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Penetration Dimension of Financial Inclusion and Poverty Index

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Abstract

This study examined the relationship between the penetration dimension of financial inclusion and poverty reduction in selected developing countries between 2012 and 2019. Using time series data and appropriate pre-regression diagnostic tests, the study employed econometric analysis to investigate the impact of financial penetration, measured primarily by the number of bank deposit accounts, on poverty headcount. The results indicate that the penetration dimension of financial inclusion exerts a negative but statistically non-significant impact on poverty reduction. This finding suggests that increasing access to deposit accounts alone does not guarantee improvements in the welfare of low-income populations. Structural barriers such as high transaction costs, complex account-opening procedures, geographical disparities, and limited relevance of financial products constrain the transformative potential of financial inclusion. The study recommends policy interventions that address these systemic challenges, including leveraging government payment systems, promoting mobile money platforms, and reducing entry barriers to financial services. Such strategies would enhance accessibility, affordability, and inclusivity, thereby strengthening financial inclusion as a tool for poverty alleviation.

Keywords: *Financial inclusion, Penetration dimension, Poverty reduction, Mobile money, Developing countries*.

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Background to the Study

Financial inclusion has, for over a century, remained a central theme in development finance due to its capacity to stimulate growth, reduce poverty, and ensure the sustainability of economies. The persistent exclusion of millions of people globally from formal financial services leads to a loss of savings, investible funds, and the overall capacity of the global economy to generate wealth. Access to financial services is widely recognised as a driver of credit creation, capital accumulation, investment, and long-term economic development (Okoye, Adetiloye, Erin & Modebe, 2017). Martinez (2011) underscores that access to financial services is a crucial policy tool for governments to stimulate growth, while Zin and Weill (2013) argue that broader access mobilises household savings, expands entrepreneurship, and enables individuals to invest in themselves and their future.

Financial inclusion strategies often focus on increasing account ownership in banks and other formal institutions, as well as promoting the use of innovative payment systems such as internet and mobile banking (Mbutor & Uba, 2013). However, according to the World Bank (2014), about 2 billion adults, representing 38% of the global population, remain unbanked due to stringent requirements and limited access to formal services. In the African and Nigerian contexts, this exclusion is particularly pronounced, making it imperative to expand access to financial services for the unbanked and marginalised. Beyond social wellbeing, financial inclusion also presents strong commercial opportunities, as it opens new markets and enhances overall economic stability (Shashank, 2014). The World Bank (2015) further emphasises that inclusive financing entails providing affordable and useful financial products—such as savings, credit, insurance, and payment systems—in a responsible and sustainable manner. Similarly, Demirguc-Kunt, Klapper, and Singer (2017) highlight its potential to reduce poverty and inequality by enabling long-term investments in human and economic capital.

Quantitative indicators of financial inclusion are typically grouped into access indicators (e.g., number of bank branches, ATMs, and agent banking points) and usage indicators (e.g., number of depositors and borrowers, average deposits per customer, and loan size per borrower). Greater access and effective utilisation of financial services are strongly associated with improved living standards and poverty reduction. Indeed, countries with higher levels of financial inclusion often record stronger economic growth (Mbutor & Uba, 2013). Alvaro (2017) adds that financial inclusion not only improves access to banking services but also raises the purchasing power and living standards of low-income populations. These dynamics explain why international initiatives such as the G20's Global Partnership for Financial Inclusion (GPFI) and national strategies have prioritised inclusive finance. Many governments and financial regulators have adopted legislative and institutional frameworks to advance this agenda. Against this backdrop, Nigeria adopted the National Financial Inclusion Strategy (NFIS) in 2012, aiming to reduce exclusion rates and enhance access to financial services across the country. This study therefore seeks to empirically examine the penetration dimension of financial inclusion, specifically focusing on the effect of bank account ownership on the poverty index in Nigeria before and after the adoption of the NFIS.

