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FINANCIAL INNOVATION AND ECONOMIC GROWTH OF NIGERIA

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Abstract: *The finance-growth literature advocates that financial innovation positively or negatively influences the level of growth. Hence, this study empirically investigated the impact of financial innovation on economic growth in Nigeria from 1981 to 2021. This research anchored on the task technology fit theory advanced by Goodhue and Thompson in 1995.The study used correlational research design and the sample size of data for the study was achieved through purposive sampling technique while secondary data were obtained from the Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS). The data were analysed using univariate analysis (descriptive statistics, unit root test), bivariate analysis (correlation matrix) and multivariate analysis (autoregressive distributive lag and granger causality tests). The result from the ARDL suggested that broad money to narrow money (M2/M1) had both positive and significant association on gross domestic product per capital (GDPC), growth in banking sector credit to private sector (GBCCP was found to be negative and insignificant association on gross domestic product per capital (GDPC) trade openness (TOP) had both positive and significant association on gross domestic product per capital (GDPC), government expenditure (GEX) had negative and significant association on gross domestic product per capital (GDPC), gross fixed capital formation (GCF) had both positive and significant association on gross domestic product per capital (GDPC) and consumer price index (CPI) had negative and significant association on gross domestic product per capital (GDPC). The study on the basis of the result concluded that financial innovation influences the level of economic growth. Hence on the basis of the conclusion the study recommended amongst others that the regulatory authorities such as the Central Bank of Nigeria should combine and implement new financial assets, payments tools and services for properly designed growth and development of financial innovation models as stimulus for economic growth and development in Nigeria.*

Keywords: Financial Innovation, Economic Growth, Nigeria, Long and Short run relationship.

Introduction

The nexus between financial innovation and economic growth has been documented in several empirical studies (Nittayakamolphun & Pholkerd, 2022; Yinusa et al, 2021; Nazir et al, 2021; Sanya & Olatunji, 2020; Ozurumba & Charles, 2019; Qamruzzaman & Wei, 2019;2017, 2018b, 2018c; Bara et al. 2016; Bara and Mudxingiri 2016; Napier 2014).Nazir et al (2021) argued that financial innovation performs avital function in economic growth through assisting financial presence, facilitation of financial operations in international business, and improving financial expertise. According to Qamruzzaman and Wei (2019), a vibrant financial system consists of several financial instruments, efficient financial institutions and comprehensive range of financial services for the effective economic activities of nations. Through the divergence of financial instruments, financial innovation is shown as an instrument for exploring the financial progress, competent financial intermediation and therefore greater the economic

growth. Hence, the enhancement of the financial system activities, effective and efficient use of economic resources in the financial sector, and intensification of productivity level in the system, ultimately leads to economic growth (Silve & Plekhanov, 2014; Saad, 2014). Qamruzzaman and Wei (2018) opined that financial innovation supports economic growth by permitting for capital mobilization, efficient and efficient financial intermediation, capital accumulation, and improved overall efficiency in deposit money banks and other financial institutions.

Financial innovation is the advent, transmission, and promotion of new financial instruments, financial institutions, financial technologies, and financial markets in any given society (Tufano, 2003). According to Sood and Ranjan (2015), financial innovation is a process of bringing about variations in the financial system through the expansion and expansion of financial products and processes. Financial innovation provides opportunities for growth in the financial sector (Napier 2014), thus enhancing economic growth. Qamruzzaman and Wei (2019),argued that financial innovation also allows for the expansion of financial services through the development of new financial institutions, financial instruments, financial reporting, technology and market knowledge. Nazir et al (2021) argued that financial innovation comprises of new financial instruments, the formation of new firm sand their corporate establishments, the development of recording approaches (Laeven, et al, 2015); such development in the organization's system is an vital component to conveyance the know-how with economic growth (Saqib, 2015). The innovation in the financial sector does not only promote the development of financial advancement but also assist capital growth as well as industrial and technical innovation, which gradually evidences to economic growth (Chou & Chin, 2011; Nazir et al, 2021). Qamruzzaman and Wei (2019), suggested that financial innovation supports economic growth by permitting capital mobilization, efficient financial intermediation, capital accumulation, and improved overall effectiveness and efficiency in financial institutions. Ozurumba and Charles (2019) argued that financial innovation increases the efficiency of financial intermediation by enhancing the diversity of financial products and services, occasioning an improved matching of the needs of individual savers with those of firms raising funds for expanding future product. The authors further noted that financial innovation enhances economic growth and transformation of the financial system of a country.

Finance and economic literatures of prior studies from several nations across Asia (Qamruzzaman & Jianguo, 2018; Nazir et al., 2021), Africa (Bara et al., 2016; Yinusa et al., 2021), and other developed and developing countries (Mollaahmetoğlu & Akçalı, 2019), along with 56 countries across the globe (Laeven et al., 2015) have stressed the relationship between financial innovation and economic growth. Studies in Thailand (Luangpituksa, 2019) which considered financial development and financial efficiency, but disregard financial innovation. According to Qamruzzaman and Wei (2017), economic growth in Bangladesh is motivated by financial innovation. Also, the study by Nazir et al. (2021) in China, India, and Pakistan discloses results in agreement with the study of Qamruzzaman & Wei (2018) in Bangladesh, India, Pakistan, and Sri Lanka, as well as another study of 17 countries in Africa (Yinusa et al., 2021). While, the study showed that there is a non existence of a connection between financial innovation and economic growth in 15 countries of The Southern African Development Community (SADC), Bara et al. (2016) had concluded that financial innovation is vital to future

economic growth. Also, the research by Bernier & Plouffe (2019) from a study of 23countries confirmed that financial innovation improves capital accumulation, leading to economic development. Bara and Mudzingiri (2016) defined financial innovation to be an economic growth-driven force in Zimbabwe, indicating simultaneous development of financial innovation and economic growth in bidirectional causality. This coincides with the feedback hypothesis seen in Spain and Sweden (Mtar & Belazreg, 2021). Pece et al. (2015) established the unidirectional relationship in a study of Poland, Hungary and the Czech Republic, while Mtar and Belazreg (2021) established the same result in the United Kingdom, Norway, and Turkey, and Pradhan et al. (2016) established the same with 18 European countries. Similarly, developing countries such as Ghana (Idun & Aboagye, 2014), Cameroon (Satia & Okle,2020), and India and Pakistan (Xu et al.,2021) have also been shown to reveal the same connection. Janicko (2015) has highlighted that the multiplicity of studies about the positive consequences of financial innovation are at variances with the outcomes from the case and country-specific studies. Lee et al. (2020) and Khan et al. (2017), for example, argue that financial innovation is harmful to the growth and firmness of banks in emerging markets in obvious inconsistency to Beck et al.(2016) conclusions for Organisation for Economic Co-operation and Development (OECD)countries. Lozano-Vivas and Pasiouras (2014) also argue that economic growth varies among countries with different levels of developments. Therefore, this study aims to fill the research gap regarding the relationship between financial innovation and economic growth in Nigeria. The present study is unique in that it aimed to investigate the impact of financial innovation on economic growth of Nigeria from 1961 to 2021 using both symmetric and asymmetric relationships by applying autoregressive distributed lag (ARDL) bounds testing, nonlinear ARDL (NARDL) and granger causality test.

