



## Nexus between Financial Inclusion and Poverty: Does the Country's Education matter? Evidence from Lower-Middle-Income Countries

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### Abstract

There are special relations between financial inclusion and social inclusion with the latter being one of the best addressed when people have access to financial services. This paper explores effects of financial access on poverty, while incorporating moderation effects by years of schooling. Therefore, this study utilizes unbalanced panel data of 17 lower-middle-income countries itself and both the above mentioned static and dynamic panel model to conduct a strict panel data analyse. The analysis of data, employing the Composite Financial Inclusion Index (CFII) as an instrument to assess financial inclusion, shows that the level of financial inclusion and poverty in these countries are negatively related and sharply influenced. Also, the study discovers that there is a positive correlation between the financial inclusion, and Poverty reduction after controlling the effects of education attainment. They provide useful recommendations for policymakers, institutions dealing with money, and governments. First, financial services must be brought nearer to the poor populations which can reduce poverty level in the society. Second, a subsequent improvement of the education level is required to achieve the best results for financial inclusion on poverty reduction.

**Keywords:** Financial Inclusion, Poverty Reduction, Education Attainment, Lower-Middle-Income Countries

### 1. Introduction

The poverty, therefore, is not a simple social ills or one-faceted issue that can just be wished away from the surface of the earth. A state which people or groups are unable to achieve acceptable quality in standard of living through access to resources, capabilities and opportunities (Aina & Fadun, 2013). Poverty reduces the ability of people and hinders their access to quality health, education and end tries to affect their live, social and economic change. It reproduces disadvantage, by socializing people and their families to intergenerational poverty and thereby failing to provide the means and opportunities for a way out of this poverty cycle (Imai et al. 2010). For vulnerable groups like women, children, ethnic minorities and those in rural tracts poverty remains high. Besides, Discrimination, along with the unequal distribution of resources and opportunities, poor accessibility to resources make poverty worse and widen the poverty line between the poor and the wealthy individuals (Jalilian, & Kirkpatrick, 2002). This inequality can cause a lot of social tension, instability and limits social and economic growth of the society (Ali, 2015; Ali & Bibi, 2017).

Poverty has implications for economic growth and development. High levels of poverty can impede economic productivity, hinder human capital development, and limit entrepreneurial activities (Uddin et al., 2014). When a significant portion of the population is unable to participate fully in economic activities due to poverty, it leads to the underutilization of human potential and constrains overall economic growth (Chaudhuri et al., 2002). Because of its growing importance, the United Nations has also developed a comprehensive agenda for addressing poverty, which is outlined in the Sustainable Development Goals. Several of these goals are directly aimed at eradicating poverty and improving the standard of living for the world's most impoverished groups.

Eradication of poverty should be done through techniques that are interlinked and require the effort of different countries. One of the comprehensive strategy is: Financial inclusion. It deals with the provision and extension of formal financial services to every category of economic player (Sarma & Pais, 2008). It implies timely, efficiently, professionally, and ethically accessible and affordable quality financial products and services that include savings, payments, credit, transactions and insurance for individuals and businesses. Availability of funds is the key to more financial liberalization. Governments remain troubled by everyone having access to a transaction account. Transaction accounts are a platform to other financial services (Helms, 2006; Bhaskar, 2013; Patwardhan et al., 2018).

There is thinking that financial inclusion should have an impact on poverty reduction and income gap decline (Park et al., 2018). The prime cause of poverty is considered to be the absence of money. Consumers whose accounts are with the banks can create their credit worth, save their money, manage their consumption flows, and accommodate adverse income volatility (Sharma, 2016). Literally, financial inclusion is also the necessary and essential factor in the improvement of economic growth (Le et al., 2020; Ali, 2018). It helps with transactions, gives all aspects of the population a means to invest, spends what is saved, invites foreign capital and enhances finance accessibility to a large population sector (Levine, 2000). Such households can afford to make investments which would enhance their future cash flows (Ellis, Alberto & Pablo, 2010).

Literacy and access to credit are known interventions with helping people end poverty. Education enables people to break out of poverty through acquisition of knowledge and appropriate skills to do paid work while financial services enable them to build assets, make sound financial decisions and overcome financial vulnerability. Both works help to enhance the socio-economic status of individuals, and communities in general. Specifically, to enhance financial inclusion in a poverty reduction effort, the Education attainment manner in the country plays a crucial role. Hence the hypothesis of this study is that, there is a positive impact of enhanced education attainment in reducing poverty, through issue of financial improvised means.

