IMPACT OF FINANCIAL INCLUSION ON HOUSEHOLD WELFARE IN RURAL NIGERIA

Apeverga, Miriam S. Joseph Sarwuan Tarka University, Makurdi, Nigeria apevergams@gmail.com

ABSTRACT

Financial exclusion remains a significant barrier to poverty reduction and welfare improvement in rural Nigeria, where access to formal financial services is substantially lower than in urban areas. This study examines the impact of financial access on household welfare in rural Nigeria using panel data from Nigeria's General Household Survey-Panel (GHS-Panel). Financial access was measured as bank account ownership, and household welfare was proxied by per capita consumption expenditure. A random-effects regression model was employed to evaluate the impact of financial access and other household characteristics on welfare outcomes. The results show that financial access significantly improves household consumption (β =1.4503; p<0.01). Higher education (β =0.0045; p<0.01), higher incomes (β =0.0418; p<0.01), phone access (β =0.0813, p < 0.05), and internet access ($\beta = 0.3131$; p < 0.01) also positively influenced household consumption. Conversely, larger household size (β =-0.1135; p<0.01), and households being female-headed (β =-0.1885; p < 0.01), and having a married head (($\beta = -0.2984$; p < 0.01) negatively affects household welfare. The findings suggest that financial access is critical for enhancing rural household welfare. However, systemic barriers such as gender, marital status, and household size can have strong limiting impacts. This implies that integrating financial inclusion initiatives with broader socioeconomic policies is necessary for maximizing welfare outcomes in rural areas.

Keywords: Rural Financial Inclusion. Financial Access. Household welfare. Nigeria.

INTRODUCTION

Financial inclusion refers to the ability of individuals and businesses to access useful and affordable financial products and services that meet their needs-transactions, payments, savings, credit, and insurance, delivered responsibly and sustainably (World Bank, 2022). Financial inclusion encompasses three dimensions – access, usage, and quality of financial services. Access refers to the availability of services, usage captures active engagement with them, and quality reflects their reliability, affordability, and suitability (International Monetary Fund [IMF], 2022; World Bank, 2022). Financial inclusion plays a pivotal role in reducing poverty, fostering inclusive growth, and improving household welfare (United Nations Development Program [UNDP], 2023; World Bank, 2022). Research particularly highlights its role in smoothing consumption, mitigating economic shocks, and improving household welfare (Abiona & Koppensteiner, 2022; Cavoli & Gopalan, 2023). Scholars argue that financial inclusion is particularly crucial in rural areas where access to formal financial services is often limited. Expanding financial inclusion in these regions is essential for reducing inequalities and enabling individuals to escape poverty (Su & Morgan, 2024).

In Nigeria, financial inclusion disproportionately impacts rural dwellers, with only 38% accessing banking services, compared to 64% of urban residents (Enhancing Financial Innovation and Access [EFInA], 2024; National Bureau of Statistics [NBS], 2023). The consequences of financial exclusion are grave. Excluded populations often rely on Informal savings schemes, which, while accessible, lack the opportunities for economic growth that formal financial institutions provide (Dabla-Norris et al., 2015; EFInA, 2024). These informal mechanisms are often unregulated and exploitative, offering little to no consumer protection (Dabla-Norris et al., 2015; Wright & Muteesassira, 2021). Moreover, the inability to access formal financial services restricts individuals' capacity to save, invest, access credit, and accumulate wealth securely, thereby perpetuating cycles of poverty and deepening economic inequality (Dabla-Norris et al., 2015; NBS, 2023; UNDP, 2023). These informal mechanisms are often unregulated and exploitative, offering little to no consumer protection (Dabla-Norris et al., 2015; Wright & Muteesassira, 2021). Moreover, the inability to access formal financial services restricts individuals' capacity to save, invest, access credit, and accumulate wealth securely, thereby perpetuating cycles of poverty and deepening economic inequality (Dabla-Norris et al., 2015; NBS, 2023; UNDP, 2023). In addition, financial exclusion limits the ability of households to improve welfare and build resilience against economic shocks, leaving them more vulnerable to income volatility and unexpected financial hardships (Abiona & Koppensteiner, 2022; Cavoli & Gopalan, 2023; Moore et al., 2019).

