

Financial inclusion and economic growth in Nigeria

Inclusão financeira e crescimento econômico na Nigéria

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Abstract: The research study aimed at examining the impact of financial inclusion on economic growth in Nigeria. The study made use of secondary data that was sourced from the central bank statistical bulletin from 1987 to 2021. The study employed Autoregressive Distributed Lag method of analysis to estimate the data. The findings showed that agent banking, mobile banking, financial services and money management 19.093214, 22.21476, 11.87068 and 2.784910 have significant impact on the gross domestic product. The study concludes that financial inclusion has positive impact on economic growth. The study therefore recommended that, CBN should direct its policy towards increasing the number of agent banks, especially to rural areas of the economy as millions of Nigerians living in rural areas have no access to basic banking services. CBN should collaborate with banks to ensure development of mobile banking applications that can be used on all mobile and telecommunication devices. It is also recommended that apart from directing policies to those inclusion variables that have positive effect on economic growth in Nigeria, government should establish regulatory frameworks that will ensure introduction of low cost and innovative products. Lastly, the government should engage in grass-root education on financial products through SMEs and other channels to increase financial literacy.

Keywords: Agent Banking. ARDL. Economic Growth. Financial Inclusion. Mobile Banking.

Resumo: O estudo teve como objetivo examinar o impacto da inclusão financeira no crescimento econômico da Nigéria. Utilizou-se dados secundários provenientes do boletim estatístico do Banco Central, referentes ao período de 1987 a 2021. O método de análise empregado foi o Autorregressivo com Defasagem Distribuída (ARDL). Os resultados demonstraram que os serviços bancários por meio de agentes, os serviços bancários móveis, os serviços financeiros e a gestão de recursos (19,093214, 22,21476, 11,87068 e 2,784910, respectivamente) têm um impacto significativo no Produto Interno Bruto (PIB). O estudo conclui que a inclusão financeira tem um impacto positivo no crescimento econômico. Portanto, recomenda-se que o Banco Central da Nigéria (CBN) direcione suas políticas para o aumento do número de bancos por meio de agentes, especialmente nas áreas rurais, visto que milhões de nigerianos que vivem nessas regiões não têm acesso a serviços bancários básicos. O CBN também deve colaborar com os bancos para garantir o desenvolvimento de aplicativos de serviços bancários móveis que possam ser utilizados em todos os dispositivos móveis e de telecomunicações. Recomenda-se também que, além de direcionar políticas para as variáveis de inclusão que têm efeito positivo no crescimento econômico da Nigéria, o governo estabeleça marcos regulatórios que garantam a introdução de produtos inovadores e de baixo custo. Por fim, o governo deve promover a educação financeira junto às comunidades, por meio de pequenas e médias empresas e outros canais, a fim de aumentar a alfabetização financeira.

Palavras-chave: Banco por meio de agentes. ARDL. Crescimento econômico. Banco móvel. Inclusão financeira.

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Introduction

Financial inclusion enhances the financial provision of the general public by creating opportunities for a viable and effective business in the financial markets and non-financial market of the economy (Ifeanyi & Chinyere, 2015). Access to a stable, fast, and affordable sources of finance by the general public is therefore recognized as a precondition for accelerating inclusive expansion in the country. According to Sierrao *et.al.* (2012), financial inclusion narrows wealth and poverty gap, creates equitable opportunities, helps people that are economically and socially relegated to integrate more fully into the system thereby contributing to its economic growth, and ensure protection against economic shocks. High level of illiteracy rates among rural dwellers attitude a challenge for operators in bank services and other financial amenities to communicate and transact banking business with them. This is worsened by inadequate and improper information programs which hamper knowledge of the usefulness of banks and its products. Onaolapo (2015) submits that several people would have to depend on their savings for future investment without financial inclusion. Due to their reliance on their pathetic incomes, they will be unable to pursue good growth possibilities, which will be a hindrance to the economic progress of the bulk of emerging economies and the sources of ongoing income inconsistency.

On the other hand, Udenwa (2022) pointed out that agent banking, which uses third parties to carry out some of its operations, has increased financial penetration in Nigeria's rural areas. Moreover, Mobile banking, access to financial services and money management skills have also increased in rural areas of Nigeria through the use of POS, internet banking, CBDC and USSD codes, where majority of Nigerians are domiciled. However, despite rising GDP growth, less than 40% of Nigerians, or 83 million people live in poverty, indicating that the country is the poverty capital of Africa (NBS, 2020). This suggests that the country's economy has drastically declined. There is worsened income inequality amongst the people because just 10% of the populace have access to more than half of the country's prosperity (Awe & Olawumi, 2012).