#### 1.1. Problem Statement

Eradication of poverty presents a significant problem that crops up most dominantly in the lower-middle-income countries. Poverty is not only the deficiency of proper money but also the deficiency of suitable service in the society. The poor are also dominated by many social groups and they have all the burdens of poverty. From the data from the World Bank it is clear that poverty rates in countries belonging to the lower-middle income group are much higher compared with rates in rest of the world. While the poor in lower-middle-income countries numbered 837 million in 2018, the poor in high-income countries stood at 26 million, and registered

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0.6 percent. But the annual rate of reduction of the global poverty headcount has been reducing in recent years but in the lower-middle-income countries in particular, this has been slow. Due to the significance, the United Nations has established the Sustainable Development Goals, with the goal of ‘eradicating extreme poverty for all people around the world. Achieving this goal will require significant effort and effective policies at the country level. Governments in lower-middle-income countries are more conscious of poverty. Different strategies and models have been designed to solve these two problems. Financial inclusion offers a promising solution to these problems. However, the question is, is financial inclusion alone sufficient to counter these problems? This study will provide a new conditional solution under which financial inclusion can more effectively cope with poverty.

### **1.2. Research Objective**

This study aims to examine the relationship between financial inclusion and poverty while taking into account the educational level of the nation. To accomplish these aims this study develop the following objectives:

- To examine the association between financial inclusion and poverty in lower middle income countries
- To examine the effect of education on poverty in lower middle income countries.
- To examine the impact of education on the relationship between financial inclusion and poverty in lower middle income countries.
- To examine the impact of total papulation between financial inclusion and poverty in lower middle income countries.
- To examine the impact of rule of law between financial inclusion and poverty in lower middle income countries.

### **1.3. Research Questions**

- Does financial inclusion reduce poverty in the lower-middle-income countries?
- Does the education effect the poverty in lower middle income countries?
- Does the education impacts the relationship between financial inclusion and poverty in lower-middle-income countries?
- Does the total papulation the relationship between financial inclusion and poverty in lower-middle-income countries?
- Does the Rule of Law the relationship between financial inclusion and poverty in lower-middle-income countries?

### **1.4. Research Significance**

Literature on financial inclusion and impact of on poverty has been reviewed by scholars (Burgess & Pandey, 2005; Townsend & Human, 2006; Levine, 2000; Sarma & Pais, 2011; Sharma, 2016; Ali & Rehman, Adeoye, 2016; Ali & Audi, 2018; Park et al., 2018; Demirguc-Kuntz et al., 2017; Le et al., Overall it is agreed that financial inclusion impacts on income inequality and poverty. The following are some more steps our study aims to make in this field of knowledge: First, by selecting a group of LMN and examining the relationship between financial inclusion and poverty. The second step is to look at the ‘condition’ or the situation where the financial inclusion seems more effective in driving out poverty. To the best of our knowledge there is no comprehensive literature that focuses on the conditional relationship between Financial Inclusion and poverty therefore his study seeks to fill this existing literature gap.

## **2. Literature Review**

The literature associated to financial inclusion is discussed in this chapter, its definition and various measurements. It next reviews the literature pertaining to financial inclusions and poverty. Ultimately, it reviews the literature on conditional factors under which financial inclusion can achieve their desired outcome efficiently.

### **2.1. Financial Inclusion: Concept and Measurement**

outlines that people need to get good and reasonable freely available services on all fours without respect to the geographical position or revenue level. It includes providing opportunities to individuals and companies that have previously been excluded from the official financial sector the usual financial assets like funds accounts, loans, investments, and payments systems. To the World Bank (2005), Financial inclusion therefore refers to provision as well as utilization of a range off cost effective products such as savings, credit, insurance and payments to the undeserved population by the formal financial system. The Alliance for Financial Inclusion (2018), describe that financial inclusion is a state where those people who are capable of utilizing the financial services receive full range of high quality affordable financial services delivered by network of institutions in appropriate manner and with due consideration to customers. The Consultative Group to Assist the Poor (2010) defined financial inclusion as the state whereby individuals have affordable, easily accessible, inclusive and sustainable financial services offered by several sustainable organizations.

Literature review shows that many authors have been defining financial inclusion over the past years. According to Meyer and Vu (2016), financial inclusion involves provision of a range of financial services to individuals who have been excluded from the financial system on grounds of persona or geographic characteristics. Singh& Rana (2016) have defined financial inclusion as the ability of users to access credit, savings, insurance and payment products and services efficiently, affordably and in a hassle free manner all the individuals and enterprises especially those in the below the line category.

