Economics and Finance Research

AIJEFR VOL 5 NO 1 (2022) P-ISSN 2642-2867 E-ISSN 2642-2875

Available online at www.acseusa.org
Journal homepage: https://www.acseusa.org/journal/index.php/aijefr
Published by American Center of Science and Education, USA

IMPACT OF FINANCIAL STABILITY ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA

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ARTICLE INFO

Article History:

Received: 03 February 2022
Accepted: 27 March 2022
Online Publication: 04 April 2022

Keywords:

ARDL, Economic Growth
Financial Development
Financial Stability, Nigeria

JEL Classification Codes:

E44, G20, O40

ABSTRACT

This study investigates the impact of financial stability on economic growth in Nigeria by employing the Autoregressive Distributed Lag (ADRL) technique using time series data from Q1, 2006-Q4, 2020. Real GDP is the experimental variable and proxy for economic growth, while financial stability is measured by capital adequacy, non-performing loans, liquidity ratios and return on assets of the banking sector as well as the All-share Index of the stock market. The results indicate that capital adequacy, non-performing loans and liquidity ratios impact negatively on economic growth. The All-share Index, however, reveals a positive and significant relationship with growth. The implication is that financial stability policy needs to be complemented by other financial development objectives in order to stimulate economic growth. The data utilised for the study is limited to the banking sector and the capital market, which dominate the financial sector in Nigeria. The study contributes to existing research as it offers new insight into the relationship between key measures of financial stability and economic growth in Nigeria considering that few studies have been carried out in this area. It established a negative relationship between financial stability and economic growth in Nigeria.

INTRODUCTION

Financial and monetary stability are considered to be of critical importance to the efficient and effective functioning of a market-based economy as they provide the rationale for planning and allocation of scarce resources in the real sector. In recent times, policy concerns and emphasis on studies related to financial stability took a heightened dimension following the aftermath of the 2007/08 global financial crisis. The crisis reaffirmed the importance of ongoing assessment of the indicators of financial stability by the authorities, while also elevating the criticality of the roles of liquidity and asset quality in ensuring financial stability. As observed by Haan et al. (2009) maintaining financial stability is primarily concerned with systemic risks, which describe events that can trigger a loss of economic value or confidence, thereby increasing uncertainty about, a substantial portion of the financial system that is serious enough to have significant adverse effects on the real economy. In addition to preventing systemic risks, maintaining financial stability aims at taking the necessary steps to restore the stability of the financial system after a crisis has occurred.

Claus et al. (2004) posit that the role of financial systems, which comprise financial markets and financial intermediaries, in economic growth, is critical. They argue that financial systems can lead to a more efficient allocation of resources because they reduce the costs of moving funds between borrowers and lenders and help overcome an information asymmetry between them. The authors further contend that if a financial system does not function well, the economy will not operate efficiently and economic growth will be negatively affected. This situation is attributable to information asymmetry arising between borrowers and lenders. Imperfect information can lead to a lack of market coordination (Akerlof, 1970). Financial systems are, therefore, the market's response to the likelihood of poor coordination between lenders and borrowers as they provide the necessary platforms for efficient and effective financial intermediation.

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https://doi.org/10.46545/aijefr.v5i1.245

To cite this article: Amali , E. ., Igwe , G. U. ., & Oballum, C. E. . (2022). IMPACT OF FINANCIAL STABILITY ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA . *American International Journal of Economics and Finance Research, 5*(1), 1–12. https://doi.org/10.46545/aijefr.v5i1.245

A sound, efficient and resilient financial system is critical to economic growth because it enhances the economic performance of the players and improves the overall welfare of the people. It provides a platform for financial institutions and markets to help allocate resources to entities that are potentially more productive in investing those resources (CBN, 2017). It has been established that only stable, well-functioning financial systems, can support economic activity and growth as unstable or crisis-prone financial systems have been shown to undermine economic growth (Somnez & Uysal, 2018; Wang et al. 2019; Eweke, 2019). The ability of the financial system to continue to sustain financial intermediation and perform other critical functions to the economy indicates system stability. Notwithstanding the high importance of financial stability to the economy, the concept has been less understood and only gained global attention following the 2007/08 global financial crises that caused a global liquidity dry-up and credit squeeze. Yet financial development has long been credited with playing a significant role in the differences and sustainability of economic growth among countries and explaining the huge developmental gap between developed high-income countries and developing low-medium income countries. Nigeria falls within the low-income developing countries, with the economy witnessing significant fluctuations in the rate of economic growth at different times. At the same time, the country has passed through multiple periods of financial instability evidenced by high incidences of bank distress, bank failures, stock market crashes and government bailouts of troubled banks.

Since the beginning of this decade, more central banks have enshrined financial stability as part of their core mandates following the aftermath of the global financial crisis. In spite of the critical role of financial systems on economic growth, the impact of financial stability on the growth of the Nigerian economy has not been widely investigated in the literature, although few studies have been carried out on banking stability and economic growth using data covering up to 2016. The current study contributes to the literature by extending the scope of prior studies to include the capital market and updating the data to 2020. In addition, unlike previous studies, this study is based on quarterly data.

The objective of the study, therefore, is to evaluate the impact of financial stability on economic growth and the link between the two important economic performance indicators in the context of Nigeria during the 15-year period, January 2006 to December 31, 2020. The study hypothesized that capital adequacy ratio and non-performing loan ratio of the banking sector, being the key indicators of financial stability, have no impact on economic growth in Nigeria.

The study is organized into five chapters. Following the introduction, Section 2 examines the theoretical and empirical literature on the relationship between financial stability and economic growth, while Section 3 discusses the methodology. Section 4 presents the data analysis and discussion of the results. Finally, Section 5 concludes and proffers policy recommendations.

LITERATURE REVIEW

Theoretical Framework

The underpinning theory of this study is the virtuous-unvirtuous cycle (VUC) theory of the finance-economic growth nexus as propounded by Lauretta et al. (2016). They argue that financial crises, which result from unmitigated financial fragility, have tended to reoccur with increasing frequency since the 1980s. They find that financial crises are endogenously generated Originate-To-Distribute (OTD) model within the new finance paradigm. They contend that good finance ensures the proper allocation of financial resources, the fair distribution of wealth, and positive economic growth (the virtuous cycle). Conversely, bad finance captures part of the created wealth and aided by a highly technologically advanced financial system with the ability to create money out of nothing, it over time drags the economy into recession or negative growth, destroying wealth and consequently social welfare (the unvirtuous cycle).

