & Adewara, 2013; Strong, 2021; Yahaya et al., 2022). However, Agoba et al. (2017) observed that the impact of CBI on reducing price instability is stronger for the developed banking sector and institutional quality.

In a panel data study of Asia-Pacific countries from 1995 to 2014, Chee-Hong (2024) found that CBI positively enhanced financial market development by employing the panel correlated standard error estimate. They adopted the Bodea and Hicks (2015) unweighted *de jure* CBI indicator, which was derived from the coding criteria set by Cukierman et al. (1992) in their analysis.

Akinci, Akinci, and Yilmaz (2015) examined the relationship between CBI, financial freedom, and economic growth of EU member countries for the 1995 to 2011 period. Employing the ARDL bounds testing technique, a statistically significant positive relationship was ascertained between CBI and financial freedom in both the short run and long run. Similarly, Aklin and Kern (2021) found quantitatively and qualitatively that CBI enhances financial deregulation such that a one-standard-deviation increase in CBI increases deregulation by about one-tenth of its standard deviation, in a study of 78 countries for the 1973 to 2009 period.

The response of the stock market to the CBI shock for 25 developing countries was examined by Anwar and Suhendra (2023). Employing panel VAR estimation technique and the Garriga (2016) CBI data set found a delayed effect of CBI to increases in the stocks traded. They concluded that it takes about six quarters for CBI to strengthen the financial market. In a similar study, Forch and Sunde (2012) found that changes in CBI enhance stock market returns more than a month after the changes for 27 emerging markets in a fixed effect panel data model for the 1988 to 2007 period. Also, Garcia and Costa (2019) found that the relationship between CBI and stock market returns was positive and significant, supporting the free-lunch hypothesis.

Bash and Al-wadhi (2023) conducted an event study on central bank independence and stock outcomes on Borsa Istanbul based on the removal of top officials of the Central Bank of Turkey by President Recep Rayyip Erdogan. Their findings revealed that CBI positively impacted cumulative abnormal returns in some parts of the events and negative effects in other parts. They concluded that political interventions in central banks could have varying impacts on stock market outcomes. Similarly, Kurihara et al. (2012) found a positive nexus between CBI and stock prices in developed economies. However, Olurin et al. (2022) discovered that whereas a negative relationship exists between central bank autonomy and stock market development in the short run, there is no evidence for a long-run relationship in Nigeria for the 1985 to 2018 period.

Employing hierarchical linear panel modeling technique, using bank-level data for fourteen years spanning 323 publicly listed banks and 40 countries, in a study of the impact of CBI on systemic risk, Andries et al. (2022) found CBI to robustly impact the contribution and exposure of banks to systemic risks.

No clear conclusions were found in the relationship between CBI and money market growth for five Western Balkans countries and five European transition countries in a study by Alishani (2012) on the effect of CBI on money market stability. However, it was identified that stable growth of money and liquidity characterizes and economic with CBI. Doumpos et al. (2024) studied large samples of commercial banks operating in various countries from 2000 to 2011. A positive impact of CBI on banking soundness was ascertained. This strongly helped in the mitigation of the adverse effects of the banking crisis. Mamoon et al. (2024), in a study of the impact of CBI and transparency on non-performing loans and economic stability in a panel data analysis of 23 developed and 16 emerging economies, found that CBI reduces the prevalence of non-performing loans. Also, Haldane (2020) opined that the supervisory and regulatory independence of central banks led to financial stability measured by non-performing loans. According to Dudchenko (2020), CBI ensured banking stability in a study of 10 developed and 10 developing countries for the 1991 to 2012 period.

From the review of literature, the relative dearth of research in the relationship between CBI and financial development in Nigeria, and the seeming erosion of the Central Bank of Nigeria independence occasioned by the intermeddling of the ousted CBN Governor, Godwin Emiefele, with the political class and his summary dismissal, in the face of hyperinflation and the falling value of the naira warrants an examination of the CBI-financial development nexus for Nigeria.

III. THE MODEL AND DATA

The theoretical underpinning of this study is based on the Free Lunch Hypothesis and the empirical findings of Mohanty (2014) and Tayssir and Feryel (2018). Debelle (1996) posited that, from empirical evidence, having an independent central bank devoid of political and economic interference seems to be a ‘free lunch’ in the long run. He further stated that on average, an independent central bank guarantees low inflation and minimizes real costs in the economy, including lower growth and output volatility (Debelle, 1996; Grilli et al., 1991). Batayneh et al. (2021) further argued that lower inflation leads to an increase in the real value of long-term returns through the reduction of cost, which represents gains that increase the real value of cash balances. CBI insulates Central banks from political and economic pressures and interferences and positions them for efficient and effective monetary management, which drives financial market development (Bernhard et al., 2002; Garriga, 2016; Rogoff, 1985; Qanas & Sawyer, 2023).