Chibba (2015) define financial inclusion as the ability and opportunity to avails and receive finance services. Financial inclusion, as defined by one of the authors Sengupta at el (2015), is a method used by standard institutional players to ensure that all the population of the society that encompasses the weaker sections of society including less developed regions and other economically weaker sections of the society get proper access, fair and reasonable and to the right sort of financial services and products, and this is affordable in terms of cost and is presented to them in a fair According to Demirgüç-Kunt & Klapper (2012), financial inclusion could be defined as the use of the developing effective, purposeful recruitment by many groups of formal financial services increases the level of many individuals’ financial health. Morduch (2011) defines financial inclusion as a way to provide financial services to populations excluded from traditional banking. Key indicators of financial inclusion include access, usage, and the quality of services, with the percentage of adults holding bank accounts as a common measure. Honohan (2007, 2008) developed a composite index for financial inclusion, but having an account doesn’t guarantee full inclusion, as access to services like credit is also vital.

Demirguc-Kunt and Klapper (2012) suggest that measuring financial inclusion should involve factors like the number of bank branches, ATMs, and overall service accessibility.

In (2007), Beck, Demirguc-Kunt and Levine proposed many types of indicators, for example number of branches, of automated teller machines (ATMs) and of credit cards to measure the index of access such consumers as: Another simple and popular indicator of the financial sector is the population density and distribution of branches and particularly of ATMs, especially in developing countries where infrastructure is an issue. The above strategy has some draw back since it has to manage for scope and standard of financial services. For instance, Even though many branches for banks and ATMs are present in a country, places like banks and ATMs themselves may remain expensive, accessibility issues, and/ or unresponsive to demand of the financially excluded individuals including women, rural dwellers and families of low income earners. Through information from a national household survey, Camara & Tuesta (2014) captured a measurement of financial inclusion as a binary variable. A household belongs to the banking system if he earns interest and pays rate through the internet, has a mortgage loan, etc. Sarma (2012) has studied such has gained too much popularity. Specifically, she created an index for the institutional variables, and using regression estimates, several dimensions for the penetration, availability, and usage of financial systems where measured.

## **2.2. Financial inclusion and poverty were analyzed**

Recent studies have examined the relationship between financial inclusion and various socioeconomic factors. Mercado (2018) explored the impact of financial inclusion on income inequality and poverty, finding positive effects in high and middle-income countries. Conversely, Badu et al. (2018) observed that in Africa, financial inclusion, poverty, and income inequality did not align similarly, prompting a call for improved financial policies. Park and Mercado (2018) confirmed a strong link between financial inclusion and poverty reduction in higher-income countries, while Turégano and Herero (2018) showed that countries with lower income inequality tend to have more developed financial systems.

Yu, Kim, and Hassan (2018) found that financial inclusion fosters economic growth in OIC countries, using Granger causality tests to reveal positive relationships. Zhang and He (2018) noted a positive link between household income and digital finance in rural families, while Bhardwaj et al. (2018) highlighted Asia's need for greater access to financial services. Chauvet & Jacolin (2017) emphasized financial inclusion's role in enterprise development in emerging economies.

Demirguc-Kuntz et al. (2017) argued that financial inclusion indices should include access to insurance and credit, which promote productivity and reduce inequality. Jabir et al. (2017) showed that financial inclusion alleviated poverty in Sub-Saharan Africa, while Sharma (2016) found a positive link between financial inclusion and economic growth in India. Kim (2016) also highlighted financial inclusion's role in reducing inequality and boosting economic growth through Fintech.

Amado and Rojas-Suarez discovered that financial inclusion improves human development in developing countries, and Burgess and Pandey (2005) demonstrated that expanding access to credit in rural India reduced poverty. Overall, these studies confirm that financial inclusion is a powerful tool for economic development and poverty reduction.