The virtuous cycle is when in the presence of highly technologically developed financial institutions that operate beneficially to the economy, with a high level of savings put into productive use in the economy, thus stimulating a high level of investment and funding for innovation projects. In this case, growth leads financial system development and efficiency (the growth-finance relationship).

The unvirtuous cycle entails a state in which the financial sector determines and leads the growth path. At a certain point, the highly technologically advanced financial system starts to abuse its monetary creation power, turning the social function for which, the financial institutions were created, into a self-serving one.

The VUC theory views that the integration of the global financial system is geared towards ensuring financial stability, which in turn contributes to the development and stability of the economic system. Although integration comes with higher risk, it has become inevitable in the global economic system, thus, making it necessary to maintain the virtuous path of the economic cycle. The theory assumes that total output measured by real GDP is a function of financial power, capital input, labour input and innovation I, as shown below.

$$Y = (FP, K, L, I) \quad (1)$$

Where,

FP = financial power; K = capital; L = labour; and I = innovation.

According to Lauretta et al. (2016), financial power is held by the financial system and is a function of the leverage ratio, financial innovation and financial institutions' size. It affects total output by exerting a positive (known as positive externality in the virtuous cycle) or negative (referred to as negative externality in the unvirtuous cycle) effect on real GDP. This effect depends on whether financial power is socially oriented, that is geared towards financing productivity of the

economic system or privately oriented, aimed at self-seeking speculative and profit interests. Financial power is expressed as:

$$FP = f(LR, SZ, FI) \quad (2)$$

Where,
LR is the amount of capital divided by total assets
SZ is the size of financial institutions, measured by market shares to GDP
FI is the degree of development of the technologically advanced financial system

They established a relationship between financial power and high financial system default risk (FSDR), noting that FSDR arises from the distortion of financial power, through the accumulation of bad debts (BD), which affects the growth path and triggers the unvirtuous cycle. Thus, the growth-finance relationship is reversed. The functional relationship between the variables is represented in equations (3) and (4).

$$\text{Ɛ} = \frac{\Delta FSDR}{\Delta FP} = \text{Volatility} \quad (3)$$

$$FSDR = f(BD) \quad (4)$$

Lauretta et al. (2016) further developed a VUC index to capture the status quo of the finance-growth relationship. A cross-country analysis of the U.S, UK and Euro-area countries was made to verify the validity of the index. Financial innovation is the core variable identified, which is an endogenous variable within the money/credit creation process. The VUC index for all countries shows clearly the effect of the degree of financial innovation over time. They concluded that it is important for scholars and policymakers to understand the mechanism underpinning the finance-growth relationship and that it is their responsibility to return the economic system to what they call the virtuous cycle and ensure financial stability.

Empirical Review

Torabi et al. (2017) analyse the relationship between financial stability and economic performance in the Organisation of Petroleum Exporting Countries (OPEC). The study uses the system Generalized Method of Moments based on annual time series and panel data from 2000 to 2013. The explained variable in the study is economic performance (economic growth), and the explanatory variables (financial stability and financial liberalisation) are the ratio of liquidity to GDP and net capital inflow to GDP, respectively. The results show that the effect of the explanatory variable of financial stability on the explained variable of economic performance in OPEC countries is positive and significant. Also, the effect of financial liberalisation on economic performance in OPEC countries is positive and significant.

Koong et al. (2017) critically interrogate the effect of credit in financial stability at the disaggregated level for the emerging market economy of Malaysia for the period 2009 to 2013. The methodology involves constructing a financial stability index to measure financial stability, using a broad range of financial and market-based variables. Based on the dynamic factor model, a negative (positive) estimated coefficient indicates that the Malaysian financial system either constricts or expands. Fifteen variables are used for the construction of the financial stability index and include non-performing loans and risk-weighted capital ratio, which measure the performance of the banking system; stock market index, which measures the performance of the share market; money supply, money market rate and interest rate spreads which reflect the situation in the money market. Others are the real effective exchange rate, which captures the conditions in the foreign exchange market; domestic credit to the private sector, which mirrors the trend in the credit market; house price index, which captures the trend in the housing market; private capital fund that represents the capital market; crude oil price, which replicates the trend in the oil market; and lastly net external reserve, which measures the capacity of the central bank to contain financial pressures, particularly foreign exchange fluctuation. Based on the concordance index, ordinary least square (OLS) and generalized method of moment (GMM) estimations, the empirical results indicate that the effect of household credit on financial stability in Malaysia is inconclusive. On the contrary, the results suggest that business credit plays a significant role in determining financial stability in Malaysia. An expansion of business credit supply causes the financial conditions to tighten, which may lead to financial instability. In other words, business credit expansion is detrimental to Malaysian financial stability.

Sonmez and Uysal (2018) investigate the impact of financial instability on economic growth in Brazil, Russia, India, China and Turkey (BRICT) economies and found empirical evidence that financial instability negates economic growth. Their methodology involves the application of non-stationary dynamic panel data analysis to investigate not only the heterogeneity of the variables but also to consider cross-section dependency between cross-section units based on annual data for the period 2000-2016. Following the estimation of the long-term regression coefficients, the panel causality analysis was used to determine the direction of causality between economic growth and financial instability. The results support the hypothesis, which suggests that financial instability has debilitating effects on economic growth.

Nasreen and Anwar (2018) examine the relationship between economic development and financial stability in five South Asian economies; namely India, Pakistan, Bangladesh, Sri Lanka and Nepal, over the period 1980 to 2012. The study employs the panel cointegration technique to establish long-run linkages between the select variables of financial stability and economic development. Human Development Index is used as a proxy for economic development and is calculated

using the goalposts based on South Asian data, while financial stability is measured by constructing an aggregate financial stability index that combines various indicators relating to financial sector development, vulnerability and banking system soundness. Other variables modeled are public and private sector investments in the subject countries. The results show that financial stability is positive and statistically significant for economic development and conclude that a stable financial system is vital for the economic development of South Asian economies in the long-run.

