

Financial Inclusion and Poverty Dynamics in Selected West Africa Countries: A PVECM Approach

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Abstract

The study delves into examining the effect of financial inclusion on poverty reduction in West Africa Sub-region economies from 2008 to 2024. The purpose of the study is to establish the relationship that exist between poverty levels and financial services such as automated teller machines, point-of-sale transactions, and mobile money transfers in West Africa countries. By adopting inclusive growth theory, the study uses panel vector error correction model (PVECM) and Johansen co-integrating test as estimating technique to capture the short and long run dynamics of this study. This study analyses the relationship between financial inclusion indicators (mobile money transfers, POS usage, ATMs, household income, and education) and poverty dynamics in selected countries using secondary data sourced from World Bank Development indicators and financial institutions in West Africa. Findings show that financial inclusion plays and significant long-term role in reducing poverty and supporting economic growth in West Africa. A strong adjustment toward equilibrium from the study suggests that its benefits build gradually over time rather than appearing immediately. While short-term effects are weak, the long-run impact remains consistent. Though, challenges such as poor infrastructure and inadequate access to formal financial services results to slow growth. Hence, these results point to the need for continued investment in digital finance, financial education, and stronger institutional support across the region.

Keywords: *Financial inclusion, Financial services, Poverty reduction, Infrastructure, Inclusive growth theory, PVECM*

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Background to the Study

The West African sub-region shares many similarities despite their cultural differences. With an estimated population of 472 million people, Nigeria has the largest population of all countries in the West African sub-region, with more than half of the total population living in Nigeria. The sub-region's economy mainly consists of trade, industry, agriculture, and human capital, and despite having an abundance of natural resources, a large majority of the population continues to live in poverty. The economy has experienced growth due in large part to increased commodity exports, services, and manufacturing. While estimates for West Africa's GDP are nearly \$19 trillion by the year 2050, it is uncertain whether the wealth will be distributed fairly within the sub-region because of unequal incomes.

Financial inclusion is a much broader concept than accessing, using and productively using formal financial services (such as accounts, payments, credit, savings and insurance), which is widely regarded as the most effective method of alleviating poverty through improving households' ability to save, smooth consumption, invest in small businesses and receive timely remittances (Osabutey, 2024; Suri, 2023). Since 2005 there has been a tremendous increase in the use of mobile financial services (MFS) in West Africa; this development has provided low-cost transaction solutions for consumers in rural and informal settings and has enabled consumers to use bank accounts and cashless payment methods without needing to open a traditional bank account or have regular access to cash (Suri, 2023; GSMA, 2025). MFS appear to be well-positioned to address many of the barriers low-income households in the region face as they work towards improving their ability to thrive following periods of economic hardship and decreases in participation in the broader marketplace. West Africa remains a region of severe poverty, and despite the fact that it has experienced some limited economic growth in the past few years, poverty levels continue to be high. The World Bank has established an international benchmark for measuring extreme poverty across nations and over time. This is done by adjusting a country's standard of living for the cost of living in that nation (World Bank, 2022). Currently, the international poverty standard is USD 2.15 per day (purchasing power adjusted to 2017).

However, Dotter (2017) contends that because poverty results might differ greatly between the worldwide and corresponding national poverty lines, the international poverty line does not fairly reflect the national poverty thresholds of specific low-income nations. This disparity shows that the international line may either understate or exaggerate poverty relative to what country-specific metrics capture, and so may not reflect the lived realities of poverty in poorer nations. In spite of empirical evidence from country specific studies and Sub-Saharan African studies that shows a positive association between greater financial inclusion and improved household welfare, the results are heterogeneous and conditional on context. This is evident from recent multi-country analyses by Ahmat-Tidjani (2025) using panel techniques to find asymmetric effects of financial inclusion on household consumption and welfare, that is, financial inclusion raises consumption and reduces poverty particularly for households below certain thresholds or when complementary factors such as institutions, infrastructure and product quality are present (Osuna, 2025). Also, Country-level micro studies in some West Africa countries depict welfare gains from adoption of mobile money and other inclusion

services, including higher consumption, better risk-coping aftershocks, and increased local economic activity where competition and agent networks expand service quality (Hussaini, 2025). Hence, the research work on West African countries is necessitated by these current trends of increasing level of poor households among African countries despite the adoption of financial inclusion policies to improve households' income and welfare of people Africa. Thus, the need to consider the effect of financial inclusion on poverty level across regional blocs like ECOWAS, COMESA, SADC and others to provide insight on how financial inclusion shows little or no result on reducing poverty gap in Africa becomes necessary for clarity and policy making.

