



Financial Inclusion, Financial Development and Poverty Nexus in Developing Nations

Azalfa Khalid¹, Sabira Dilawar², Kashif Saeed³, Asad Abbas⁴, Muhammad Ramzan Sheikh⁵**Abstract**

The main purpose of this study is to analyze the effect of financial inclusion and financial development on poverty in developing countries. It examines whether financial inclusion and financial development have a positive or negative impact on poverty in developing countries. To analyze the effects of financial inclusion and financial development on poverty the Method of Moments of Quantile Regression (MMQR) technique is used for an unbalanced panel data of 134 developing nations. The results suggest that financial inclusion and financial development have a negative and significant impact on poverty in developing countries. As the financial sector develops it will improve the accessibility of financial assets to poor and financial usage, quality and access to improve the financial conditions in developing countries. The government should promote financial inclusion by providing greater accessibility, better quality and awareness of its usage to reduce the poverty in developing countries. policymakers should improve the financial development by providing greater accessibility of financial institutions, improve the financial stability, provides more efficiency of financial institutions and enhance the financial depth. planners should implement such policies that will increase the GDP per capita in developing countries hence poverty will be reduced. The government and central bank should implement such fiscal and monetary policies that improve the price stability or reduce inflation to reduce the poverty in developing countries. Government should encourage trade to reduce the poverty in developing countries. policymakers should implement such policies that reduce the income inequality in order to reduce the poverty in developing countries. This study differs from past studies as this study analyzes the impact of financial inclusion and financial development on poverty in developing countries from 2011 to 2021 by using the financial development index and financial inclusion index and also using the MMQR technique for panel data estimation.

Keywords: Poverty headcount ratio, Financial Inclusion, Financial Development, GDP Per Capita, Inflation, Trade, Gini Index, Secondary School Enrollment

1. Introduction

Financial inclusion has been declared one of the most important goals of the Millennium Development Goals (MDGs) through the United Nations (UN) to improve the social, economic, and environmental conditions of the whole population in the world. A country can build a strong financial infrastructure through financial inclusion that can improve the growth and development conditions of the country. Financial inclusion can be increased by providing access to the financial sectors, giving business loans to the people, and also by improving the services of microfinance. Reducing poverty through effective growth of the economy, increasing development through income distribution, and stability of the financial sector are the main concerns of financial inclusion (Ratnawati, 2020; Jammazi, & Mokni, 2021; Audi et al., 2023).

During past years monetary policy has been given prior importance to financial inclusion. It also ensures financial access to individuals and firms through savings, low-cost transactions, and the availability of credit card facilities. According to Mader (2018), poverty and inequality can be reduced through insurance coverage and by enabling households to manage their consumption. To reduce the inequalities in income distribution and also to break the vicious cycle of poverty the main concern of the World Bank is financial inclusion. Therefore, governments of many countries now promoting financial inclusion. Different strategies are adopted to promote or improve financial access to individuals and businesses. Financial inclusion is still a challenge for different countries as the benefits of digital financing and access to finance are unequally distributed between different areas and individuals. Promoting financial inclusion by introducing innovations in the formal financial system and banking system to reduce poverty (Audi et al., 2022; Damiyano and Mago, 2023; van Zanden, 2023).

Financial services are available for everyone and easy access to finance through bank deposits and credit insurance is known as financial inclusion. Financial inclusion has a negative and significant impact on poverty as poverty is reduced through the optimal utilization of resources and improvement in the facilities of credit and deposit. Financial inclusion can increase savings that will increase the investment level that enhances social equity and thus poverty would be reduced. The increasing level of financial inclusion in an economy would improve the banking sector's efficiency. A developed financial sector of a country cannot remain developed alone due to unequal income distributions (Omari, 2022; Kumar, 2023).

The access and usage of financial services is known as financial inclusion. Many countries are giving priority to financial inclusion to achieve inclusive growth of the private sector. The mobilization of savings, using capital in productive ways, observing the investments, managing risks, and making the exchange of goods easy for individuals are the key functions of financial inclusion. Countries with deeper financial systems are more likely to have better access to financial services. Financial depth and financial inclusion relationships in many countries are imperfect as the fund mobilization among individuals of the rich and the poor countries is not perfect while these countries have the same financial depth (Ali & Sajid, 2020; Ndoye and Barajas, 2022; Ali & Mohsin, 2023).

Poverty reduction is the main goal of the United Nations (UN). Poverty can be reduced through the help of financial development. Many studies have been done to investigate the effects of financial development on poverty. Financial development can directly

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decrease poverty by reducing cost of transactions and providing free information about the formal financial sectors. Financial development can indirectly reduce poverty by influencing those factors that are related to poverty or have an impact on poverty, as financial development can increase the growth of an economy through which poverty can be reduced. The development of the financial sector may improve the distribution of income and also reduce financial instability and thus poverty can be reduced (Eoy & Madheswaran, 2020; Haan et al., 2022; Kallianiotis, 2022).