Review of Related Literature

Concept of Financial Innovation: Financial innovation is the advent, transmission, and promotion of new financial instruments, financial institutions, financial technologies, and financial markets in any given society (Tufano, 2003). According to Sood and Ranjan (2015), financial innovation is a process of bringing about variations in the financial system through the expansion of financial products and processes. Nazir et al (2021) argued that financial innovation comprises of new financial instruments, the formation of new firms and their corporate establishments, the development of recording approaches (Laeven, et al, 2015); such development in the organization's system is an vital component to conveyance the know-how with economic growth (Saqib, 2015).Tahir,et al, (2018) noted that financial innovation can be classified into process, product and institutional innovation. ***Process innovation*** is new ways of operating business and implementing information technology, such as the Automated Teller Machine (ATM), mobile banking, and online banking, among others. ***Product innovation*** includes new financial products such as securitized assets, derivatives, weather derivatives, foreign currency mortgages, hedge funds, exchange-traded funds, private equity and retail structured products, among others. An ***institutional innovation*** is the process of introducing new types of financial firms such as discount broking firms, internet banking, and specialist credit card firms, among others (Zubairu & Oyedeko, 2018).

Financial innovation expands economic activities by promoting financial inclusion, facilitating a financial transaction in international trade, enabling remittance, and uplifting financial efficiency. Secondly, the

innovation-growth hypothesis postulated that financial innovation increases the quality of financial products and services(McGuire and Conroy 2013), expedites the financial development process (Qamruzzaman and Wei (2017), improves capital accumulation and allocation processes, and increases the level of efficiency in financial institutions (Shaughnessy 2015). Third, financial innovation in the form of institutional development in the financial system expedites the financial process with greater accessibility to formal financial service, such as internet banking and mobile banking services (Raffaelli & Glynn 2013). Qamruzzaman and Wei (2019) observed that financial innovation also allows for the expansion of financial services through the development of new financial institutions, financial instruments, financial reporting, technology and market knowledge. The innovation in the financial sector does not only promote the development of financial advancement but also assist capital growth as well as industrial and technical innovation, which gradually evidences to economic growth (Chou & Chin, 2011; Nazir et al, 2021). The role of financial innovation in the financial system are diverse which are observed in finance literatures such as, financial services diversification (Silve and Plekhanov 2014), efficient financial intermediation(Johnson and Kwak 2012), technological advancement (Michalopoulos et al. 2011), efficient resources allocation (Sood and Ranjan 2015), and institutional efficiency (Okere et al. 2015), thus eventually promotes economic growth. Michalopoulos et al. (2011) measured financial innovation as the growth of financial development, by means of the growth rate of the ratio of bank credit to the private sector to the GDP as an indicator for financial innovation.

The financial innovation-growth nexus can be explained using four types of the causal hypothesis available in finance literature. First, the supply leading hypothesis which explains that financial innovation stimulates economic growth by allowing financing expansion, trade efficiency, easy access to financial services, and efficiency in financial institutions of dealing with a customer (Shittu 2012). Second, the demand-leading hypothesis which explains that economic growth expands economic activities in both macro and micro level. Third, the feedback hypothesis that is caused by both financial innovation and economic growth is also known as bidirectional causality. The feedback hypothesis explained that the effect could be observed from each other and empirical literatures have produced ample evidence in this regards see, (Bara et al. 2016; Qamruzzaman and Wei 2017, 2018a, 2018b, 2018c). Fourth, the neutral hypothesis suggests that no causality occurs between financial innovation and economic growth.

Concept of Economic Growth: Economic growth simply refers to as an increase in the value of goods and services produced by a country over a period and can be used to reflect the size of a country. According to Appah (2022), economic growth is a sustained increase in per capita national output or net national product over an extended period. It implies that the rate of increase in total output must be higher than the rate of population growth thereby resulting to improvement or increased in standard of living of the citizens. There are different indicators used for measuring economic growth but the most accepted is Gross Domestic Product (GDP).GDP is the monetary value of goods and services produced in a nation during a particular period by the residents of that nation irrespective of the nationality of the residents. GDP can be measured at current basic prices (Nominal GDP) or constant basic prices (Real GDP) or current market price. Real GDP has been seen as a good measure of economic growth because it account for the change in the price level of goods and services

produced within the nation at particular period. Appah and Zibaghafa (2018) clearly state that Gross Domestic Product is the total volume of production that has taken place in the economy irrespective of the nationality of the people who produced the goods and services. According to the authors, it is the total production that has taken place in Nigeria by Nigerians themselves and foreigners living in Nigeria. The GDP does not include incomes and property earnings of Nigerians abroad. In the same vein, it does not exclude the income of foreigners and foreign property earnings in Nigeria.

Theoretical Review

The study was anchored on the theory of Task Technology Fit (TTF) advanced by Goodhue and Thompson in 1995. The theory postulates that Information Technology will most likely influence positively on individual performance and be used if the proficiencies of information communication and technology (ICT) match the tasks that the user must perform (Chukwunulu, 2019). Hsiao (2019) posited that the theory appraise how information technology leads to performance, evaluate usage effects, and judge the match between the task and technology features (Wu &Chen, 2017). TTF states that information technology should be a good fit with the tasks it supports in order to be utilized and to positively affect user performance (El Said, 2015). Hsiao (2019) noted that both task characteristics and technology characteristics can affect the task-technology fit, which in turn defines users' utilization of technology and their task performance. TTF theory is extensively applied in various fields, including technological innovation (Irum &Ismail,2017), commercial bank (Abbas et al.,2018),information processing and network directional behavior (Xia & Zhao, 2019). According to Chukwunulu (2019), some of the financial innovations in the banking sector are Mobile Banking services, Automated Teller Machine, Point of Sales and so on. According to this theory, for e-payment channels to fit into the need of the banking public, citizens must be proficient of using it and it must fit into serving the particular need of the user. Consequently, this theory fits this study because citizens do not need to acquire higher degree to practice the use of mobile banking, ATM and PoS services of financial institutions in Nigeria. According to Tam and Oliveira (2016), the financial sector is using mobile application platforms to offer more and more financial services to customers, which include account balances and recent transactions overview, funds transfer between a customer's own accounts, and paying bills. Many digital banking teams are developing a range of additional functionalities based on the advancement ofphone hardware features such as position system (GPS) locators to help customers easily find the location of branches and ATMs, or make bill payments more easily by using the camera on a smart phone to scan details from a bill, through quick response(QR) codes. These sophisticated financial services provided by the banking industry using financial innovation models goes a long way in stimulating the economy thereby improving economic growth.