Tosunoglu (2018) analyses the relationship between financial system stability and economic growth in Turkey using the Autoregressive Distributed Lag (ARDL) technique. The study covers the period 2002-2017, during which the country implemented inflation-targeting monetary policy regime. Financial leverage, capital adequacy, asset quality and liquidity ratios are variables utilised as important components of financial stability. Results obtained from the study show a positive relationship between financial stability and economic growth as the key indicators of financial stability, especially financial leverage, capital adequacy, asset quality and liquidity affect economic growth. Thus, suggesting that a steadily functioning financial system is necessary for economic growth. The study underscores the importance of understanding the factors that affect financial stability in formulating policies to support economic growth.

Vo et al. (2019) examine a set of variables that are presumed valid indicators of financial instability in developing countries, using panel data for 17 developing countries from the period 2000 to 2017. Credit growth measured by domestic credit was used as a proxy for financial instability in the study. Other variables include GDP growth rate, inflation rate, broad money supply, lending rate, return on equity and stock market index. Standard methods such as the pooled OLS, fixed effect model and random effect model are employed in the econometric techniques to ensure robustness. The results of the study show a positive relationship between credit growth and the variables. The results of the panel data regression analysis with country-fixed effects also show strong similarity between the results obtained from the pooled OLS regression and the random effects regression. In these two regressions, all independent variables were statistically significant and had a positive correlation with credit expansion. The findings on the impacts of GDP growth, inflation rate and base money growth on the credit expansion are consistent with the intuition of Post-Keynesians. The authors argue that easy access to credit, in turn, causes lending institutions to engage in more risky projects and coupled with rising asset prices, banks are likely to be exposed to high credit risk and low asset quality because of higher non-performing loans.

In Qatar, Alsamara et al. (2019) examine the switching impact of financial stability and economic growth using the Vector Error Correction Model with structural breaks for the period 1980Q1–2013Q4. The study estimates two different specifications by using real GDP and non-oil real GDP and constructs a new variable (real loan provisions) as an indicator of financial stability. The results show that GDP growth has a long-run negative impact and a moderate short-run positive impact on financial stability. This negative relationship indicates that an increase in the real GDP growth rate may lead to lower defaults on loans in the Qatar banking sector.

Eweke (2019) investigates the impact of banking system stability on the Nigerian economy during the period 1986 to 2016 based on annual data. The variables used in the study to capture banking system stability are the banking stability index, return on assets, financial depth and interest rate, while real GDP is used to measure economic growth. The banking stability index developed for the study involved estimation of the arithmetic mean of the sum of the standard deviations of three banking sector variables namely: (i) credit to the private sector, (ii) bank deposits and foreign liabilities of banks. The relationship was modelled using the ARDL Bounds test to cointegration. The results of the ARDL model reveals that for both the long and short-run, the banking sector stability index, financial depth and return on assets have positive but insignificant effect on economic growth, while interest rate has a negative long and short-run and insignificant effect on economic growth. The results further indicate that there exists a long-run relationship among the variables.

In China, Wang et al. (2019) examine the linkages between assets bubbles, banking stability and economic growth from both the theoretical and empirical dimensions. The study utilises the Bayesian Model Averaging and Panel Vector Autoregression model to analyse the soundness of the theoretical arguments based on data from 26 characteristic economies for the period 2000 to 2014. The analysis is based on a partial equilibrium model where it is assumed that all credit facilities in the economy are provided by the banks and the bankers are risk-neutral. Three key variables used for the study to measure asset bubbles and banking stability are regulatory capital to risk-weighted assets ratio, stock market volatility as a proxy of equity bubbles (asset bubble) which is calculated as the average of the daily stock indices in one year and Z-score banking index, which measures the banking stability. Z-score provides a signal of a bank's exposure at risk of default. The greater the Z-score, the more stable the banking sector is assumed to be. In addition, the growth of real GDP per capita is used as the dependent variable in the model as a proxy for economic growth. The empirical results support the theoretical findings that equity bubbles diminish banking stability and that banking instability is harmful to economic growth.

Similarly, Ntarmah et al. (2019) examine the effects of banking system stability on economic sustainability in the context of 37 developing economies from 2000 to 2016. The study employs fixed effects and random effects models for panel data estimation based on the results of the Hausman test of endogeneity. First, the findings show that banking system Z-scores have positive effects on the economic sustainability of developing countries, while banking system regulatory capital and bank credit have negative effects on economic sustainability among sample economies. Second, while banking system Z-scores, bank liquid assets and bank credit have positive effects on the economic sustainability in the emerging economies of Brazil, Russia, India, China and South Africa (BRICS), bank liquid assets and bank credit have negative effects on the economic sustainability of non-BRICS. Furthermore, banking system Z-scores have positive effects on the economic sustainability of Asian and non-Asian economies. Conversely, NPLs and bank credit have negative effects on the economic sustainability of Asian economies while banks' regulatory capital requirement has a negative effect on the economic sustainability of non-Asian economies. The study, therefore, affirms that banking system stability plays a significant but mixed role in the economic sustainability of developing countries as the effects of banking stability on economic sustainability differ markedly between the BRICS economies and non-BRICS economies as well as between the

economies of Asia and non-Asian countries.

Yonusi and Nafla (2019) examine the relationships among financial stability, monetary policy and economic growth based on a sample of 40 developed and developing countries using yearly data from 1993 to 2015. Fixed and random effects panel data regression models are applied to evaluate the effect of financial stability and monetary policy on economic growth. The explained variable is economic growth, proxied by real GDP per capita and the explanatory variables include a suite of financial development and stability indicators as well as the traditional monetary stability measures across the selected countries. The study shows that financial crisis, bank liquid reserves and non-performing loans are harmful to financial stability, financial development and economic growth. The impact depends, however, on the vulnerability and fragility of the banking system. The key findings reaffirm the complementarity and the importance of real, financial, monetary variables and banking sector soundness and resilience as well as their significant influences on financial stability and economic growth.

Ijaz et al. (2020) use panel data from 39 European countries for the period 2001 to 2017 to examine the impact of bank competition and financial stability on economic growth over the period. Banking competition is measured with the Boone indicator, while bank stability is measured with Z-scores and the ratio of non-performing loans. The fixed-effect estimator and GMM are employed for the econometric analysis, controlling for unobserved heterogeneity, endogeneity, the dynamic effect of economic growth, and reverse causality in its estimation. Results indicate that bank stability significantly contributes to economic growth in European countries because economic growth falls during periods of financial crisis for both the national banking crisis and global financial crisis. The findings further reinforce the necessity of a resilient banking system during crisis episodes. Moreover, empirical outcomes show that low banking competition supports economic growth and increases financial stability.

