

Financial Inclusion And Poverty: Does The Country's Education Matter? Evidence From Lower-Middle-Income Countries

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Abstract

Financial Inclusion is a critical element of social inclusion, mainly helpful in combating poverty. The study aims to examine the impact of financial inclusion on poverty with the moderating role of education attainment. The sample comprises lower middle-income countries using the unbalanced panel data for the span of 2005–2021. Through rigorous analysis¹ by employing static and dynamic panel models, the study finds that financial Inclusion (CFII) significantly and negatively influences poverty in lower-middle-income countries. The findings also indicate that the education attainment level of a country has significantly and positively impacted the relationship between financial inclusion and poverty. This study provides valuable insights for policymakers, Federal Banks and Governments. First, financial institutions should broaden their formal financial services to the vulnerable individuals of society to combat poverty. Second, the government must focus on the educational attainment level to increase the effectiveness of financial inclusion in eradicating poverty.

Keywords: *Financial Inclusion, Poverty, Education attainment, Lower-Middle-income countries, Generalized method of moment (GMM).*

JEL Classification: *G21, I32, O11, O15, O53*

Introduction

Poverty is a complicated, diverse problem that remains a major global challenge. It is a condition of deprivation in which people or communities lack the resources, capabilities, and opportunities necessary to meet their basic needs and enjoy a decent standard of living (Fadun, 2014). Poverty does not only mean a lack of adequate money but also a lack of access to fundamental services in society. Various social groups bear a disproportionate burden of poverty. According to data from the World Bank (2023), poverty rates in lower-middle-income countries are much higher than in the rest of the world. The mean poverty rate in lower-middle-income countries is around 18.3%, compared to just 0.7% in high-income countries (Macro poverty outlook, 2023). However, the global poverty rate has increased in recent years (44 million people living in poverty), but this increase is more pronounced in lower-middle-income countries (World Bank, 2023). Poverty limits individuals' potential, depriving them of access

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to quality education, healthcare, and economic and social mobility opportunities. It perpetuates cycles of disadvantage, trapping individuals and communities in intergenerational poverty and hindering their ability to escape it (Imai et al., 2010). Poverty disproportionately affects marginalized groups such as women, children, ethnic minorities, and rural populations. Discrimination, unequal distribution of resources, and limited access to opportunities exacerbate poverty and widen the gap between the rich and the poor (Jalilian & Kirkpatrick, 2002). This inequality can fuel social tensions and instability and hinder overall social and economic progress. Addressing poverty requires comprehensive and integrated strategies across nations. One of the comprehensive strategies is financial inclusion. It refers to the availability and accessibility of formal financial services to all economic actors (Sarma & Pais, 2011). It refers to the availability of quality and cost-effective financial goods and services to individuals and businesses delivered sustainably and ethically, such as savings, payments, credit, transactions, and insurance. Access to financing is the first step towards increased financial inclusion. Everyone having access to a transaction account continues to concern governments. Transaction accounts are a gateway to additional financial services (Helms, 2006; Bhaskar, 2013; Patwardhan et al., 2018). Financial inclusion is thought to be a powerful factor that reduces poverty and income disparity (Park & Mercado, 2018). The main factor contributing to poverty is a lack of financial resources. Individuals with access to their bank accounts can build their credit worth, save money, smooth their spending patterns, and handle negative financial shocks (Sharma, 2016). Financial inclusion is also a crucial and indispensable component in economic progress (Le et al., 2020). It boosts economic expansion by assisting with transactions, giving all facets of the population investment opportunities, spending down saving, facilitating foreign capital inflows and increasing access to finance to larger population sectors (Levine, 2000). Households with access to financial products and services can make investments to increase their future income (Ellis et al., 2010). Financial inclusion and its relationship with poverty have been well documented in the literature (Burgess & Pandey, 2005; Townsend & Ueda, 2006; Levine, 2000; Sarma & Pais, 2011; Sharma, 2016; Adeoye, 2016; Park et al., 2018; Demirguc-Kuntz et al., 2018; Le et al., 2020). However, these studies have not considered the other important conditions under which financial inclusion can significantly reduce poverty. The effectiveness of financial inclusion depends on several elements, the most crucial of which is the Population's degree of education attainment. The role of education in promoting financial inclusion must be considered. Education helps individuals understand the value of saving and investing, which increases the probability of financial market participation (Cole & Shastry, 2009). Individuals can acquire financial literacy skills through education to use formal financial services effectively. The country's education attainment matters to increase the effectiveness of financial inclusion in reducing poverty. The current study contributes to the literature in the following ways: First, by taking a representative sample of lower-middle-income nations and looking at the associations between financial inclusion and poverty. Second, consider the condition (i.e., education attainment level) in which financial inclusion may prove more successful in eradicating poverty. To the best of our knowledge, empirical studies have yet to broadly examine the conditional relationship of financial inclusion with poverty; thus, his study aims to fill this prevailing gap in the literature. Thus, this study hypothesizes that countries with greater educational attainment are better able to reduce poverty through financial inclusion.