Empirical Review

Nittayakamolphun and Pholkerd (2022) carried out a study of financial innovation and economic growth in Thailand. The research used quarterly secondary data obtained from 2010 to 2020, from the Bank of Thailand, World Bank and the Office of National Economics and Social Development Council. The study used real gross domestic product per capita (GDPC) as an indicator for economic growth while financial innovation measures used were ratio of bank sector credit for the private sector to GDP(BCP), value of electronic payment and domestic credit in the private sector to GDP, trade openness, inflation, fixed capital formation, government expenditure as

macroeconomic indicators. The data collected were analysed using descriptive statistics, unit root test, autoregressive distributive lag, error correction model, diagnostic test and granger causality test. The findings of the study indicated that financial innovation (electronic payment) showed a unidirectional relationship with economic growth in Thailand; that financial innovation (banking sector credit in the private sector) disclosed a unidirectional relationship with economic growth in Thailand. The further noted that financial innovation affects economic growth in Thailand in the long run.

Wang et al (2022) conducted a study of financial innovation, technological innovation and economic growth of 31 provinces and cities in China from 2011 to 2019. The study used secondary data obtained from the Bank of China. The dependent variable economic growth was measured using Per capita gross regional product (PGDP), the independent variables financial innovation and technological innovation were measured using balance of financial institutions loans and research and development expenditure while the control variables were foreign direct investment and population growth rate. The data were analysed using descriptive statistics and fixed effects regression analysis. The results indicated that financial innovation and technological innovation have a positive effect in promoting economic growth, and the influence of financial innovation input in promoting economic growth is larger than that of technological innovation output.

Nsor-Ambala and Amewu (2022) studied financial innovation and economic growth in Ghana from 1960 to 2019. The secondary data were collected from the World Bank and Bank of Ghana. The study measured economic growth using gross domestic product while financial innovation was measured using broad money to narrow money, and control variables of trade openness, inflation, gross capital formation, and domestic credit to the public were used. The data obtained were analysed using descriptive statistics, unit root tests, autoregressive distributive lag. The linear and nonlinear autoregressive distributive lag indicated that financial innovation establishes no significant influence on gross domestic product. A further short and long-run relationship between gross domestic product and financial innovation submits no significant short or long-run effect.

Nazir et al (2020) investigated financial innovation and economic growth of China, India and Pakistan from 1970 to 2016. The study employed secondary data obtained from World Bank Indicators and World Economic Outlook. The data collected were analysed using Autoregressive Distributed Lag (ARDL) bound testing and Granger causality-based Error Correction Model (ECM), Dynamic Ordinary Least Square (DOLS), Fully Modified Ordinary Least Square (FMOLS) method and the empirically analysis indicated that financial innovation positively and statistically significant influences economic growth in the short-run and long-run. The findings disclosed that in the long-run, monetary policy and credit flow to the private sector performs a vital role in economic growth. The trade openness and gross capital formation contribute considerably to the economic growth in China, India, and Pakistan.

Qamruzzaman, and Wei (2018) analysed the relationship between financial innovation and economic growth in South Asia. The study employed quarterly secondary data collected from the World Bank Indicators, World Economic Outlook, International Monetary Fund, Bangladesh Economic Review and the Asian Development Bank from 1975 to 2016. The quarterly data were tested using autoregressive distributed lag (ARDL) bounds test for long-run relationships, the nonlinear ARDL (NARDL) test to examine the asymmetry, granger causality test under an error correction model to test

directional causality between financial innovation and economic growth in Four South Asian Countries of Bangladesh, India, Pakistan, Sri Lanka. The results from the econometric tests disclosed long-run cointegration between financial innovation and economic growth in the four countries. Also, the NARDL established positive changes in financial innovation associated positively with economic growth and vice versa in the long run. Consequently, financial innovation increases economic growth in the long run by stimulating financial service expansion, financial efficiency, capital accumulation, and efficient financial intermediation, which are necessary elements for sustainable economic growth.

Ozurumba and Charles (2019) conducted a study of financial innovation and economic growth of Nigeria from 2012 to 2018. The study employed quarterly secondary data obtained from the Central Bank of Nigeria (CBN), the Nigeria Interbank Settlement System (NIBSS) and the National Bureau of Statistics (NBS).The study used NIBSS Instant Payment, Agent Banking and Automated Tiller Machine as measures of financial innovation while real gross domestic product as growth indicator. The secondary data collected were analysed using ordinary least square regression technique to estimate the relationship between financial innovation and economic growth; Augmented Dickey Fuller test to examine the stationarity or non-stationarity of the data while cointegration test to investigate cointegration between nonstationary of variables. The analysis indicated that the Nigerian Interbank Settlement System (NIBSS) and Agent banking are positively influence economic growth, but not significant. However, the ATM transactions disclosed a negative and significant association with economic growth. The study concluded that financial innovation influences economic growth.

Sanya and Olatunji (2020) investigated the nexus between financial innovation and economic growth using sectoral ananlysis of Agriculture, Manufacturing, Construction and Services from 1990 to 2018. The study employed secondary data from the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). The secondary data was analysed using unit root test, Johansen Co-integration test, and Vector Error Correction Model (VECM). The findings from the analysis indicated a long-run co-movement between sectoral real outputand financial innovation. The VAR results disclosed that sectoral output responded heterogeneously to shocks emanating from financial innovation. The responses from manufacturing and Agricultural sectors to shocks from financial innovation measures were positive and significant while responses from service and construction sectors were positive but insignificant. The findings from the variance decomposition disclosed that Automated teller machine ATM) and point of sale transaction (POS) influenced sectoral output in Nigeria. The study concludes that financial innovation positively and but significant influence on sectoral real output in Nigeria.

Zubairu and Oyedeko (2018) studied financial innovation and industrial growth volatility of the Nigerian banking industry from 1981 to 2016. The study collected secondary data from the Central Bank of Nigeria and causal research design was employed while the data were analysed using descriptive analysis, correlation matrix, staionarity test, VAR estimation and engodicity test, granger causality, impulse response and variance decomposition. The results from the analsysis indicated that bank branch network indicated a negative and significant relationship with industrial growth volatility; banks' credit growth to private sector revealed a negative and significant relationship with industrial growth

volatility; quasi-money in circulation disclosed a positive and significant association with industrial growth volatility of banks in Nigeria. Hence, the study concluded that financial innovation reduces the level of industrial growth volatility in banks in Nigeria.