Ma (2020) examines the trade-off between financial stability and economic growth and the effect of macroprudential policy in a small open economy. The result suggests that optimal macroprudential policy such as higher capital to risk-weighted assets ratio reduces the frequency of crisis but has a small negative effect on growth as it reduces borrowings by firms and households. The result of the OLS regression and system GMM further showed that macroprudential policies encourage a greater buildup of buffers, which mitigate the negative growth effects of unstable capital flows and limit financial vulnerability.

Elsayed et al. (2021) examine the interaction between monetary policy and financial stability in the Gulf Cooperation Council (GCC) countries, namely, Bahrain, Kuwait, Saudi Arabia, and the United Arab Emirates, by adding a new composite financial stability index to monitor financial vulnerabilities and crisis episodes occurring during the period 2006-Q4 to 2020-Q2. The sample period covers some important economic and financial events (e.g., the 2008 global financial crisis, the 2011 Syrian civil war; the 2014-2015 oil price drop, 2020 COVID-19 pandemic lockdown). The study employs the Nonlinear Autoregressive Distributed Lag Model. The data on financial stability indicators are short-term money market rate, inflation rate, real GDP, and real effective exchange rate. Empirical findings indicate that monetary authorities' response to the deviation of inflation from their target level, output gap, or exchange rate movement differ in terms of magnitude, sign, and significance across the GCC countries. The results further explain that monetary authorities react significantly to negative or positive shocks in financial stability, but their reactions differ in the short-run and the long-run. The results further show that an augmented Taylor rule, which incorporates financial stability as an additional monetary policy objective has better price stability and growth potential for the GCC countries.

Shabira et al. (2021) investigate the effect of economic policy uncertainty (EPU) on bank stability using bank-level panel data of 1481 banks in 24 countries from 2005 to 2019. The study uses the banking Z-score as the primary measure of banking stability. The findings reveal that EPU decreases bank stability, but the impact differs across each bank and market structure and is significantly higher during financial crisis episodes. The authors also probe the roles of institutional quality and bank competition in shaping the EPU-bank stability relationship. The results reveal a significant threshold effect on the EPU-bank stability linkage based on the threshold estimation technique, taking into account the nonlinearity of the association between the variables. Countries with institutional quality above the specified threshold level dampen the negative impact of policy uncertainty on bank stability, while lesser bank competition strengthens the adverse impact. Moreover, EPU has adverse consequences for bank stability in all countries in the sample irrespective of their level of development and per capita GDP. The findings reiterate and elevate the importance of institutional quality in mitigating bank instability and have specific policy implications for banks, regulatory bodies, and government agencies for decision-making.

METHOD

This study employs the Autoregressive Distributed Lag (ARDL) to examine the impact of financial stability on economic growth in Nigeria. The model follows the approach of Pesaran and Shin (1999) and Pesaran et al. (2001). The ARDL Bounds test approach to cointegration is employed because of its ability to demonstrate the presence of short and long-run relationships between economic time-series data and applicability to nonstationary time series when the data are integrated of different orders. E-Views 10 is used for the analyses and all data sets, which are not in percentages, are transformed into their natural log form so that they have the same magnitude and improve the quality of the data analysis.

Data Sources and Method of Data Collection

The study is carried out using secondary data obtained from the Central Bank of Nigeria (CBN) statistical bulletin and banking supervision annual report as well as other statistical publications. The analysis is conducted using quarterly time-series data from Q1:2006 to Q4:2020. The data coverage period is restricted to Q1:2006 to Q4:2020 due to the lack of data for prior periods for certain key variables for the study. This limitation, nonetheless, is not expected to significantly affect

the outcome of the study.

The study utilises real gross domestic product (RGDP) as a measure of the growth rate of the economy while asset quality as indicated by the non-performing loans (NPL) ratio of the banking sector serves as a proxy for financial stability. Other metrics theoretically established to affect financial system stability are also used. These additional indicators include (i) Capital adequacy ratio, which is the ratio of total qualifying capital divided by the amount of risk-weighted assets of the banking industry, (ii) Liquidity ratio of the banking industry as measured by total eligible liquid assets divided by total deposits and net takings; (iii) banks earnings, measured by return on total assets (ROA), (iv) All-share index, which proxies the movements in market prices of equities traded in the Nigerian Exchange Group and (v) Credit to the private sector, which signals the strength of financial intermediation.

Model Specification

The study follows the work of Tosunoglu (2018), which used financial leverage, capital adequacy, asset quality and liquidity ratios as important components of financial stability affecting economic growth in Turkey.

The basic model is specified as follows:

$$RGDP = f(CAR, NPL, LR, ASI, CPS, ROA, \mu) \quad (5)$$

Where,

RGDP = real gross domestic product in Naira
CAR = the capital adequacy ratio of the banking sector expressed in percentage
NPL Ratio = the ratio of non-performing loans to gross loans of the banking sector expressed as a percentage
LR = Liquidity ratio of the banking sector in percentage
ASI = Nigerian Exchange Group All-share index in natural logarithm
CPS = Total domestic credit given to the private sector in naira.
ROA = Return on assets of the banking sector, and measures the profitability of the sector
μ = Stochastic disturbance term, which represents other uncontrolled variables affecting RGDP

Equation (5) shows the functional relationship between the explained variable, Real Gross Domestic Product (RGDP) and the explanatory variables.

