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ASSESSING THE IMPACT OF BANKING PENETRATION ON FINANCIAL INCLUSION AND POVERTY REDUCTION IN NIGERIA'S ECONOMY

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Abstract

This study examines the impact of banking penetration on financial inclusion and poverty reduction in Nigeria's economy using time series data of 15 years (2009-2023). The variables used for the study included volume of transactions from ATM, POS and web-pay as the independent variables and unemployment rate as the dependent variable. Quantitative research design was employed for this study. The time series data was generated and analysed using the Autoregressive Distributed Lagged (ARDL) testing technique and the unit root test. The study found that ATM has an insignificant positive effect on the unemployment rate, with an unstandardized coefficient of 2.999 and a p-value of 0.512. Conversely, POS showed a significant impact, with an unstandardized coefficient of 4.698 and a p-value of 0.049. Web-pay was statistically significant on the unemployment rate, with an unstandardized coefficient of -4.329 and a p-value of 0.016. The study concluded that while banking penetration enhances financial inclusion, its impact on unemployment varies by channel. Based on these findings, the study recommended that policymakers invest in digital infrastructure, especially for Web-pay systems, to enhance job creation.

Keywords: ATM, POS, Poverty reduction, Unemployment rate, web-pay

1.0 Introduction

Financial inclusion critical banking penetration is the adoption and access to bank branches, automated teller machines (ATM) and mobile banking, and digital financial services (Ezekiel et al., 2021). Financial inclusion can be characterised as the accessibility and access to financial goods and services to anyone, and most importantly, the underserved population (Ofosu-Mensah et al., 2021). Central Bank of Nigeria (CBN) and other stakeholders who have tried to increase financial infrastructure in Nigeria have held the potential of getting more people into formal financial systems.

Empirical findings indicate that improved banking penetration has the effect of raising savings, access to credit, and financial literacy, which can tremendously accelerate the income growth of low-income earners and lower the rate of poverty (Kulshrestha, 2023). As an example, mobile banking and agency banking have spread out to rural locations, which encourages involvement in official economic activities. Nevertheless, inequalities are still observed in rural areas because of infrastructural differences and insufficient digital literacy (Omweri, 2024).

A strong banking industry promotes investments, consumption and acreage, which are essential in alleviating poverty (Mbodj & Laye, 2025). Thus, a sustainable alleviation against poverty requires a policy reform to reduce the barriers of entry, promote digital banking innovation, and enhance the requisite financial education in Nigeria.

Although there has been a concerted effort to achieve financial inclusion in Nigeria, a lot still needs to be done to increase penetration of banking in terms of the number of Automated Teller Machines (ATMs), Point of Sales (POS) terminals, as well as Web payment system to manifest in true reduction of poverty and creation of jobs. Although the availability of online banking access has increased, huge populations with rural and low-income families continue to experience low access because of infrastructure gaps, low Internet speeds, and financial literacy deprivation (Anakpo et al., 2023). This increment in the ATMs and POS machines has not made a major impact in the creation of jobs as the unemployment rate remained high, at 4.1% in Q1 2023, but that is an understatement regarding underemployment and informal work (NBS, 2023). Also, the unbanked population has an insufficient rate of adopting Web payments since they lack trust, and they have been left behind by digital technology (Jain & Sahu, 2025). Such a disconnect poses serious questions on whether inclusiveness in economic growth can be stimulated by technological banking infrastructure and not underpinned by complementary policies that alleviate unemployment and structural poverty.

This study aims to examine the effect of banking penetration on financial inclusion and poverty reduction in the economy of Nigeria. The specific goals are to examine the:

(i) Impact of volume of transactions in Automated Teller Machine (ATM) on unemployment rate in Nigeria.
(ii) Impact of volume of transactions in Point of Sales (POS) on unemployment rate in Nigeria.
(iii) Impact of volume of transactions in web-pay on unemployment rate in Nigeria.