The main goal of the developed and developing countries is to achieve sustainable development. Poverty reduction is the first objective of sustainable development. According to SDGs, the population ratio of developing countries is very high, there is little availability of resources to the people as compared to the advanced economies. Financial development provides financial access, enhances economic growth, and lowers the income gap among citizens hence poverty will be reduced (Taiwo et al., 2024).

Reducing the poverty headcount ratio around the world is the main concern of the MDGs (Millennium Development Goals). Several policies recommend that the development of the financial sector is the key to reducing poverty. Specifically, increasing the financial depth, availability of finance, and inclusiveness are very important in poverty reduction. Due to the financial crises of the 1930's great depression policymakers were giving more attention towards financial stability. According to the study of Cihak et al. (2013), the development of the financial system is based on four components. The first one is the availability of financial services to the people and firms. Second is the size or the depth of financial services. The third one is the stability of the financial system. The last one is financial efficiency which facilitates individuals by providing low-cost financial transactions (Zubair & Hayat, 2020; Rewilak, 2017). The poverty reduction strategies are very important as compared to the growth. The reforms of the financial sectors change the income level which can reduce poverty. The economic progress of an economy doesn't mean that people are living better lives it will just increase the growth of the economy. Substantial development of the formal financial sector is very important to achieve the required resources to implement strategies to reduce poverty. An efficient financial system can attract more financial resources from foreign sources to reduce poverty. The financial sectors that are suffering from the problems of market imperfections and moral hazards cannot reduce poverty. Due to the development of the financial system, poverty is reduced as the domestic resources are fully utilized which results in economic growth of the economy (Salah Uddin et al., 2014; Ahmad & Rehman, 2019).

It is challenging for developing nations to reduce poverty. Most of the international organizations developed their programs and their main objective is to reduce poverty (Zahonogo, 2017). The most important aim of Millennium Development goal is to reduce poverty around the world. Development of the financial sector and many other policies were used to achieve this goal (Rewilak, 2017). The problem of poverty has to be solved and for this purpose, different policy measures were used such as the policy of financial liberalization in 1986 and the organization of Operation Feed the Nation (OFN). The development of the financial sector influences poverty by providing access to finance and it has a positive impact on economic growth which will provide new employment opportunities that will increase investments and also increase the GDP per capita of developing countries (Server, 2019; Okoduwa et al. 2023).

To study the connection of financial inclusion and financial development on poverty in developing countries, specific research questions are recognized as:

- How does financial inclusion affect the poverty level in developing nations?
- How does financial development influence the poverty level in developing countries?

Previous studies mainly work on the influence of financial inclusion on economic growth and some probe the impact of financial development on economic growth. We have examined the impact of financial inclusion and financial development on poverty in the case of developing countries. Prior studies have used ARDL, GMM, 2SLS, and FGLS techniques in their studies. This study used the latest technique of the Method of Moment of Quantile Regression (MMQR) to analyze the effect of financial inclusion and financial development on poverty levels of developing countries.

The rest of the study is organized as: Second section presents the literature review. Section three explains the data, model and methodology. Section four exhibits the results and findings of the study. Finally, section five represents the conclusion and policy recommendations.

2. Review of Literature

The literature evaluation is concerned with explicit and investigated work that has been done in the past. In this section, we have made an effort to review former studies resting on financial inclusion on poverty and financial development on poverty in developing nations. Table1 shows the review on the studies based on financial inclusion and poverty and studies on financial development and poverty.

Table 1: Review of Assorted Studies

Author(s)	Time Period	Country	Methodology	Main Results
Summary of Studies on financial inclusion and Poverty				
Ozili (2023)	2013-2019	18 countries	Generalized method of moments (GMM), the two-stage least squares(2SLS) Pearson correlation test	The findings revealed that financial inclusion and financial development are significant determinants of fintech and big-tech lending.
Khan et al. (2022)	2004-2017	15 developed and emerging economies	Principle composite analysis (PCA), autoregressive distributed lag (ARDL), and generalized method of moments (GMM)	The results showed that financial inclusion was statistically significant in explaining financial stability and efficiency among the selected G20 countries.