The functional equation in (5) is expressed in econometric form as:

$$RGDP_t = \beta_0 + \beta_1 CAR_{t-1} + \beta_2 NPL_{t-1} + \beta_3 LR_{t-1} + \beta_4 ASI_{t-1} + \beta_5 CPS_{t-1} + \beta_6 ROA_{t-1} + \mu_t \quad (6)$$

All the variables except ROA are expressed in their natural logarithms to establish linearity and deal with the issue heteroscedasticity in the data. ROA is not logged because the data series contained some negative values. Consequently, we formulate a third equation to convert equation (6) in their log-linear form as follows:

$$\ln RGDP_t = \beta_0 + \beta_2 \ln CAR_{t-1} + \beta_1 \ln NPL_{t-1} + \beta_3 \ln LR_{t-1} + \beta_4 \ln ASI_{t-1} + \beta_5 \ln CPS_{t-1} + \beta_6 \ln ROA_{t-1} + \mu_t \quad (7)$$

The ARDL representation of equation (7) is as follows:

$$lnRGDP_t = \beta_0 + \sum_{j=1}^{n} \varphi h \Delta\ lnRGDP_{t-1} + \sum_{j=1}^{n} \phi i \Delta\ \ln CAR_{t-1} + \sum_{j=1}^{n} \lambda j \Delta\ lnNPL_{t-1} + \sum_{j=1}^{n} \underline{\omega} k \Delta\ \ln LR_{t-1} + \sum_{j=1}^{n} \rho l \Delta\ \ln ASI_{t-1} + \sum_{j=1}^{n} \psi m \Delta\ \ln CPS_{t-1} + \sum_{j=1}^{n} \chi p \Delta\ \ln ROA_{t-1} + \nu \quad (8)$$

Where Δ signifies the first difference operator, β_1 is the intercept, β1, β2, β3, are the long-run multipliers. δ, ϕ, λ, ω and ρ are short-run parameters and νt are white noise errors. This study estimates equation (8) with the Bounds test to access the long-run relationship among the variables. The F-test was used to interpret the existence of this relationship.

The null hypothesis of no long-run relationship is tested against the alternate hypotheses of a long-run relationship as shown below:

H_0: $\alpha = \beta 1 = \beta 2 = 0$
H_1: $\alpha \neq \beta 1 \neq \beta 2 \neq 0$

The Bounds test provides for two asymptotic critical values for cointegration when the response variables are 1(d) (where $0 \leq d \leq 1$): a lower value assuming the explanatory variables are I(0) and an upper value assuming purely I(1) independent variables. If the F-statistic is above the upper critical value, the null hypothesis of no long-run relationship can be rejected irrespective of the orders of integration of the time series. Conversely, if the F-statistic is below the lower critical value, we cannot reject the null hypothesis. Lastly, where the statistic lies between the lower and upper critical values, the result is considered inconclusive. The approximate critical values for the F-statistic test are obtained from Pesaran et al. (2001).

Once cointegration is confirmed, we proceed to estimate the long-run ARDL as follows:

$$logRGDP_t = \mu_0 + \sum_{j=1}^{n} \varphi h\Delta\ logRGDP_{t-1} + \sum_{j=1}^{n} \phi i\Delta\ \log CAR_{t-1} + \sum_{j=1}^{n} \lambda j\Delta\ logNPL_{t-1} + \sum_{j=1}^{n} \underline{\omega} k\Delta\ \log LR_{t-1} + \sum_{j=1}^{n} \rho l\Delta\ \log ASI_{t-1} + \sum_{j=1}^{n} \psi m\Delta \log CPS_{t-1} + \sum_{j=1}^{n} \chi p\Delta\ \log ROA_{t-1} + \nu \quad (9)$$

Following from the estimation from equation (9) above, we further obtain the parameters of the short-run dynamics by estimating an error correction model (ECM) within the ARDL framework, as shown below:

$$logRGDP_t = \mu_0 + \sum_{j=1}^{n} \varphi h\Delta\ logRGDP_{t-1} + \sum_{j=1}^{n} \phi i\Delta\ \log CAR_{t-1} + \sum_{j=1}^{n} \lambda j\Delta\ logNPL_{t-1} + \sum_{j=1}^{n} \underline{\omega} k\Delta\ \log LR_{t-1} + \sum_{j=1}^{n} \rho l\Delta\ \log ASI_{t-1} + \sum_{j=1}^{n} \psi m\Delta \log CPS_{t-1} + \sum_{j=1}^{n} \chi p\Delta\ \log ROA_{t-1}\ \vartheta \mathrm{ECM}_{t-1} + \nu \quad (10)$$

Where ϑ denotes the speed of adjustment of the parameters to long-run equilibrium following a shock to the system and ECM represents the residuals obtained from equation (10). Moreover, the coefficient (ϑ) of the ECM should be negative and statistically significant to substantiate the existence of cointegration among the variables.

RESULTS

This section presents the results of data analysis and estimations using the ARDL Bounds test approach to cointegration.

Descriptive Statistics

Table 1. Descriptive Statistics Results

	lnRGDP	lnCAR	lnNPL	lnLR	lnCPS	lnASI	ROA
Mean	9.405052	2.571396	2.163260	3.799115	9.455095	10.34119	2.633943
Median	9.662785	2.814708	2.182517	3.816218	9.594396	10.32546	2.479946
Maximum	9.880738	3.164223	3.646743	4.643429	10.31393	11.05115	7.401140
Minimum	8.290614	-1.620467	1.085033	2.887033	7.662447	9.896054	-8.845985
Std. Dev.	0.500965	0.789572	0.651721	0.353920	0.689240	0.279868	2.254266
Skewness	-1.023298	-3.321695	0.440300	-0.223341	-1.068149	0.527233	-1.858824
Kurtosis	2.328062	15.72653	2.699546	3.165488	3.451641	2.709930	13.19889
Jarque-Bera	11.60014	515.2483	2.164320	0.567276	11.91936	2.990098	294.5957
Probability	0.003027	0.000000	0.338863	0.753039	0.002581	0.224238	0.000000
Sum	564.3031	154.2838	129.7956	227.9469	567.3057	620.4716	158.0366
Sum Sq. Dev.	14.80697	36.78198	25.05964	7.390290	28.02802	4.621226	299.8211
Observations	60	60	60	60	60	60	60

Source: Author's Computation using EViews 10.0.

The table for the descriptive statistics explains the nature of the variables used in the model. The mean and median are measures of central tendencies. The mean shows the average value of each of the variables over the years under review. The mean values of the natural logs for RGDP, CAR, NPL, LR, CPS, ASI, and ROA are 9.405052, 2.571396, 2.163260, 3.799115, 9.455095, 10.34119, and 2.633943, respectively. The medians of the variables in the distribution are 9.662785, 2.814708, 2.182517, 3.816218, 9.594396, 10.32546 and 2.479946, respectively.