Employing the free lunch hypothesis of Debelle (1996) (also see Grilli, Masciadaro & Tabellini, 1991), adopting the frameworks put forward by Garriga (2016), Garriga & Rodriguez (2020) and Cukierman et al. (1992) and the empirical studies briefly discussed in the preceding section and modifying the financial development model by Edo, et al. (2019), the baseline model for this study is presented as;

$$FD_{PSD} = \alpha_0 + \alpha_1 CBI + \alpha_2 FO + \alpha_3 PR + \mu \quad (1)$$

Where, FD_{PSD} is financial development measured as the private domestic credit to GDP ratio. Broad money to GDP ratio (FD_{BM}) is used in place of FD_{PSD} as an alternative index of financial development for the robustness check of the baseline model. CBI is the explanatory variable of interest which represents central bank independence. Several indexes of CBI exist. They include Romelli’s Central Bank Independence index (CBI_R), Grilli, Masciadaro and Tabelli Central Bank Independence index (CBI_{GMT}), Cukierman, Webb and Neyapti Central Bank Independence unweighted index (CBI_{CWNU}), Cukierman, Webb and Neyapti Central Bank Independence weighted index (CBI_{CWNW}) and Romelli’s monetary policy and conflict resolution dimension of Central Bank Independence index (CBI_{MP}) (see Romelli, 2022; Grilli, Masciadaro & Tabellini, 1991). This study develops five models of financial development from Equation 1 by substituting each of the indexes of Central Bank Independence with the ‘CBI’ variable in Equation 1. The justification for this is to utilize known metrics of central bank independence in a robust CBI-Financial development framework for Nigeria. FO is financial openness, and PR is political right representing the institutional control variable that indicates the level of freedom of institutions, given that a free society is also reflected in the independence of the regulatory institutions, including the Central Banks. PR takes the values of 1 (free) to 7 (not free). The society loses freedom with increases in the value of PR. μ is the stochastic error term.

From the literature, CBI is expected to have a positive relationship with financial development. An increase in central bank independence devoid of political interference allows the Central Bank to focus on its primary responsibility of ensuring price stability (see Cukierman et al., 1992; Garriga & Rodriguez 2020; Yahaya et al., 2022). This is expected to stimulate financial development through higher levels of savings and minimized cost of transactions in financial markets (Abusomwan, 2019; Anyanwu, 1993; Anyanwu, 2006; Azariadis & Smith, 1996; Bittencourt, 2011; Boyd et al., 1996). Financial openness via financial liberalization is expected to enhance financial development (McKinnon, 1973; Shaw, 1973) through savings mobilization and a decline in current levels of consumption. An increase in the political right (PR) index represents a decrease in institutional freedom (Freedom House, 2022). Decrease in institutional freedom, including Central banks, results in weak institutions, which further weaken macroeconomic conditions including financial development. Therefore, PR is expected to have a negative coefficient in relation to financial sector development (see Akinleye & Adekunle, 2019). The description and measurement of the variables are presented in Table 1.

Table 1. Definition of Variables and Sources of Data used for the Regression Analysis

Variable	Definition	Source
Financial Development (FD_{PSD})	Private Sector Domestic Credit to GDP ratio	World Bank (WDI, 2024)
Financial Development (FD_{BM})	Broad Money to GDP ratio (robustness check of the baseline model)	World Bank (WDI, 2024)
Central Bank Independence (CBI_R)	Extended Romelli’s Central Bank Independence index (0;1)	Romelli (2022)

Central Bank Independence (CBI_GMT)	Extended Grilli, Masciandaro and Tabelli Central Bank Independence index (0;1)	Grilli, Masciandaro and Tabellini (1991); Romelli (2022)
Central Bank Independence (CBI_CWNU)	Extended Cukierman, Webb and Neyapti Central Bank Independence unweighted index (0;1)	Cukierman, Webb and Neyapti (1992); Romelli (2022)
Central Bank Independence (CBI_CWNW)	Extended Cukierman, Webb and Neyapti Central Bank Independence weighted index (0;1)	Cukierman, Webb and Neyapti (1992); Romelli (2022)
Central Bank Independence (CBI_MP)	Extended Romelli's monetary policy and conflict resolution dimension of Central Bank Independence index (0;1)	Romelli (2022)
Financial Openness (FO)	Total financial assets plus financial liabilities (% of GDP)	World Bank (WDI, 2024)
Political Right (PR)	Freedom of institutions and individuals [ranging from 1 - 7, free(1), not free(7)]	Freedom House (2022)

The data utilized by the study spanned from 1980 to 2022 based on the availability of the various CBI data.

Methods of Data Analysis

The Dynamic Ordinary Least Squares (DOLS) technique developed by Stock and Watson (1993) is chosen as the method for the long-run data analysis, while the Error Correction Mechanism (DOLS_ECM) is adopted for the short-run dynamic modeling.

The DOLS Model

The choice of the DOLS technique is predicated on its ability to provide estimates that are robust to serial correlation and endogeneity concerns existential for co-integrating relationships (Abusomwan & Ohion, 2022). The DOLS model is constructed by transforming the long-run model in Equation 1 to a dynamic one (Stock & Watson, 1993).

The Stock and Watson (1993) DOLS model for the analysis of the relationships in the model is specified in Equation 2.

$$FD_{PSD} = \alpha_0 + \alpha_1 CBI + \alpha_2 FO + \alpha_3 PR + \sum_{i=1}^3 \sum_{j=-q,p}^2 \gamma_i \Delta X_{t-j} + \mu \quad (2)$$

The variables in Equation 2 are as defined in Equation 1. The vector of the explanatory variables is defined by X (CBI, FO, and PR). It is expressed in a dynamic form by the introduction of the lag difference operator (Δ). $-q$ denotes the lead while p represents the lag. The inclusion of the lags and leads is to make the errors independent (see Edo, et al., 2019). The long-run coefficients of the explanatory variables are α_i ($i = 1, 2, 3$). They explain the responsiveness of changes in FD_{PSD} to changes in the explanatory variables. γ_i (1, 2, 3) represent the coefficients of the first difference variables.