Numerous research works have been carried out on financial inclusion, mostly look into the effect of financial inclusion on economic growth. However, few empirical research study have focused on how agent banking, mobile banking, financial service accessibility, and money management affect Nigeria's economic growth Jesudasan and D'souza (2015) looked at leveraging financial inclusion for economic prosperity using independent elements of access to financial

services and demand usage of financial services. Gourène and Mendy (2017) studied financial inclusion and economic growth using financial inclusion supply and demand indicators. Nonetheless, a limited number of studies on financial inclusion and economic growth in Nigeria have been conducted, using varying variables, time frames, and methodologies (Babajide, Adegbeye & Omankhanlen, 2015; Nwafor, 2018; Oladimeji & Adegbite, 2019). It is therefore critical to carryout investigation on the impact of financial inclusion on economic growth in Nigeria.

1. Literature Review

1.1 Conceptual Review

1.1.1 Financial Inclusion

Financial inclusion embraces all activities that signify availability of financial services or inclusion to households such as the less privileged, mini, average and large scale firms and governments agencies who desire such services, at their pace, condition of life and time of need, involves admitting individuals that has been denied access to basic banking services or operations in the financial system. This is basically to make sure that the financial and social security needs of the populace are taken care of through adequate financial operation service providers. Financial inclusion is defined by Ibor, Offiong, and Mendie (2017) as the provision of inexpensive financial services to vulnerable populations, such as low-income groups. Ozili (2022) had sketched the ideal circumstances for financial inclusion in a similar manner. Availability of adequate financial services to the public at a cost that is both affordable and profitable enough to incentivize financial service providers to keep offering these services, the best level of financial inclusion is reached. Any degree of financial inclusion that falls short of these requirements is wasteful in terms of incentives for both financial service providers and consumers. Furthermore, Kenny *et. al.* (2020), assert that a major catalyst for attaining sustainable economic growth in Nigeria by developing new goods and services that will draw savings from rural inhabitants due to the significance of deposits to the country's development is giving adequate access to financial services. However, Ozil (2020) asserts that a number of factors, including consumer protection, cultural orientation, and the degree of economic development, stability, financial literacy, and technological innovation and breakthrough, affect financial inclusion. These factors vary greatly between nations and even

within the same region. Ene (2019) defines financial inclusion as the process of providing all societal segments with basic banking services at a reasonable cost, with a focus on the most underprivileged and low-income populations that are typically left out of the official banking system.

Agent Banking

The Strategic Summary Report of financial inclusion (2012, updated in 2018) recognized intermediaries as essential conduits for promoting equitable growth in developing nations around the globe. A regulated deposit money bank or mobile money operator employs a banking agent, often known as a retail or postal platform, to provide a range of services to clients. Nigeria had gone through significant economic growth over time. Nigeria is the country with the greatest GDP in Africa as of December 2021, with a GDP peak of \$173,182.07 billion (CBN statistical bulletin, December 2021). Thirty-two (32) million Nigerians or less than 46.3% of the nation's population lack access to adequate financial services despite the country's massive GDP development. The unbanked and underbanked Nigerians frequently turn to ineffective informal means of meeting their banking needs, which are typically riskier and more expensive to run than the regulated official sector (CBN Monetary Policy Gazette, 2021).

However, businesses such as pharmaceutical stores, shopping malls, convenience stores, lottery outlets, postal offices, and many other establishments can function as banking agents. A variety of banking services can be provided by bank agents, such as deposits and withdrawals, money transfer, bills payment, loans disbursement and repayment, payment of salaries and account, loan application collection *etc.* Bank agents cannot access applications and are only able to conduct cash transactions. Technology powers all aspects of agent banking. Transactions can be completed online, through a POS system, or by phone, and they must instantly appear in the bank's main banking system (Keeler, 2011).

After the Agent Banking Model was implemented, commercial banks were able to work with a variety of retail organizations. These organizations, which include post offices, pharmacies, supermarkets, security firms, and courier services, function as third party agents that carry out cash-in and cash-out financial transactions and other important financial services in accordance with established standards. Banking agents' job is to assist customers with deposits and help banks declutter banking space by offering "complementary", frequently more convenient

channels. Agents are used by financial institutions, particularly in developing economies to access a “additional” clientele or geographical area. The Apex bank has identified three types of bank agents: super agents, sole agents, and sub agents. Their modes of operation, capital, registration requirements, ownership structure and management, coverage space, reporting mechanisms and disclosures, control as well as monitoring, and reporting methods of these agents vary. When a financial institution appoints an agent, it must do due diligence on the agency to determine that it is qualified for managing such a delicate assignment.