Objectives of Study

The main objective of this study is to examine how financial inclusion and poverty dynamics affects economic growth in selected West African countries, while the specific objective of the study is to Establish the relationship that exist between financial inclusion and poverty dynamics in selected West African countries.

Literature Review

Conceptual Issues

Financial Inclusion and Poverty

Financial inclusion and poverty are two central concepts in global development, and they are closely related (Ozili, 2018). Poverty is a state where an individual or community lacks the financial essentials for a basic standard of living. Financial inclusion has been a growing concern in West Africa. It is the availability of opportunities for individuals and businesses to access and use a range of suitable, affordable, and timely financial services that meet needs, which are sustainable (Odumusor et al., 2024). Study of Hassan et al., (2019) revealed financial inclusion to be a process that facilitates economic growth, job creation, and the development of the economy. Also, study by Akhil (2016) states that simple access to financial services can enhance daily transactions and decrease the use of informal credits, which are frequently abusive. Thus, to realize financial inclusion, households and individual must own a bank account that would give them access to basic financial services.

According to Demirguc-Kunt & Klapper (2012), in the absence of an inclusive financial system, poor individuals and households rely on their own limited savings to invest in their education, while small businesses will rely on their small profits to grow their business, and this can contribute to the widening of the income inequality gap and slow economic growth. It was suggested that financial inclusion would also help to reduce inequality within countries (Omar and Inaba, 2020). Financial Inclusion which denotes the convenience and readiness of financial services has been acknowledged to play a critical part in the economic expansion of a country (Ozili, 2020).

Financial inclusion and poverty in selected Anglophone West African countries.

In recent years, some researchers believe that increased financial access creates more diverse economies and therefore, benefit the entire economy (Adeola & Evans, 2017). On the other hand, others feel that increasing access to banking services (financial inclusion) is an important

step towards creating economic growth and reducing poverty, resulting in improved quality of living (Adeola & Evans, 2017). According to the CBN (2021), financial inclusion means that all adults have access to a variety of banking services at affordable prices that will help them improve their livelihood and also enable them to participate actively to grow the Nigerian economy.

Also, on the demand side for banking services, people lack knowledge of what financial services are available, do not know how to use them, have fears regarding certain banking services based on religious beliefs, have problems with the expense associated with transactions, and may not have an interest in financial products/services from various segments of their rural communities. On the supply side of banking services, there is not enough information available to encourage banks to open new branches, and banks do not want to engage in the promotion or support of financial inclusion programs because of the cost and the unwillingness of banks to bear the social cost associated with establishing a bank-based financial inclusion program (Chude & Chude, 2022).

In addition, financial inclusion has been recognized as having the capacity to reduce poverty and the likelihood of being poor, as indicated in Ghana, where financial inclusion has been shown to reduce poverty incidence significantly, as indicated by comparing financially included households with those that are excluded (Asumah, 2021). Recent studies also identify that mobile money and digital finances have an important role in expanding financial access among low income and rural household thereby alleviating poverty (Opoku, 2023). Despite this, multidimensional analyses show that when there is adequate financial inclusion in Ghana, it reduces poverty and welfare, thus showing that it is possible for access to greater financial services to increase the ability of households to invest in their basic needs and assets (kabutey-Ongor et al., 2025). Therefore, it implies that gender, location, and household size moderate the relationship between financial inclusion and poverty, as shown in Asumah (2021) in his studies.

Financial inclusion in Liberia has been a major factor influencing poverty and household welfare in light of the country's post conflict and fragile economy. However, studies from Mulbah et al. (2022) shows that access to financial services have significant impact on outcomes of household welfare, food security and diversity which demonstrate the role of financial inclusion in alleviating poverty in Liberia. Also, their studies emphasize that Liberia's financial sector is characterized by low financial access, while persistent gender disparities further limit the ability of vulnerable populations such as women and rural households in benefitting fully from financial services which in turn increases poverty level and inequality. Additionally, studies reveal that the use of mobile money and digital financial services has direct effects on financial access, inclusivity of unbanked segments and contribution to broader economic participation (Kanu, 2025). However, barriers like limited financial and digital literacy, infrastructure as well as regulatory challenges continue to constrain adequate inclusion and its impact on poverty reduction in Liberia.