As national efforts to expand access to finance intensify, numerous studies have established a strong link between financial inclusion and economic well-being in Nigeria. Adebowale & Dimova (2017) and Adebowale & Lawson (2018) found that access to formal finance significantly improves household welfare and reduces inequality in Nigeria, particularly through enhanced access to credit and financial services. Awaworyi Churchill et al. (2020) provided micro-level evidence linking financial inclusion to poverty reduction and improved well-being in Nigeria. Ibrahim et al. (2018) demonstrated that financial inclusion reduces income inequality and improves welfare outcomes at the household level. Eze & Alugbuo (2021) and Ozoh et al. (2022) further linked financial inclusion with increased household consumption and savings, suggesting its role in lifting households out of poverty.

However, despite these insights, a significant knowledge gap persists regarding the welfare impacts of financial inclusion in rural areas where financial exclusion is most pronounced. Many studies address financial inclusion broadly without specifically focusing on rural household welfare outcomes. Most existing studies rely on cross-sectional data rather than panel data, limiting insights into welfare dynamics over time. The unit of analysis often centers on individuals rather than households, overlooking household-level dynamics. Furthermore, structural drivers such as household size and marital status remain underexplored in explaining variations in welfare outcomes.

For instance, previous works, such as Adebanjo et al. (2023) and Afolabi (2020), focus broadly on financial inclusion and poverty reduction without specifically targeting rural welfare outcomes. Research works, including that by Ajide (2015) and Eze & Alugbuo (2021), focus on individuals as the unit of analysis rather than households, thus missing critical intra-household welfare dynamics. While some studies, such as Ibrahim et al. (2019) and Awaworyi Churchill et al. (2020), highlight the poverty-reducing effects of financial inclusion, they rarely account for structural factors like household size, marital status, or regional disparities, which are important drivers of welfare differences. Moreover, most others rely on cross-sectional data, which limits the ability to track changes in household welfare over time. Although studies by Adebowale & Dimova (2017) and Adebowale & Lawson (2018) utilize panel data, rural-specific dynamics.

The welfare effects of financial inclusion among rural households remain underexplored, leaving an incomplete understanding of its effectiveness in improving welfare in rural communities. There is therefore a need for a study that applies panel data to rural households, focusing on household welfare dynamics, while integrating broader structural factors affecting the welfare impact of financial inclusion. Understanding these rural-specific dynamics is critical for the design of inclusive financial policies. This study addresses these gaps by focusing exclusively on rural households and highlighting the structural and socio-economic barriers that may limit the effectiveness of financial inclusion, focusing specifically on the access dimension of financial inclusion, which signifies the entry point into the formal financial system and a necessary first step toward full financial engagement.

METHODOLOGY

The study used panel data from Nigeria's 2015 and 2018 General Household Survey – Panel (GHS-P), which is implemented as part of the Living Standards Measurement Study – Integrated Surveys on Agriculture. The National Bureau of Statistics (2019) reports that the GHS-P is a nationally representative survey of households across rural and urban areas. The survey collects detailed information on household consumption, income, access to financial services, demographic characteristics, and agricultural variables, among others. For this study, the relevant household data files from the two waves of the survey were selected and merged to form a single dataset for each of the respective waves, after which a case selection of rural households was made. The resulting sample comprises 3,119 rural households from 2015 and 3,429 from 2018, making a final sample of 6,548 observations.