## **2.3. Relationship Between: Financial Inclusion, Education and Poverty**

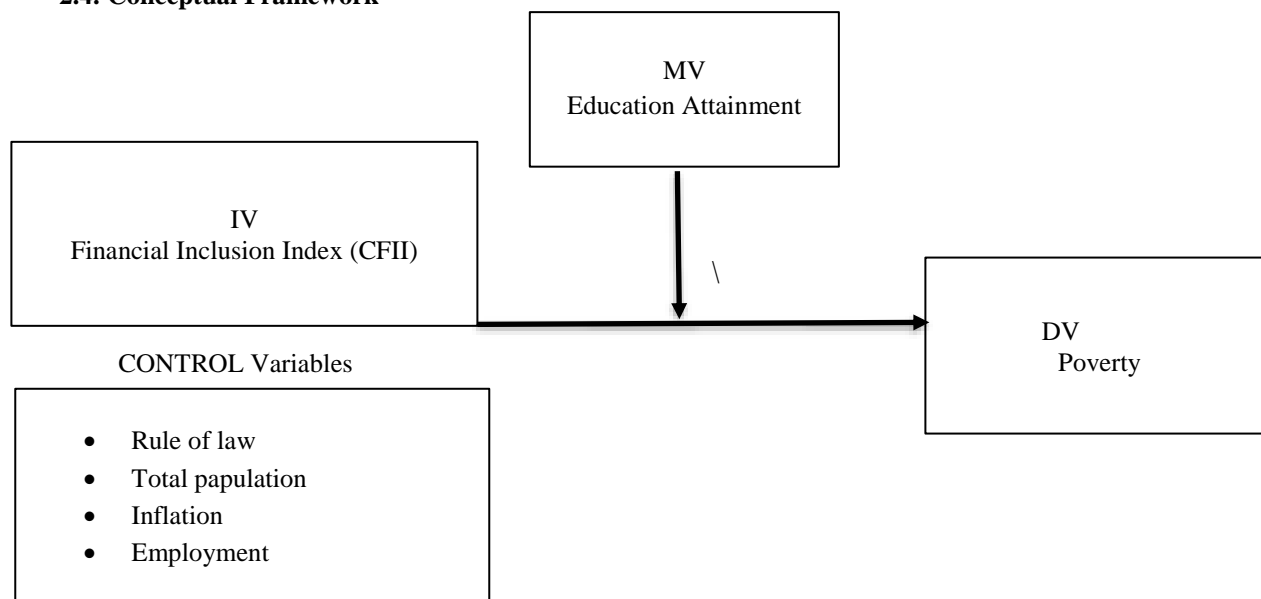
Financial inclusion, education, and income all link to one another; this was explored by Adeel et al., in 2021. They also found out that people who have higher educational attainment and those who have higher income are more likely to have access to finance institutions while those living in cities have higher chance of having access than those in rural areas. Through the analysis of over 140 countries, Allen et al. (2016) found out that individuals with education level of up to 8 years are negatively expected to own a bank account by about 12 percent more than those with higher level of education. Cole and Shastry (2009) argued the probability of engaging in financial markets increases by 7/8 percent due to one year of education. Priyadi et al. (2016) affirmatively and significantly infer that education level has a positive relationship with family savings. Brita (1999) for instance opined that as the level of learning, of the head of the family, improves, there is an enhanced level of management, and saving of the money in the bank.

Wardhono et al. (2016) posit increase in educational level comes with increase in the level of financial literacy, the amount of financial information people can obtain. Omar and Inaba (2020) correlated educational approaches with the objectives for the progress of financially excluded people since such population segments typically have rather poor financial literacy. Financial literacy was found by Hussain et al. (2018) to enhance a firm's capacity in financing and growth of the business. Studying by Kusuma and Hasnah (2019) indicates that financial education can enhance financial literacy and in extenuation, enhances financial inclusion in Indonesia. It means that efforts to increase people's financial literacy are necessary to contribute to the promotion of opportunities for financial services and products among the population. Kusuma and Hasnah (2019) points out that financial education can enhance the level of understanding and could consequently enhance overall financial inclusion in Indonesia. This demonstrates why programs that increase people's financial literacy are useful in promoting the financial inclusion and reducing existing barriers to reach basic financial services. Using the Indonesian example, Nopirin's (2018) exploration of financial inclusion shows high significant correlation with income and education as with Hettige and Kelegama (2018) when looking at Sri Lanka. The result of these studies pointed out that there is a positive relationship between education level income and financial inclusion and people from the urban area are more favorable to have financial facilities. Klapper, and Peria (2016), said that out of all the population characteristic that they preferred formal borrowing and transactional accounts at formal institutions inclusive of old age, high income, and education level. According to Kim (2016), some persons are excluded from formal financial services, either through being ineligible for such services or because those services are unavailable to them or because they have insufficient understanding of the concepts of formal finance. However, alongside demographic characteristics, financial factors are also important to financial inclusion, particularly the financial industry.

Li and Lu (2016) found out that a positive association exists between degree of financial literacy and level of education, particularly for females. According to the studies conducted by Anjani (2016), more education leads to better money access in Nepal and lots of educated people preferred to have the saving account and the facility of proper credit money. Chao and Collins (2011) prepared the

study on education and financial inclusive in Asian area. And they detected that the level of completed education by the households is positively associated with increased volume in deposits of formal family and official credit availed.