The DOLS_ECM Model

The DOLS Error Correction Mechanism (DOLS_ECM) is estimated for the short-run dynamic CBI_financial development nexus for Nigeria. It also becomes necessary to ascertain the speed of adjustment to the long-run equilibrium of the DOLS CBI-financial development nexus. As a precondition for ECM, tests for stationarity and co-integration are required. When the series are stationary at the same order, e.g., $I(0)$ or $I(1)$, the hypothesis of a unit root is rejected, and the likelihood of co-integration of the variables exists. Equations 3 and 4 show the Augmented Dickey Fuller unit root test specifications for intercept only and for trend and intercept, respectively.

$$\Delta X_t = \beta_0 + \tau X_{t-1} + \delta_i \sum_{i=1}^p \Delta X_{t-p} + \varepsilon_t \quad (3)$$

$$\Delta X_t = \beta_0 + \beta_1 t + \tau X_{t-1} + \delta_i \sum_{i=1}^p \Delta X_{t-p} + \varepsilon_t \quad (4)$$

The co-integration tests proposed by Johansen (1988), Johansen and Juselius (1990), and Johansen (1992), to ascertain the long-run relationship among the variables employed by the study, is also adopted. The ECM is specified in Equation 5.

$$\Delta FD_{PSD_t} = \pi + \sum_{i=1}^m \sigma_i \Delta CBI_{t-1} + \sum_{i=1}^n \lambda_i \Delta FO_{t-1} + \sum_{i=1}^p \tau_i \Delta PR_{t-1} + \psi ecm(-1) + \mu_i \quad (5)$$

The variables in Equation 5 (the short-run dynamic model) are as presented in the long run model (Equation 1). $t - 1$ represents a one period lag of the explanatory variables. The lag operator is represented by Δ , $ecm(-1)$ is the one period lag of the residual from Equation 2 (DOLS Models), π is the constant term, σ, λ and τ are the short-run dynamic parameters with expected signs as in the equation, while ψ is the speed of adjustment to the long-run equilibrium from the short-run disequilibrium. ψ is expected to be statistically significant and with a negative value.

The ARDL Model

The Autoregressive Distributed Lag is the regression technique utilized for the robustness check of the DOLS Models. It is also robust for endogeneity concerns, especially in small sample estimation, and serial correlation concerns. The technique accommodates mixed order of stationarity and also guarantees unbiased and non-spurious estimates (Pesaran & Shin, 2002; Pesaran et al., 2000; Phillips, 1995).

The descriptive statistics of the main variables used for the regression analysis is presented in Table 2.

Table 2. Descriptive Statistics of Variables

Variable	Observation	Mean	Median	Standard Deviation
Financial Development (FD_PSD)	32	17.742	15.845	5.566
Central Bank Independence (CBI_R)	32	0.623	0.610	0.017
Financial Openness (FP)	32	78.380	63.753	31.566
Political Right (PR)	32	4.594	4.000	1.215

Private sector domestic credit to GDP ratio averaged 17.74% for the period 1980 to 2022 with standard revealing a relatively low level of financial development in Nigeria. The aggregate index for Central Bank Independence (CBI_R) is 0.623 indicates a relatively moderate Central Bank of Nigeria Independence. Political Right (PR) has a mean of 4.59 which shows that the institutions in Nigeria lack quality and are generally weak. CBI_R showed the least variation from its mean.

Estimation Procedure

In this section, the procedure utilized by this study to analyze the relationship between CBI and financial development in Nigeria is presented. The first step is to conduct the unit root test to ascertain the stationarity of the data. The Augmented Dickey Fuller test is conducted for ‘intercept only’ and ‘trend and intercept’. This is necessary to determine the most suitable estimation technique (Dickey & Fuller, 1981). Secondly, the Johansen cointegration test is carried out to ascertain if a long run relationship exists amongst the variables (Johansen, 1988). The third step is to estimate the DOLS model which is suitable when the data are stationary in the same order of integration, either $I(0)$ or $I(1)$ and cointegrated. The DOLS model is used to determine the long run relationship between CBI and financial development. The short run relationship between CBI and financial development is ascertained using the DOLS_ECM technique in the fourth step of the estimation. The adjustment to the long run equilibrium is also ascertained here. The fifth step will be to check for the robustness of the DOLS models. This is first done by examining the diagnostics of the DOLS long run and dynamic short run models. This includes the structural stability, serial correlation and heteroskedasticity tests (see Edo et al., 2019). Furthermore, the robustness of the DOLS models is checked by estimating ARDL and Granger Causality models and comparing same with the DOLS results (see Pesaran et al., 2000; Phillips, 1995).