2. Literature

2.1 Financial Inclusion: Concept and Measurement

Financial inclusion ensures everyone can access reasonable and suitable financial services, regardless of location or income level. It offers people and enterprises already shut out of the official financial system access to conventional financial facilities such as funds accounts,

loans, investments, and payment systems. According to the World Bank (2005) definition, Financial inclusion is the access and use of a broad range of affordable financial services, including savings, credit, insurance, and payments, by individuals and businesses that are underserved by the formal financial sector. Alliance for Financial Inclusion (2018) defines financial inclusion as a condition in which all individuals who can use financial services have been granted a complete range of high-quality, reasonably priced financial facilities delivered by various institutions in a suitable manner and with respect for the customers. According to the Consultative Group to Assist the Poor (2010), financial inclusion is the condition of having access to a full range of high-quality financial services at competitive rates, which several reliable and long-lasting organizations offer. Various authors have defined financial inclusion over the past years. Meyer and Vu (2016) defined financial inclusion as the accessibility of various financial services to persons who have been eliminated from the financial ecosystem due to socioeconomic or geographical factors. Singh (2017) explains that financial inclusion ensures access to financial services, including credit, savings, insurance, and payments, at affordable costs to all individuals and businesses, especially the low-income and disadvantaged segments of society. Chibba (2015), financial inclusion is the accessibility and equality of access to financial services. Financial inclusion, according to one of the authors, Sengupta et al. (2015), is a technique by which standard institutional actors make certain that all members of society, including vulnerable groups such as less resilient regions and economically disadvantaged populations in particular, have equitable access to the appropriate financial services and products at a reasonable cost in a way that is equitable and transparent. Demirgüç-Kunt and Klapper (2012), financial inclusion is the deliberate utilization of formal financial services by many groups that improve the financial health of many individuals. Morduch (2011) defines financial inclusion as the provision of financial services to portions of the Population that the conventional banking system neglects. Measuring financial inclusion is a serious step toward assessing the efficiency of financial inclusion initiatives and programs. Utilizing metrics, including access, use, and quality of financial services, is one popular method of gauging financial inclusion. The percentage of adults having bank accounts is one often cited metric of financial inclusion. Honohan (2007, 2008) used a variety of accounts from commercial banks and microfinance organizations to create a composite financial inclusion index. Since some people may have accounts but still experience difficulties obtaining credit or other financial services, this measurement may not accurately reflect the full amount of financial inclusion. The three key factors are the availability of financial facilities, use of financial facilities, and quality of financial facilities. Demirguc-Kunt and Klapper (2013) proposed to be used to measure financial inclusion. Indicators like the number of bank branches and ATMs, the count of borrowers and depositors, and the ease of obtaining financial services were also suggested. Beck et al. (2007) proposed a variety of indicators to measure financial inclusion, such as the number of branches, ATMs, and credit cards issued. A common indication of financial inclusion is the number of bank branches and ATMs, especially in developing nations where physical accessibility to financial services is still problematic. This strategy has disadvantages since it must account for the breadth and standard of financial services. For example, a country with many branches for banks and ATMs may still have financial inclusion at low levels if these services are not affordable, user-friendly, or service the needs of underserved communities such as women, rural populations, and families with less-income households. Camara and Tuesta (2014) measured financial inclusion as a binary variable using information from a national household survey. A household is considered a part of the banking system if it earns interest, has a mortgage loan, or uses online banking. Sarma (2012) worked has gained too much popularity. She developed an index with multiple dimensions for measuring financial inclusion by estimating the penetration, availability, and usage dimensions.