Okoye et al (2019) conducted a study of financial technological innovation and economic growth in Nigeria from 2009 to 2019. The employed quarterly secondary data collected from the Central Bank of Nigeria and the data were tested using unit root test, ARDL bound test, error correction model and diagnostic and stability test. The analysis indicated that mobile phone transfers are positively correlated to economic growth in the long-run and at lag 0 in the short run while ATM and POS transfers are negatively associated to economic growth in the long-run but positive at lag 1 in the shortrun. Hence, the study indicated a positive association between economic growth and financial technological innovation. The study therefore, recommends, amongst others, that policies aimed at promoting and enhancing the availability and penetration of financial technological innovations should be implemented and made effective as this will also increase financial inclusion.

Yinusa et al (2020) investigated financial innovation and economic growth in seventeen African countries from 2004 to 2018. The study used secondary data collected from the World Bank Indicator and the data were analysed using descriptive statistics, correlation matrix and regression analysis (Generalised Method of Moments). The results from the Generalised Method of Moments analysis indicated that Automated Teller Machine showed a positive and significant effect on economic growth; domestic credit indicated a positive and significant effect on economic growth; gross capital formation revealed a positive effect on economic growth; inflation and labour disclosed a negative effect on economic growth. Hence, the study indicated that financial innovation significantly impact of economic growth.

Chukwunulu (2019) conducted a study of financial innovation and the Nigerian economy from 2008 to 2017. The study used secondary data from the Central Bank of Nigeria and the data collected were analysed using generalized method of moments. The dependent variable was measured using gross domestic product growth while the independent variables were ATM, POS, Mobile payments and web transactions. The results from the generalized method of moments reveal that ATM positively and significantly influences gross domestic product growth in Nigeria; internet banking positively and significantly influences gross domestic product growth in Nigeria; POS positively and significantly influences gross domestic product growth in Nigeria; and mobile banking positively and significantly influences gross domestic product growth in Nigeria. The study concluded that financial innovation positively and significantly affects economic growth.

Satia and Okle (2020) analysed empirically financial innovation and economic growth in Cameroon from 1970 to 2018. The study used secondary data obtained from the World Bank and the Central Bank for Central African States. The economic growth as the dependent variable was measured using gross domestic product per capital growth (GDPPCG) while financial innovation as the independent variable was measured using mobile penetration rate (MB), financial resources made available to household and businesses (DCP), broad money as a percentage to GDP (M2) while control variables consisted of gross capital formation, consumer price index, trade openness, government financial consumption expenditure. The data collected was analysed using unit root test, ARDL bound test. The results indicated that domestic credit to private sector positively and significantly influences economic growth in the long

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run; broad money positively and insignificantly affects economic growth in the long run; mobile banking positively and significantly influences economic growth in the short run and long run. The study concluded that financial innovation contributes to economic growth in the long run in Cameroon.

Methodology

This study of financial innovation and economic growth of Nigeria adopted the correlational research design and the sample size of data for the study was attained through purposive sampling technique. The sample size covers the period of forty-one years which spans from 1961 to 2021. Data were obtained from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS). The secondary data obtained were analysed using univariate, bivariate and multivariate analysis. Table 1 below shows the variables used in the study.

Table 1: Variables Employed in the Study

Type	Variable	Symbol	Explanation	Source
Dependent	Economic Growth	GDPC	Growth in real gross domestic product per capital	Nsor-Ambala & Amewu (2022); Nittayakamolphun & Pholkerd, (2022); Nazir et al (2020); Bara & Mudzingiri (2016); Satia & Okle (2020); Qamruzzaman & Wei (2018b)
Independent	Financial Innovation	M2/M1	Broad money to narrow money	Nittayakamolphun & Pholkerd (2022); Nazir et al (2020); Bara & Mudzingiri (2016); Satia & Okle (2020);
Independent	Financial Innovation	GBCCP	Growth in banking sector credit to private sector as a proportion to gross domestic product	Nittayakamolphun & Pholkerd (2022); Nazir et al (2020); Bara & Mudzingiri (2016); Satia & Okle (2020);
Control	Macro-economic	TOP	Trade openness to gross domestic product	Nsor-Ambala & Amewu (2022); Nittayakamolphun & Pholkerd, 2022; Nazir et al (2020); Bara & Mudzingiri

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				(2016); Satia & Okle (2020);
Control	Macro-economic	GEX	Total government expenditure to gross domestic product	Nsor-Ambala & Amewu (2022); Nittayakamolphun & Pholkerd, 2022;Nazir et al (2020); Satia &Okle (2020);
Control	Macroeconomic	GCF	Gross fixed capital formation to gross domestic product	Nsor-Ambala & Amewu (2022); Nittayakamolphun & Pholkerd, 2022;Nazir et al (2020); Bara & Mudzingiri (2016); Satia & Okle (2020);
Control	Macro-economic	CPI	Consumer price index	Nsor-Ambala & Amewu (2022); Nittayakamolphun & Pholkerd, 2022;Nazir et al (2020); Bara & Mudzingiri (2016); Yinusa et al., (2021)

Source: Desk Research 2022

This study adopts the financial innovation model developed by Laeven et al. (2015) which extended the Aghion, Howitt and Mayer-Foulkes' (AHM) regression framework and consequently employed by Bara et al (2016). These empirical studies tested the effects of financial innovation on endogenous growth in a model with a vital characteristic which provides that economies without financial innovation will stagnate, notwithstanding the initial level of financial development. To test their model, Laeven et al. (2015) and Bara et al (2016) extended the AHM to incorporate the financial innovation with financial progress. All of the researchers emphasized financial innovation. The authors expected that financial growth is the result of earlier steps of financial innovations. Bara et al. (2016) derived the following model:

$g_{i,t} - g_{1i,t} = b0 + b_1 Fi,t + b2\eth yi,t - y_{1i,t} t Þ + b3Fi,\eth yi,t - y_{1i,t} t Þ + b4Xi,t + b5fi,t + b6fi,\eth yi,t - y1i,t Þ + \delta i + ui,t$ ---------- (1)

Where t represents periods, so that t = 1, 2…., for individual l country i, data authorizing, δiis the coefficient on a country-particular effect, and also control for a time-specific influence in each period in

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this panel. Therefore, the regression model is stated as follows:

$$lnGDPCt = \alpha0 + \alpha1lnGEXt + \alpha2lnCPIt + \alpha3lnTOPt + \alpha4lnGDPCt-1 + \alpha5lnGCFt + \alpha6lnM2Mt + \alpha7lnGBCCPt + \varepsilon t \text{ ---------- (2)}$$