From the results, RGDP and CAR are highly skewed to the left; NPL and LR are approximately symmetrical, while ASI and ROA data sets are positively skewed. The results of the kurtosis reveal that RGDP has a lighter tail or platykurtic (flatter relative to a normal distribution); CAR and ROA have very heavy tails or leptokurtic (highly peaked relative to normal), while NPL, LR, CPS and ASI are of the approximately normal distribution as their values are close to 3.0.

Unit Root Test

The unit root test is carried out to determine the stationarity of the time series data employed for the model estimation. The results of the tests are shown in Tables 2 and 3.

Table 2. ADF Unit Root Stationarity Result

Variables	ADF Calculated Value at Levels	ADF Calculated Value at First Difference	Critical Values			I(d)
			1%	5%	10%	
RGDP	-2.116640	-7.435376	-3.546099	-2.911730	-2.593551	I(1)
CAR	-3.716430	----------	-3.716430	-3.716430	-3.716430	I(0)
NPL	-2.278609	-5.019169	-3.548208	-2.912631	-2.594027	I(1)
LR	-3.339524	-8.297213	-3.546099	-2.911730	-2.593551	I(1)

CPS	-4.147396	----------	-3.546099	-2.911730	-2.593551	I(0)
ASI	-2.210508	-5.858505	-3.548208	-2.912631	-2.594027	I(1)
ROA	-3.665784	----------	-3.546099	-2.911730	-2.593551	I(0)

Source: Author's Computation using EViews 10.0

The critical values for rejection of the hypothesis of the unit root are from MacKinnon (1991) as reported in EViews 10.0.

Table 3. KPSS Unit Root Stationarity Result

Variables	KPSS Calculated Value at Levels	KPSS Calculated Value at First Difference	Critical Values			I(d)
			1%	5%	10%	
RGDP	0.777959	0.308939	0.739000	0.463000	0.347000	I(1)
CAR	0.087723	----------	0.739000	0.463000	0.347000	I(0)
NPL	0.133910	----------	0.739000	0.463000	0.347000	I(0)
LR	0.339807	----------	0.739000	0.463000	0.347000	I(0)
CPS	0.889522	0.425528	0.739000	0.463000	0.347000	I(0)
ASI	0.084605	----------	0.739000	0.463000	0.347000	I(0)
ROA	0.270368	----------	0.7390009	0.463000	0.3470001	I(0)

Source: Author's Computation using E-Views 10.0

From Tables 2 and 3, the null hypothesis of the ADF unit root test method assumes that the variable has a unit root. The t-statistics and p-value are used to test the null hypothesis of the absence of unit root (stationarity) of the variables of the model. The variable is stationary if the computed value of the T-statistic is less than the critical value at 5% level of significance and the probability value is less than 0.05. The results reveal that the variables have a combination of stationarity at level and first difference. CAR, CPS and ROA are each stationary at level 1(0), while RGDP, NPL, LR and ASI are stationary at first difference, I(1). We, therefore, reject the null hypothesis of the presence of unit root (non-stationarity) of the time series data and fail to reject the alternative hypothesis.

The result of the KPSS unit root test revealed that all the variables are stationary at level except for RGDP, which is stationary at first difference, confirming the failure to reject the null hypothesis that the data set is stationarity. The mixture of both I(0) and I(1) stationary of the ADF and KPSS unit root tests justifies the employment of the ARDL model as an appropriate estimation technique for our empirical analysis of the impact of financial stability on economic growth in Nigeria.

Autoregressive Distributed Lag Model Short-run Estimates

Table 4. Short-run ARDL Result

Variables	Coefficients	Std. Error	T. Stats.	Probability
C				
lnRGDP(-1)	0.205767	0.089872	2.289542	0.0295*
lnCAR	-0.196618	0.032519	-6.046235	0.0000*
lnNPL	-0.086926	0.014707	-5.910600	0.0000*
lnLR(-4)	-0.076757	0.022618	-3.393619	0.0020*
lnCPS	0.084531	0.104232	0.810989	0.4240**
lnASI	0.103391	0.043913	2.354436	0.0255*
ROA	0.025780	0.004507	5.720140	0.0000*
Statistical Tests:				
R-squared		0.996870		
Adj. R-square		0.994063		
F-statistic		355.2071		
Durbin-Watson stat		2.270766		
Log-likelihood		128.2091		
Akaike AIC		-3.614610		
Schwarz SC		-3.236019		

* Significant at 5%, **insignificant at 5%

The results in Table 4 show that the coefficients of CAR, NPL ratio, and LR are all negatively signed and significant as shown by their respective p-values, indicating that the variables have negative and significant impacts on economic growth in the short-run. However, LR is significant at lag 4. CPS has a positive but insignificant on RGDP while ASI and ROA show positive and significant effects on RGDP in the short-run as evidenced by their p-values. The coefficient of determination (R^2) shows the explanatory power of the model to be very high at 99.69%, indicating that the total variation in the explained variable is accounted for by the explanatory variables in the model. This shows that the goodness of fit of the regression model is strong.

Autoregressive Distributed Lag Model Bounds Test and Long-Run Estimates

The ARDL bounds test is utilised to establish the existence of cointegration (long-run relationship) among the variables in the model. The variables are cointegrated if the F-statistic of the Bounds test is greater than the critical values of the upper and lower bounds at 5%. Where this is the case, the null hypothesis of the absence of cointegration is rejected and the

alternative hypothesis of cointegration is accepted.

Table 5. ARDL Long-run Form and Bounds Test

Critical value	Lower bound	Upper bound
1%	3.15	4.43
5%	2.45	3.61
10%	2.12	3.23
F- statistics	31.69956	

From the results in table 5, the ARDL Bounds Test provides evidence that cointegration exists among the variables in the model. The value of the F-statistic of the bounds test is 31.69956, which is greater than the critical value of the upper bound value of 4.43 at 5%. This outcome suggests a strong long-run relationship between the variables in the model. We, therefore, reject the null hypothesis of no cointegration. This result implies that the explanatory variables, which are the indicators of financial stability used in the model, do have a long-run relationship with economic growth.