1.1 Research Hypotheses

The following hypotheses have been developed based on the research objectives:

H_{01}: Volume of transaction in Automated Teller Machine (ATM) has no significant impact on unemployment rate in Nigeria.
H_{02}: Volume of transaction in Point of Sales (POS) has no significant impact on unemployment rate in Nigeria.
H_{03}: Volume of transaction in web-pay has no significant impact on unemployment rate in Nigeria.

2.0 Conceptual Review

The conceptual review explores the relationship between banking penetration through financial inclusion indicators such as ATMs, POS, and Web payments and poverty reduction within Nigeria's economic and financial development context.

Financial Inclusion

Financial inclusion is a procedure that says that everyone and every business can have reasonable and suitable financial services like savings, credit, insurance, and payment systems, especially the underserved and low-income populations (Kandpal & Mehrotra, 2019). It is important in enhancing economic development, decreasing poverty, and improving financial stability. Financial inclusion plays the necessary role of citizen empowerment, productivity, and narrowing the gap of economic inequality in Nigeria.

Volume of Transactions from Automated Teller Machine (ATM)

It indicates the number of times people use formal official financial institutions to handle simple procedures like the withdrawal of money, balance checking, and transfers (Alhassan et al., 2019). An ATM with a large transaction value represents increased access to the available bank services, especially in semi-urban and urban regions.

Volume of Transactions from Point of Sales (POS)

POS terminals enable individuals and enterprises to conduct and accept cashless transactions at a point that fosters financial inclusion since one can do away with the use of cash (Maigari & Yelwa, 2023). An Increase in the number of POS transactions indicates a widened base of the financial services, particularly in the urban and semi-urban sectors. In the current research, with the aim of providing a proxy of bank penetration to measure how further banking penetration helps economic activities, they promote formal participation in the financial system and also help poverty reduction and inclusive economic growth via financial inclusion through digital financial access. POS transaction data was utilised.

Volume of Transactions from Web-pay

The number of transactions in Web-pay shows the increased application of the internet-based financial services in Nigeria. The method of making payments online, Web-pay, enables the purchase of goods, services, and bills online, and it becomes convenient and reaches more people who can access the services without physically going to a specific location to get a bank service (Zaccheaus, 2023). An expansion of Web-pay deals is an indicator that changes financial conduct toward a more digital type and financial inclusion. In the case of this research, the volume of Web-pay transactions was used as a proxy of bank penetration to measure how it can help in enhancing economic participation, improving financial access, and decreasing poverty through the inclusion of more people in the formal financial system.

Poverty Reduction

Poverty reduction is a set of joint strategies and results that target to enhance the living standards of individuals and societies through the creation of more available opportunities and resources as well as key services. It includes diminishing income inequality, joblessness, and societal susceptibility by means of embracive financial development, admirable instruction, wellbeing, and financial prosperity (Labeeque & Sanaullah, 2019). Poverty alleviation is a critical issue of development in Nigeria even under the National Social Investment Programme (NSIP) and other econo-economic reforms. There are

structural problems and those are unemployment, inflation and also weak financial inclusion which has been driving backward (Settle, 2022).

2.2 Theoretical Review

This study is explained by the following theories:

Financial Intermediation Theory

The financial intermediation theory began with the work of Gurley and Shaw (1960) explaining the role of financial institutions as intermediaries between those economic units with excess savings and those with deficits, in the mobilization of savings and the provision of credit. The theory proposes that transactions cost, risk elimination, and enhanced capital allocation based on effectiveness will cut down costs and enhance economic growth of the financial intermediate (Bongomin et al., 2021). The financial intermediation benefit of higher penetration of banking in Nigeria in terms of ATM, POS, and Web-pay helps to drive the use of credit and savings facilities in Nigeria. It enhances financial inclusion, as well as contributes to the alleviation of poverty, particularly among the underserved individuals (Adelaja et al., 2024; Mbodj & Laye, 2025).