Financial inclusion and poverty in selected Francophone West Africa.

Financial inclusion is at the core of poverty alleviation and inclusive development discussions in West African countries such as Côte d'Ivoire, Guinea, Benin, etc., as access to financial services helps families/households save, transact, and mitigate risks that are critical for economic shock absorbers. As a part of financial inclusion, access to formal account ownership and digital financial services has been recognized as a measurable aspect, which helps individuals access key components of the financial system and contribute to inclusive growth (World's Bank Global Findex Database, 2025).

In Cote d'Ivoire and other WAEMU countries, the focus remains on addressing concerns such as urbanization and underlying infrastructure in financial inclusion, although the results in financial inclusion are still uneven and face challenges such as access in rural areas and differences in education (Koffi & Konan, 2025). Findings in West Africa show that women and poorer people always tend to have very low financial inclusiveness and education levels, and income and gender proximity are always associated with financial inclusion and poverty in the region (Onyina, 2024).

In Benin, financial inclusion rates have risen in recent years due to the expansion of digital and microfinance services. However, a substantial portion of the population remains financially excluded, underscoring the necessity for policies that enhance service accessibility in underserved communities to mitigate poverty and inequality (African Development Bank, 2025; World Bank, 2025). Also, Household survey data indicates significant disparities in financial inclusion metrics among rural populations in Guinea characterised by minimal formal account and savings ownership, which underscores increased susceptibility to shocks and restricted avenues for escaping poverty (World Bank, 2024). The awareness that increasing financial inclusion is linked to lower levels of extreme poverty in developing nations is further supported by cross-national empirical data, though the impact varies depending on contextual factors like inequality and institutional quality (Saha et al., 2022).

Theoretical reviews

The theoretical foundation of this study is deliberated from three fundamental models namely: the Finance growth hypothesis, the Endogenous growth theory and the Inclusive growth theory. These models offer a distinct perspective for analysing the effect of relationship between a nation's financial development and poverty dynamics on its growth.

Finance Growth Hypothesis

The Finance Growth Hypothesis Theory originated from early works of McKinnon (1973) and Goldsmith (1969) and has been refined through extensive research. According to Guei, (2022), the finance growth hypothesis theory posits that financial development is a driver of economic growth, where the financial sector leads and stimulates real economic activities by efficiently allocating resources and promoting investment, Levine, (2004). The theory argues that a well-developed financial sector provides the real economy with greater access to finance, particularly for profitable projects that spur growth (Fengju, (2024). According to Ajisafe, (2020), the finance growth hypothesis theory enhances economic growth by facilitating

transactions, managing risks, and exerting corporate control. The theory improved financial systems reduce information and transaction costs, which encourages more investment and innovation and thereby boosts productivity. The hypothesis showing that financial development raises economic growth rates largely through higher productivity rather than just more investment, Adayleh, (2018). Although this hypothesis emphasizes finance leading growth, there are also views acknowledging bidirectional causality, where economic growth itself spurs financial development. In summary, the finance growth hypothesis highlights financial system development as a fundamental catalyst for long-term economic growth by enabling efficient resource allocation, facilitating investment, and fostering innovation in the economy (Odeniran and Udejaja, (2010).

Endogenous Growth Theory

The Endogenous Growth Theory is a macroeconomic theory that posits that economic growth is primarily the result of internal forces within an economic system, rather than external (exogenous) factors (Romer, (1990). The theory was postulated in the 1980s, by economists Paul Romer and Robert Lucas, to address limitations in particularly its reliance on exogenous technological progress to explain sustained, long-term per capita growth (Aghion and Howitt, (1992). The theory is the most crucial theory, unlike the Solow model, where technological change is an unexplained external factor. According to Rebelo, (1991), the theory often assumes that when capital is broadly defined to include human capital and knowledge, the aggregate production function does not exhibit diminishing returns to capital accumulation. A major implication about the theory is that government policies can affect an economy's long-run growth rate, not just its level of income, but the Policies that promote and protect intellectual property rights (patents), subsidize education, or encourage competition and openness are believed to stimulate innovation and, thus, long-term growth. In summary, Endogenous Growth Theory redefines the source of long-run economic growth, making it a product of purposeful economic activity, particularly the creation and diffusion of knowledge rather than an outside force. This has provided a much richer framework for analyzing the effects of economic policy on long-term prosperity.