Mobile Banking

In developing economies, particularly in Nigeria, mobile banking plays a major role in stimulating and promoting financial inclusion. Mobile penetration lowers the likelihood that a household will become impoverished and boost financial inclusion. Various instruments were used to address the need to jack up the level of access to financial services while improving the structure of financial system. The outcomes were limited by the apex bank reluctance to adopt this model, which was determined on the monopoly of a cell phone provider, the component of the cell phone industry, and the innovation delayed introduction, which occurred at same period as the global financial crisis of 2008. As a results, owing to mobile network services operator systems used in other African nations, the “bank-led” (or non-MNSO-led, mobile network service operators-led) ecosystem model employed in Nigeria produces distinct network externalities. The cheap costs produced by the increased competition across banks provide credence to the viability of this approach. From the standpoint of the customer, ubiquitousness, instantaneous connectivity, proactive functionality, satisfaction, access to financial services at any time or location, privacy, and period and effort keeping are critical components of mobile banking features (Singh 2012, Tiwari *et al.*, 2016).

The main pillars of mobile banking system in Nigeria includes: knowledge, convenience and accessibility to financial services (Tarthini *et al.*, 2015). Mobile banking is an important element of the country's financial system operations since it is a practical tool for providing the nation's growing customer base with fast, convenient, trustworthy, and high-quality services (Agu *et al.*, 2016). Moreso, mobile banking allows various individuals to engage in financial services across various locations and at anytime. It also creates a convenient channel or means for buying and selling of goods or services. Khan and Ejike (2017) believe access to technological innovations that improve one's knowledge of mobile devices is a factor in the widespread acceptance of mobile banking; nonetheless, the level of easiness and satisfaction with usage is quite insignificant.

Access to Financial Services

Under specific regulated arrangements, deposit money banks serve as the intermediary between fund owners and users. These arrangements might be short-, medium-, or long-term (Olaitan, 2015). The demand-side characteristic of access is taken into consideration while analyzing access to financial operation including loan, mobile, and bank accounts. The ability of various households to participate in insurance services, savings and credits which represents the supply side of financial operation. Beck *et. al.* (2013) state that the number of adult individuals in the population with bank accounts, loans, and mobile accounts per 1000 is a measure of access to financial inclusion. According to Sarma and Pias (2011), possessing a bank account is a fundamental gage of financial accessibility and one of the core markers of financial inclusion. Lending money to customers who own different kinds of accounts is one of deposit money banks' primary responsibilities. These loans could be used for venture capital, business expansion, working capital management, capital acquisition for businesses, household expenses for health and education, upkeep, home goods purchases, and farm tool purchases, among other things.

Money Management

The ability as well as boldness to successfully manage personal funding through long and short term financial control accompanied with appropriate decision-making, while putting into consideration future events and shift in the economic conditions, is measured through one's understanding of key financial concepts (Calcagno & Monticone, 2015). Money management involve the effective use of knowledge and ability that helps to efficiently make use financial resources. The statement underscores the correlation between money management and financial information. Financial knowledge is a way of enhancing individuals understanding of financial instrument, solutions, and concepts to boost an informed decision, stay away from likely hazards, know where to seek for help, use other means to improve the short- and long-term financial health. Although money management is conceptually associated with talents, the majority of money management assessments in use today are based on measures of objective knowledge. Money management is defined by Klapper, Lusardi, and Van (2015) as the capacity to make wise decisions about how to use and manage financial resources. People can use this knowledge of money and financial items to make well-informed financial decisions and manage their finances.

Managing money requires knowledge from various different fields. Understanding financial concepts and how things like credit, loans, and insurance operate is crucial. Understanding and managing exchange rates and interest are also critical skills, with interest being a major worry since many customers take advantage of the loan market.

1.1.2 Economic Growth

The level of goods and services produced per head of the populace in a given year is referred to as economic growth. Furthermore, economic prosperity involves the increase in the gross domestic product in an economy over a period of time. (Diruvedi, 2012). Black (2010) defines economic growth as a rise in an economic variable, typically persistence during prosperous times. The variable in question might be measured in absolute or per capital terms, and it can be real or nominal. A nation experiences economic growth when its labour force, capital, consumption, and trade volume all increase along with a qualitatively sustained increase in per capita production or income (Jhingan, 2008). According to Solow (2001), the word “economic growth” refers to an increase in aggregate income or per capita GDP. Economic growth is broadly defined by the World Bank (2013) as increased output and productivity growth in manufactured exports and agriculture, bolstered by high rates of domestic saving and the addition of both physical and human capital. Accordingly, the building of productive assets serves as the basis for swift economic expansion that boosts real wages, generates jobs, and increases the rate of return on labor force, all of which in turn drive up demand for information and technology (Grushibet, 2012).