Financial access was measured as bank account ownership, while household welfare was proxied by per capita consumption expenditure. Bank account ownership signifies the entry point into the formal financial system, which is a necessary first step toward full financial engagement. While access does not explicitly capture the usage or quality of financial services, it remains a widely accepted proxy for financial inclusion due to its simplicity, consistency, and policy relevance. It is strongly linked to welfare outcomes, particularly in rural contexts where detailed usage data is scarce (Demirgüç-Kunt et al., 2018; Allen et al., 2013).

Thus, account ownership provides a practical foundation for analyzing the impact of financial access on household welfare. On the other hand, consumption expenditure is widely regarded as a reliable welfare indicator, particularly in developing economies where income data may be less stable or accurate (Beegle et al., 2012; Deaton, 1997). Other explanatory variables in the study included income, household size, phone access, internet access, remittances, safety nets, land size, and characteristics of the household head.

The selection of explanatory variables in this study is grounded in both theoretical expectations and empirical findings from previous research on household welfare. Each variable is believed to influence household welfare directly or indirectly through its effect on income generation, consumption capacity, or access to resources. Income is a primary determinant of consumption and overall household welfare, as higher income improves access to food, healthcare, and education (Adebowale & Lawson, 2018; Agyepong et al., 2024).

Larger households may experience lower per capita consumption due to resource dilution, making household size an important factor in welfare analysis (Anyanwu, 2014; Adebanjo et al., 2023). Mobile phones facilitate financial inclusion and access to market information, both of which can influence household income and consumption (Babajide et al., 2020; Ekong & Ekong, 2022). Internet access enhances connectivity, financial access, and education, contributing to welfare improvements, especially in rural areas where physical bank branches may not be present (Bahia et al., 2024; EFInA, 2024). Remittances serve as an alternative income source, enhancing household consumption, especially for poor and rural households (Ajide, 2015; Enisan & Akinwumi, 2019). Access to government safety nets or community-based social protection programs can stabilize consumption during economic shocks (Ajayi et al., 2023; Monyei et al., 2023). Land is a key productive asset in rural economies, influencing agricultural output, income, and food security (Michael & Sharon, 2014; Odozi & Adeyonu, 2021). Gender differences in access to resources, employment, and financial inclusion can lead to welfare disparities (Okojie, 2002; Idris, 2024). Married heads of households may benefit from pooled income and labor but also face higher consumption needs, which may influence per capita welfare outcomes (Amadu et al., 2021; Anyanwu, 2014). Older heads may have more economic experience and stable income, affecting household welfare (Ogbuabor et al., 2020), though the effect can vary by context. Education is associated with better employment, financial literacy, and resource management, which directly impact welfare (Ogundari & Aromolaran, 2014; Ade ola & Evans, 2017). Employment in the formal or off-farm sector typically offers more stable income than on-farm jobs, influencing household consumption (Shittu, 2014; Odozi & Adeyonu, 2021). Variables in the study were either measured as continuous or categorical. For each categorical variable, one category was selected as the reference group, which was excluded from the regression to avoid perfect collinearity (Table 1 in appendix). Data for the study was analyzed using Stata version 15.1.

Data Analysis

The goal of the analysis was to estimate the impact of financial access and other determinants on household welfare in Rural Nigeria. The random effects model was used to estimate this relationship.

Random Effects Model

The Random Effects (RE) Model is a widely used technique in panel data analysis, offering insights into variations across entities (between effects) and variations within entities over time (within effects) (Baltagi, 2008). The RE model incorporates these two dimensions, providing more efficient and comprehensive estimates, particularly when individual-specific effects are uncorrelated with the explanatory variables (Hsiao, 2014). Mathematically, the random effects model can be expressed as:

$$HW_{it} = \alpha + X_{it}\beta + u_i + v_{it}$$

(1)

Where:

 HW_{it} = Household welfare for *i* individual at time *t*

 X_{it} = Vector of explanatory variables: financial access, household income, household size, phone access, internet access, safety nets, remittances, land size, geopolitical region, and household head attributes education, age, gender, marital status, employment type.