2.2 Financial Inclusion and Poverty

Investigators have recently examined the link between financial inclusion and various socioeconomic variables. Mercado (2018) investigated how financial inclusions impacted income inequality and poverty nationwide. The consequences showed a link between financial inclusion, economic expansion, and declining poverty rates, particularly in high- and middle-income countries. Agyemang-Badu et al. (2018) explored the link between financial inclusion, poverty and income inequality in Africa and exposed an inverse relationship. To resolve this issue, they urged establishing policies and activities that improve low-income people's formal access to financial services. Park and Mercado (2018) discovered a substantial connection between financial inclusion and economic growth and decreased poverty rates in recent research. This association, however, was only found in high- and middle-high-income countries. Turégano and Herero (2018) further support this idea by showing that countries with less unequal income distribution usually have more inclusive financial systems. Zhang and He (2018) argued that only rural families have a favorable correlation between household income and digital financial inclusion. Bhardwaj et al. (2018) investigated the association between financial inclusion, poverty, and economic growth. He contended that Asia's lack of accessibility to financial services is a fundamental impediment to attaining equitable and inclusive economic growth. Over a billion Asians require formal financial services. However, just one-third of businesses have a loan or secured line of credit, and only 27% of individuals have a formal financial institution account. Jabir et al. (2017) examined the effect of financial inclusion in alleviating poverty among families with modest incomes in 35 Sub-Saharan African nations. They discovered that providing access to money for poor people drastically reduced the prevalence of poverty. Sharma (2016) contended the connection between various aspects of the development of the economy and financial inclusion in India from 2004 to 2013. This study focused on three key important factors of financial inclusion: banking penetration, availability of banking facilities, and use of banking facilities. The findings show a favorable association between economic progress and various forms of financial inclusion. Rojas-Suarez and Amado (2014) argued that access to basic financial services is typically limited to vulnerable segments of society and that financial inclusion substantially enhances the well-being of these groups of society. They employed the financial inclusion index to analyze the elements that lead to various levels of financial inclusion in different countries. They found that financial inclusion is highly related to human development and is impacted by macroeconomic and building factors such as funds, disparity, literacy, development, and physical assets. Burgess and Pandey (2005) claim that developing state-run bank outlets in unbanked rural areas has greatly reduced rural poverty in India by growing access to formal sector credit and savings opportunities. These results suggest that financial inclusion can be a powerful instrument for encouraging economic growth and lowering poverty and inequality.

2.2 Financial Inclusion, Education and Poverty

The connection between financial inclusion, education, and income was examined by (Adeel et al. in 2021). They found that higher education and income levels are connected with more financial inclusion and that those who live in cities are more expected to have access to financial services. Allen et al. (2016) explored that people with up to 8 years of education are about 12% less expected to own a bank account than their more educated peers using a sample of more than 140 nations. Cole and Shastry (2009) claimed that one year of education raises the chances of financial market engagement by 7-8 percent. Priyadi et al. (2021) proposed that education level favorably and significantly influences family savings. Brata (1999) contends that people's awareness of managing and saving their money in the bank increases with the level of learning of the family's head of household. Wardhono et al. (2016) argued that the more education a person has, the higher their financial literacy and the more intensively they can acquire financial information. Omar and Inaba (2020) emphasized the necessity of

education and awareness to achieve financial inclusion goals, particularly for marginalized people who usually have lower levels of financial literacy. Hussain et al. (2018) discovered that financial literacy boosts a firm's ability to access finance and expand its business. Financial education can promote financial literacy and, as a result, increase financial inclusion in Indonesia. It shows that initiatives to raise financial awareness and education are essential in fostering financial inclusion and closing accessibility gaps to financial services (Kusuma & Hasnah, 2019). These studies concluded that greater education level and income are linked with greater financial inclusion, and people living in urban areas were more likely to have access to financial facilities. Klapper and Peria (2016) argued that older, wealthier, and better-educated people were more likely to have formal borrowing and transactional accounts at formal financial institutions. Kim (2016) emphasized that some people lack financial accessibility due to ineligibility, unavailability, or lack of financial education. In addition to demographic factors, the financial industry plays a crucial role in financial inclusion. Li and Lu (2016) found that higher levels of education are directly linked with greater financial inclusion, specifically for women. Anjani (2016) found that higher levels of education are strongly linked with greater financial inclusion in Nepal and that people with higher levels of education were more likely to have a savings account and access to formal credit. Chao and Collins (2011) researched the relationship between education and financial inclusion in the Asian region. They found that a greater degree of formal education is positively related to greater financial inclusion and that households with a greater level of education are more likely to have savings accounts and access to official credit.