Review of Related Literature

Bakari, Donga, Adamu, Hedima, Wilson, Babayo and Ibrahim (2019) examined the impact of financial inclusion on poverty reduction in forty-nine Sub-Saharan African countries using data from 1980–2017. Employing a static panel data model, the study found that savings, private sector credit, ATM access, information technology, inflation, and government expenditure significantly contributed to poverty reduction, while high interest rates and weak economic growth increased poverty. The authors concluded that financial inclusion remains a viable tool for poverty reduction in the region and recommended lowering policy rates, expanding rural banking, and ensuring affordable internet access to strengthen financial outreach. Babajide, Adegboye and Omankhanlen (2015) investigated the relationship between financial inclusion and economic growth in Nigeria. Using ordinary least squares estimation, they established that financial inclusion significantly determines total factor productivity, underscoring its central role in stimulating economic growth.

Hussaini and Imo (2018) explored the effects of financial inclusion on poverty reduction with microfinance as a moderating variable. Data were obtained from 384 microfinance bank customers in Kebbi State, Nigeria, and analysed using Partial Least Squares-Structural Equation Modelling (PLS-SEM). The findings revealed a significant relationship between financial inclusion and poverty reduction, with microfinance positively moderating this effect. The study recommended strengthening financial inclusion initiatives in rural areas and expanding microfinance services to include education loans, skills training, and housing support. Otiwu, Okere, Uzowuru and Ozuzu (2018) focused on financial inclusion and economic growth in Nigeria through microfinance operations between 1992 and 2013. Using OLS and Johansen cointegration tests, the study revealed that microfinance activities significantly contributed to growth through loans and advances, although total deposits had an inverse effect. A long-run relationship was found between GDP, loans, deposits, investments, and microfinance institutions. The study highlighted the importance of extending financial services to excluded populations and recommended that microfinance banks prioritise low-cost deposits and financial literacy. Dinabandhu and Debashis (2018) examined cross-country evidence on the financial inclusion–growth nexus using panel data models, including fixed effects, cointegration, and causality tests. Data from Sarma's (2012) index covering 2004–2010 showed a positive long-run relationship between financial inclusion and growth across 31 countries. The results also revealed a bi-directional causality, indicating that financial inclusion and economic growth reinforce each other.

Nwafor and Yomi (2018) studied financial inclusion and economic growth in Nigeria using Two-Stage Least Squares regression with data from 2001–2016. The findings showed that financial inclusion significantly impacts economic growth, though financial intermediation had not sufficiently enhanced inclusion during the study period. The study recommended that Nigerian banks develop innovative products tailored to excluded populations to enhance financial penetration and boost per capita income. Overall, the reviewed literature consistently demonstrates that financial inclusion, whether through savings, credit access, microfinance, or technological innovations, is strongly linked to poverty reduction and economic growth. However, country-specific challenges such as high interest rates, weak rural outreach, and

inadequate financial products remain obstacles. This provides the foundation for the present study, which investigates the penetration dimension of financial inclusion and its effect on the poverty index in Nigeria.

Methodology

The study is quantitative in nature and basically depends on *ex post facto* research design, as it involves exploring the causal link between penetration dimension of financial inclusion index) and poverty index. The data already exist and accordingly the investigation starts after the fact has taken place (Neil, 2000). And the data will be taken out from the Central Bank of Nigeria (CBN) statistical reports, within the period 2005 to 2018. The total proportion of economic development will be measured by the poverty index in Nigeria. Then, the appropriate regression analysis technique will be applied along granger causality analysis to examine the impact of financial inclusion on poverty index after the necessary diagnostic test.

The general form of the empirical model to be estimated for this study will be specified as follows: Poverty Index (POVINDEX) = f {Financial Inclusion Indicators (NAOP}. Where dependent variable depends only on core variables of financial inclusion indicator (NAOP).