IV. EMPIRICAL RESULTS

Unit Root and Cointegration Tests

The diagnostics required before the DOLS and DOLS_ECM models are analyzed are the tests of stationarity (Unit Root Test) and co-integration. The Augmented Dickey Fuller test for unit root is presented in Table 3 while the Johansen co-integration test is shown in Table 4.

Table 3: Unit Root Test Result (Intercept)

Variable	AUGMENTED DICKEY FULLER TEST					
	LEVELS			FIRST DIFFERENCE		
	Test Stat.	5% Critical Value	Remark	Test Stat.	5% Critical Value	Remark
<i>FD PSD</i>	-1.053	-2.960	Not Stationary	-4.631	-2.964	Stationary I(1)
<i>FD MS</i>	-2.870	-2.964	Not Stationary	-4.635	-2.968	Stationary I(1)
<i>CBI R</i>	-2.602	-2.960	Not Stationary	-7.625	-2.964	Stationary I(1)
<i>CBI GMT</i>	-1.154	-2.960	Not Stationary	-5.334	-2.964	Stationary I(1)
<i>CBI CWNNU</i>	-2.386	-2.960	Not Stationary	-4.325	-2.998	Stationary I(1)
<i>CBI CWNW</i>	-2.199	-2.960	Not Stationary	-3.683	-2.998	Stationary I(1)
<i>CBI MP</i>	-0.904	-2.960	Not Stationary	-5.477	-2.964	Stationary I(1)
<i>FO</i>	-1.553	-2.960	Not Stationary	-8.390	-2.972	Stationary I(1)
<i>PR</i>	-1.557	-2.960	Not Stationary	-4.749	-2.964	Stationary I(1)

The Augmented Dickey Fuller stationarity tests in Table 3 (Intercept) and Table 4 (Trend and Intercept) clearly show that whereas all the variables were not stationary at levels, they became stationary at first difference [I(1)] allowing for the conduct of co-integration test (Table 5) and the use of the DOLS and ARDL estimation methods (Tables 6, 7 and 8).

Table 4: Unit Root Test Result (Trend and Intercept)

Variable	AUGMENTED DICKEY FULLER TEST					
	LEVELS			FIRST DIFFERENCE		
	Test Stat.	5% Critical Value	Remark	Test Stat.	5% Critical Value	Remark
<i>FD PSD</i>	-2.241	-3.563	Not Stationary	-4.562	-3.568	Stationary I(1)
<i>FD MS</i>	-3.898	-3.568	Stationary I(0)	-4.512	-3.574	Stationary I(1)
<i>CBI R</i>	-3.330	-3.563	Not Stationary	-7.335	-3.568	Stationary I(1)
<i>CBI GMT</i>	-1.902	-3.563	Not Stationary	-5.269	-3.568	Stationary I(1)
<i>CBI CWNNU</i>	-6.675	-3.612	Stationary I(0)	-4.407	-3.622	Stationary I(1)
<i>CBI CWNW</i>	-2.154	-3.563	Not Stationary	-3.679	-3.622	Stationary I(1)
<i>CBI MP</i>	-2.056	-3.563	Not Stationary	-5.378	-3.568	Stationary I(1)
<i>FO</i>	-2.422	-3.574	Not Stationary	-6.365	-3.568	Stationary I(1)
<i>PR</i>	-2.308	-3.563	Not Stationary	-4.664	-3.568	Stationary I(1)

The Johansen cointegration test in Table 5 reveals that a long-run relationship exists amongst central bank independence, financial openness, political right, and financial development in Nigeria since the hypothesis that there

is no co-integrating equation(s) is rejected by the trace (71.326) and maximum eigenvalue (45.618) statistics with 0.05 critical values of 47.856 and 27.584, respectively.

Table 5: Johansen Co-integration Test Result

No. of Cointegrating Equation(s)	Eigenvalue	Trace		Maximum Eigenvalue	
		Trace statistic	0.5 critical value	Max-Eigen Statistic	0.5 critical value
None*	0.781	71.326*	47.856	45.618*	27.584
At most 1	0.426	25.708	29.797	18.596	21.134
At most 2	0.185	7.112	15.495	6.138	14.265
At most 3	0.032	0.974	3.841	0.974	3.841

Given that the series employed by the study are stationary and that the variables are co-integrated, the DOLS and DOLS_ECM regression can be conducted and analyzed (Stock & Watson, 1993).

The DOLS Result

The DOLS estimation is undertaken to analyze the long run CBI-Financial development nexus for Nigeria (Table 6). For a holistic presentation of the CBI-financial development relations, five models, capturing the relationships between the five known metrics of CBI, and financial development are presented (see Table 1 for the variable description and measurement).

Employing CBI_R, CBI_GMT, CBI_CWNU, CBI_CWNW and CBI_MP as indexes for central bank independence in Models 1 – 5 respectively, there is abundant evidence that a significant positive relationship exists between CBI and financial development in Nigeria (see Table 6). The coefficients and the t-statistics of CBI_R (422.822, 9.194), CBI_GMT (73.379, 4.490), CBI_CWNW (85.680, 3.06) and CBI_MP (46.100,) reveal a significant impact at the 1 percent level while those of CBI_CWNU (99.293, 2.600) shows an impact at the 5% level of significance. This implies that enhancing CBI, especially via the political and financial independence in the formulation and implementation of monetary policy will no doubt enhance financial development in Nigeria. This is in line with the a-priori expectation of this study and in support of the works of Garriga (2020), Jacome and Pienknagura (2022) and Yahaya et al. (2022). The result is intuitively plausible given that the enhancement of CBI assures of non-political interferences by the political class and allows the Central Bank of Nigeria to focus on its primary mandate of price stability. This no doubt enhances financial stability, financial inclusion, financial efficiency and financial depth which are the pillars of financial development (Abusomwan and Izevbogie, 2024; Bittencourt, 2011; Khan et al, 2001).