2.3 Theoretical Underpinning

The theoretical principles underlying financial inclusion, poverty, and education can be described either in terms of the Human Capital Development Theory (HCT), Sustainable livelihood approach (SLA), or Finance-growth theories (FGT). The theoretical review underpinning Human capital development (HCD) suggests that people as assets whose skills, knowledge, and abilities serve as a type of capital comparable to physical and financial capital. The fundamental tenet is that by improving human capital, people can become more productive, make more money, and be happier, while society can promote economic progress and eradicate poverty (Ismail & Youssef, 2010). The architecture of education systems, workforce development, and policies intended to raise the standard of the labor force and promote economic growth have all been significantly influenced by the Human Capital Theory. Arsani, Ario, and Ramadhan (2020) argued that education, particularly tertiary education, enhances people's wealth and lowers poverty rates. While discussing the human capital theory, Ismail and Yussof (2010) argued that factors such as education, training, and health decreased income inequality in Malaysia. Similarly, Yang and Qiu (2016) argued that education inequality significantly contributes to income inequality, consistent with Lee and Lee (2018). The Human capital theory is relevant to the current study in the following ways. First, financial inclusion could be attained through raising citizens' financial knowledge through education. The financial inclusion initiatives that aim to eradicate poverty through increased access to the formal financial sector can only be successfully achieved with the formal education level. Educated people may become more aware of the financial services and products accessible to them. They will be willing to join the official financial sector by opening a bank account after they learn about the financial products and services currently available, which can enhance their well-being. Second, people can benefit from more services the formal financial sector offers by acquiring greater financial knowledge. By teaching people to save money so they can pay their bills on time and retirement plans and helping them differentiate between needs and wants, financial knowledge can help people become self-sufficient and stabilize their finances. The sustainability livelihood approach (SLA) posits that educated individuals, households, or

groups are likelier to have better sustainable livelihoods. In contrast, the less literate Population in society is more likely to be financially excluded, depriving them of their sustainable livelihood. The idea proposes that the level of reliance on asset capacity and vulnerability/risk to poverty by the individual group or household is determined by their existing financial provision, participation, and the person's literacy level (Morse & McNamara, 2013). The finance growth theory (FGT) is also relevant to the current study. Financial inclusion ensures growth and equal income distribution, thus improving living conditions (Sierra and colleagues, 2012). There should be increased access to financial institutions that raise savings, boost growth and eradicate poverty. Financial inclusion research shows that it enhances wealth creation by enhancing access to financial services, lowering financial risk and transaction costs, increasing savings, and enhancing the liquidity position of individual individuals and groups (Park & Mercado, 2015; Masiyandima et al., 2017).

3. Methodology

3.1 Data

The study utilizes an unbalanced data panel spanning 17 years from 2005 to 2021. The data is gathered from reputable sources, including the Financial Access Survey (FAS), World Governance Indicator, and World Bank databases. World Bank database has been used to obtain information on Secondary school attainment, Inflation, Poverty, Education and Rule of law. The Financial Access Survey (FAS) database has been used to obtain information on financial inclusion. The Population of the study comprises the World Bank's lower middle-income nations. The World Bank has classified 54 countries as Lower Middle Income Countries. All 54 countries are the Population of the study. However, the sample comprises 48 countries because of the data availability of the selected variables.

3.2 Composite Financial Inclusion Index Construction

The preliminary and critical job is to generate a composite financial inclusion index (CFII). The methodology used in this study was that of Omar and Inaba (2020). This study considers several indicators related to outreach to the financial sector, categorized into three dimensions: the use, accessibility, and penetration of financial services.

Penetration Dimension:

This shows how many people have penetrated the official financial system overall. Financial service penetration is calculated using the no. of deposit accounts with financial associations per 1000 adults and the number of active depositors with financial institutes per 1000 people. A higher weight, such as 0.70, is assigned to the number of bank accounts held by a financial institution to describe its significance. The deposit accounts index is a vital indicator for estimating the number of people with bank accounts. On the other hand, we give a weight of 0.30 to the number of active depositors with financial institutes per 1,000 people because a tiny proportion of depositors with bank accounts continue to participate in the financial organization. The penetration dimension is, therefore, represented by the weighted average of these two sub-indices. Given that it is a leading indicator of financial inclusion, the penetration dimension is given a weight of 1 overall in the computation of CFII.