According to Ray (1998), economic growth is the steady rise in a nation's standard of living combined with continuous modifications to its industrial structure. It is the gradual rise in production of goods and services in a nation economy. Economic growth is the gradual process through which an economy's productivity rises over time to result in higher levels of national output and wealth, according to Todaro and Smith (2005). Mladen (2015) states that changes in production over a brief period of time, often a year, are included in economic growth. The annual growth rate of the national income, or the annual increase in material production stated in monetary terms.

1.2. Theoretical Review

1.2.1. Financial Intermediation Theory

The theory supporting this research study is the financial intermediation theory. In 1960, Gurley and Shaw put forth the financial intermediation theory. Within an economy, banks serve as intermediaries between savers and fund users. This role is explained by theory. Financing affects not only how well resources are distributed across the economy, but also how well people from relatively wealthy or impoverished households compare economically. A bank offers a variety of financial instruments, such as demand of deposits and availability of cash when needed. Financial institutions can create and give customized financial solutions by way of intermediation thereby meeting the requirement of diverse clients. This occurs each time banks demonstrate their ability to provide financial products for greater profits that fully offset their costs. Furthermore, the reason banks exist as financial intermediaries is due to defects in the market. Hence, banks would not exist where there are no transaction or information costs. Ndebbio (2004) claims that the financial intermediation theory explains how banks help close the gap in the market between consumers who have surplus and deficit spending habits. By collecting funds from depositors and distributing them to users who require them for consumption and production. The risk aversion of investors and depositors makes it difficult to predict when to seize future chances. Banks help investors escape being tied into long-term, illiquid assets that will pay off large sums to future customers by providing intermediation services. Honohan (2008) also noted that a significant factor influencing the degree to which low-income clients may obtain capital to invest in consumption and tangible assets is the accumulation of capital in conjunction with unreliable financial systems.

1.3. Empirical Review

Oti *et.al.* (2022) studied the impact of financial services on Nigeria's economy. The study used ordinary least square method to estimate time series data and putting the data through an ADF unit root test, however, the investigation revealed that the number of ATMs per 100,000 adults makes a substantial and favorable contribution to the economy of Nigeria. This was linked to the fact that POS was recently introduced into the financial system as a means of payment and is yet to make any significant impact on RGDP.

In the same vein, Obi (2022) conducted a short-term empirical investigation on the bond among Nigeria's economic prosperity and access to financial services policy. The study employed time series data covering 2004 to 2021. The pre-inclusion phase to the implementation phase were all covered by the study. The method of Ordinary Least Squares was used to estimate the data. Additionally, post-estimation and preliminary testing were carried out. The OLS finding verified that it had a favorable impact on economic expansion. The conclusion was that one factor promoting growth is financial inclusion.

Muhammad (2022) studied how financial inclusion affects economic prosperity from a worldwide standpoint. A huge number of panels from 2002 to 2020 that were categorized by income and regional levels were employed. The cointegration panel test result explains a long-term relationship in the variables. Additionally, the research study used System-GMM method of analysis to examine how access to financial services and control variables affect economic prosperity. The panel findings showed that access to financial services positively impacts economic growth thereby suggesting access to financial services is a useful instrument in influencing global economic prosperity at a quick pace.

Okonkwo and Nwanna (2021) investigated the impact of financial services on economic growth in Nigeria. The study covered 1992 to 2018. Ex-post facto research design was used. The result showed that circulation of currency in the economy not significantly related to economic growth in Nigeria.

Gebrehiwot and Makina (2019) examined in a panel data GMM dynamic model, banking penetration using 27 African countries as case study. The study implemented ex-post facto research design. Findings from empirical studies suggest that proximity to bank branch has significant effect on economic growth. However, it is noticed that results obtained from this work may not reflect what obtains in Nigeria due to variability of the different macro-economies. The present study is local and used ARDL for estimation, filling gaps created by the former work.

Kaur and Abrol (2018) empirically looked into the determinants of financial inclusion. the study employed time series data. The study made use of the ex-post facto research design. Stationarity and co-integration tests were conducted. Variables were stationary at level and on that basis, the data was analysed using regression technique. Findings show that agent banking had significant effect on economic growth in India. However, it is noticed that this study did not examine agent banking, mobile banking, access to financial services and money management, and endogenous variable of gross domestic product of Nigeria, providing a gap which this present research work fills.