Inclusive Growth Theory

The concept of Inclusive Growth is a modern development paradigm that serves as a critical policy framework rather than a formal, mathematically defined "theory" like the Solow-Swan or Endogenous Growth Models. It represents a paradigm shift from prioritizing *any* growth to prioritizing quality of growth. Inclusive growth refers to the pace and pattern of economic growth, ensuring that all segments of society contribute to, and primarily benefit from, the growth process.

According to Kakwani, *et al.*, (2000), the theory focused on "pro-poor growth" (a precursor), which established the critical need for a growth strategy where the poor benefit proportionally more than the non-poor, directly challenging the notion that growth alone is sufficient to reduce poverty and inequality. The policy framework is designed around ensuring both broad-based participation and equitable outcomes. Inclusive growth theory focused on both the pace and pattern of growth, emphasizing that inclusiveness is about enlarging the size of the

economy by improving productivity and creating productive employment for the excluded (World Bank, (2009). According to The Commission on Growth and Development (2008), *inclusiveness* (encompassing equity, equality of opportunity, and social protection) is an essential ingredient for any successful, long-term growth strategy. Anand, *et al.*, (2013), attempted to integrate the pace and pattern of growth into a unified measure of inclusive growth and empirically studied the key drivers and determinants. According to Ranieri, *et al.*, (2013), it offers a comprehensive review of the evolution of the concept, comparing and contrasting different definitions of pro-poor and inclusive growth. In summary, the core insight of the theory is about is that inequality is a constraint on long-term growth and sustainability, and therefore, equity must be built into the economic model from the start.

Empirical Review

Significant research has been conducted regarding the link between financial inclusion, economic growth and poverty alleviation. Afolabi (2020) researched the impact of financial inclusion on inclusive development in Nigeria in the years of 1981-2017 using various indicators (number of bank branches; gross domestic product per capita; ratio of private sector credit to GDP; ratio of money supply to GDP; and rural lending). Ozili P., (2022), analyzed financial inclusion in Nigeria from the Global Financial Indicators. The analysis shows a general increase in financial inclusion indicators at the start of financial inclusion in 2014; there was a decline in financial inclusion indicators by 2017.

Hugues and Lewis, (2020) studied factors that affect farmer decision making as it relates to financial inclusion in Ivory Coast. They generated indices on (access, usage, quality) and a synthetic financial inclusion index. The results of their descriptive analysis of the data indicate that farmers are poorly included in financial inclusivity through the “usage” and “quality” indices; additionally, only 33% of farmers are included as related to access. Md Nur Alam and Sajal (2018) looked into whether or not financial inclusion can be associated with a nation's financial stability (Z-score). Using the GMM dynamic panel data estimator, robust results show that the independent variables associated with financial inclusion, which in this analysis were measured using the number of small and medium-sized enterprises (SMEs) that were borrowers divided by all borrowers and total SME outstanding loan balance divided by total loan balance, each positively impacted or contributed to financial stability. The GDP per capita, liquidity, and the proportion of private credit to GDP each also had positive associations with financial stability, while the proportion of total domestic credit extended to the private sector and financial crises each had negative relationships with financial stability.

Koomson et al. (2020) explored the impact of financial inclusion on both the poverty status and the likelihood of Ghanaian households becoming poor. From the seventh round of the Ghana Living Standards Survey conducted in the 2016/17 period, data was extracted for the purpose of developing a financial inclusion index using multiple correspondence analysis and estimating the likelihood (vulnerability) that Ghanaian households will become poor using three-stage feasible least squares. Results indicated that while 23.4 percent of all Ghanaians are estimated to be in poverty, almost 51 percent of Ghanaians are vulnerable to poverty and financial inclusion will influence household poverty. Nyarko et al. (2023) examined the effect

of financial inclusion on poverty by way of access to mobile money in the context of Ghana's economy. To perform their analysis, they adopted the two-step system GMM estimator due to its efficiency and robustness with respect to heteroskedasticity and autocorrelation. Overall, their findings indicated that financial inclusion generally improved and statistically significantly reduced poverty over the study's time frame, while income inequality exacerbated poverty.