Availability Dimension:

This dimension represents the availability and accessibility of proper financial facilities in low- and middle-income nations via the outlets of financial institutions. There are two indications: the number of financial institution branches per 100,000 adults and the number of ATMs per 100,000 adults. These variables assess the availability of formal financial services in the country, considering the accessibility of physical outlets where people can obtain financial

services. Given the increasing trend of electronic-based financial services, such as Internet banking and mobile banking, in many countries, the availability dimension may also reflect the availability of digital financial services. However, data availability of digital banking may be a challenge in some countries. Therefore, the traditional indicators of physical outlets, such as branches and ATMs, have been used to represent the Availability dimension. To calculate the availability index (CFII) for this study, a weighted average of the two indicators may be considered, with a higher weight of 0.70 assigned to the no. of bank branches and a lower weight of 0.30 assigned to the no of ATM, based on the previous studies. The overall weight allocated to the availability dimension is 0.60, considering the data availability limitations for some indicators (such as digital banking). Since it represents the reach and accessibility of formal financial services to the general public, the availability dimension is a crucial component of financial inclusion.

Usage Dimension:

This dimension evaluates the frequency and efficiency with which customers use various financial services, including savings, borrowing, payments, remittances, transfers, etc. This dimension represents the effectiveness of a financial system. This study uses two pointers: the number of financial institution loan accounts per 1000 people and the number of financial institution borrowers per 1000 adults. Following **Omar and Inaba (2020)**, the loan account and debtor indexes are assigned a weight of 0.50. However, due to insufficient and relevant information on several essential indicators for gauging usage, the Usage dimension index is assigned a significantly lower overall weight of 0.50 in the composite financial inclusion index (CFII) formulations.

Table No. 1: Dimension weights for computation of CFII Index

Dimension of CFII	Measurement	Weights in the computation of CFII
Penetration (weightage in Index =1)	<ul style="list-style-type: none"> • No. of deposit accounts with FIs per 1000 adults • Number of active depositors with FIs per 1000 adults 	<p style="text-align: center;">0.70</p> <p style="text-align: center;">0.30</p>
Availability (weightage in index=0.60)	<ul style="list-style-type: none"> • No. of branches of FIs per 100,000 adults • No. of ATMS per 100,000 adults 	<p style="text-align: center;">0.70</p> <p style="text-align: center;">0.30</p>

Usage (weightage in Index =0.50)	• No. of loan accounts with FIs per 1000 adults	0.50
	• Number of FIs active borrowers per 1000 adult	0.50

Source: Omar and Inaba (2020)

3.3 INDEX COMPUTATION

The methodological approach Sarma (2012) used to compute the financial inclusion index is followed in this work. This study does not claim that all aspects of financial inclusion have equal importance in terms of the total index score, so we assigned different weights. Furthermore, because the values in financial inclusion are complicated, we incorporate the least and extreme values for each indicator, as followed by Sarma (2012). The CFII is calculated by first computing all three sub-indices by using the following formula:

$$DM_i = w_i \frac{A_{ikt} - m_i}{M_i - m_i} \quad (1)$$

Where w_i is the weight corresponding to a particular indication for the dimension i and DM_i is the index value for particular measurement i . A_i is the actual figure of a specific indicator of measurement for a country k in time t , M_i is the upper range value of a specific indicator for dimension i , measured by the 90th percentile value, and m_i is the lower range value of a specific indicator for dimension i , which is set at 0. The value of DM_i , according to Eq. (1), is the standardized value of any indicator for each specified dimension. A more excellent value of DM_i suggests that economic performance in that dimension is performing better. The following formulas are then used to calculate the CFII for an economy i created on the idea of the distance of achievement points ($X=d_1, d_2, d_3$) from the worst ($O=0, 0, 0, 0$) and best ($W=w_1, w_2, w_3$) scenarios.

$$X_1 = \frac{\sqrt{d_1^2 + d_2^2 + \dots + d_n^2}}{\sqrt{w_1^2 + w_2^2 + \dots + w_n^2}} \quad (2)$$

$$X_2 = 1 - \frac{\sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + \dots + (w_n - d_n)^2}}{\sqrt{w_1^2 + w_2^2 + \dots + w_n^2}} \quad (3)$$

$$CFII = \frac{1}{2} [X_1 + X_2] \quad (4)$$

The normalized Euclidean distance between the best attainment point X and the worst achievement point O on the n th-dimensional space is provided by the equation for X_1 (2). The normalized opposite Euclidean distance between the actual situation W and the ideal location X is represented by equation (3). The normalized range for both of these distances is between 0 and 1. Equations (2) and (3) are averaged to determine the CFII (Eq. 4). In this case, a higher space between X and O denotes a higher level of financial inclusion. In contrast, a smaller space between X and W denotes an inferior level of financial inclusion. The CFII, on the other hand, ranges from 0 to 1 and increases monotonically.