 $\alpha = Intercept$

 β = Coefficient vector for the explanatory variables

 u_i = Individual-specific random effect, assumed to be normally distributed with mean zero and variance $\sigma^2 u$.

 v_{it} = Idiosyncratic error term

The random effects model assumes unobserved heterogeneity is random and uncorrelated with explanatory variables, expressed as $Cov(\mu_i, X_{ii}) = 0$ (Wooldridge, 2010). If violated, estimates become biased. The Hausman test helps determine the model's appropriateness over its alternative, the fixed effects model (Baltagi, 2008; Wooldridge, 2010). The test statistic is calculated as:

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})' \left[Var(\hat{\beta}_{FE}) - Var(\hat{\beta}_{RE}) \right] - 1(\hat{\beta}_{RE} - \hat{\beta}_{FE})$$
(2)
Where:

 $\hat{\beta}_{RE}$ = Coefficient estimates from the random effects model

 $\hat{\beta}_{\text{FE}}$ = Coefficient estimates from the fixed effects model

Var = variance.

RESULTS AND DISCUSSIONS

Distribution of Households According to Variables in the Study

To gain insights into the demographic, socio-economic, and infrastructural characteristics of rural households in the sample, a descriptive analysis of key variables in the study was carried out using means and percentages. Table 2 below provides the distribution of households based on key variables in the study. As displayed in Table 2 above, the descriptive statistics provide valuable insight into the demographic and socio-economic profile of rural households in Nigeria. The average age of household heads (51.92 years) indicates a mature, ageing rural population, which may have implications for labour productivity, access to innovation, and digital financial services. The dominance of maleheaded households (72.46%) and married heads (60.04%) reflects traditional household structures, yet these patterns could mask gender-related disparities in access to financial services and household decision-making power.

The fact that a large proportion of household heads attained only secondary education (40.16%) suggests limited human capital development, which may hinder the ability to understand and utilize financial products effectively. The predominance of off-farm employment (45.71%) over on-farm or mixed activities could point to a gradual diversification of rural livelihoods, potentially improving income stability and capacity for financial inclusion. The overwhelming lack of internet access (90.26%) and absence of social safety nets (93.86%) highlight infrastructural and institutional weaknesses that can severely constrain financial inclusion and welfare outcomes. These deficits suggest that while some households may be financially included through basic accounts, their ability to fully participate in or benefit from the digital economy remains limited. The relatively low average monthly income (N141,498.80) and modest consumption (N160,896.40) reflect the economic vulnerability of rural households. With an average landholding of 4.11 hectares and a significant distance (49.56 km) from the state capital, access to markets, services, and financial institutions remains a geographic challenge, further contributing to welfare inequality.

Welfare Impacts of Financial Access

To assess the impact of financial access and examine the determinants of household welfare, a random-effects regression model was employed. The model accounts for both withingroup (intra-household over time) and between-group (across households) variations, making it suitable for panel data. Table 3 below presents the results of the regression, showing the estimated coefficients, standard errors, z-values, and p-values for each explanatory variable. The dependent variable is household welfare, proxied by per capita consumption expenditure. As Table 3 displays, the random effects model was statistically significant (Wald chi²(19) 1503.11, p < 0.01), explaining 54.13% of the variation in welfare, with between-household variation (54.30%) being more substantial than within-household variation (16.26%). This indicates that most 54.30%) of the variation in welfare is due to differences between households, rather than changes within a household over time.