Felix et al. (2024) analysis aimed to investigate financial inclusion as a worldwide development that encompasses issues of financial expansion, policy, and comprehensive development. The goal of their research was to determine the status of financial inclusion within Ghana's informal sector. This included a descriptive and cross-sectional study with multi-staged sampling design from eight regions throughout Ghana targeting 365 participants in the informal sector. The result of their research reveals very limited access to, poor quality of, and minimal use of financial services and products within Ghana's informal sector.

Methodology

This study is based on Inclusive Growth Theory which offers a thorough framework for investigating the relationship between financial inclusion and poverty alleviation in West Africa. The inclusive growth theory emphasises that both the rate and the pattern of growth are important for enhancing societal welfare, in contrast to traditional economic growth theories that place an emphasis on the expansion of output as a whole without considering its distributional effects (Kakwani & Pernia, 2000; World Bank, 2009). Economic growth that is equitable, broad-based, and offers chances for all facets of the population to engage in and profit from the growth process is referred to as inclusive growth by the World Bank (2009) and the Commission on Growth and Development (2008). The idea was born out of the realisation that, if the advantages are not shared equally, fast economic expansion by itself does not ensure the eradication of poverty. Accordingly, inclusive growth highlights social protection, fair access to opportunities, and productive employment as necessary prerequisites for sustainable development (Anand, Mishra, & Peiris, 2013; Ranieri & Ramos, 2013).

The hypothesis of inclusive growth provides a strong framework for how financial inclusion serves as a catalyst for economic transformation by giving poor and disadvantaged populations easier access to the financial system through affordable financial services such as credit, insurance, savings, and payment systems (Odumusor et al., 2024; Osabutey, 2024). It supplies individuals with means to manage financial risk, invest in education, and establish their own enterprises, thus contributing to improved welfare and greater income generation (Suri, 2023). The current research contends that financial inclusion is the primary driver of inclusive growth because it promotes economic engagement across regional, income and gender divides. Access to financial products such as mobile money, POS systems, and ATMs enables individuals and small businesses to more effectively engage in productive economic activity. This promotes the tenets of inclusive growth through poverty alleviation, improved income distribution, and collective prosperity (Osuma, 2025; Koomson et al., 2020).

This theory guarantee that economic benefits are inclusive rather than exclusive, policy interventions supporting digital financial infrastructure, financial literacy, and gender parity in access to financial services are required. This is consistent with research from West Africa showing that the link between financial inclusion and poverty reduction is strengthened by higher household income and educational attainment (Okonkwo & Nwanna, 2021; Hassan et al., 2019).

The functional form of the model is given as:

$$Y = f(\text{FinX}, \text{PcI}) \quad (1)$$

The relationship between financial inclusion and poverty West African (WA) countries is analysed using panel econometric techniques. A critical preliminary step to validate the reliability and robustness of the data involved conducting four panel unit root tests that increases the robustness of the analysis by minimising the risk of making biased assumptions based on the specific limitations of any single test procedure. The study first performed essential stationarity tests on the panel data to reduce the chances of spurious data. The existence of long-run co-integrating relationships among the variables was examined using the Johansen-Fisher panel co-integration test. This test is employed to provide a comprehensive understanding of West Africa region's long-run dynamics by identifying co-integrating relationships for both country-specific and overall panel levels.

The Panel vector error correction model (PVECM) was used to estimate the short and long-run coefficients. PVECM is highly appropriate for co-integrated panel data sets because it corrects for both serial correlation and endogeneity. These methods establish a broader econometric framework to analyse the relationships that exist between financial inclusion, poverty rate and growth in West African countries.