This study uses Autoregressive Distributed Lag (ARDL) bounds tests to study the relationship between financial innovation and economic growth. The model is established in equation (3) below:

$$\Delta ln \eth GDPCPt = \alpha0 + \alpha1\Delta ln\eth GEXPt-1 + \alpha2\Delta ln\eth CPIPt-1 + \alpha3\Delta ln\eth TOPPt-1 + \alpha4\Delta ln\eth GDPCPt-1 + \alpha5\Delta ln\eth GCFPt-1 + \alpha6\Delta ln\eth M2M1Pt-1 + \alpha7\Delta ln\eth DCPPt-1 + \lambda0ln\eth GDPCPt-1 + \lambda1ln\eth GEXPt + \lambda2ln\eth CPIPt + \lambda3ln\eth TOPPt + \lambda4ln\eth GCFPt + \lambda5ln\eth M2M1Pt + \lambda6ln\eth GBCCPPt + \varepsilon t \text{ ---------- (3)}$$

Data Analysis and Interpretation of Findings

Table 2: Description of the characteristics of the variables under study

	GDPC	M2M1	GBCCP	TOP	GEX	GCF	CPI
Mean	2548.758	0.232459	0.145787	0.400148	0.149754	0.123803	16.37918
Median	2611.992	0.226000	0.140000	0.387000	0.150000	0.120000	12.10000
Maximum	8250.910	0.396000	0.338000	0.833000	0.302000	0.394000	72.81000
Minimum	47.80700	0.124000	0.050000	0.082000	0.014000	0.055000	0.290000
Std. Dev.	2093.487	0.071869	0.060314	0.190052	0.075308	0.060782	15.82059
Skewness	0.602355	0.739206	0.514419	0.230000	0.253847	2.767331	1.837185
Kurtosis	2.917313	2.985569	3.184273	2.213603	2.032964	12.69589	5.865381
Jarque-Bera	3.706161	5.555862	2.776682	2.109636	3.031989	316.8004	55.18314
Probability	0.156754	0.062167	0.249489	0.348256	0.219590	0.000000	0.000000
Sum	155474.2	14.18000	8.893000	24.40900	9.135000	7.552000	999.1300
Sum Sq. Dev.	2.63E+08	0.309909	0.218270	2.167196	0.340279	0.221664	15017.47
Observations	61	61	61	61	61	61	61

Source: Author's Computation using E-Views, 12

The descriptive statistics of the independent and dependent variables as well as controls is presented in the above Table 1. The table disclosed that all the variables had equal observation period (61) between 1961 and 2021. The result indicated that gross domestic product per capital (GDPC) has a Mean value of 2548.758 with a Standard deviation of 2093.487 and it ranges between minimum and maximum growth from 47.80 to 8250.910. Broad money to narrow money (M2/M1) has a Mean value of 0.232 with a Standard deviation of 0.071 and it ranges between minimum and maximum growth from 0.124 to 0.396. Growth in banking sector credit to private sector (GBCCP) has a Mean value of 0.145 with a Standard deviation of 0.060, it ranges between the minimum, and maximum grow from 0.050 to 0.338. Trade openness (TOP) has a Mean value of 0.400 with a Standard deviation of 0.190, it ranges between the minimum, and maximum grow from 0.082 to 0.833. Government expenditure (GEX) has a Mean value of 0.149 with a Standard deviation of 0.075, it ranges between the minimum, and maximum grow from 0.014 to 0.302. Gross fixed capital formation (GCF) has a Mean value of 0.123 with a Standard deviation of 0.060, it ranges between the minimum, and maximum grow from 0.055 to 0.394. Finally, consumer price index (CPI) has a Mean value

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of 16.379 with a Standard deviation of 15.820 and it ranges between minimum and maximum grow from 0.290 to 72.810.

The skewness statistics indicated that all the variables GDPC, M2/M1, GBCCP, TOP, GEX, GCF and CPI are positively skewed and this means that they have a long right tail. The information provided by kurtosis indicate that GDPC, M2/M1, TOP and GEX has a platykurtic value which is less than the kurtosis value of (3). But GBCCP, GCF and CPI indicate that these variables are leptokurtic values, which suggest that the variables are higher than the kurtosis value of (3) that is clearly mesokurtic. The overall Jarque-Bera values for GDPC, M2/M1, GBCCP, TOP and GEX variables are higher and their respective corresponding probability values is greater than 0.05 level of significance indicating that they are normally distributed. However, GCF and CPI is also higher but his respective corresponding probability value is less than 0.05 level of significant shows that the distribution level at mean zero and constant variance meanings non-normal distributed.

Table 3: Summary of Unit Root Test Result at Level

Group unit root test: Summary
Series: CPI, GBCCP, GCF, GDPC, GEX, M2M1, RESID, TOP
Date: 01/14/23 Time: 03:30
Sample: 1 61
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.44890	0.0737	8	476
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.16663	0.0000	8	476
ADF - Fisher Chi-square	69.0162	0.0000	8	476
PP - Fisher Chi-square	71.7595	0.0000	8	478

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 4: Summary of Unit Root Test Result at first Difference

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Group unit root test: Summary
Series: CPI, GBCCP, GCF, GDPC, GEX, M2M1, RESID, TOP
Date: 01/14/23 Time: 03:34
Sample: 1 61
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-24.6232	0.0000	8	466
Breitung t-stat	-17.3671	0.0000	8	458
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.7018	0.0000	8	466
ADF - Fisher Chi-square	297.297	0.0000	8	466
PP - Fisher Chi-square	288.123	0.0000	8	470

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Author's Computation using E-Views, 12

The table 3 and 4 presents the group unit root test, using Levin, IM, ADF and PP as the criteria for decision. It was found that at level Levin unit root test in the model was non-stationary which is not statistically qualified for further estimation because it might bring spurious estimates. But IM, ADF and PP unit root test at the same level in the model were stationary which is statistically qualified for further estimation. Thus, first difference method was applied to further improve the model. However, the unit root result at first difference above however shows that all the variables in the model was stationary using Levin, IM, ADF and PP because the P-values is less than 0.05.