Table 6: The Dynamic Ordinary Least Squares Regression Results

Explanatory Variable	Dependent Variable is <i>FD_PSD</i>				
	(1)	(2)	(3)	(4)	(5)
Central Bank Independence (CBI_R)	422.822*** (9.194)				
Central Bank Independence (CBI_GMT)		73.379*** (4.490)			
Central Bank Independence (CBI_CWNU)			99.293** (2.600)		
Central Bank Independence (CBI_CWNW)				85.680*** (3.060)	
Central Bank Independence (CBI_MP)					46.100*** (8.511)

<i>Financial Openness (FO)</i>	0.065*	-0.023	5.189**	-0.083	0.065*
	(2.175)	(-0.467)	(2.47)	(-1.333)	(2.052)
<i>Political Right (PR)</i>	-6.874**	-8.146***	9.376***	-8.343	-6.572*
	(-2.363)	(-3.39)	(4.96)	(-1.000)	(-2.166)
<i>Constant</i>	-241.113***	7.838	-23.750	-13.207	1.435
	(-8.513)	(1.341)	(-1.172)	(-0.930)	(0.449)
DIAGNOSTICS					
<i>Stationarity Test of DOLS Residuals</i>	-6.332	-5.071	-4.595	-4.576	-6.136
	{2.986}	{-2.986}	{-2.986}	{-2.986}	{-2.986}
<i>Serial Correlation Test (F-statistic)</i>	2.075	1.607	1.692	1.534	1.922
	[0.207]	[0.276]	[0.261]	[0.290]	[0.226]
<i>Heteroskedasticity Test (F-statistic)</i>	0.196	0.490	0.548	0.483	0.205***
	[0.998]	[0.900]	[0.862]	[0.905]	[0.998]
<i>R-Squared</i>	0.9890	0.9733	0.9419	0.9525	0.9888
<i>Adjusted R-Squared</i>	0.9645	0.9128	0.8114	0.8466	0.9637
<i>F-statistic</i>	40.221***	16.111***	7.215***	8.913***	39.317***
<i>Observations</i>	30	30	30	30	30

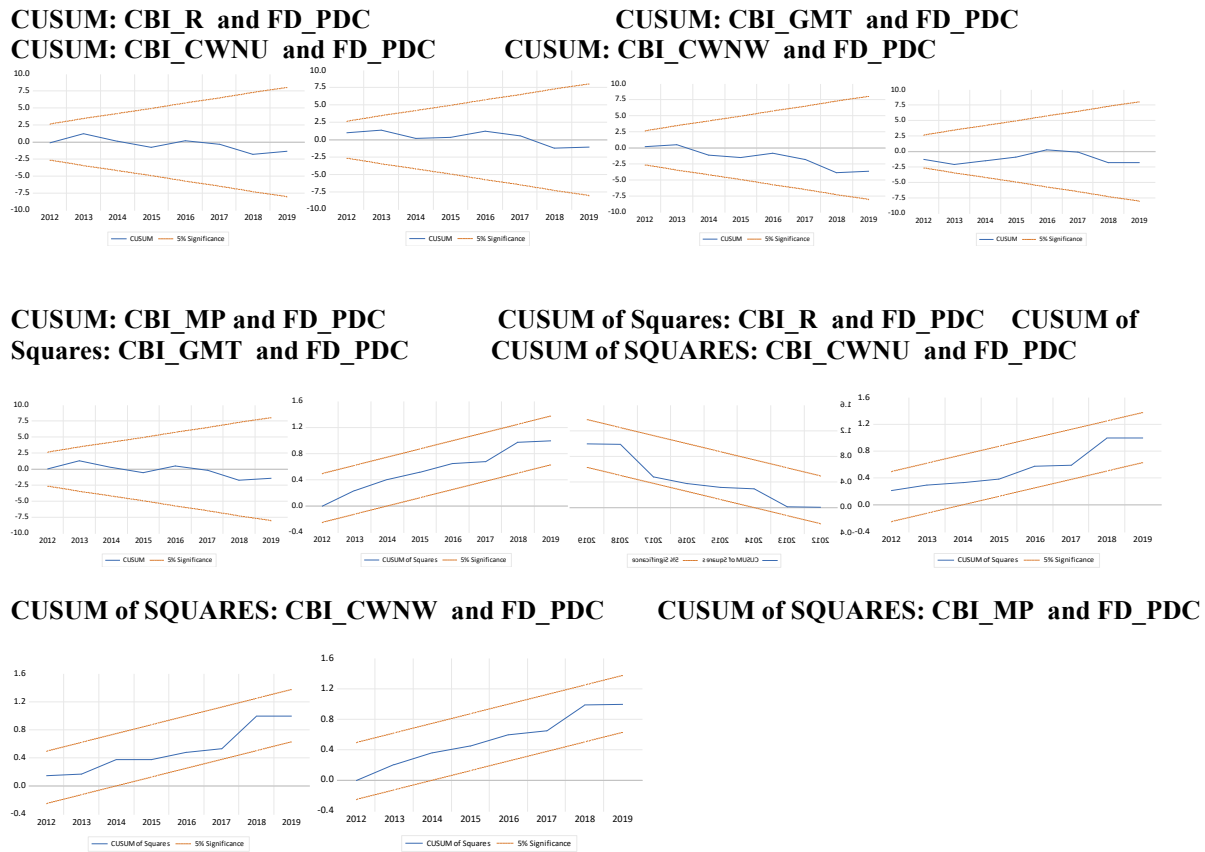
Note: t-statistics are in parenthesis; Model (1) is the baseline model which employs the Romelli CBI index; Model (2) utilizes the extended Grilli, Masciandaro and Tabelli (GMT) CBI index; Model (3) uses the extended Cukierman, Webb and Neyapti unweighted CBI index; Model (4) employs the extended Cukierman, Webb and Neyapti weighted CBI index; and in Model (5) the disaggregated component of Romelli CBI which captures CBI with respect to the formulation of monetary policy is utilized. Values in ‘[]’ are probabilities of the F-statistic at the 5% level of significance.