Data and Sources

This study is based on selected Six (6) West African countries, they are; Nigeria, Ghana, Liberia, Coted'Ivoire, Benin and Guniea. The justification of these countries is based on Gross National Income (GNI) per capita grouping, Variance in Dialects (Francophone and Anglophone countries), and proven history of poverty reforms according to World Bank (2023) reports. This study employs secondary data from 2008 to 2024 using World Bank Development indicators (WDI) database (2025) and International Financial development (IFD) Index (2025)

Estimation Techniques

Panel Stationary Tests

The study employs panel unit root test of Levin, lin and chu (LLC), Im, Pesaran and Shin (IPS), AD- fisher Chi square and Philips Peron Fisher Chi square to examine the fundamental requirements for estimating macroeconomic data. The essence of employing different four panel unit tests is to examine the robustness of the data employed for this study. The unit root test, Lag selection criteria, Combined Johansen Fisher panel co-integration test, Johansen

normalized results and Panel Vector Error Correction model (PVECM), was adopted to investigate the intricate relationship that exist between Financial inclusion, poverty and economic growth in selected West African countries. This checks for long-term relationships between the variables in the model and uses two statistics which are Trace statistic and Max Eigen statistic. These statistics help determine how many co-integrating long term relationships exist between the variables and the Johansen normalization estimate the co-integrating vectors and normalized on one variable (dependent variable). While panel vector error correction accommodates different dynamics among variables as it measures short- run dynamics through differenced variables between variables (short-run effects) and captures long term relationships among variables through error correction term (ECT) that shows how variables adjust over time to restore to long-run equilibrium after a shock.

Model Specification

Based on Inclusive growth theory, the effect of financial inclusion and poverty on economic growth in West Africa is captured by the linear model expressed in Equation (3.2) below. Following Osuma (2025), the estimated equation is as follows:

$$RGR = \alpha_0 + \beta_1 FinX_{it} + \beta_2 Pcl_{it} + \varepsilon_{it} \quad (2)$$

Where RGR proxy Real growth rate, FinX proxy Financial inclusion index and PcI that is Per capita income proxy poverty in selected west African countries. Thus, estimating the Long run and Short run relationship between financial inclusion, poverty and growth, the modified equation is expressed in equation (3.3) below following Ganic (2024), the estimated long and short run equation is given as.

$$\Delta RGR_{it} = \alpha_0 + \sum_{i=1}^p \alpha_1^i \Delta FinX_{it-i} + \sum_{i=1}^p \alpha_2^i \Delta Pcl_{it-i} + \lambda(RGR_{it-1} - (\beta_0 + \beta_1 FinX_{it-1} + \beta_2 Pcl_{it-1})) + \lambda ECM_{it-1} + \varepsilon_{it} \quad (3)$$

Results and Discussion of Findings

Panel unit root test and Lag selection criteria

The panel unit root results in Table 1 shows that the variables are integrated in a mixed order. At level I(0), the Real Growth Rate (RGR) is stationary, but Financial Inclusion Index (FinX) and Per Capita Income (PcI) are non-stationary. While all variables are stationary at first difference I(1). The application of PVECM estimation and combined Johansen panel co-integration test is justified by the existence of I(1) variables. This is consistent with other macro-panel studies that used comparable methods to investigate the relationship between financial inclusion and poverty in Ghana, such as Koomson et al. (2020) and Takyi et al. (2022).

Table 1: Panel Unit root test

Unit root Test	Levin, Lin & Chut Statistics (prob)*	Im, Pesaran and Shin W-stat Statistics (prob)*	ADF-Fisher Chi-square Statistics (prob)*	PP-Fisher Chi-square Statistics (prob)*	Conclusions
Variables					
Panel unit root test results at level					
RGR	-3.249(0.001)	-2.150(0.016)	22.195(0.035)	29.79(0.003)	I(0)
FinX	0.658(0.745)	-0.230(0.394)	10.143(0.603)	34.711(0.000)	Insignificant
PcI	3.237(0.999)	3.846(0.999)	2.533(0.998)	3.275(0.993)	Insignificant
Panel unit root test results at first difference					
RGR	-7.049(0.000)*	-5.641(0.000)*	52.172(0.000)*	350.498(0.000)*	I(1)
FinX	-2.636(0.004)*	-4.267(0.000)*	40.205(0.000)*	121.327(0.000)*	I(1)
PcI	-4.824(0.000)*	-3.263(0.000)*	31.536(0.002)*	99.484(0.000)*	I(1)

Note: The asterisk values in bracket are the probabilities values at 5% significant level

Source: Authors' computation using data from World Bank (2026)

Lag selection criteria were used to select the optimal lag to ensure efficient short run specification, parsimonious specification and avoidance of too much of parameterization that is consistent with the study of Osuma (2025) that emphasized on how Lag structure in pane studies preserves degree of freedom as shown in Table 2.