Diagnostic Test

Table 5: Normality Test

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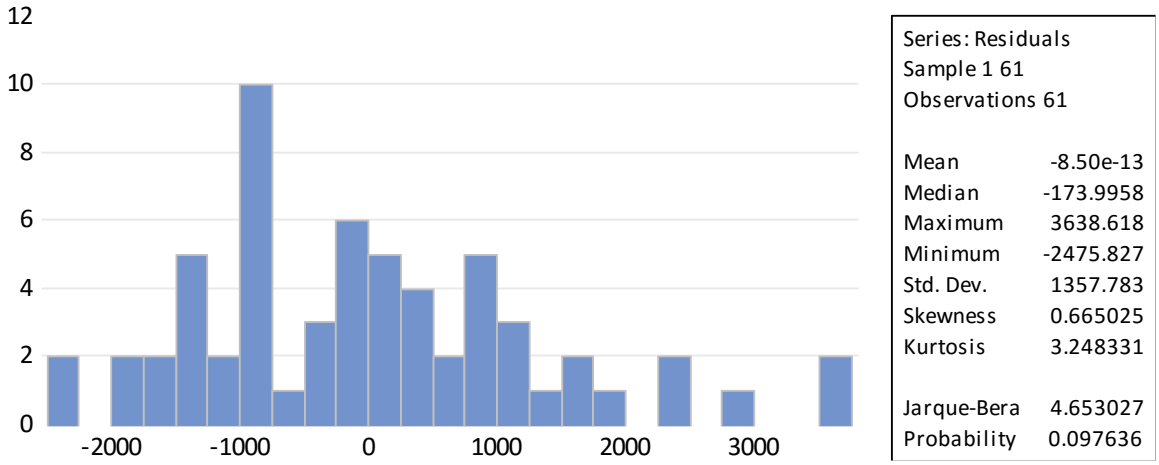

Source: Author's Computation using E-Views, 12

The table 5 presents the diagnostic test using normality test of residuals histograms has a criteria for decision. It was found that Jarque-Beta probability value is greater than 0.05 (>0.05) and this means that that the residuals are normally distributed.

Table 6: Multicollinearity Test

Variance Inflation Factors
Date: 01/20/23 Time: 23:44
Sample: 1 61
Included observations: 61

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
M2M1	33701456	59.33047	5.098765
GBCCP	38673182	28.59787	4.120846
TOP	1675001.	9.758826	1.772129
GEX	15243048	12.71199	2.532149
GCF	14389683	8.125051	1.557140
CPI	153.1716	2.346639	1.122941
C	589843.1	17.56501	NA

Source: Author's Computation using E-Views, 12

The table 6 presents the diagnostic test using multicollinearity test of variance inflation factors has a criteria for decision. The result indicate that all the variables VIF values is less than 10 VIF criteria and this applies that there is no multicollineariy presence amongst the variables.

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Table 7: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.804231	Prob. F(6,54)	0.0689
Obs*R-squared	14.49125	Prob. Chi-Square(6)	0.0746
Scaled explained SS	12.76627	Prob. Chi-Square(6)	0.0869

Heteroskedasticity Test: Harvey
Null hypothesis: Homoskedasticity

F-statistic	1.541616	Prob. F(6,54)	0.1824
Obs*R-squared	8.920700	Prob. Chi-Square(6)	0.1781
Scaled explained SS	10.29291	Prob. Chi-Square(6)	0.1128

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Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.370019	Prob. F(27,33)	0.0895
Obs*R-squared	40.24539	Prob. Chi-Square(27)	0.0585
Scaled explained SS	35.45473	Prob. Chi-Square(27)	0.1277

Source: Author's Computation using E-Views, 12

Table 7 presents heteroskedasticity diagnostic test, using Harvey, Breusch-Pagan-Godfrey, and White heteroskedasticity test as the criteria for decision. It was found that all the three method of heteroskedasticity test indicates that, the probability chi-squared values of 0.178, 0.074 and 0.058 > 0.05 which is greater than 5 percent level of significance, thus we accept the null hypothesis that is there is no heteroskedasticity in the model.

Table 8: Ramsey Reset Test

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Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: GDPC M2M1 GBCCP TOP GEX GCF CPI C

	Value	df	Probability
t-statistic	2.114604	53	0.0691
F-statistic	4.471551	(1, 53)	0.0591
Likelihood ratio	4.940886	1	0.0562

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	8606311.	1	8606311.
Restricted SSR	1.11E+08	54	2048416.
Unrestricted SSR	1.02E+08	53	1924682.

LR test summary:

	Value
Restricted LogL	-526.0812
Unrestricted LogL	-523.6108

Source: Author's Computation using E-Views, 12

Table 8 presents diagnostic test using Ramsey Reset Test as the criteria for decision. The result indicate that Ramsey Reset Test T-statistic, F-statistic and Likelihhod ratio values of 0.0691, 0.0591 and 0.0562 > 0.05 which is greater than 5 percent level of significance, thus we accept the null hypothesis that is there is no specification error in the model.

Table 9: Correlation Matrix

GDPC	1	0.27964768...	0.61614273...	-0.2316732...	-0.3987418...	0.07703742...	0.09240985...
M2M1	0.27964768...	1	0.80027059...	-0.0085196...	0.35054535...	0.52240490...	0.17547226...
GBCCP	0.61614273...	0.80027059...	1	-0.1292488...	-0.0288635...	0.40145610...	0.06298502...
TOP	-0.2316732...	-0.0085196...	-0.1292488...	1	0.53067263...	-0.2049316...	0.26240357...
GEX	-0.3987418...	0.35054535...	-0.0288635...	0.53067263...	1	0.23313017...	0.26335366...
GCF	0.07703742...	0.52240490...	0.40145610...	-0.2049316...	0.23313017...	1	0.07986414...
CPI	0.09240985...	0.17547226...	0.06298502...	0.26240357...	0.26335366...	0.07986414...	1

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Source: Author's Computation using E-Views, 12

The results in table 9 revealed a correlation coefficient of R-value (0.279) which illustrated weak positive relationship between broad money to narrow money (M2/M1) and gross domestic product per capital (GDPC). Correlation coefficient of R-value 0.616) illustrated a strong positive correlation between growth in banking sector credit to private sector (GBCCP) and gross domestic product per capital (GDPC). And, a correlation coefficient of R-value (-0.231; -0.398) which illustrated a weak negative relationship between trade openness (TOP), government expenditure (GEX) and gross domestic product per capital (GDPC).

Finally, the results in table 9 revealed a correlation coefficient of R-values (0.077 and 0.092) which illustrated that gross fixed capital formation (GCF) and consumer price index (CPI) has negative relationship with gross domestic product per capital (GDPC).