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \quad \text{equ I}$$

Y_t= Poverty index (development indicators) at time t,
β_0= the intercept of equation
β= coefficient of $X_t$variable
X_t= a vector of financial inclusion variable (Number of Accounts Opening)
t = time; 1, 2, 3, 4, 5, 6, 7…….. 31yrs
ε = the error term.

The modified new model (including the control variables Z) where poverty index depends on both core and control variables of financial inclusion indicators.

This model is thus consistent with Sanjaya and Arun (2016) and Abiola, Folasade & Alexander (2015). The model is specified as follow;

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 Z_t + \varepsilon_t \quad \text{equ 2}$$

Where:
Y_t= Poverty index (development indicators) at time t,
β_0= the intercept of equation
β= coefficient of $X_t$variables
X_t= a vector of financial inclusion variables (different independent variables for financial inclusion elements)
t = time; 1, 2, 3, 4, 5, 6, 7…….. 31yrs
ε = the error term.
Z_t = Control variables

However, the above model will be used to analyze the impact of financial inclusion indicator (NAOP) on poverty index by specifying a modified model where poverty index depends on both core and control variables utilized as in equation 2. In this model the independent variables utilized will be analyzed on the dependent variable, along with the control variables. It controlled for Exchange rate, interest rate and gross domestic product. However, the model will be consistent with Kehinde & Olayinka, (2017).

Dependent Variable: Poverty headcount ratio - Percentage of total population (POVHEAD) sourced from Global Consumption and Income Project (GCIP

Mobile money accounts - Number of registered mobile money accounts per 1,000 adults, sourced from Financial Access Survey database of the IMF.

First model: the impact of number of accounts opening on poverty index

Poverty Index = β_0+Number of Accounts Opening$_t$ + Control variables$_t$ + ε_t

$POVINDEX_t = \beta_0 + \beta_2 NOAP_t + \beta_3 INTR_t + \beta_4 REXCH_t + \beta_5 GDP_t + \varepsilon_t$……equ. 3

Results, Findings and Discussion

Table 1: Regression Results for Hypothesis One

Dependent Variable: *lnPOVHEAD*				
Method: System Generalized Method of Moment				
Variable	**Coefficient**	**Std. Error**	**t − statistic**	**Prob.**
C	0.6779	0.2771	2.45	0.020
L1.lnPOVHEAD	0. 8935	0. 0358	24.99	0.000
lnPDI	-0. 0142	0.0079	-1.81	0.079
lnGDPPC	-0. 16779	0. 0923	-1.82	0.078
lnSSENROLL	0.0081	0.0151	0.54	0.594
lnGOVTEXTP	-0.097	0.1766	-0.55	0.585
lnTRAOPEN	0.0300	0.1225	0.25	0.808
F − stat (6, 33) = 384.91			Prob (F − stat) = 0.000	
Hansen J − Statistic = 21.79			Prob (J − Statistic) = 0.343	
Arellano-Bond AR(1) = 28.59			Prob (AB) = 0.124	
Arellano-Bond AR(2) = 17.49			Prob (AB) = 0.742	
No. Obs = 238			No of instruments/groups =24/34	

Source: Author's Computation (STATA 15)

(See Appendix G1 for verification of result)

Table 1 reveals that the coefficient of the constant term (C) is 0.6779 and statistically significant. This indicates that, in the absence of influencing factors, poverty per head count tends to increase over time. The coefficient of the lagged value of poverty per head count (L1.POVHEAD) is 0.8935 and significant at the 5% level, suggesting that lower-income countries reduce poverty at a slower pace compared to higher-income countries in the developing world.

The log of the penetration dimension index of financial inclusion (lnPDI) is -0.0142 with a p-value of 0.079, which, though not significant at the 5% level, carries the expected negative sign. This implies that a 1% increase in financial penetration would reduce poverty by approximately 1.42% in the selected developing countries, ceteris paribus. Similarly, the coefficient of the log of GDP per capita (lnGDPPC) is -0.168, also not statistically significant, but consistent with a priori expectations, indicating that a 1% rise in GDP per capita could reduce poverty by 16.8%.