Table 2: Distri	ibution of Households According	g to Study Varia	bles	
Variables		Wave 3	Wave 4	Wave 3&4
Number of ob	servations	3119	3429	6548
Per capita con	sumption: (Average)	132630.9	186606.5	160896.4
Account owne	ership: Yes	8.34	12.69	10.61
	No	91.66	87.31	89.39
Age of househ	nold head: (Average)	54.13	50.39	51.92
Gender of hou	sehold head: Male	73.23	71.92	72.46
	Female	26.77	28.08	27.54
Marital status of household head: Married		63.55	57.61	60.04
	Not married	36.45	42.39	39.96
Education leve	el of household head: None	0.81	1.45	1.13
	Primary	31.45	32.2	31.83
	Secondary	61.45	57.6	59.52
	Tertiary	6.29	8.75	7.52
Employment status of household head: On- farm		46.45	34.34	39.3
	Off-	33.23	54.36	45.71
farm		20.22	11.0	14.00
form	Both on-farm & off-	20.32	11.3	14.99
Household siz	e: (Average)	6.13	5.6	5.86
Household inc	come: (Average)	87432.62	190677	141498.8
Land size: Av	erage	3.43	4.72	4.11
Phone access:	Yes	90.70	45.58	67.07
	No	9.30	54.42	32.93
Internet access	s: Yes	7.09	12.16	9.74
	No	92.91	87.84	90.26
Safety nets:	Yes	0.71	11.08	6.14
5	No	99.29	88.92	93.86
Remittances:	Yes	13.88	14.09	13.99
	No	86.12	85.91	86.01
Distance to ma	ajor road: (Average)	7.4	4.65	7.6
Distance to state administrative capital		76.64	21.29	49.56
(Average)	L L			
Regional zone	es: North Central	18.24	17.47	17.84
	North East	17.28	20.5	18.97
	North West	23.12	20.41	21.7
	South East	17.95	18.17	18.07
	South-south	16.42	16.77	16.6
	South West	6.99	6.68	6.83

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Source: Data analysis, 2024

VariableCoef.Std. Err.Z $P> z $ Access to finance 0.3255 0.0425 7.67 0.000^{***} Age of household head 0.0002 0.0009 0.18 0.861 Educational level of the head 0.0022 0.0009 2.53 0.012^{**} Gender of head: female -0.1885 0.0522 -3.61 0.000^{***} Marital status of head: Married -0.2804 0.0482 -5.82 0.000^{***} Both on-farm and off-farm -0.2578 0.0355 -7.26 0.000^{***} Both on-farm and off-farm -0.1911 0.0466 -4.1 0.000^{***} Household income 0.0748 0.0101 7.38 0.000^{***} Household size -0.1187 0.0061 -19.47 0.000^{***} Phone access 0.3131 0.0486 6.44 0.000^{***} Remittances 0.0272 0.0401 0.68 0.497 Safety nets 0.1222 0.0694 1.76 0.078^* land size -0.0013 0.0038 -0.33 0.739 Regions: North East 0.1269 0.0525 -2.33 0.020^{***} North West 0.1676 0.0531 4.67 0.000^{***} South Kest 0.1676 0.0583 2.87 0.004^{***}	Table 3: Welfare Impacts of Financial Access						
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Internet access0.31310.04866.440.000***Remittances0.02720.04010.680.497Safety nets0.12220.06941.760.078*land size-0.00130.0038-0.330.739Regions: North East0.12690.0545-2.330.020**North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	Phone access		0.0813	0.0377	2.16	0.031**	
Remittances0.02720.04010.680.497Safety nets0.12220.06941.760.078*land size-0.00130.0038-0.330.739Regions: North East0.12690.0545-2.330.020**North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	Internet access		0.3131	0.0486	6.44	0.000***	
Safety nets0.12220.06941.760.078*land size-0.00130.0038-0.330.739Regions: North East0.12690.0545-2.330.020**North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	Remittances		0.0272	0.0401	0.68	0.497	
land size-0.00130.0038-0.330.739Regions: North East0.12690.0545-2.330.020**North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	Safety nets		0.1222	0.0694	1.76	0.078*	
Regions: North East0.12690.0545-2.330.020**North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	land size		-0.0013	0.0038	-0.33	0.739	
North West-0.13600.0523-2.60.009***South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	Regions: North East		0.1269	0.0545	-2.33	0.020**	
South East0.24950.05254.750.000***South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	North West		-0.1360	0.0523	-2.6	0.009***	
South South0.24790.05314.670.000***South West0.16760.05832.870.004***Constant11.75180.139884.060.000	South East		0.2495	0.0525	4.75	0.000***	
South West0.16760.05832.870.004***Constant11.75180.139884.060.000	South South		0.2479	0.0531	4.67	0.000***	
Constant 11.7518 0.1398 84.06 0.000	South West		0.1676	0.0583	2.87	0.004***	
	Constant		11.7518	0.1398	84.06	0.000	