Inclusive Growth Theory

The theory of inclusive growth introduced by Rauniyar and Kanbur (2010) meanders on the fact that economic growth should be inclusive so that the benefits of the development are distributed across all classes in society, especially the poor and marginalized. Whereas the traditional growth models only emphasized on GDP this theory considers equitable access to opportunities, gainful employment, and needed services. On the one hand, ATMs, POS, and Web-pay systems promoted more banking penetration in Nigeria that helps to realize more inclusive growth by opening access to more people (Iwedi, 2024). These instruments enable people and small enterprises to partake in the formal economy, earn more revenue, and curb poverty on a sustainable basis.

2.3 Empirical Review

Musa et al. (2022) studied the financial inclusion and the economic growth in Nigeria based on time series data. It was also observed that the extent of financial inclusion, characterised by the number of branches and ATM in use as well as the utilisation of banks, had a significant positive influence on enlargement. The author established that the benefits of making formal financial services more accessible would have a direct impact on reducing poverty, as reflected in savings and investment propensities among the poor earners.

Musa et al's (2022) survey on access to financial services nationwide in Nigeria. Findings of the study showed that although the number of banking channels, such as POS, ATMs, has been growing, a substantial number of citizens, especially in rural settings, are financially excluded. Musa et al. (2022) highlighted that despite the expansion in banking penetration, there still exist gaps between the digital and physical infrastructure to support the full potential of banking penetration in enhanced inclusive financial access and poverty alleviation.

Kelikume (2021) analysed the relationship between poverty reduction and the use of digital financial services in sub-Saharan Africa with reference to the example of Nigeria. In a panel data study, they identified that POS and mobile banking made significant positive improvements in financial access, particularly for women and small businesses. They, however, stated that these positive effects depend on the financial literacy and infrastructure development. Ibrahim et al. (2019) examined the impact of financial inclusion on poverty reduction in Nigeria. According to their regression analysis, it was indicated that its frequent use of ATM and Web-pay was significantly correlated with higher household welfare and less income inequality. They advised the reinforcement of regulatory systems to enhance consumer confidence in digital banking.

Amar and Pratama (2020) used cross-country evidence in the relationship between access to finance and the reduction of poverty and inequality. Their research showed that financial development minimises income inequality and poverty by making more credit and financial services available. Even though these findings are not Nigerian-based, they give premises to the relevance of the banking penetration in terms of financial inclusion in the world. Ajakaiye and Tella (2021) recognised that access to money has increased through the use of ATMs and POS they believed that, on its own, banking penetration might be of little help in addressing poverty, since, unless there were corresponding growths of employment and education, financial inclusion might not achieve many results in alleviating poverty. The study indicated that the development policies need to be integrated, such as financial inclusion with those of the broad social and economic reforms.

3.0 Methodology

Research Design

The quantitative research design of the study was applied through secondary data on the effect that banking penetration has on both financial inclusion and poverty reduction in Nigeria. The design was justified because it could enable it to carry out statistical analysis of the bulk of data and then find patterns and relationships between classes of variables such as ATM, POS, and Web-pay volumes and their association with poverty indicators and therefore be objective, reliable and generalizable of the outcome.

Method of Data Collection

The data for this study were obtained from the Central Bank of Nigeria (CBN), Nigeria Inter-Bank Settlement System (NIBSS), National Bureau of Statistics (NBS) and the World Bank. On variables like ATM, POS, Web-pay transactions, and the financial inclusion indicators, data was extracted between the period of 2009-2023.

Method of Data Analysis

The data collected were analysed using multiple regression analysis to assess the relationship between banking penetration on financial inclusion and poverty reduction in Nigeria's economy. Time-series data were examined to identify patterns and correlations.