3.3. Econometric Model

To measure the impact of financial inclusion and poverty with moderating role of education attainment in the country is estimated by the following equation:

$$POVi,t = \beta_1CFIi,t + \beta_2EDUi,t + \beta_3CFIi,t * EDUi,t + \beta_4RLi,t + \beta_5TPi,t + \beta_6IFi,t + \beta_7EMPi,t + \mu_{i,t} \quad (5)$$

Dependent variable is $POVi,t$. The major independent variable, $CFIi,t$, reflects financial inclusion. $EDUi,t$ is a moderating variable that stands for education attainment. Control variable are; RLi,t stands for the rule of law. TPi,t represents the population size. IFi,t is the inflation rate. $EMPi,t$ is the employment rate. The error term, ui,t captures unexplained variance in dependent variable that is not explained by the factors included.

4. Results

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
POV at \$3.65	337	35.754	21.797	.2	80.4
POV at \$2.15	337	14.131	12.846	.05	54
CFII	337	39.664	27.43	.1	98.251
SSE	337	68.323	21.487	19.087	99.89
CPI	337	7.257	5.854	-2.431	48.7
FDI	337	3.966	3.962	-5.16	25.731
RFLI	337	31.585	19.371	.939	76.923

Table 2 presents the summary statistics of the key variables of the study. The table reports the number of observations, Mean, Standard deviation, Minimum, and Maximum. POV stands poverty head count ratio at \$3.65 a day (Percentage of Population), POV stands poverty head count ratio at \$2.15 a day (Percentage of Population). The term CFII represents Composite Financial Inclusion Index, SSE represents Secondary school enrollment, CPI represents consumer price index, and FDI represents foreign direct investment (FDI). RFLI stands for Rule of Law Index.

Table 3: Matrix of correlations

Variables	PHR	CFII	SSE	CPI	FDI	RFLI
PHR	1.000					
CFII	-0.447	1.000				
SSE	-0.571	0.603	1.000			
CPI	0.062	-0.094	-0.126	1.000		
FDI	-0.135	-0.013	0.130	0.021	1.000	
RFLI	-0.247	0.564	0.313	-0.130	0.023	1.000

Table 3 presents the findings of the Correlation matrix of coefficients. As expected, the financial inclusion index (CFII), Secondary school enrollments (SSE), Foreign direct investment (FDI) and Rule of Law Index (RFLI) are negatively related to the Poverty headcount ratio (PHR). However, the Consumer Price Index (CPI) is positively related to the Poverty headcount ratio (PHR), but the strength of the relationship is very weak. The correlation values among variables are less than 0.8, indicating the issue of serve multicollinearity is not present.

Table 4: The Impact of Financial Inclusion on Poverty

Dependent Variable	Poverty Headcount Ratio (POV)	
	Independent Variable	
	Coefficients	Coefficients
	OLS	GMM
	(1)	(2)
L		.775*** (.035)(22.04)
CFII	-.250** (.081)(-2.53)	-.031*** (.009)(-3.36)
SSE	-.288*** (.092)(-3.67)	-.125** (.056)(-2.23)
CPI	-.015 (.063)(-.024)	-.0003 (.002)(-0.15)
FDI	-.084* (.051)(-1.66)	-.002 (.002)(-1.19)
RFLI	-.013 (.091)(-0.15)	-.059*** (.02)(-2.95)
Constant	4.535*** (.323)(14.03)	.662*** (.156)(4.23)
AR1		.170
AR2		.384
Sargen Test		.5997
R- Square	.349	

Note: Poverty Headcount Ratio at \$3.65 a day is taken as a dependent variable. The Independent variable is the Financial Inclusion Index (CFII). The control variables are Secondary School Education (SSE), Inflation (CPI), Foreign Direct Investment (FDI), and the Rule of Law Index (RFLI). Column 1 reports the results of pooled OLS. Column 2 reports the result of GMM estimates. *** represents a 1% significant level, ** represents a 5% significant level, and * represents a 10% probability level. The number reported in the first parentheses is the standard error, and the number reported in the second is the t-statistic.