2. Methodology

The study employed secondary data which involves time series analysis. Data on agent banking, mobile banking, access to financial inclusion, money management and the Gross Domestic Product Growth were calm from the 2021 CBN bulletin for the different years. Thereafter, the unit root tests was implemented using (ADF) unit root test. This is followed by cointegration test of the purely on I(0) and I(1) series as obtained from the unit root test. The study used (ARDL) model to capture the stated objectives. The functional relationship for financial inclusion and economic growth is stated as:

$$GDP = f(AB, MB, AFS, MM) \quad (1)$$

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta AGB_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta MMB_{t-1} + \sum_{i=1}^q \alpha_{3i} \Delta AFS_{t-1} + \sum_{i=1}^q \alpha_{4i} \Delta MEM_{t-i} + e_t \quad (2)$$

where:

GDP = Gross Domestic Product

AGB = Agent Banking

MBB = Mobile Banking

AFS = Access to Financial Services

MEM = Money Management

3. Discussion and findings

Table 1 – Descriptive statistics

	GDP	AGB	MBB	AFS	MEM
Mean	42242.97	1.21E+08	1.14E+08	45535.94	33258.23
Median	15678.20	27269178	36544884	12926.90	20476.25
Maximum	173182.1	4.39E+08	3.77E+08	296798.4	132932.1
Minimum	196.1700	918256.0	1156533.	19.72000	0.000000
Std. Dev.	51120.44	1.71E+08	1.61E+08	80431.04	32651.65
Skewness	1.104057	1.116562	1.066881	2.080484	1.474945
Kurtosis	3.003792	2.570088	2.249956	6.118558	4.974345
Jarque-Bera	2.585835	2.557755	95.21846	40.55859	18.89983
Probability	0.274469	0.278350	0.000000	0.000000	0.000079
Sum	1.45E+09	1.37E+09	3832016.	1639294.	1197296.
Sum Sq. Dev.	3.23E+17	2.84E+17	1.83E+12	2.26E+11	3.73E+10

Source: E-Views 9 Output (2022).

Table 1 shows the mean of GDP, agent banking, mobile banking, access to financial services and money management. The mean value of GDP is 42242.97; agent banking is 1.21E+08, mobile banking is 1.14E+08, access to financial services is 45535.94 and money

management is 33258.23. Usage of financial services had the highest mean value, followed by GDP, mobile banking and then, agent banking.

The median for GDP is 15678.20, agent banking is 27269178, mobile banking is 36544884, access to financial services is 12926.90 and money management is 20476.25. GDP has maximum value of 173182.1; agent banking is 4.39E+08; mobile banking is 4.39E+08, access to financial services is and money management is 132932.1. The minimum value for GDP is 196.1700; agent banking is 918256.0; mobile banking is 1156533, access to financial services is 19.72000 and money management is 0.000000.

3.1 Correlation Analysis

Table 2: Variables

	(GDP)	(AB)	(MB)	(AFS)	(MM)
(GDP)	1				
(AB)	0.34824	1			
(MB)	0.32530	0.77473	1		
(AFS)	0.31125	0.62175	0.62981	1	
(MM)	0.10557	0.71029	0.70473	0.60010	1

Source: E-Views 9 Output (2022).

From table 2, gross domestic product positively correlate with agent banking with Correlation coefficient of 0.34824. The connection that exist between GDP and mobile banking is also positive, with a coefficient value of 0.32530. GDP has a positive connection with usage of financial instrument with a coefficient value of 0.31125. The relationship between gross domestic and money management is also positive with a coefficient value of 0.10557.

Agent banking has positive relationship with mobile banking, indicated by a coefficient value of 0.77473. The relationship between agent banking and mobile banking is positive, with a coefficient value of 0.67135. The relationship between agent banking and fund management is also positive, with a coefficient of 0.71029. Access to financial services is positively related to money management, denoted by a coefficient value of 0.60010.

3.2 Tests for Stationarity

Table 3: ADF Test Statistic

Variables	Level		First Difference		Order of Integrations
	ADF Test Statistics	Critical Value 5%	ADF Test Statistics	Critical Value 5%	
GDP	9.891111	-2.948404	-	-	1(0)
AB	1.603179	-2.948404	-5.194996	-2.951125	1(1)
MB	2.019294	-2.957110	-3.824778	-2.957110	1(1)
AFS	-0.351264	-2.948404	-6.061781	-2.951125	1(1)
MM	-5.791660	-2.948404	-	-	1(0)

Source: E-Views 9 Output (2022).

At level, GDP growth rate is stationary as its overall value of ADF of 9.891111 is higher than the critical value of -2.948404 at 5% significance level. Agent banking was not stationary at level as its ADF test statistic of 1.0603179 was less than critical test statistic of -2.948404. It however became stationary at first difference as ADF test statistic of -5.194996 is higher than the critical value of -2.951125 at 5% significant level.

Access to financial services was not stationary at level as ADF test statistic of -0.351264 was less than the critical values of -2.9484045 at 5% significance level. It however became stationary at first difference as its ADF test statistic of -6.061781 is higher than critical value of -2.951125. Money management is stationary at level as the total value of ADF statistic is -5.791160 which is higher than the critical value of -2.948404 at 5% significance level.