Model Specification

For this study, the following model specifications were formulated:

$$UMR_{it} = \beta_0 + \beta_1 ATM_{it} + \beta_2 POS_{it} + \beta_3 WP_{it} + \mu_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where:
UMR = Unemployment Rate
ATM = Volume of Transactions from ATM
POS = Volume of Transactions from POS
WP = Volume of Transactions from Web-Pay
β = average change in y that is associated with a unit change in variable x
μ= error term

4.0 Data Presentation, Analysis and Discussion Of Findings

Data obtained for the study are analysed, and findings therefrom are stated here.

Table 1: Descriptive Statistics

	UMR	ATM	POS	WP
Mean	3.293267	8.723500	7.830873	7.735632
Median	3.711000	8.771028	7.804243	7.148857
Maximum	10.69500	9.281992	9.993315	10.33754
Minimum	0.000000	7.779117	5.962964	6.204415
Std. Dev.	3.416287	0.418756	1.326322	1.556679
Skewness	0.705365	-0.771706	0.064372	0.728050
Kurtosis	2.576980	3.052914	1.786842	1.900418
Jarque-Bera	1.355690	1.490574	0.930204	2.080816
Probability	0.507710	0.474598	0.628071	0.353311
Sum	49.39900	130.8525	117.4631	116.0345
Sum Sq. Dev.	163.3943	2.454991	24.62783	33.92550

Source: Researcher's Compilation (2025)

The descriptive statistics provide insights into the distribution and variability of the unemployment rate (UMR), ATM, POS, and Web-pay (WP) transaction volumes from 2009 to 2023. The mean UMR was 3.29%, with a median of 3.71%, indicating relatively low unemployment on average. However, the maximum UMR reached 10.70%, and the standard deviation of 3.42 suggests high variability.

ATM transaction volume showed stability, with a mean of 8.72 and a low standard deviation (0.42), indicating consistent usage. POS and WP had means of 7.83 and 7.74, respectively, with moderate standard deviations, suggesting steady growth but with noticeable fluctuations. The skewness values indicate that UMR and WP were positively skewed, while ATM had negative skewness, implying longer left tails. The Jarque-Bera test results show all variables are approximately normally distributed (p-values > 0.05).

Table 2: Augmented Dickey Fuller (ADF) Unit Root Results

Variable	Test @ Trend	ADF Critical Values 5%	P-values	Remark
UMR	-4.208	-3.098	0.007**	I(0)
ATM	-5.231	-3.119	0.000**	I(1)
POS	-5.369	-3.119	0.000**	I(1)
WP	-3.335	-3.119	0.030**	I(1)

Source: Researcher's Compilation (2025)

The Augmented Dickey-Fuller (ADF) test results indicate the stationarity of each variable. The unemployment rate (UMR) is stationary at a level, as the test statistic (-4.208) is less than the 5% critical value (-3.098) with a p-value of 0.007, leading to its classification as I(0). However, ATM, POS, and Web-pay (WP) become stationary only after first differencing, as their ADF statistics exceed the 5% critical value and p-values are significant at 0.000 and 0.030, respectively. These variables are thus integrated of order one, I(1), implying that they were non-stationary at the level but became stationary after differencing.

Table 3: Ardl Result on Banking Penetration On Financial Inclusion And Poverty Reduction In Nigeria
[$Dependent = UMR$)]

Variables	Parameter	Coefficient	t-Value	Pr(>|t|)
Constant	α	-25.202	-0.837	0.424
$(UMR)_{t-1}$	γ_1	-0.335	-1.332	0.216
ATM	β_1	2.999	0.683	0.512
POS	β_2	4.698	2.276	0.048
WP	β_3	-4.340	-2.957	0.016

R^2 = 0.520; Adj. R^2 = 0.307; MSE = 3.528; AIC = 5.201; F-Stat. = 2.441 (P-value = 0.122); DW = 2.803
***Source**: Researcher's Compilation (2025)*

Hypothesis 1: Volume of transactions in Automated Teller Machine (ATM) has no significant impact on unemployment rate in Nigeria
Among the banking variables, ATM ($\beta_1 = 2.999$) shows a positive but insignificant effect on UMR ($p = 0.512$), meaning ATM usage does not significantly reduce unemployment. In view of the result, it was found that the null hypothesis was accepted while the alternative hypothesis was rejected. Thus, the volume of transactions in Automated Teller Machines (ATM) has no significant impact on the unemployment rate in Nigeria.