Table 4 represents the effects of pooled OLS and GMM estimates. For statistical reasons, the data is transformed into a log. As expected, the Composite financial inclusion index (CFII) is negatively associated with poverty in both models. In the first model, the coefficient of CFII is -0.20 and significant at the 5% level. In the second model, the coefficient of CFII is -.031 and

significant at the 1% level. The results confirmed that financial inclusion hurts poverty in lower-middle-income countries. The results support the findings presented by Mercado, 2018; Park and Mercado, 2018; Jabir et al., 2017; Kim, 2016; Amado and Rojas-Suarez, 2014; Pandey, 2005. Financial inclusion provides access to finance to the most vulnerable people in societies, opening the door to livelihood (Park et al., 2018; Sarma, 2012). Secondary school enrollment (SSE) is also negatively associated with poverty, as expected. The coefficient of SSE is -0.288 in the first model and significant at the 1 % level. The coefficient of SSE is -0.125 in the second model and significant at the 5 % level. The result provides support to the existing literature that education provides employment opportunities to the vulnerable, which ultimately reduces poverty (Allen et al., 2016; Cole & Shastry, 2009; Wardhono et al., 2016; Hettige & Kelegama, 2018; Collins, 2011). As expected, Foreign direct investment (FDI), Consumer price index (CPI), and Rule of Law index are all negatively related to poverty in both models. The Arellano-Bond and Sargen test statistics have shown that the GMM model has been correctly specified.

Table 5: The impact of Financial Inclusion on Poverty with the interacting effect of education

Dependent Variable	Poverty Headcount Ratio (POV)	
	Coefficients	Coefficients
Independent Variable	OLS	GMM
	(1)	(2)
L		.184*** (.324)(25.16)
CFII*SSE	-.534*** (.055)(-9.66)	-.324*** (.156)(-2.07)
CPI	.014 (.065)(.22)	.001 (.003)(.027)
FDI	-.132** (.052)(-2.54)	-.001 (.002)(-.09)
RFLI	.087 (.093)(.93)	-.055*** (.021)(-2.64)
Constant	3.052*** (.172)(17.79)	.459*** (.093)(4.95)
AR1		.160
AR2		.387

Sargen Test

.5837

R-square

.290

Note: The poverty headcount ratio at \$3.65 a day is the dependent variable. The Independent variable is the Financial Inclusion Index (CFII). The interaction term **CFII*SSE** is the interacting variable. The control variables are Inflation (CPI), Foreign Direct Investment (FDI), and the Rule of Law Index (RFLI). Column 1 reports the results of pooled OLS. Column 2 reports the result of GMM estimates. *** represents a 1% significant level, ** represents a 5% significant level, and * represents a 10% probability level. The number reported in the first parentheses is the standard error, and the number reported in the second is the t-statistic.

Table 5 represents the results of financial inclusion and poverty with the interaction term education. To avoid the issue of multicollinearity, this regression does not show the individual effect of CFII and SSE. As expected, the interaction term CFII*SSE is significant and negative in both regression models. In the OLS model, the interaction term CFII*SSE is -0.534, which indicates a one percent increase in interaction term reduces poverty by 0.534 percent. In the GMM model, the interaction term CFII*SSE is -0.324, which indicates a one percent increase in the interaction term CFII*SSE, which reduces poverty by 0.324 percent. The joint effect of financial inclusion and education is more substantial on poverty than the individual effect (see Table 4.3). The result confirms that education (proxy by secondary school enrolment) significantly and positively influences the association between financial inclusion and poverty. This indicates that the country's education attainment level is crucial for attaining the desirable results of financial inclusion. The results provide empirical support to the idea presented by the earlier researcher that the formal education level is strongly linked with greater financial inclusion. (Allen et al. 2016; Cole and Shastry, 2009; Li and Lu, 2016; Kusuma and Hasnah, 2019 and Anjani, 2016). The education levels and financial literacy are related, and the quality and stream of education impact financial literacy (Anjani, 2016; Li & Lu, 2016; Kim, 2016; Cole & Shastry, 2009). The results are also aligned with Human Capital Development Theory (HCT), Sustainable livelihood approach (SLA), and Finance-growth theories (FGT). According to these theories, people are more mindful of managing and saving their money with a formal degree of education (Arsani et al., 2020; Ismail & Yussof, 2010; Morse & McNamara, 2013; Sierra and colleagues, 2012). The Sargan test accepts the null hypothesis that Instruments are valid. According to Roodman (2009), it is recommended that the Sargan p-value should be greater than 0.25. So, the above results with p-values of 0.5837 indicate that the instruments used in the analysis are validly exogenous. The Arellano-Bond test for zero autocorrelation results indicates that the model has no first and second-order autocorrelation. The p-values of AR (1) and AR (2) are more significant than 5, indicating that no serial autocorrelation is present in the model.