## 2.4. Conceptual Framework



## 3. Methodology

### 3.1. Sources of Data

The study employed an unbalanced panel of data and data collection extends from the year 2005 to 2021. Traditional and literature based variables are used for the analysis. Because most of the studies explore the instability of economies, the given variables are determined in the logarithmic form. The data is collected from credible sources such as FAS, World Governance Indicator and World Bank database. Data on the population, inflation, age dependency, economic growth, poverty, consciousness, rule of law, and unemployment will be collected from the World Bank database. The sample will use the Financial Access Survey (FAS) database to gather data on FI.

**Table 1: Sample of the Study**

Serial No.	Country	Serial No.	Country
1	India	17	Tajikistan
2	Nepal	18	Timor Leste
3	Pakistan	19	Uzbekistan
4	Bangladesh	20	Vietnam
5	Myanmar	21	Angola
6	Bhutan	22	Bolivia
7	Indonesia	23	Cabo Verde
8	Iran	24	Honduras
9	Kyrgyzstan	25	Kenya
10	Laos	26	Ghana
11	Nigeria	27	Cambodia
12	Philippines	28	Cameroon
13	Egypt	29	Mongolia
14	Moldova	30	Tunisia
15	Sri Lanka	31	Ukraine
16	Sudan	32	Zambia

### 3.2. Composite Financial inclusion index Construction

The first and very important task is to develop an aggregate financial access index (AFIA). This study employed the methodology used by Omar and Inaba (2020). In this case, this study looks at several variables attached to outreach to the financial sector which we group in to three perspectives which include; Penetration, Availability, and usage of financial services.

#### 3.2.1. Penetration Dimension

This has indicated the extent to which many individuals have been financially included in the official financial sector. Financial service depth relies on the ratio of credit accounts with the financial institutions to every thousand adults and active creditor controlling financial institutions for every thousand citizens. The importance of the number of bank accounts is also indicated using a higher weight value of 0.70. The deposit accounts index is useful in establishing the number of those with accounts by providing the necessary coefficients. On the other hand, we assign a weight of 0.30 to the number of creditors with financial institutions per

1,000 people because only a tiny fraction of the population who opened deposit accounts still actively engage in the financial system. The penetration dimension is therefore expressed by the weighted average that takes into account these sub-indices. For this reason, the penetration dimension is accorded an overall weightage of 1 in the calculation of the CFII index.

### 3.2.2. Availability Dimension

From this dimension it is concerned with the openness and availability of formal financial structures within LMI nations through emergent outlets of financial institutions. There are two indications in it: branch network of financial institutions per 100,000 adult and average ATM stations per 100,000 population. These variables are used to measure the extent of branch infrastructure for formal financial services in the country, via indices of the ease of physical access to outlets for receiving financial services. Due to the continuously rising use of electronic-type financial service, including Internet banking services as well as mobile banking services in many countries, the availability dimension may also capture the availability of these services. However, the availability of data regarding digital banking could be an issue in some parts or countries. As a result, outsourcing metrics like branch and ATM have been employed to measure the Availability dimension at retail banking firms. Consequently the availability index (CFII) for this study could consider the weighted average of the two indicators, whereby the number of bank branches will be given a higher weight of 0.70 and the number of ATM given low weight 0.30 based on previous research. The other dimension is the availability that has a total weight of 0.60 due to the constrain in getting data for some of the indicators like digital banking. The availability dimension is considered to be the most sensitive to financial inclusion because it implies the extent to which the population has access to the respective formal services.

### 3.2.3. Usage Dimension

This dimension identifies how often and how effectively clients engage with all types of financial services, whether saving, borrowing, paying bills, sending money, transferring funds, and much more. This is the dimension with the effectiveness of a financial system. This study use two indicators: the stock of new financial institution loan accounts – as a proxy for the depth of outreach – and the share of the population and adults with a financial institution loan account. As is the case with Omar and Inaba (2020), the loan account index is given a weight of 0.50 while the borrower index is given a weight of 0.50. However, because of lack of adequate and appropriate information on several crucial variables that determine the degree of usage dimension, the Usage dimension index is given a remarkably low overall weighting of 0.50 in the models of the CFII.