(***) [**] and {*} denote significance at the 0.01, 0.05 and 0.10 levels respectively

Source: Authors' Calculations (2026)

The results also confirm a long-run significantly negative nexus between lack of political freedom and financial development in Nigeria mostly at the 1 percent level of significance (given that higher values of PR connote reduced political freedom individually and in the institutions of governance). This means that in the long run institutional quality, evidenced by the reduction of PR value, enhances financial development in Nigeria. This is consistent with the findings of Abusomwan and Izevbogie (2024) and Khan, et al. (2019). Financial openness was found not to be a good predictor of financial development in Nigeria for the period under study. This is evident from the coefficients of financial openness in Models 1 – 5 (see Table 6). The DOLS residuals pass the stationarity test for all the Models. There are no evidence of serial correlation and heteroskedasticity in the models. The CUSUM and CUSUM of squares tests reveals structural stability of the Models (see Figure 1). Therefore, the DOLS results are reliable for policy considerations.

FIGURE 1: CUSUM and CUSUM of Squares Test



The DOLS_ECM Results

The short run dynamic relationship between the CBI and financial development is presented by the DOLS Error Correction Model (ECM) in Table 7.

Table 7: The DOLS_ECM Results

Explanatory Variable	Dependent Variable is ΔFD_PSD				
	(1)	(2)	(3)	(4)	(5)
ΔCBI	174.910*** (3.504)	36.775** (2.868)	40.006* (1.809)	39.674** (2.199)	19.434*** (3.471)
$\Delta CBI(-1)$	245.575*** (4.810)	49.169*** (3.786)	52.243** (2.444)	51.388*** (2.910)	28.286*** (4.764)
$\Delta CBI(-2)$	75.658 (0.187)	28.615* (2.043)	47.065* (2.025)	40.874** (2.127)	8.406 (0.358)
ΔPR	-7.623*** (-3.171)	-8.298*** (-2.937)	-7.463** (-2.175)	-2.491 (-0.865)	-7.623*** (-3.141)
$\Delta PR(-1)$	1.629 (0.767)	-1.544 (-0.613)	-2.352 (0.766)	1.629*** (0.767)	1.629*** (0.759)
$\Delta PR(-2)$	-8.255*** (-3.474)	-10.994*** (-3.606)	-12.700*** (-3.185)	-12.508*** (-3.402)	-8.255*** (-3.441)
ΔFO	0.062 (1.639)	0.039 (0.694)	0.027 (0.506)	0.024 (0.467)	0.062 (1.623)
$ECM(-1)$	-0.858*** (-2.989)	-0.843** (-2.529)	-0.704** (-2.704)	-0.730** (-2.651)	-0.854*** (-2.901)
Constant	-0.256 (-0.501)	-0.208 (-0.486)	-0.100 (-0.213)	-0.022 (-0.049)	-0.256 (-0.681)
DIAGNOSTICS					
Serial Correlation Test (F-statistic)	1.679 [0.218]	5.062 [0.020]	1.101 [0.356]	2.318 [0.131]	1.917 [0.179]
Heteroskedasticity Test (F-statistic)	0.729 [0.665]	0.587 [0.776]	0.931 [0.516]	0.652 [0.725]	0.768 [0.635]
R-Squared	0.7923	0.7203	0.6317	0.6627	0.7882
Adjusted R-Squared	0.7000	0.5960	0.4680	0.5128	0.6941
F-statistic	8.584***	5.795***	3.859***	4.420***	8.375***
Observations	30	30	30	30	30

Note: t-statistics are in parenthesis; Model (1) is the baseline model which employs the Romelli CBI index; Model (2) utilizes the extended Grilli, Masciandaro and Tabelli (GMT) CBI index; Model (3) uses the extended Cukierman, Webb and Neyapti unweighted CBI index; Model (4) employs the extended Cukierman, Webb and Neyapti weighted CBI index; and in Model (5) the disaggregated component of Romelli CBI, which captures CBI with respect to the formulation of monetary policy is utilized. Values in ‘[]’ are probabilities of the F-statistic at the 5% level of significance.