Table 6: Robustness: The Impact of Financial Inclusion on Poverty

Dependent Variable	Poverty Headcount Ratio (POV)	
	Coefficients	Coefficients
Independent Variable	OLS	GMM
	(1)	(2)
L		.884*** (.045)(19.67)

CFII	-0.241** (.109)(-2.20)	-0.082*** (.027)(-3.01)
SSE	-0.471*** (.198)(-2.44)	-0.152** (.062)(-2.14)
CPI	-0.021 (.085)(-0.25)	.005 (.005)(1.14)
FDI	-0.082* (.049)(-1.67)	.002 (.004)(0.45)
RFLI	-0.106 (.123)(-0.87)	-0.064*** (.024)(-2.69)
Constant	5.504*** (.435)(12.66)	.198 (.173)(1.14)
AR1		.293
AR2		.930
Sargen Test		.337
R-Square	.381	

Note: For Robustness testing, the Poverty headcount ratio at \$2.15 a day is taken as the dependent variable. The Independent variable is the Financial Inclusion Index (CFII). The control variables are Secondary School Education (SSE), Inflation (CPI), Foreign Direct Investment (FDI), and the Rule of Law Index (RFLI). Column 1 reports the results of pooled OLS. Column 2 reports the result of GMM. *** represents a 1% significant level, ** represents a 5% significant level, and * represents a 10% probability level. The number reported in the first parentheses is the standard error, and the number reported in the second is the t-statistic.

Table 6 For Robustness, the Poverty headcount ratio at \$2.15 (Population percentage) is the dependent variable. The finding reconfirms that financial inclusion has a negative and significantly affects poverty. The results are the same in both regression models. Secondary school enrollment (SSE) has also negatively and significantly affected poverty in both regression models. The control variable, Inflation (CPI), is negatively related to poverty, but the relationship is not statistically significant at a 5 percent probability level. However, Foreign direct investment (FDI) and the Rule of Law Index (RFLI) have significantly and negatively affected poverty.

Table 7: Robustness: The impact of Financial Inclusion on Poverty with the interacting effect of education

Dependent Variable	Poverty Headcount Ratio (POV)	
	Independent Variable	Coefficients
		OLS
		(1)
		Coefficients
		GMM
		(2)
L		.858*** (.041)(20.77)
CFII*SSE	-.774*** (.075)(-9.88)	-.441*** (.163)(-2.71)
CPI	.024 (.089)(.27)	.006 (.005)(1.27)
FDI	-.155** (.071)(-2.19)	.002 (.004)(0.50)
RFLI	-.047 (.127)(-.37)	-.064*** (.018)(-3.53)
Constant	3.231*** (.234)(13.83)	.378*** (.113)(3.34)
AR1		.295
AR2		.950
Sargen Test		.439
R-square	.308	

Note: For Robustness Poverty headcount ratio at \$2.15 a day is taken as dependent variable The Independent variable Financial inclusion Index (CFII). The interaction term **CFII*SSE** is the interacting variable. The control variables are Secondary School Education (SSE), Inflation (CPI), Foreign Direct Investment (FDI), and the Rule of Law Index (RFLI). Column 1 reports the results of pooled OLS. Column 2 reports the result of GMM. *** represents a 1% significant level, ** represents a 5% significant level, and * represents a 10% probability level. The number reported in the first parentheses is the standard error, and the number reported in the second is the t-statistic.

Table 7 For Robustness, Poverty headcount ratio at \$2.15 (percentage of Population) is taken as the dependent variable. To avoid the issue of multicollinearity, the regression models do not show the individual effect of CFII and SSE. The interaction term CFII*SSE is significant and negative in both models. The joint effect of financial inclusion and education is also more substantial on poverty than the individual effect. The result reconfirms that education (proxy

by secondary school enrolment SSE) significantly and positively influences the relationship between financial inclusion and poverty.

Conclusion

This study examined the impact of financial inclusion on poverty with a moderating role of education. The literature has extensively studied the relationship between financial inclusion and poverty. However, these studies still need to consider the additional crucial circumstances in which financial inclusion might lower poverty. Several aspects influence the efficiency of financial inclusion, the most important being the level of education attained by the people. An unbalanced panel of data covering 17 years of lower-middle-income countries, from 2005 to 2021, is used in the study. Three hypotheses have been developed based on the literature to explore the relationship between financial inclusion, poverty, and education. This study shows that more than financial inclusion is needed to eradicate poverty. The education attainment level of the countries is also crucial. The study recommends that educational attainment plays a crucial part in the association between financial inclusion and poverty. The relationship between financial inclusion and poverty is stronger in countries with higher educational attainment. People with financial knowledge, frequently obtained through schooling, are better equipped to negotiate the intricacies of official finances. Thus, encouraging financial inclusion programs in addition to education has a complementary effect that opens doors for inclusive economic growth and long-term poverty reduction.

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