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Table 10 Estimation of Short Run ARDL Bound test

Dependent Variable: GDPC
Method: ARDL
Date: 01/15/23 Time: 15:42
Sample (adjusted): 4 61
Included observations: 58 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): M2M1 GBCCP TOP GEX GCF CPI
Fixed regressors: C
Number of models evaluated: 12288
Selected Model: ARDL(3, 3, 3, 2, 3, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDPC(-1)	0.611115	0.130894	4.668794	0.0000
GDPC(-2)	0.252587	0.147211	1.715810	0.0950
GDPC(-3)	0.280709	0.132912	2.112001	0.0419
M2M1	3597.088	1600.538	2.247424	0.0310
M2M1(-1)	356.7693	1946.574	0.183281	0.8556
M2M1(-2)	-570.7821	1809.332	-0.315466	0.7543
M2M1(-3)	-3002.091	1366.312	-2.197222	0.0347
GBCCP	-2582.619	1926.515	-1.340565	0.1887
GBCCP(-1)	-4030.801	2038.880	-1.976969	0.0560
GBCCP(-2)	-49.31277	2186.447	-0.022554	0.9821
GBCCP(-3)	2706.845	1885.714	1.435449	0.1600
TOP	1671.715	417.0460	4.008467	0.0003
TOP(-1)	-1608.538	454.9643	-3.535526	0.0012
TOP(-2)	-823.6904	451.6058	-1.823915	0.0767
GEX	-3458.026	874.4706	-3.954422	0.0004
GEX(-1)	362.0837	936.9130	0.386465	0.7015
GEX(-2)	-1427.328	961.1750	-1.484983	0.1465
GEX(-3)	4802.093	980.5442	4.897375	0.0000
GCF	5510.786	1009.551	5.458650	0.0000
GCF(-1)	361.1361	1449.575	0.249132	0.8047
GCF(-2)	-3361.224	1091.709	-3.078864	0.0040
CPI	0.972992	2.865918	0.339504	0.7363
C	321.5576	177.3683	1.812937	0.0784

R-squared	0.991533	Mean dependent var	2677.674
Adjusted R-squared	0.986211	S.D. dependent var	2066.276
S.E. of regression	242.6394	Akaike info criterion	14.10904
Sum squared resid	2060585.	Schwarz criterion	14.92611
Log likelihood	-386.1621	Hannan-Quinn criter.	14.42730
F-statistic	186.3002	Durbin-Watson stat	2.137036
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Author's Computation using E-Views, 12

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Result from the short run estimation of ADRD disclosed that, the maximum lag length for the variables is 3 as concluded by majority of the information criterion including the Akaike information criterion (AIC). The GDPC ARDL model was estimated with the aid of this lag lengths and the model with the highest AIC value was selected. From about 12288 models that was estimated using combinations of different lags, the ARDL model (3, 3, 3, 2, 3, 0) was selected because it has the highest AIC values of all the models estimated.

Table 10 further shows the ARDL model of short run equation result with gross domestic product per capital (GDPC) as the dependent variable which represents economic growth and financial innovation proxy by Broad money to narrow money (M2/M1) and Growth in banking sector credit to private sector (GBCCP) as the explanatory variables jointly with Trade openness (TOP), Government expenditure (GEX), Gross fixed capital formation (GCF) and consumer price index (CPI) as the control variables which represent macro-economic. The R2 and adjusted R2 are the coefficient of determination which signifies the proportion of dependent variable that is explained by the independent variables. While the adjusted R2 is adjusted for the number of variables in the equation, the R2 is not. The Adjusted R2 in Table 9 indicates that 98.62% of the variation in gross domestic product per capital (GDPC) is explained by the financial innovation variables (Broad money to narrow money (M2/M1) and Growth in banking sector credit to private sector (GBCCP) as well as Trade openness (TOP), Government expenditure (GEX), Gross fixed capital formation (GCF) and consumer price index (CPI) employed in this study. On the other hand, the remaining 1.38% account for other variables not include in the model. The probability value of the model's F statistic is less than 5% which indicates that the overall model in Table 10 is significant. Finally, the durbin watson stat value shows that the null hypothesis of the serial correlation test is not rejected (that is there is no evidence of first-degree serial correlation) because the DW value is within 1.55 and 2.45.

The result also further revealed that in the short, Broad money to narrow money (M2/M1) had both positive and significant association on gross domestic product per capital (GDPC) (P-value of 0.0310 in each case), Growth in banking sector credit to private sector (GBCCP was found to be negative and insignificant association on gross domestic product per capital (GDPC) (P-value of 0.1887 in each case), Trade openness (TOP) had both positive and significant association on gross domestic product per capital (GDPC) (P-value of 0.0003 in each case), Trade openness (TOP) had both positive and significant association on gross domestic product per capital (GDPC) (P-value of 0.0003 in each case), Government expenditure (GEX) had negative and significant association on gross domestic product per capital (GDPC) (P-value of 0.0004 in each case), Gross fixed capital formation (GCF) had both positive and significant association on gross domestic product per capital (GDPC) (P-value of 0.0000 in each case) and finally, consumer price index (CPI) had negative and significant association on gross domestic product per capital (GDPC) (P-value of 0.0004 in each case). Since four out of the six variables has short run relationship with gross domestic product per capital (GDPC), the study concludes that there is a short run ARDL association between financial innovation and economic growth in Nigeria.

Table 11: ARDL Long -run result for financial innovation and economic growth in Nigeria

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ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDPC)
Selected Model: ARDL(3, 3, 3, 2, 3, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 01/15/23 Time: 15:46
Sample: 1 61
Included observations: 58

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	321.5576	177.3683	1.812937	0.0784
GDPC(-1)*	0.144411	0.044063	3.277353	0.0024
M2M1(-1)	380.9844	1638.387	0.232536	0.8175
GBCCP(-1)	-3955.888	2423.737	-1.632144	0.1116
TOP(-1)	-760.5136	331.3234	-2.295381	0.0278
GEX(-1)	278.8223	1138.927	0.244812	0.8080
GCF(-1)	2510.699	1349.182	1.860904	0.0712
CPI**	0.972992	2.865918	0.339504	0.7363
D(GDPC(-1))	-0.533296	0.154987	-3.440900	0.0015
D(GDPC(-2))	-0.280709	0.132912	-2.112001	0.0419
D(M2M1)	3597.088	1600.538	2.247424	0.0310
D(M2M1(-1))	3572.873	1651.622	2.163251	0.0374
D(M2M1(-2))	3002.091	1366.312	2.197222	0.0347
D(GBCCP)	-2582.619	1926.515	-1.340565	0.1887
D(GBCCP(-1))	-2657.533	2038.044	-1.303962	0.2008
D(GBCCP(-2))	-2706.845	1885.714	-1.435449	0.1600
D(TOP)	1671.715	417.0460	4.008467	0.0003
D(TOP(-1))	823.6904	451.6058	1.823915	0.0767
D(GEX)	-3458.026	874.4706	-3.954422	0.0004
D(GEX(-1))	-3374.764	1171.419	-2.880920	0.0067
D(GEX(-2))	-4802.093	980.5442	-4.897375	0.0000
D(GCF)	5510.786	1009.551	5.458650	0.0000
D(GCF(-1))	3361.224	1091.709	3.078864	0.0040

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2M1	-2638.189	11065.35	-0.238419	0.8129
GBCCP	27393.20	12141.47	2.256168	0.0304
TOP	5266.301	2782.586	1.892592	0.0667
GEX	-1930.751	7880.699	-0.244997	0.8079
GCF	-17385.75	8319.556	-2.089745	0.0440
CPI	-6.737642	20.81694	-0.323661	0.7481
C	-2226.679	1527.562	-1.457668	0.1538

EC = GDPC - (-2638.1891*M2M1 + 27393.1968*GBCCP + 5266.3013*TOP
-1930.7512*GEX -17385.7462*GCF -6.7376*CPI - 2226.6788)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	5.931924	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
Actual Sample Size	58	Finite Sample: n=60		
		10%	2.114	3.153
		5%	2.456	3.598
		1%	3.293	4.615
		Finite Sample: n=55		
		10%	2.139	3.204
		5%	2.49	3.658
		1%	3.33	4.708

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Source: Author's Computation using E-Views, 12

Table 11 above reveals the results for the bound test. The null hypothesis of the model is that there is no long run relationship between financial innovation and economic growth. The F-statistics value (5.931) from the table is higher than the values of the distribution at the upper bounds of all the level of significance tested; hence, the independent variables exert long run association on economic growth in Nigeria.