Table 2: Lag order Selection Criteria Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1012.48	NA	6352706	24.18	24.27	24.21
1	-767.65	466.34*	23148.88*	18.56*	18.91*	18.70*
2	-7.63.92	6.82	26273.79	18.69	19.30	18.93
3	-758.41	9.72	28608.43	18.77	19.64	19.12
4	-754.42	6.75	32365.14	18.89	20.02	19.34

Note: The asterisk value is the lowest value among all criterion at lag 1

Source: Authors' computation using data from World Bank (2026)

Panel Johansen Co-integration

The study confirms the long run relationship among RGR, FinX and PcI. The test reveals one co-integrating equation among the variables, with both trace and maximum Eigen statistics rejecting the null hypothesis of no co-integration at 5% level of significance but fail to reject the null hypothesis at “At most 1 and At most 2” as shown in Table 3.

Table 3: Panel Johansen Co-integration with lag results

Linear deterministic trend					
Series: Lag interval (in first differences) 1 to 8					
Hypothesized No of CE(s)	Eigen value	Trace Statistic (probability)	0.05 Critical value	Max Eigen Statistic (probability)	0.05 critical value
None *	0.267	33.93(0.016)	29.80	29.83(0.002)	21.13
At most 1	0.0413	4.10(0.895)	15.50	4.05(0.854)	14.27
At most 2	0.000	0.05(0.818)	0.05	0.05(0.818)	3.84

Note: The asterisk value of co-integrating equations depicts one co-integrating relationship

Source: Authors' computation using data from World Bank (2026)

Also, the study normalized long run relationship is given as

$$RGR_{it} = -0.213FinX_{it} - 0.001PcI_{it} + 5.321 \tag{4}$$

The equation shows a positive relationship between RGR, FinX and PcI in the long run as shown in Table 4 and 5.

Table 4: Johansen normalized results (1 co-integrating equation(s))

RGR	FinX	PcI
1.0000	0.213	0.001
	(0.412)	(0.001)
Adjustment coefficients (Standard error in parentheses)		
D(RGDP)	-0.575 (0.114)	
D(FinX)	-0.003 (0.009)	
D(PcI)	8.695 (6.807)	

Source: Authors' computation using data from World Bank (2026)

Panel Vector Error Correction model (PVECM)

In Table 5, the error correction term coefficient in RGR is large, negative and significant at -0.575 indicating strong convergence towards long run equilibrium. This depicts 57.4% of short-run disequilibrium is corrected within one period. While most short run coefficients of D(FinX(-1)) and D(PcI(-1)) are statistically insignificant. Also, the estimated short and long run equation is given as follows in line with study of Osuma (2025) in Africa.

$$\Delta RGR_{it} = -0.575(RGR_{it-1} + 0.213FinX_{it-1} + 0.001PcI_{it-1} - 5.321) + (-0.003\Delta RGR_{it-1} - 1.340\Delta FinX_{it-1} + \Delta 0.001PcI_{it-1}) - 0.041 \tag{5}$$

Table 5: Panel Vector Error Correction model test results

PVECM estimates Standard errors in () t-statistics in []			
Cointegrating Eq		Coefficients	
RGR(-1)		1.000	
FinX(-1)		0.213 (0.4115) [0.5187]	
PcI(-1)		0.001 (0.001) [0.5468]	
C		-5.3212	
Error correction	D(RGR)	D(FinX)	D(PcI)
cointEq1	-0.575 (0.114) [-5.030]	-0.003 (0.009) [-0.328]	8.695 (6.807) [1.277]
D(RGR(-1))	-0.003 (0.101) [-0.003]	0.001 (0.008) [0.173]	7.703 (5.987) [1.287]
D(FinX(-1))	-1.340 (1.151) [-1.216]	-0.0584 (0.0914) [-0.6391]	-61.1572 (68.5898) [-0.8916]
D(PcI(-1))	0.001 (0.002) [0.348]	-0.0002 (0.000) [1.247]	-0.187 (0.108) [-1.730]
C	-0.041 (0.330) [-0.126]	-0.002 (0.026) [-0.069]	66.492 (19.649) [3.384]