(***) [**] and {*} denote significance at the 0.01, 0.05, and 0.10 levels, respectively

Source: Authors' Calculation (2026)

From Table 7, a short run relationship evidently exists between CBI and financial development in Nigeria. The one period lagged Error Correction Term [ECM (-1)] is significant and correctly signed indicating that on the average, about 80% of the disequilibrium in the previous period is corrected in the current period. The short run dynamic Models are also devoid of serial correlation and heteroskedasticity which make their interpretations non-spurious and therefore, good for policy making.

Table 8: Granger Causality Test Results

Null Hypothesis	Observation	F-statistic	Probability
<i>Central Bank Independence(CBI_R) does not granger cause financial development (FD PSD)</i>	30	8.557***	0.0015
<i>Central Bank Independence(CBI_MP) does not granger cause financial development (FD PSD)</i>	30	8.801***	0.0013

(***) [**] and {*} denote significance at the 0.01, 0.05 and 0.10 levels respectively

The robustness of the DOLS result is shown by the Granger causality, the ARDL results and the results of the DOLS by utilizing broad money to GDP ratio as an alternative proxy for financial development. The results are presented in Tables 8, 9 and 10 respectively. It is evident from Table 8 that, as it was in the long run DOLS results, CBI granger causes financial development in Nigeria at the one percent level of significance. The line of causation is from central bank independence to financial development and not the other way. This is evident for the Romelli CBI and Monetary Policy CBI indexes. The robustness of the DOLS result is further ascertained by the ARDL results in Table 9. All the known metrics of CBI (CBI_R, CBI_GMT, CBI_CWNU, CBI_CWNW and CBI_MP) significantly enhanced financial development in Nigeria for the period under review, at the 1% level of significance, in the absence of serial correlation and heteroskedasticity and after passing the bounds test of cointegration (See Table 9).

Table 9: The ARDL Results (Robustness Check of the DOLS Models)

<i>Explanatory Variable</i>	<i>Dependent Variable is FD_PSD</i>				
	(1)	(2)	(3)	(4)	(5)
<i>CBI_R</i>	388.062*** (14.436)				
<i>CBI_GMT</i>		82.931*** (14.436)			
<i>CBI_CWNU</i>			81.354*** (2.845)		
<i>CBI_CWNW</i>				75.253*** (3.444)	
<i>CBI_MP</i>					49.975*** (28.756)
<i>FO</i>	0.073*** (6.991)	0.027 (1.670)	-0.117** (-2.331)	-0.090* (-1.898)	0.071*** (7.900)
<i>PR</i>	-9.915*** (-8.349)	-14.487*** (-7.376)	-8.122 (-1.328)	-8.578*** (-6.595)	-10.797*** (-9.960)
<i>Constant</i>	-215.165*** (-18.445)	10.327*** (3.578)	-10.809 (-0.703)	-5.472 (-0.481)	6.006*** (4.118)
DIAGNOSTICS					
<i>F-Bounds Test [Lower bound is 2.79; Upper bound is 3.67at 5% Level of significance]</i>	20.775	8.579	4.921	5.502	14.378
<i>Serial Correlation Test (F-statistic)</i>	0.784	0.213	1.417	1.576	0.219

	[0.471]	[0.810]	[0.265]	[0.230]	[0.805]
<i>Heteroskedasticity Test (F-statistic)</i>	2.214	2.933	0.675	0.688	1.012
	[0.069]	[0.022]	[0.671]	[0.661]	[0.468]
<i>R-Squared</i>	0.9752	0.9558	0.9204	0.9250	0.9813
<i>Adjusted R-Squared</i>	0.9657	0.9360	0.8997	0.9054	0.914
<i>F-statistic</i>	103.075***	48.091***	44.340***	47.276***	99.657***
<i>Observations</i>	30	30	30	30	30

Note: t-statistics are in parenthesis; Model (1) is the baseline model which employs the Romelli CBI index (CBI_R); Model (2) utilizes the extended Grilli, Masciandaro and Tabelli CBI index (CBI_GMT); Model (3) uses the extended Cukierman, Webb and Neyapti unweighted CBI index (CBI_CWNU); Model (4) employs the extended Cukierman, Webb and Neyapti weighted CBI index (CBI_CWNW); and in Model (5) the disaggregated component of Romelli CBI index which captures CBI with respect to the formulation of monetary policy (CBI_MP) is also utilized. Values in ‘[]’ are probabilities of the F-statistic at the 5% level of significance. (***) [**] and [*] denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

As expected, institutional quality (PR) and financial openness (FO) also significantly enhanced financial deepening.

In Table 10, broad money to GDP ratio is used as a proxy for financial development as a replacement for private sector credit to GDP ratio used in the baseline models. Again, the results confirm the robustness of the baseline model and reveal a highly significant relationship between the various metrics of central bank independence and financial development in Nigeria.