Table 12: Granger Causality Tests- Pairwise Granger Causality Tests

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Pairwise Granger Causality Tests
Date: 01/14/23 Time: 06:40
Sample: 1 61
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
GBCCP does not Granger Cause CPI	61	1.31999	0.2554
CPI does not Granger Cause GBCCP		0.57768	0.4504
GCF does not Granger Cause CPI	61	1.98493	0.1643
CPI does not Granger Cause GCF		0.41565	0.5217
GDPC does not Granger Cause CPI	61	0.08584	0.7706
CPI does not Granger Cause GDPC		0.03878	0.8446
GEX does not Granger Cause CPI	61	1.35567	0.2491
CPI does not Granger Cause GEX		2.12523	0.1504
M2M1 does not Granger Cause CPI	61	4.41619	0.0400
CPI does not Granger Cause M2M1		1.23913	0.2703
TOP does not Granger Cause CPI	61	0.34554	0.5590
CPI does not Granger Cause TOP		2.27959	0.1366
GCF does not Granger Cause GBCCP	61	1.82139	0.1825
GBCCP does not Granger Cause GCF		0.15953	0.6911
GDPC does not Granger Cause GBCCP	61	3.03105	0.0871
GBCCP does not Granger Cause GDPC		3.37024	0.0716
GEX does not Granger Cause GBCCP	61	0.16647	0.6848
GBCCP does not Granger Cause GEX		2.42560	0.1249
M2M1 does not Granger Cause GBCCP	61	0.42688	0.5162
GBCCP does not Granger Cause M2M1		0.27250	0.6037
TOP does not Granger Cause GBCCP	61	0.00393	0.9502
GBCCP does not Granger Cause TOP		4.13161	0.0468
GDPC does not Granger Cause GCF	61	0.29733	0.5877
GCF does not Granger Cause GDPC		0.01025	0.9197
GEX does not Granger Cause GCF	61	2.51415	0.1184
GCF does not Granger Cause GEX		0.01645	0.8984
M2M1 does not Granger Cause GCF	61	1.31566	0.2562
GCF does not Granger Cause M2M1		5.69760	0.0203
TOP does not Granger Cause GCF	61	0.33279	0.5663
GCF does not Granger Cause TOP		0.98782	0.3245
GEX does not Granger Cause GDPC	61	0.00506	0.9435
GDPC does not Granger Cause GEX		3.75180	0.0577
M2M1 does not Granger Cause GDPC	61	1.47043	0.2303
GDPC does not Granger Cause M2M1		0.01726	0.8959
TOP does not Granger Cause GDPC	61	4.05420	0.0488
GDPC does not Granger Cause TOP		1.54740	0.2186
M2M1 does not Granger Cause GEX	61	0.19210	0.6628
GEX does not Granger Cause M2M1		0.58893	0.4460
TOP does not Granger Cause GEX	61	0.29274	0.5906
GEX does not Granger Cause TOP		1.80533	0.1844
TOP does not Granger Cause M2M1	61	0.21123	0.6476
M2M1 does not Granger Cause TOP		0.67369	0.4152

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Source: Author's Computation using E-Views, 12

From the result, we observed that financial innovation granger does not causes the level of economic growth and also economic growth does not granger cause financial innovation. This shows that financial innovation does not lead to improve economic growth in Nigeria.

Conclusions and Recommendations

This study empirically investigates the impact of financial innovation on economic growth in Nigeria in Nigeria between 1961 and 2021. It specifically focuses on broad money to narrow money (M2/M1), growth in banking sector credit to private sector (GBCCP), trade openness (TOP), government expenditure (GEX), gross fixed capital formation (GCF), consumer price index (CPI) and gross domestic product per capital (GDPC). The study employed ARDL-Bound Test approach to investigate the presence of long and short run relationships among the variables. From the result, it was found that there is a short run and long run impact of financial innovation on economic growth in Nigeria. This conclusion was consistent with Nittayakamolphun and Pholkerd (2022), their result noted that financial innovation affects economic growth in Thailand in the long run. Wang et al (2022), finding was empirically in-line with this study conclusion and their results indicated that financial innovation and technological innovation have a positive effect in promoting economic growth, and the influence of financial innovation input in promoting economic growth is larger than that of technological innovation output. Others empirical findings that supported this study includes; Sanya and Olatunji (2020), Yinusa et al (2020), Satia and Okle (2020), Chukwunulu (2019), Qamruzzaman, and Wei (2018), Zubairu and Oyedeko (2018). However, the study conclusion was inconsistent with Nsor-Ambala and Amewu (2022), their linear and nonlinear autoregressive distributive lag indicated that financial innovation establishes no significant influence on gross domestic product. A further short and long-run relationship between gross domestic product and financial innovation submits no significant short or long-run effect. Based on these findings and conclusions, the following recommendations are made;

1. The regulatory authorities should enhance a competitive financial environment with more cooperation by providing efficient financial instruments along with financial diversification of informal organizations in the financial system.
2. The regulatory authorities such as the Central Bank of Nigeria should combine and implement new financial assets, payments tools and services for properly designed growth and development of financial innovation models as stimulus for economic growth and development in Nigeria.
3. There should be an economic collaboration between deposit money banks and telecommunication networks in Nigeria by extending their scope and network coverage to broader areas within the country so that firms can have better access to domestic credits through their mobile money wallet. This, in the long run will stimulate their financial output and performance of deposit money banks thereby improving the economic growth of the country.

The study made the following areas of further research on the impact of financial innovation and economic growth of Nigeria. It will be beneficial for a further research whereby a moderating role of interest rates and non-performing loans to banks liquidity on financial innovation and economic growth. Also, it would be an important addition to knowledge for a further study on the social value of financial innovations on economic growth. This study would be suitable for developing country. An exhaustive analysis of the social value of financial innovations in line with socio-economic progressions

will produce much interest in the support of local firms innovations and growth in Nigeria.

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