Hypothesis 2: Volume of transactions in Point of Sales (POS) has no significant impact on the unemployment rate in Nigeria
POS transactions ($\beta_2 = 4.698$) have a statistically significant positive impact ($p = 0.048$), indicating that increased POS usage is associated with higher unemployment, possibly reflecting expansion in low-wage informal sectors. In view of the result, it was found that the null hypothesis was rejected while the alternative hypothesis was accepted. Thus, the volume of transactions in Point of Sales (POS) has a significant impact on unemployment rate in Nigeria.

Hypothesis 3: Volume of transactions in web-pay has no significant impact on the unemployment rate in Nigeria
Web-pay ($\beta_3 = -4.340$) has a significant negative effect on UMR ($p = 0.016$), suggesting that digital financial services promote job creation or economic engagement. In view of the result, it was found that the null hypothesis was rejected while the alternative hypothesis

was accepted. Thus, the volume of transactions in web-pay has a significant impact on the unemployment rate in Nigeria.

Overall Model Performance

The model's R^2 value is 0.520, indicating that 52% of the variation in unemployment is explained by the independent variables. The adjusted R^2 is 0.307, showing moderate explanatory power after adjusting for model complexity. The F-statistic (2.441) is not statistically significant ($p = 0.122$), implying that the model lacks strong predictive power. The Durbin-Watson (DW = 2.803) suggests no serious autocorrelation in the residuals.

4.2 Discussion of Findings

The analysis demonstrated that the number of transactions carried out by ATMs had no considerable effect on the unemployment level in Nigeria. This confirms the observations made by Fouillet et al. (2021) that the use of ATM, despite its growth, is urban-bound and does not contribute to massive employment. In the same line of thought, Prabhakar (2024) proclaimed that financial infrastructure devoid of specific employment policies has little influence on unemployment. As opposed to the current study findings, however, Oyadeyi (2024), by deviating from the mainstream narrative in another way, believed that ATM deployment would become a source of financial inclusion and economic activity, which may facilitate employment.

On the other hand, the analysis revealed that an important positive influence was played by POS transaction volume on unemployment, which may point to increased informal or underemployment retail employment. This observation is consistent with that provided by Ruzi et al. (2024), who stated that although POS systems positively impact micro-entrepreneurs, the jobs they entail usually have low wages and low levels of stability.

Finally, the relationships between Web-pay transactions and unemployment were highly negative, which indicates that internet-based financial tools contribute to formal employment. This substantiates the findings of Alom et al. (2025), who related digital finance to entrepreneurship and eradication of poverty and Ali and Malik (2021), who discussed the potential of Web-pay in creating economic prospects in digital services.

5.0 Conclusion

The results indicated that the utilisation of ATM did not make any difference to unemployment, whereas POS transactions had a positive impact on unemployment as a result of growth in the informal sectors. On the other hand, Web-pay transactions also helped to eliminate real unemployment to a large extent, meaning that digital finance holds promise to help in the creation of employment opportunities. This was found to be the case with the study concluding that although banking penetration has a positive impact on financial inclusion, it does have mixed results in unemployment, depending on the channel. To utilise effectively the potential of digital banking services in Nigeria as a source of employment, policymakers should give priority to digital infrastructure and financial literacy.

5.1 Recommendations

The research suggested policymakers invest in digital infrastructure, particularly Web-pay systems to expand employment. There should also be an attempt to develop financial

literacy as well as increase the facilities of providing formal financial services in rural world. To stabilise, the informal POS sector should also be controlled and sustained, and it can be transformed into long-term employment in Nigeria, as well.

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