Table 4: Bound Test

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	457.2274	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Finite Sample: n=35				
Actual Sample Size	28	10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532
Finite Sample: n=30				
		10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Source: E-Views 9 Output (2022).

Decision Rule: should the value of the F-statistics is lesser than the I(0) bound, when there is no co-integration among the variables, we accept the null hypothesis which states that there is no co-integration, but should the F-statistics is higher than the values of the I(1) bound, we reject the null hypothesis. The coefficient of the F statistic obtained from the study is 457.222 which is clearly greater than the I(0) bound values of 2.2 (10%), 2.56 (5%), 2.88 (2.5%) and 3.29 (1%) so the null hypothesis that there is no co-integration is rejected. Therefore, this means that there is long run relationship among gross domestic product of Nigeria, agent banking, mobile banking, access to financial services and money management.

Table 5: Lag Selection Criteria

VAR Lag Order Selection Criteria
 Endogenous variables: GDP
 Exogenous variables: C AB MB AFS MM

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-23.84331	NA*	1.921992	3.480414	3.673561	3.490304
1	-21.72509	2.912558	1.689421*	3.340636	3.582070*	3.352999
2	-21.47682	0.310331	1.887367	3.434603	3.724323	3.449439
3	-19.64691	2.058649	1.744131	3.330864	3.668871	3.348173
4	-18.42833	1.218585	1.758174	3.303541*	3.689835	3.323322*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: E-Views 9 Output (2022).

The lag selection criteria either lag 1 or lag 4 are right for this model as two of the criteria support selection of lag 1 and the other two criteria (Akaike criterion and Hannan-Quinn information criterion) support selection of lag 4. This study used lag 4 selection criteria because it gives a better ARDL result than that of lag 1 criteria selection.

Table 6: ARDL Error Correction

D V: D(GDP)

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.735150	0.022869	-32.14625	0.0000
D(GDP(-2))	-0.724744	0.030928	-23.43305	0.0000
D(GDP(-3))	-0.179057	0.027077	-6.612831	0.0006
D(BP)	19.93214	0.729345	27.32883	0.0000
D(AB(-1))	-18.48016	0.471295	-39.21142	0.0000
D(MB)	-22.21476	1.475349	-15.05730	0.0000
D(MB(-1))	15.73011	0.842499	18.67078	0.0000
D(MB(-2))	18.83392	0.978258	19.25250	0.0000
D(MB(-3))	-20.23844	1.390328	-14.55659	0.0000
D(AFS)	-11.87068	0.246457	-48.16537	0.0000
D(AFS(-1))	-6.533323	0.266999	-24.46943	0.0000
D(AFS(-2))	-21.07749	0.406067	-51.90640	0.0000
D(AFS(-3))	3.982824	0.523246	7.611763	0.0003
D(MM)	-2.784910	0.181360	-15.35572	0.0000
D(MM(-1))	-23.13009	0.531230	-43.54064	0.0000
D(MM(-2))	-5.632749	0.318510	-17.68469	0.0000
CointEq(-1)*	-0.123038	0.001735	-70.91898	0.0000
R-squared	0.899889	Mean dependent var	5192.308	
Adjusted R-squared	0.899728	S.D. dependent var	4718.033	
S.E. of regression	77.87775	Akaike info criterion	11.82813	
Sum squared resid	66714.39	Schwarz criterion	12.63697	
Log likelihood	-148.5939	Hannan-Quinn criter.	12.07540	
Durbin-Watson stat	2.155835			

Source: E-Views 9 Output (2022).

Table 6 of the study shows the ARDL ECR result. Current period of agent banking significantly influences economic prosperity. One period lag of agent banking has significant but negative impact on economic growth. The current period, a unit change in agent banking increases economic growth by 19.093214. One lag period of agent banking decreases economic growth by 18.48016.

Current period of input of mobile network banking have significant but negative influence on economic growth. One lag period of mobile banking significantly influence economic growth. Two lag periods of usage of mobile banking also have significant and positive impact on economic growth. Three lag periods of usage of mobile banking has significant but negative impact on economic growth. In the current period, a unit change in mobile banking decreases economic

growth by 22.21476. One lag period of usage of mobile banking increases economic growth by 15.73011. Two lag period of mobile banking also increases economic growth by 18.83392. Three lag period of mobile banking reduces economic growth by 20.23844.

Current period of access to financial services has significant but negative impact on economic growth. All the lags of access to financial services on financial services (lag one, two and three) have significant and negative impact on economic growth. Current period of access to financial services reduces economic growth by 11.87068. 1 (One) lag period of access to financial services decreases economic prosperity by 6.533392. Two lag periods of financial inclusion also decreased economic growth by 21.07749. Three lag period of access to financial services increases economic growth by 3.9828242.