Table 6. ARDL Long-run Form Estimates

Variable	Coefficient	Std. error	t-statistics	Probability
lnCAR	-1.193045	0.426859	-2.794939	0.0091*
lnNPL	-0.475685	0.144563	-3.290506	0.0026*
lnLR	-0.306362	0.176030	-1.740399	0.0924**
lnCPS	0.191486	0.205961	0.929720	0.3602**
lnASI	0.897138	0.431092	2.081081	0.0464*
ROA	-0.015835	0.056097	-0.282272	0.7797**

* Significant at 5%, **insignificant at 5%

The long-run ARDL results in Table 6 show that the coefficients of CAR, NPL ratio, and LR all have the expected negative signs with the dependent variable, RGDP. The impacts of the NPL ratio and CAR on economic growth are negative and significant as shown by their respective p-values, implying that the higher these variables, the lower the RGDP in Nigeria in the long-run. Although LR is negative with economic growth, it is insignificant, suggesting a weak relationship. Contrary to the short-run result, ROA has a negative but insignificant relationship with RGDP. However, in the long-run, CPS and ASI aligned with the short-run result. CPS has a positive but insignificant impact on economic growth while ASI shows a positive and significant effect on economic growth.

Autoregressive Distributed Lag Error Correction Model

Table 7. ARDL Error Correction Model

Variable	Coefficient	Std. error	T-statistics	Probability
D(lnRGDP(-1))	-0.611495	0.070700	-8.649153	0.0000
D(lnCAR)	-0.196618	0.015204	-12.93196	0.0000
D(lnLR)	0.038824	0.018246	2.127775	0.0420
D(lnCPS)	0.084531	0.073397	1.151701	0.2589
D(lnASI)	0.103391	0.031619	3.269941	0.0028
D(ROA)	0.025780	0.002982	8.644267	0.0000
C	0.735745	0.043436	16.93867	0.0000
ECM(-1)	-0.182738	0.011167	-16.36480	0.0000
		Statistics Test		
R squared		0.953466		
Adjusted R squared		0.926875		
Durbin Watson		2.270766		

From the results of the ARDL ECM in Table 7, the coefficient of the ECM has the expected negative sign and is significant at 5% with the economic growth variable, RGDP. The ECM signals the speed of adjustment for reversion to equilibrium in the event of a shock to any of the explanatory variables.

The ARDL ECM indicates the nature of the relationship that exists between the selected financial stability indicators and economic growth in the short-run through the signs of the coefficients of the explanatory variables and the p-value of the t-statistics. The coefficient of the lag of the error correction term of negative 0.182738 and p-value of 0.0000 suggests a convergence from short-run disequilibrium to long-run equilibrium at approximately the rate of 18.27% after a shock. The result indicates a marginal speed of adjustment in the model.

Diagnostic Tests

To ensure the correctness of the model specification and the stability of the parameters, which could result in bias estimates,

diagnostic or post-estimation tests namely, Serial correlation (Breusch-Godfrey LM test), Heteroscedasticity test, Normality test (Jarque-Bera) and CUSUM of recursive residuals are applied. The results are presented in table 8 below:

Table 8. Diagnostic Tests

Diagnostic Test	Test Statistics (F-Statistic)	P-value
Serial correlation	0.672922	0.5186
Heteroscedasticity	0.592312	0.9075
Normality test (Jarque-Bera)	5.547266	0.062435

Source: Author's Computation Using Eviews 10.0

From table 8, the result of the heteroscedasticity test indicates no heteroscedasticity evidenced by the p-value being greater than 0.05. The result of the LM serial correlation test shows the absence of serial correlation in the model since the p-value of the F-statistics is greater than 0.05. The Jarque-Bera test statistics of 0.062435 (>0.05) indicates that the model residuals are normally distributed.

The stability test result using the CUSUM of recursive residuals test as shown in figure 1 suggests that all estimated coefficients of the model are stable over the period covered by the study as they fall within the 5% critical bounds. The model is taken as stable since the blue line lies within the boundary of 5% significance.

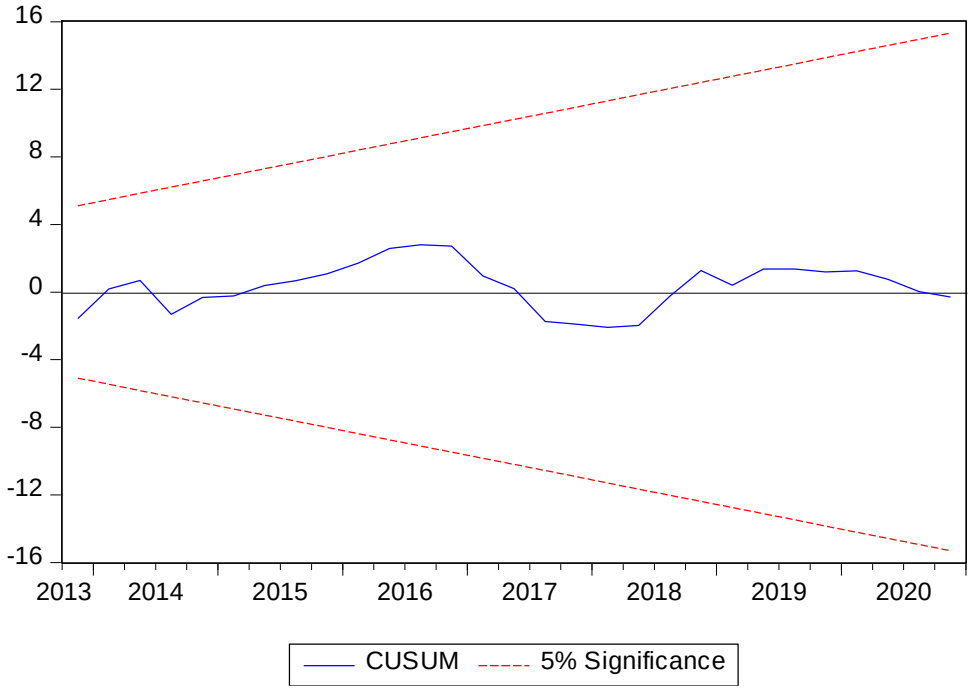

Figure 1. Plot of CUSUM

DISCUSSION

The results show that the financial stability indicators have varying impacts on economic growth. CAR has a significant negative impact on economic growth in Nigeria in the short-run and long-run, implying that imposing higher CAR requirements on banks would slow economic growth. When banks are required to deliberately hold higher capital relative to their risk assets holding, their ability to expand credit is constrained by the ratio of the capital required to their total risk-weighted assets. Since new bank loans and other credit facilities are needed to finance investments in production, which is necessary to increase output, undue restriction of credit expansion will weaken aggregate output. Considering that capital adequacy has asymmetric effects, it is an appropriate policy instrument for managing rapid credit growth but inappropriate during times of financial instability when credit expansion is required to accelerate growth. Similarly, the NPL ratio has a negative and significant impact on economic growth, implying that high NPL ratio in the banking sector stifles economic growth in Nigeria. Non-performing loans constitute a burden on the financial system as it often results in credit contraction, worsening market confidence and slow growth. The negative implication of a high NPL ratio for the economy is that it portrays inefficiency in the allocation of credit, failure to keep up with debt repayment, and ineffective recovery mechanisms.