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Source: Author's data analysis, 2024

Statistical significance at p<0.01, p<0.05, and p<0.1 probability levels are denoted by ***, **, and *, respectively.

Temporal changes and fluctuations within households account for only 16.26% of welfare disparities. This implies that structural factors influencing welfare are more persistent and less affected by short-term changes. Findings indicate that financial access has a strongly significant impact on household welfare (β =0.3255, p<0.01). Specifically, households with financial access exhibit higher levels of per capita consumption, which is the proxy indicator of welfare in the study. In general, this finding supports the study's hypothesis that financial access leads to improved welfare outcomes by providing households with the tools to smooth consumption. The findings further align with several previous studies (Adebowale & Dimova, 2017; Adebowale & Lawson, 2018; Awaworyi Churchill, 2020; Eze &Alugbuo, 2021; Ibrahim et al., 2018; Iyanuoluwa et al., 2020; Ozoh et al., 2022).

Beyond financial access, income positively impacts household welfare (β =0.0848, p<0.01), reflecting the role income plays in providing households with the resources to meet consumption needs in rural areas. This again aligns with studies suggesting that higher incomes provide a buffer for households Agyepong et al., 2024; Ozoh et al., 2022. Equally, education is a key determinant of welfare, as households headed by individuals with higher levels of education tend to have higher consumption levels (β =0.0022, p< 0.05). This aligns with existing studies that underscore the role of education in enhancing welfare through informed decision-making, higher-paying jobs, and income-generating opportunities (Adebowale and Dimova, 2017; Adebowale and Lawson, 2018; Awaworyi Churchill et al., 2020; Ogundari and Aromolaran, 2014; Okojie, 2002; Ozoh et al., 2022). Furthermore, phone access (β =0.0813, p<0.05) and internet access (β =0.3131, p<0.01) showed a strong positive impact on household welfare, indicating that digital infrastructure and connectivity can support the welfare of rural households.

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Certain factors were negative determinants of household welfare. Female gender of the household head was associated with lower welfare (β =-0.1885, p<0.00), indicating that female-headed households face unique socio-economic or structural constraints in meeting consumption needs, such as limited access to resources and unstable incomes. This further aligns with several previous studies (Ajefu, 2018; Idris, 2024; Okojie, 2002). Similarly, larger households were associated with lower levels of consumption (β =-0.11 87, p<0.01), highlighting the strain that larger families place on household resources, further suggesting the need for proper family planning and resource allocation. Adebanjo et al., 2023; Adepoju & Akinluyi 2017; Anyanwu 2014). Likewise, households headed by married individuals tend to have lower consumption compared to non-married households (β = -0.2804, p<0.01), reflecting increased financial responsibilities associated with marriage. Agyepong et al., 2024; Amadu et al., 2021; Anyanwu, 2014).