In contrast, the log of secondary school enrolment (lnSSENTROLL) is positive (0.0081) and non-significant, which contradicts the a priori expectation. This result suggests that a unit increase in enrolment is associated with a 0.81% rise in poverty per head count. Likewise, the coefficient of government expenditure (lnGOVEXTP) is -0.097, non-significant, but implies that an increase in government spending raises poverty by 9.7%. The coefficient of trade openness (lnTRAOPEN) is positive (0.030) and non-significant, suggesting that greater trade openness is associated with a 3% increase in poverty per head count.

The F-statistic of 384.91 with a p-value of 0.000 indicates that the independent variables jointly have a significant relationship with poverty in model (2). The Hansen J-statistic of 21.79 with a p-value of 0.343 (greater than 0.05) confirms that the instruments used are valid, as the error terms are uncorrelated and excluded instruments are correctly specified. Importantly, the condition that the number of instruments should not exceed the number of groups (24/34) was satisfied, validating the test results. The Arellano-Bond AR test further confirms the absence of second-order autocorrelation due to its non-significant probability value. Moreover, evidence from Table 4.9 suggests heteroscedasticity and autocorrelation, which were addressed by employing the robust option in the GMM estimation for variance correction.

Test Statistic:

Table 2: Test Statistics for Hypothesis One

Dependent Variable: *lnPOVHEAD*				
Variable	**Coefficient**	**Std. Error**	**t − statistic**	**Prob.**
lnPDI	−0.0142	0.0079	−1.81	0.079

Source: Author's Computation (STATA 15)
(See Appendix G1 for verifications)

Decision

Based on the test statistic results, the negative coefficient and the probability value of 0.079 (see Table 4.2), which is greater than the 5% conventional significance level, indicate that we do not reject the null hypothesis. Therefore, we conclude that the penetration dimension of financial inclusion does not have a positive and statistically significant impact on poverty reduction in the selected developing countries at the 5% level of significance. However, the finding implies that the penetration dimension of financial inclusion has a negative effect on

poverty headcount, thereby addressing research question one and fulfilling the first research objective.

A prerequisite for a developed financial system is broad accessibility, allowing a large share of the population to benefit. In this study, the penetration dimension index—proxied by the number of deposit accounts with commercial banks, credit unions, and cooperatives per 1,000 adults, as well as registered mobile money accounts per 1,000 adults—was found to exert a negative but statistically insignificant effect on poverty headcount. Specifically, the coefficient of the log of penetration dimension index of financial inclusion is -0.0142, implying that a 1% increase in penetration dimension reduces poverty by approximately 1.42% in the selected developing countries, ceteris paribus.

These results align with the finance-narrowing hypothesis of Galor and Zeira (1993) and Banerjee and Newman (1993), which posits that financial market imperfections discourage the poor from borrowing for human and physical capital investments. Individuals with greater inherited wealth can invest in education, while those with limited wealth face higher borrowing costs, leaving them unskilled or uneducated. As financial systems deepen and broaden access, the poor gain opportunities to borrow, invest in human development, and improve their income-generating capacity. Thus, financial inclusion can play a vital role in poverty alleviation.

Our findings are consistent with the empirical results of Agyemang-Badu in Africa, Okoye et al. (2017) in Nigeria, Anwar and Amrullah (2017) in Indonesia, Ousmane, Ismaeel, and Aliyu (2017) in Nigeria, and Omojolaibi (2017) in Nigeria, all of whom found an indirect link between financial inclusion and poverty reduction. It also supports Olukorede's (2018) findings in Tanzania, where mobile money adoption enabled households to smooth consumption during shocks and sustain human capital investments. However, our results contradict the findings of Neaime and Gaysset (2018) in MENA countries, where financial inclusion was found to have no effect on poverty. Financial access enhances day-to-day living and supports both households and enterprises in achieving long-term objectives and weathering unexpected shocks. The first step into the formal financial system is through a transaction account, which facilitates money storage, transfers, and payments. Such accounts provide gateways to other financial services, including credit, insurance, and investment opportunities. Consequently, financially included individuals are more likely to invest in education, health, business startups, or expansions, thereby reducing vulnerability and improving quality of life (Tita and Aziakpono, 2017; Yah and Chamberlain, 2018).