Current period of money management is significant but negatively influences economic prosperity. One lag period of money management is significant but negatively impact on economic prosperity. Two lag periods of money management also have significant but negative impact on economic growth. Money management reduces economic growth by 2.784910. One lag period of money management further reduces economic growth by 23.1300. Three lag period of money management also reduces economic growth by 5.632749.

As expected, the lagged error correction term is negative (-0.123038) which is statistically significant at 5 percent. The coefficient reveals that it takes an average speed of 12.3038 percent to adjust to equilibrium when there is disequilibrium in the system.

The coefficient that determines GDP is 89.9 percent which states that 89.6 percent of GDP is explained by the exogenous variables (agent banking, mobile banking, access to financial services and money management). The remaining 10.1 percent accounts for other factors that are considered in the model. The Durbin Watson statistic shows that there is no serial correlation from a simple rule of thumb which holds that if R^2 is greater than Durbin Watson, there is no serial correlation.

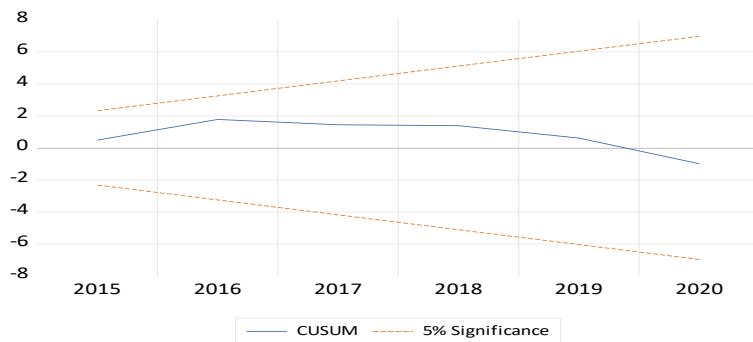
Table 7: Heteroskedasticity Test: Breusch-Pagan-Godfrey
 Heteroskedasticity Test: Breusch-Pagan-Godfrey
 Null hypothesis: Homoskedasticity

F-statistics	0.528863	Prob. F(21,6)	0.8701
Obs*R-squared	18.17896	Prob. Chi-Square(21)	0.6377
Scaled explained SS	1.702700	Prob. Chi-Square(21)	1.0000

Source: E-Views 9 Output (2022).

The BPG SC LM Test was used to test for the presence of auto correlation in the model. The F-statistics of 0.528863 and the corresponding p-value of 0.8701 showed that there is no presence of auto correlation in the model.

Table 8: CUSUM Test



Source: E-Views 9 Output (2022).

CUSUM was employed to test the stabilization of the model estimation and the result showed that the model is stable at 5%.

4 Discussion of findings

The first hypothesis that states agent banking have no significant impact on gross domestic product of Nigeria is rejected as the F-probability of 0.0000 in the Wald result is less than 0.05. Following this result, the other hypothesis which states agent banking significantly impact on the GDP of Nigeria is accepted. This result agrees with the work of Alamel and Sankaramuthukumar (2012) which examined the influence of financial inclusion on economic growth, using agent banking as exogenous variable. It was observed from the study findings that financial inclusion significantly influences economic growth. The work of Oti, Emmanuella and Callistar (2022) also studied the effects of financial inclusion on economics with agent banking as an independent variable. Findings from the analysis suggested that agent banking had significant effects on economic growth of SSA economies.

Findings from the Auto Regressive Distributed Lag estimates suggest that in current period and lag one, agent banking has significant effect on economic prosperity in Nigeria. The finding agrees with the works of Dhungana and Kumar (2015) which examined the status of financial inclusion in Nepal and found out that agent banking and mobile banking had significant influence on economic growth. Finding from the work of King (2012) also suggests that agent banking has significant effect on economic growth.

The research findings which state mobile banking significantly influences GDP in Nigeria, is in line with finance-growth theory which hold the view that creation of financial assets helps to spur economic growth. The theory holds the view that financial assets produce a positive growth climate through “supply lead” or “demand follow-up which raises aggregate national output”. Access and usage of a stable, fast, and affordable financing source enables households, business firms and governments to make effective demand which leads to greater aggregate demand, higher levels of aggregate investments and economic output. Nwafor (2018) empirically examined financial instruments and economic growth in Nigeria, using mobile banking and access to financial service as exogenous variables. The study used Two-staged Least Squares Regression econometric technique and found out that mobile banking has significant and positive effect on economic growth. Empirical findings from the work of Sethi and Acharya (2018) was looked into. Using random effect and time fixed effect panel regressions to examined the connection between access to financial services and economic growth. The research revealed a positively long-term relationship between access to financial services and economic growth. 31 nations was considered. A causality test was carried out which showed a bi-directional influence among access to financial services and economic growth.