Table 10: The Dynamic Ordinary Least Squares Regression Results using Broad Money to GDP ratio as Proxy for Financial Development

<i>Explanatory Variable</i>	<i>Dependent Variable is FD_BM</i>				
	(1)	(2)	(3)	(4)	(5)
<i>Central Bank Independence (CBI_R)</i>	336.093*** (5.366)				
<i>Central Bank Independence (CBI_GMT)</i>		47.116** (2.380)			
<i>Central Bank Independence (CBI_CWNU)</i>			18.902*** (8.044)		
<i>Central Bank Independence (CBI_CWNW)</i>				15.664*** (6.887)	
<i>Central Bank Independence (CBI_MP)</i>					7.268*** (4.289)
<i>Financial Openness (FO)</i>	0.138*** (3.270)	0.070 (1.153)	-0.024*** (-5.514)	-0.022*** (-4.069)	-0.005 (-0.521)
<i>Political Right (PR)</i>	-3.962*** (-4.985)	-3.788** (-2.558)	-0.029 (0.229)	0.022 (0.148)	0.151 (0.737)
<i>Constant</i>	-194.965*** (-4.913)	7.248*** (9.998)	0.808 (0.632)	3.022** (2.596)	6.883*** (7.068)

DIAGNOSTICS					
<i>Stationarity Test of DOLS Residuals</i>	-5.303	-4.443	-3.311	-3.594	-5.083
	{2.972}	{-2.972}	{-2.976}	{-2.976}	{-2.986}
<i>Serial Correlation Test (F-statistic)</i>	0.052	0.400	0.846	0.615	0.386
	[0.949]	[0.683]	[0.469]	[0.568]	[0.691]
<i>Heteroskedasticity Test (F-statistic)</i>	0.821	0.386	0.240	0.290	0.601
	[0.657]	[0.962]	[0.995]	[0.988]	[0.829]
<i>R-Squared</i>	0.9833	0.9864	0.9912	0.9901	0.9823
<i>Adjusted R-Squared</i>	0.9527	0.9594	0.9752	0.9703	0.9461
<i>F-statistic</i>	28.576***	36.425***	59.930***	50.025***	27.412***
<i>Observations</i>	30	30	30	30	30

Note: t-statistics are in parenthesis; Model (1) is the baseline model which employs the Romelli CBI index; Model (2) utilizes the extended Grilli, Masciandaro and Tabelli (GMT) CBI index; Model (3) uses the extended Cukierman, Webb and Neyapti unweighted CBI index; Model (4) employs the extended Cukierman, Webb and Neyapti weighted CBI index; and in Model (5) the disaggregated component of Romelli CBI which captures CBI with respect to the formulation of monetary policy is utilized. Values in ‘[]’ are probabilities of the F-statistic at the 5% level of significance. Values in ‘{}’ are critical values of t-statistics at the 5% level of significance (***) [**] and {*} denote significance at the 0.01, 0.05, and 0.10 levels, respectively

Source: Authors' Calculations (2026).

V. POLICY RECOMMENDATIONS

This study has revealed that central bank independence significantly enhances financial development in Nigeria from the long-run DOLS and short-run dynamic DOLS_ECM models, with a high speed of adjustment to equilibrium in the event of a temporary disturbance. To this end, this study recommends that central bank independence should be vigorously pursued through;

- Legislation that prohibits the executive arm from interfering with the matters of monetary policy formulation and implementation.
- Tightening the selection process of the Central Bank Governor to ensure that: the CBN Governor is apolitical; has no future political ambition; is well grounded in matters of monetary policy; is not solely selected by the President; is selected from one of several applications for the position, and adequately screened to ensure that the best of the candidates is selected.
- The pursuit and implementation of the financial independence of the Central Bank of Nigeria
- Ensuring that the legal and judicial institutions are cleansed of executive manipulations and interferences.
- The strengthening of the institutions responsible for the rule of law, governance, and political processes to engender investors' confidence in the economy for productivity growth rather than in nominal money.

VI. CONCLUSION

The long-run and short-run dynamic CBI-financial development nexus is empirically examined by this study against the backdrop of the persistent and hyperinflation currently pervading the Nigerian economy. The study employed robust DOLS model and DOLS_Error Correction Mechanism for the long run and short run dynamic estimations, respectively, on the data spanning 1980 to 2022 utilizing known metrics of CBIs including the Romelli CBI index, extended Grilli, Masciandaro and Tabelli CBI index, extended Cukierman, Webb and Neyapti unweighted CBI index and Romelli CBI index which captures CBI with respect to the formulation of monetary policy (CBI_MP). The DOLS and ECM results revealed a highly significant and positive CBI-financial development relation implying that enhancing central bank independence in Nigeria deepens the financial system and ensures financial stability and

efficiency in Nigeria. This was further buttressed by a robust ARDL estimation and the Granger causality test results. The diagnostics were very good with high coefficients of determination, good overall significance of the models, absence of serial correlation and heteroskedasticity and a guaranteed stability via the CUSUM and CUSUM of squared results for both the long run and short run dynamic analyses. In accordance with expectations, political right (the control variable for quality of institutions) was found to also enhance financial development significantly. Financial openness revealed mixed results for the DOLS and ARDL models respectively. It is recommended that central bank independence should be vigorously pursued through legislations that will further divorce the CBN from the aprons of the executive arm of government in Nigeria to allow it focus on its core mandate of monetary and financial stability.

*All authors declare that they have no conflicts of interest.

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