The statistical insignificance of our results may reflect persistent structural barriers, including incomplete reforms, limited private-sector innovation, reliance on costly financial products, instability in the financial sector, and the absence of coherent fiscal-monetary policy coordination. Addressing these challenges could strengthen the penetration dimension of financial inclusion, thereby improving its capacity to reduce poverty in developing countries.

Summary

The study explored the penetration dimension of financial inclusion and its effect on poverty reduction in selected developing countries over the period under review. Employing time series data and robust econometric techniques, the analysis assessed the relationship between financial penetration—captured by indicators such as the number of deposit accounts, mobile money accounts, and overall usage of financial products—and poverty headcount. The results revealed that financial penetration has a negative but statistically non-significant effect on poverty (B = …; p-value > 0.05). This outcome indicates that although broader financial access is often associated with improved welfare, the magnitude of its impact is insufficient to produce significant poverty reduction on its own.

The findings suggest that financial penetration, while necessary, is not a sufficient driver of poverty alleviation. Structural bottlenecks such as high transaction costs, limited outreach of financial institutions in rural areas, regulatory inefficiencies, and socio-economic exclusion reduce the effectiveness of financial inclusion initiatives. The study therefore underscores the need for complementary policies, including institutional reforms, digital financial innovations, and targeted government interventions, to enhance the inclusivity, affordability, and relevance of financial services in combating poverty.

Conclusion

The findings of this study reveal that while financial penetration has expanded across selected developing countries, its contribution to poverty reduction remains limited when systemic barriers are not adequately addressed. Merely increasing the number of individuals with access to financial services does not automatically translate into improved welfare outcomes if the services remain costly, geographically inaccessible, or socially exclusive. High transaction costs, cumbersome account opening procedures, and the concentration of financial institutions in urban centres continue to exclude a large segment of the rural and poor population from fully participating in the financial system.

Therefore, the study underscores the need for a more holistic approach to financial inclusion, one that goes beyond numerical access to focus on affordability, accessibility, and suitability of financial services. True financial inclusion must empower low-income groups by tailoring products and services to their realities, reducing costs, and bridging rural–urban disparities. By tackling these challenges, financial inclusion can become a genuine driver of poverty alleviation and inclusive growth, thereby enhancing its transformative potential in developing economies.

Recommendations

Based on the study findings, the following recommendations are made:

1. Leverage government-to-person (G2P) payments – Governments should use social transfers, subsidies, and wage payments to encourage citizens to open and actively use deposit or mobile money accounts.
2. Reduce barriers to account ownership – Simplify account opening procedures by minimising paperwork, easing identity documentation requirements, lowering

minimum balance thresholds, and cutting down long queues in banking halls.

3. Address high transaction costs – Review and reduce charges such as withdrawal fees, transfer fees, and maintenance costs that discourage low-income individuals from participating in the formal financial system.
4. Expand mobile money services – Promote the use of mobile telephony and mobile banking platforms, especially in rural areas where physical bank branches are limited.
5. Enhance rural financial access – Encourage banks and other financial institutions to establish more service outlets in underserved areas, with a focus on inclusivity rather than just profitability.
6. Strengthen financial literacy – Implement awareness and capacity-building programmes to equip individuals, especially rural dwellers, with knowledge and confidence to use financial services effectively.
7. Promote public–private collaboration – Foster synergy between monetary authorities, commercial banks, and mobile network operators to build a more inclusive and accessible financial ecosystem.

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