Furthermore, households where the head is employed only on-farm have significantly lower consumption (β =-0.2578, p<0.01), reflecting low and unstable income in farming jobs, which reduces welfare (Adeoye et al., 2.019; Nmeregini et al., 2019; Odozi & Adeyonu, 2021; Shittu, 2014). Similarly, households where the head is engaged in both on-farm and off-farm work show a negatively significant relationship with consumption levels (β =-0.1911, p<0.10), indicating that combined employment does not provide the same level of welfare gains or income stability as exclusive off-farm employment. The supplementary income from off-farm activities may offset variability in on-farm earnings, but it does not consistently translate into higher consumption or improved welfare. In addition, household welfare varies regionally, with lower consumption in the Northeast (β =0.1269; p<0.05) and Northwest (β =0.1360; p<0.01) compared to the North Central region. In contrast, the Southeast (β =0.2495; p<0.01), South-South (β =0.2 479, p<0.01), Southwest (β =0.1676, p<0.01) regions experienced higher consumption levels, reflecting better conditions in the South. These findings align with studies by Aigbokhan, (2008), Babatunde & Qaim (2010), and Odusola et al. (2017), who found that the southern regions outperform the northern regions in household welfare.

CONCLUSION

The study found that financial access plays a significant role in improving household welfare in rural Nigeria. Financially included households benefit from financial services, which in turn increase consumption and welfare. Beyond financial access, factors such as income, education, off-farm employment, phone access, and internet access are critical for improving welfare, while larger household sizes, female gender, being married, and on-farm employment have adverse effects on welfare, Geographical regions also had implications for household welfare with South West and South-South regions experiencing higher consumption compared to the North Central region while the other regions showed no significant relationship. These findings underscore the need for comprehensive welfare policies in rural areas. Welfare programs could integrate financial inclusion initiatives with policies that account for structural and systemic challenges to further enhance the effectiveness of financial inclusion programs and improve overall welfare in rural areas.

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Policies that promote family planning and focus on reducing dependency ratios, improving resource allocation, or providing targeted support to larger households may also help mitigate these challenges and improve welfare outcomes. Policies should also focus on addressing the specific welfare constraints faced by households in various regions.

Limitations

This study focuses on the economic dimension of welfare, excluding social and psychological aspects. Findings are specific to rural Nigeria and may not be generalizable beyond rural Nigeria. Future research should incorporate broader welfare indicators and urban contexts for a more comprehensive analysis of financial inclusion's impact.

	Variable	Туре	Definition and Unit of Measurement
1	Household welfare	Continuous	Natural log of households' per capita consumption expenditures
2	Financial Inclusion	Dummy	Dummy: Account ownership with a commercial bank, with 1 reflecting ownership, and 0 for otherwise.
3	Age of household head	Continuous	Age of the household head in years
4	Gender of household head: Female	Dummy	Dummy: 1 if the household head is female and 0 if male
5	Marital status of household head: Married	Dummy	Dummy: 1 if the household head is married and 0 if otherwise.
6	Educational status of household head	Categorical	Ordered: 0 if the household head has no formal education; 1 if the highest education attainment is primary education; 2 if the highest education attainment is secondary education; and 3 if the highest education attainment is tertiary education.
7	Employment status of household head: Off-farm	Categorical	Categorical: 1 if household head is employed on farm only; 2 if employed both on-farm and off-farm.
8	Household size	Continuous	Number of members in the household
9	Household income	Continuous	Total household income in naira
10	Land size	Continuous	Size of land owned by household in hectares
11	Phone access	Dummy	Dummy: 1 if a household member has access to a phone, otherwise $= 0$
12	Internet access	Dummy	Dummy: 1 if a household member has access to the internet, otherwise $= 0$
13	Safety nets	Dummy	Dummy: 1 if a household member has benefited from safety nets, otherwise = 0
14	Remittances	Dummy	Dummy: 1 if a household member has received remittances, otherwise = 0
15	Distance to major road	Continuous	Distance of household's location from major roads in kilometers.
16	Distance to state administrative capital	Continuous	Distance of household's location from state administrative capital in kilometers.
17	Regions: North Central	Categorical	Categorical = 1 if the household is located in North East Nigeria; 2 if the household is located in North West Nigeria; 3 if the household is located in South East Nigeria; 4 if the household is located in South-South Nigeria; and 5 if the household is located in South West Nigeria.

Table 1: Measurement of Variables in the Study

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