Source: Authors' computation using data from World Bank (2026)

Diagnostic test

In Table 6, the panel vector error correction model residual heteroskedasticity test value in Table 6 shows a value of 0.9174 that is greater than 5% significant level, thereby rejecting null hypothesis of heteroskedasticity. This depicts reliable standard errors that confirmed the robustness of the model used for the study.

Table 6: PVEC Residual Heteroskedasticity test results

Chi sq	Df	Probability
35.097	46	0.9174

Source: Authors' computation using data from World Bank (2026)

Discussion of Findings

The panel unit root test indicates stationary at first difference, this informed the choice of PVECM as the preferred estimation technique for this study. Also, the Johansen Fisher panel co-integration test reveals one co-integrating equation among real growth rate, financial inclusion index and per capita income confirming the existence of long run relationship among these variables. The long-term relationship strongly supports the inclusive growth theory that posits that access to financial systems contributes to sustained and shared economic progress (Kakwani & Pernia, 2000). The long run normalized equation is positive in West Africa in the long run in consonance with the work of Osabutey (2024) that emphasizes on digital finance as a poverty alleviating mechanism in Africa. While per capita income positive coefficient of 0.001 indicates that improvement in income levels are linked to increase in growth rate. Additionally, the small coefficient implies that reduction of poverty through improve income level is gradual in West Africa.

The PVECM results implies 57.4% of disequilibrium in the short run is corrected within a year with strong convergence towards equilibrium with a stable nexus among financial inclusion, poverty and economic growth in West Africa as economic growth adjusts significantly to deviations in financial inclusion and per capita income conditions. Hence, the study suggests a stable long-term relationship exist among the variables, financial inclusion enhances economic growth in the region and reducing poverty levels can be achieve through long run structural channels. The robustness of the PVECM estimation technique employed in the study is supported by the heteroskedasticity diagnostics test for endogeneity and correlation with reliable standard errors given the structural heterogeneity and income disparities in West African countries.

Conclusion

This study provides insights into dynamic panel evidence that examine the effect of the relationship between financial inclusion and poverty on economic growth of West Africa countries with macro panel evidence that gives account for short and long run dynamics that takes into consideration endogeneity issues and speed of adjustment. Thus, by advancing methodology the study reduces spurious regression in the macroeconomic panel data and strengthens causal inference that deepens the application of inclusive growth theory in West Africa countries.

Although, the study contributes to existing literature by providing region specific perceptions of how financial inclusion and poverty dynamics affects growth in West Africa in the long run, while there is absence of significant impact in the short run. This study will guide policy makers on the need to adopt a sustainable structural financial inclusion policy rather than immediate poverty outcomes. Also, the study recommends the need for countries in West Africa to have digital set-up, regulatory reforms in human capital development and creating awareness on financial reforms that is integral to maximizing the benefits of financial inclusion in alleviating poverty as well as improving household's income in the region.

This study is however limited by its reliance on secondary data that may contain measurement errors or inconsistencies across countries. Also, the study focuses on only six West African countries which may limit the generalizability of findings to the entire sub-region. To improve the generalizability of findings on financial inclusion and poverty, future research should incorporate micro-level (household or firm-level) data and broaden nation coverage. While methodology can be improved upon using threshold models to account for asymmetries and nonlinear interactions. Also, subsequent research studies should look at how emerging financial technology (FinTech) and institutional quality affect the fight against poverty in West Africa.

However, unlike earlier studies that relies on bank account ownership (single proxies), the study integrates multiple financial inclusion indicators such as Mobile money transfers, POS transactions, ATMs amidst others into a composite framework (financial inclusion index). A multidimensional measurement that improves robustness and captures digital transformation in West Africa. Thus, the study noted that expansion of digital finance enhances growth, financial literacy improves the effect of poverty alleviation policies, while institutional quality and infrastructural development are complimentary towards sustainable growth in West African countries.

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