From the Auto Regressive Distributed Lag estimates, a unit decrease in access to financial instruments will reduce GDP by 22.21476 in current time period. Access to financial service will increase the gross domestic product by 15.73011 and 18.83392 in both lag one and two. This is in line with the findings from the work of Williams, Adegoke, and Dare (2017) which empirically investigated the role of financial inclusion on poverty alleviation and economic growth in a growing economy. The study employed panel data regression to estimate the information collected. The research covered 2006 to 2015. Findings of the panel regression result revealed numbers of active ATM, bank locations and government spendings are important estimators of financial inclusion which significantly influences EG. A unit increase in the ratio of active ATM

leads to 0.0082 percent increase in the gross domestic product. On the contrary note, the findings of Sarma (2008) show that most of the ATMs in developing economies are obsolete, which may be a hindrance to economic growth. A simpler technology for dispensing cash from banks would be more appropriate in rural areas.

The third hypothesis that access to financial services does not significantly impact on GDP growth rate is rejected as the F-probability of 0.0000 in the Wald result is less than 0.05. Following this result, the alternative hypothesis that access to financial services has significant effect on the gross domestic product growth rate of Nigeria is accepted. These findings are in line with the work of Hadiza and Philip (2017) which examined the role of financial inclusion and inclusive growth in Nigeria. FMOLS and OLS methods were employed. The findings on the research revealed a significant and positive influence on access to financial instruments and inclusive economic growth.

A unit change in access to financial instruments will reduce GDP growth rate by 11.87068. Access to financial instrument will decrease economic prosperity by 6.533323 on first lag, reduce economic growth by 21.07749 in second lag, and also reduce economic growth by 5.632749 in the third lag. These statistics are contrary to the findings of Okoye, Erine, and Modebbe (2017) examined effects of financial instrument on economic growth and development in Nigeria, OLS econometric method was employed. Findings from the study showed independent variables significantly influences economic growth.

Fourth hypothesis which states that money management does not significantly influence GDP growth rate was rejected as the F-probability of 0.0000 in the Wald result is less than 0.05. Following this result, the other hypothesis which states that money management significantly influences GDP in Nigeria is accepted. The findings here agree with the works of Dinesha (2017) which examined the relationship among money management and access to financial instruments in India. The study found out that having adequate information about money management enhances one's access to money which promotes conducive atmosphere for appropriate financial conduct and also encourages several individuals to embark on economic activities that reduces their level of poverty. The work of Kurihara (2013) also evaluated the link between financial ability and economic growth. 56 countries across Asia were considered covering the period of 2009 – 2011. It is observed from the findings of the study that financial knowledge promotes economic prosperity.

Conclusions and recommendations

The research study examined the influence of financial inclusion on economic growth in Nigeria. The study covered 1986 to 2021. Most theories on finance hold the view that financial instrument is intricately linked with economic growth. The financial system performs the function of intermediary by channeling funds from the excess sector of the economy to the deficient sector of the economy. Deepened financial intermediary improves economic prosperity through creating more opportunities for investing, and raising returns to financial resources thereby boosting the level of productivity in the economy. A nation's financial sector compels the allocation of savings to investment via well-designated structures. Agent banking, mobile banking, access to financial service and money management are vital tools that can be used in stabilizing economic prosperity because of their skill to hasten the efficiency of productive resources, thus bringing down the cost of investment. The study therefore concludes that financial inclusion significantly impact on economic growth: This is because all the exogenous variables of the study (agent banking, mobile banking, access to financial services and money management) individually had significant effects on economic growth.

Based on the conclusions above, the following recommendations was made:

- i. CBN should direct its policy towards increasing the numbers of agent banks, especially to rural areas of the economy as millions of Nigerians dwelling in the rural areas have no access to basic banking services. Also, to encourage collaborations between DMBs, MFBs and Communication service providers to provide alternative channels for financial products/services in order to enhance financial intermediation especially for the rural dwellers.
- ii. CBN should collaborate with banks to ensure development of qualitative mobile banking applications that can be used on all mobile and telecommunication devices. Telecommunication service providers should be supported to develop well-tailored products (like online savings account, online deposits and withdrawals, online third party transfers, payment for bills and readily accessible online credit) suited to their preference needs on a short term.

- iii. Its therefore recommends that apart from directing policies to those inclusion elements that significantly influences economic growth in Nigeria, government should establish regulatory frameworks that will ensure introduction of low cost and innovative products.
- iv. Lastly, it is recommended that government engage in grass-root education on financial products through SMEs and other channels to increase financial literacy. Financial institutions should also strive to improve the quality of information available to society. Furthermore, educational institutions should introduce into their curriculum courses which expand financial literacy among their students.

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