**Table 2: Dimension weightages for computation of CFII Index**

Dimension of CFII	Measurement	Weightages in computation of CFII
Penetration (weightage in Index =1)	• No. of deposits accounts with FIs per 1000 adults	0.70
	• Number of active depositors with FIs per 1000 adults	0.30
Availability (weightage in index=0.60)	• No. of branches of FIs per 100,000 adults	0.70
	• No. of ATMS per 100,000 adults	0.30
Usage (weightage in index =0.50)	• No. of loan accounts with FIs per 1000 adults	0.50
	• Number of FIs active debtors per 1000 adult	0.50

### 3.3. Index Computation

This study uses Sarma’s (2012) methodology for measuring the financial inclusion index. Recognizing that not all aspects of financial access hold equal importance, different weights were assigned to each element. To account for the complexity of financial inclusion, both minimum and maximum values for each indicator were included, as recommended by Sarma. The Composite Financial Inclusion Index (CFII) is calculated by first determining the three sub-indices using the following formula:

$$DMi = wi \frac{A_{ik,t} - m_i}{M_i - m_i} \quad (1)$$

In this formula, \*wi\* represents the weight for each dimension \*i\*, and \*DMi\* is the value index for that dimension. \*Ai\* is the actual value of an indicator for a country \*k\* at time \*t\*, while \*Mi\* and \*mi\* are the upper (90th percentile) and lower (0) range values, respectively. The value of \*DMi\* is a standardized score reflecting performance in a specific dimension. Higher \*DMi\* values indicate better performance. The Composite Financial Inclusion Index (CFII) is then calculated based on the distance between the worst (O=0) and best (W=w1, w2, w3) performance points.

$$X1 = \frac{\sqrt{d1^2 + d2^2 + \dots + dn^2}}{\sqrt{w1^2 + w2^2 + \dots + wn^2}} \quad (2)$$

$$X2 = 1 - \frac{\sqrt{(w1-d1)^2+(w2-d2)^2+\dots+(wn-dn)^2}}{\sqrt{w1^2+w2^2+\dots+wn^2}} \quad (3)$$

$$CFII = \frac{1}{2} [X1 + X2] \quad (4)$$

The normalized distance between the best achievement point (X) and the worst point (O) is calculated using Equation 2. The opposite Euclidean distance between the actual situation (W) and the ideal situation (X) is given by Equation 3. Both distances range from 0 to 1. The CFII is the average of these distances (Equation 4), where a smaller distance between X and O indicates low financial inclusion, and a smaller distance between X and W indicates high financial inclusion. CFII values range from 0 to 1, increasing monotonically.

### 3.4. Econometric Model

The impact of financial inclusion and poverty, with education attainment as a moderating factor, is estimated using the following equation:

$$POVi,t = \beta1CFIIt + \beta2EDUi,t + \beta3CFIIt * EDUi,t + \beta4RLi,t + \beta5TPi,t + \beta6IFi,t + \beta7EMPi,t + \mu i,t \quad (5)$$

The dependent variable, \*POV<sub>t</sub>\*, represents poverty, while the main independent variable, \*CFII<sub>t</sub>\*, indicates financial inclusion. \*EDU<sub>t</sub>\* is the intermediate variable for education attainment. Control variables include \*RL<sub>t</sub>\* for rule of law, \*TP<sub>t</sub>\* for population size, \*IF<sub>t</sub>\* for inflation, and \*EMP<sub>t</sub>\* for employment rate. The term \*u<sub>t</sub>\* accounts for unexplained variability or random fluctuations in the dependent variable.

**Table 3: Measurement of Variables**

Variable	Measurement Proxy	Source	References
Financial Inclusion (FI)	Access to formal financial services, measured by Financial Inclusion Index	FAS Database of IMF	Omar and Inaba, (2020); Sarma (2012)
Education attainment (EDU)	Gross secondary school enrolment, regardless of age, as a proportion of the total population	WDI	Barro, R. J. (1991). Lee, J. W. (2003)
Income (PCI)	Level of per capita income in a country	WDI	Becket al. (2007) Milanovic, B. (2016)
Rule of Law (RL)	The World Bank's Rule of Law Index measures the quality and effectiveness of the legal and regulatory framework controlling financial services.	WDI	Vishny, et al., (1998)  Hall, R. E., & Jones, C. I. (1999)
Poverty (POV)	Proportion of the whole population that lives on less than USD 1.90 per day.	WDI	Ravallion, M. (2016) Foster, J. E., & Székely, M. (2001)
Population (POP)	Total number of individuals living in a specific area or country	WDI	United Nations (2019) Becker, S. O., & Woessmann, L. (2009)
Inflation	Annual percentage change in the average consumer price index	WDI	Romer, C. D., & Romer, D. H. (2000) Mishkin, F. S. (2011).
Employment	Employment to total population ratio	WDI	

## 4. Results and Discussion

Table 4 provides descriptive statistics for the variables used in the research. The poverty headcount ratio at \$3.65 a day has a mean of 35.75%, with significant variation across countries, ranging from 0.2% to 80.4%. The poverty headcount ratio at \$2.15 a day averages 14.13%, with a range from 0.05% to 54%. The compound financial inclusion index (CFII) has an average of 39.66%, ranging from 0.1% to 98.25%, showing wide variation in financial inclusion. The secondary school enrollment ratio averages 68.32%, ranging from 19.09% to 99.9%, indicating varied education levels. The consumer price index (CPI) has a mean of 7.26%, with a range from -2.41% to 48.7%, showing inflation differences. Foreign direct investment (FDI) net inflows average 3.96%, with values ranging from -5.16% to 25.73%. The Rule of Law index averages 31.54%, with a range from 0.94% to 76.92%, indicating variations in justice systems across countries.