LR has a negative and significant effect on economic growth, indicating that excess liquidity in the system may be inimical to growth. Banks and non-bank financial intermediaries need sufficient liquidity to finance productive investments in the real sector, however, large holdings of liquid assets in long-run, may not stimulate growth. The reason for this reverse effect is that investments in liquid assets often yield a lower rate of returns than real sector projects, and excessive holdings

of liquidity mean reduced availability of funding for the real sector. Theoretically, high liquidity is expected to buoy growth as funds are made available for investment in real sector business enterprises and social services. In the long-run, however, liquidity moderates as funds are held up in long-term productive assets such as factory buildings, plant and machinery as well as surplus term inventories. At this point, holding more assets in liquid form may hinder production activities and limit economic growth. The findings in respect of CAR, NPL and LR align with empirical studies like Ntarmah et al. (2019), Yonusi and Nafla (2019) and Ijaz et al. (2020).

CPS has a positive but insignificant impact on economic growth in the short-run and long-run, which suggests that CPS does not accelerate economic growth in Nigeria. The implication is that increase in banking sector credits to the private sector will not lead to an increase in RGDP; an outcome that is rather surprising and inconsistent with economic theory. Traditionally, CPS propels growth because it fosters economic activities through investment in the productive sector of the economy. However, if the credit portfolio is largely non-performing, then it would negate economic growth as the banking system would become unstable since they would not be able to meet up with their responsibility of financial mediation. The ASI of the capital market has a positive and significant impact on economic growth in the short and long-run. ASI shows the performance of the stock market and higher ASI attracts investors to invest in the Nigerian Exchange Group, which promotes economic growth as it increases the resources for productivity in the real sector of the economy. The capital market is known to be a major driver of economic growth since it provides long-term capital for businesses and reflects the confidence of market players in the economy. Furthermore, the market is the major platform for attracting foreign capital into the Nigerian economy, through equity and debt portfolio investments in the critical sectors of the economy. ROA of the banking system has a positive and significant impact on economic growth in the long-run, indicating that the more profit banks generate, the more they would be able to return more funds for investment in the critical aspects of the economy which leads to an increase in RGDP and favours economic growth. ROA is an indicator of the profitability of the banking sector and high ROA means that the banking sector (by implication the financial system) would be able to withstand external shocks. However, in the short-run, ROA has a negative and significant effect on economic growth. This implies that the rate of returns on banks' assets is low in the short-run, which will harm the banking system as it would not have the capacity to withstand external shocks in the economy. The result for CPS supports Eweke (2019) but varies slightly for ROA, which has a positive but insignificant effect on economic growth.

Overall, the results do not support studies like Torabi et al. (2017), Tosunoglu (2018) and Nasreen and Anwar (2018), which show that the impact of financial stability indicators on economic growth is positive and significant.

CONCLUSION

The study investigated the impact of financial stability on economic growth using the ARDL model from 2006 to 2020. The results of the model estimation showed that CAR, NPL ratio and LR of the banking industry have significant negative impacts on economic growth in Nigeria in the short-run and long-run. CPS has a positive but insignificant impact on economic growth in the short-run and long-run. In addition, the other two financial stability indicators, which are ROA of the banking system and ASI of the capital market both have positive and significant impacts on economic growth in the long-run but varying results in the short-run. Based on the empirical findings of the study, the following policy recommendations for consideration and possible implementation of the relevant authorities and institutions:

- The financial system regulatory authorities should attempt to strike a balance between capital adequacy ratio requirements necessary to ensure financial system stability and the need to free more capital to enable the expansion of credit to the private sector at low-interest rates. This is because the higher the capital that banks are required to maintain relative to the size of their risk assets, the higher their cost of funds and less their capacity to expand credits to the real economy.
- Deposit money banks should be urged to enhance their credit risk management practices, while the regulatory and supervisory authorities should work with the relevant government ministries and agencies to set up specialized commercial courts to enable the speed adjudication and enforcement of loan contracts between banks and their customers. This measure is essential to minimise the incidences of non-performing loans in the Nigerian banking system. In addition, the current efforts aimed at checkmating loan defaults in the banking system through the implementation of the global standing instruction (GSI) regulations should be enhanced and sustained.
- The CBN should make its monetary policy more accommodating through downward adjustment in Monetary Policy Rate (MPR) and the transmission mechanism should be strengthened so that adjustments in MPR will positively influence lending rates in banks. In addition, the Cash Reserve Requirements should also be reduced to free more funds for lending. The prevailing high lending rates in the banking industry are unfavourable to support real sector productive activities and, therefore, incapable of stimulating economic growth.

Author Contributions: Conceptualization, E.A., and C.E.O.; Data Curation, G.U.I., and C.E.O.; Methodology, E.A., G.U.I., and C.E.O.; Validation, E.A., G.U.I., and C.E.O.; Visualization, E.A., G.U.I., and C.E.O.; Formal Analysis, E.A., G.U.I., and C.E.O.; Investigation, E.A., G.U.I., and C.E.O.; Supervision, E.A., G.U.I., and C.E.O.; Software, G.U.I, and C.E.O.; Project Administration, E.A., G.U.I., and C.E.O.; Funding Acquisition, E.A., G.U.I., and C.E.O.; Authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: Ethical review and approval were waived for this study, due to the fact that the research does not deal with vulnerable groups or sensitive issues.

Funding: The authors received no direct funding for this research.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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