Table 5 shows the correlation matrix results. The financial inclusion index (CFII), secondary school enrollments (SSE), foreign direct investment (FDI), and Rule of Law Index (RFLI) are negatively correlated with the poverty headcount ratio (PHR), meaning these factors reduce poverty. The consumer price index (CPI) is positively related to PHR, but the relationship is weak. Since all

correlation values are below 0.8, there is no severe multicollinearity issue in the analysis.

**Table 4: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Povertyheadcount\$3.65	337	35.754	21.797	.2	80.4
Povertyheadcount\$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 5: 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

Note: Rule of thumb: If the correlation > 0.8, severe multicollinearity may be present.

**Table 6: Linear regression (OLS)**

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
PHR365							
CFII	-.205	.081	-2.53	.012	-.365	-.046	**
SSE	-.288	.092	-3.67	.004	-.423	-0.153	***
CPI	-.015	.063	-0.24	.814	-.139	.109	
FDI	-.084	.051	-1.66	.099	-.184	.016	*
RFLI	-.013	.091	-0.15	.883	-.193	.166	
Constant	4.535	.323	14.03	0.00	3.899	5.171	***
Mean dependent var		1.393	SD dependent var			0.519	
R-squared		0.349	Number of obs			319	
F-test		33.505	Prob > F			0.000	
Akaike crit. (AIC)		361.035	Bayesian crit. (BIC)			383.626	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 6 presents the results of the pooled OLS analysis, with data transformed into logs. The composite financial inclusion index (CFII) has a significant negative relationship with poverty, with a 1% increase in financial inclusion reducing poverty by 0.20%. Secondary school enrollment (SSE) also has a significant negative effect on poverty, where a 1% increase in enrollments reduces poverty by 0.33%. Foreign direct investment (FDI) is negatively related to poverty, with a 1% increase in FDI lowering poverty by 0.08%, though it's significant at the 10% level. Inflation (CPI) and the Rule of Law index also show negative relationships with poverty, but these are not statistically significant.

**Table 7: Moderation Testing with OLS Model**

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
PHR365							
CFII*SSE	-.534	.055	-9.66	0	-.642	-.425	***
CPI	.014	.065	0.22	.826	-.114	.143	
FDI	-.132	.052	-2.54	.012	-.234	-.03	**
RFLI	.087	.093	0.93	.352	-.096	.27	
Constant	3.052	.172	17.79	0	2.714	3.39	***
Mean dependent var		1.393	SD dependent var			0.519	
R-squared		0.290	Number of obs			319	
F-test		31.993	Prob > F			0.000	
Akaike crit. (AIC)		386.731	Bayesian crit. (BIC)			405.557	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 7 presents the results of pooled OLS with moderation terms. Due to multicollinearity, the individual effects of the composite financial inclusion index (CFII) and secondary school enrollment (SSE) are not shown. However, the interaction term CFII\*SSE is significant and negative, with a coefficient of -0.534. This indicates that a 1% increase in the interaction between financial inclusion and education reduces poverty by 0.534%. The combined effect of financial inclusion and education on poverty is stronger than their individual effects, confirming that education enhances the impact of financial inclusion in reducing poverty.

**Table 8: Linear regression (OLS)**

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
PHR at \$2.15							
CFII	-.241	.109	-2.20	.028	-.456	-.026	**
SSE	-.471	.198	-2.44	.012	-.581	-0.36	***
CPI	-.021	.085	-0.25	.807	-.188	.146	
FDI	-.082	.049	-1.67	.232	-.216	.053	*
RFLI	-.106	.123	-0.87	.387	-.347	.135	
Constant	5.504	.435	12.66	0	4.648	6.359	***
Mean dependent var		0.831	SD dependent var			0.716	
R-squared		0.381	Number of obs			319	
F-test		38.548	Prob > F			0.000	
Akaike crit. (AIC)		549.925	Bayesian crit. (BIC)			572.516	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 8 presents the results of a pooled OLS analysis using the poverty headcount ratio at \$2.15 per day as the dependent variable. The composite financial inclusion index (CFII) is negatively associated with poverty, with a 1% increase in financial inclusion reducing poverty by 0.241%, significant at the 5% level. Secondary school enrollment (SSE) also has a significant negative effect, with a 1% increase in enrollment reducing poverty by 0.483%. Although inflation (CPI) and foreign direct investment (FDI) show negative relationships with poverty, these are not statistically significant. The Rule of Law Index (RFLI) has a significant negative effect, with a 1% increase in RFLI reducing poverty by 0.106%.

## 5. Discussion

Examining the effect of financial inclusion on poverty with a moderating role of education is the primary goal of the research. The current thesis puts insight into how financial inclusion affects poverty in lower-middle-income countries and how crucial education is in the relationship between both. First, the study measured the financial inclusion score by developing the Composite financial inclusion index (CFII) for the lower middle-income countries. The total 48 lower-middle-income countries on World Development Indicators (WDI) are ranked according to their level of financial inclusion. Mauritius is ranked at the top with an average score of 96. Moldova ranked 2<sup>nd</sup> at second place with an average score of 92 on the composite financial inclusion index. Ukraine ranked at number 3 with a mean score of 88.

The average score on the financial inclusion index remained at 38. Pakistan has a mean score of 26 on the CFII index, which is below the average score of the index. India has a mean score of 62, and Bangladesh has an average score of 46. The lowest mean score on the financial inclusion index is 5, 6 and 6 for Congo, Côte d'Ivoire and Guinea. These figures of the financial inclusion score across lower-middle-income countries are not satisfactory. The average score on the composite financial inclusion index was only 38 out of 100. Countries should devote serious attention to the rising level of financial inclusion in their countries.

The current study has provided an empirical response to three research hypotheses. The study validated the hypothesis that financial inclusion relationship is negative with poverty in LMI countries. The results corroborate the conclusions made by Mercado (2018), Park & Mercado (2018), Jabir et al. (2017), Kim (2016), Ali & Senturk (2019), Amado & Rojas-Suarez (2014), Pandey (2005). Financial liberalization gives the ability of obtaining finance to the target populace of the societies, thus aligning the door to livelihood (Audi et al., 2021; Park et al., 2018; Audi & Ali, 2017; Sarma, 2012). The study findings further supported the hypothesis that education level has impacted on the relationship between finTrade-off The results also confirmed that the country's education level has played a role in moderating the link between financial inclusion and poverty. This means that education attainment level in a country is important if the country must achieve the set goals of financial inclusion. The findings confirm the findings of the earlier researcher that hold that there is a direct and positive relationship between formal education and financial inclusion. The conspicuous nature of the Internet is supported therefore by Allen et al., 2016; Cole and Shastry, 2009; Li and Lu, 2016; Kusuma and Hasnah, 2019 and Anjani, 2016.

Education level is connected with financial literacy and quality-stream of the education influences financial literacy (Audi et al., 2021; Sajid & Ali, 2018; Anjani, 2016; Li & Lu, 2016; Kim, 2016; Cole & Shastry, 2009).

HCT, Sustainable livelihood approach (SLA) and Finance-growth theories (FGT) are also evidenced through the results. Allo of these theories suggests that their money management and their saving tendencies are have a more formal outlook with the degree (Ismail & Yussof, 2010; Morse & McNamara, 2013; Sierra et al., 2012; Sentuk & Ali, 2021). in that it brings valuable new knowledge into the body of research. According to Omar and Inaba (2020) the poverty cannot be eradicated just by facilitating access to financial services, the other characteristics of the macroeconomy are paramount. In agreement to Omar and Inaba (2020), the current conclusion is that, to eradicate poverty, financial inclusion initiatives is possible with the formal education level.

Educated people are willing to participate in the official financial sector, enhancing their overall well-being.

## 6. Conclusion

This research investigated the impact of financial inclusion (FI) on poverty, with education as a moderating factor, using data from lower-middle-income countries over 17 years (2005-2021). Data were sourced from the IMF, World Bank, and World Governance Indicator databases. The study developed a composite financial inclusion index (CFII) based on Sarma's (2012) methodology, measuring FI through penetration, availability, and usage dimensions. The OLS and GMM models were used for analysis.



The results confirmed that financial inclusion significantly reduces poverty, especially in countries with higher education levels. The study also reconfirmed that FI negatively impacts poverty when measured with the \$2.15 poverty headcount ratio. Education was shown to enhance the relationship between FI and poverty reduction. These findings contribute valuable insights into how education amplifies the effectiveness of financial inclusion in reducing poverty.

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