Jungo et al. (2022)	2005-2018	46 Sub-Saharan African (SSA) and 31 Latin American Caribbean (LAC) countries	Principal component analysis, and feasible generalized least squares	The findings suggested that inclusion enhanced bank stability in SSA and LAC countries, there is no statistical significance in the effect of financial regulation on financial stability in SSA countries. Competitiveness negatively affects financial stability, and financial regulation moderates the negative effect of competitiveness on financial stability in SSA and LAC countries.
Abdelghaffar et al. (2022)	2009-2019	38 countries of different income groups	Generalized method of moments	Results show the positive and significant effect of financial inclusion on human development in low and lower-middle-income countries had a higher effect on human development than that in high and upper-middle-income countries.
Shi and Qamruzzaman (2022)	1995-2018	A panel of 68 lower and lower-middle-income countries	Cross-sectional dependency test (CSD), panel unit root test, panel cointegration test, generalized method of moments (GMM), and system-GMM test	Government investment in education positively assists poverty reduction. Furthermore, the inclusion of the population into the formal financial system expedited the poverty reduction process.
Aracil et al. (2021)	2004-2017	Seventy-five developing and developed countries	Cross-section and quantile analysis	Results suggested that institutional quality intensifies the beneficial effects of financial inclusion on poverty rates.
Qiao et al. (2021)	2011-2019	26 OECD countries	Padroni unit root test, FMOLS, and DOLS technique	Renewable energy consumption favorably correlated with economic growth, and the renewable energy index positively correlated with green bond financing.
Pollonl-silva et al. (2021)	2004-2017	13 Latin American countries	Feasible generalized least square (FGLS) and the limited information maximum likelihood (LIML)	Results suggested that financial inclusion and technology adoption could reduce poverty and inequality.
Qin et al. (2021)	2004-2016	Seven emerging economies	Panel quantile regression analysis and panel cointegration test	Financial inclusion could reduce carbon dioxide emissions at the 25 th and 50 th quantiles, while globalization and renewable electricity generation were found to curb carbon dioxide emissions at all quantiles.
Demir et al. (2020)	Survey data for 2011, 2014, and 2017	140 countries	Quantile regression analysis	Financial inclusion was a key channel through which fintech reduced income inequality.
Huang et al. (2020)	1995-2015	27 European Union nations	Panel econometric techniques	Financial inclusion positively promoted economic performance across EU nations.
Koomson and Danquah (2020)	6 th and 7 th rounds of Ghana living standards survey 2012/13, 2016/17	Ghana	Linear probability model	Household energy poverty was negatively affected by financial inclusion location-wise.
Ali et al. (2020)	2000-2016	45 Islamic Development Bank (ISDB) member countries	Dynamic panel data analysis, generalized method of moments, two-stage least square, panel vector autoregressive, and panel Granger causality test	Results confirmed the positive and significant association between financial inclusion and economic growth.

Ratnawati (2020)	2009-2018	10 Asian countries	Generalized method of moments	Financial inclusion positively impacted economic growth, poverty alleviation, income inequality reduction, and financial stability in Asian countries.
Odugbesan et al. (2020)	2004-2018	33 Sub-Saharan African (SSA) economies	Cross-sectional dependence and unit root test, panel cointegration test, panel estimation technique, and panel granger causality testing procedures	A positive and significant relationship existed between financial inclusion and sustainable development, and a negative and significant relationship between financial development and sustainable development
Mushtaq and Bruneau (2019)	2001-2012	62 countries	Generalized method of moments (GMM)	The study depicted a negative relationship between information and communication technology diffusion and poverty.
Neaime and Gaysset (2017)	2002-2015	Eight MENA countries	Generalized method of moments and generalized least square econometric models	The empirical results show that financial inclusion decreases inequality but has no significant effect on poverty, an increase in financial inclusion and population contributes positively to financial stability.
Kim (2015)	2004-2011	40 OECD and EU countries	Gini-coefficient	The empirical results draw three conclusions. First, income inequality negatively affected the GDP growth rate. Second, progressivity was not a major factor in reducing income inequality, financial inclusion improved the relationship between income inequality and economic growth rate.
Ajide (2015)	1996-2013	Nigerian rural communities	Autoregressive distributed lag model	Results confirmed that financial inclusion was suitable for poverty reduction in rural areas.
Thompson et al. (2021)	1996-2015	Summary of the Studies on Financial Development and Poverty 40 African countries	Ordinary least square estimation technique, generalized method of moments	The study suggested that financial development did not influence relative poverty in Africa and that only private credit can reduce poverty in Africa.
Hassan and Meyer (2020)	1970-2018	South Africa	Autoregressive distributed lag (ARDL) and bound testing technique	Results showed that market imperfections should be reduced so that income inequality is reduced through the mechanism of financial development.
Zameer et al. (2020)	2007-2018	China	Data envelopment analysis (DEA), Generalized method of moments (GMM)	The study indicated that financial development and technological innovation positively influenced the poverty alleviation efficiency in China. The impact of globalization on poverty alleviation was insignificant.
Minhaj Ali et al. (2020)	2000-2016	45 Organization of Islamic Cooperation (OIC) countries	Arellano-bond generalized method of moments and 2SLS method	The empirical results confirmed that there existed a significant and positive relationship between financial inclusion, institutional quality, and financial development.
Kavya and Shijin (2019)	1984-2014	85 countries of different income groups	Kuznets hypothesis, greenwood and Jovanovic hypothesis, generalized method of moments	The financial Kuznets curve hypothesis found that the empirical results in high, middle, and low-income countries challenged the assumption of economic growth along with financial development that reduced income inequality.
Zhang and Naceur (2018)	1961-2011	143 countries, both developed and developing	Hansen's J-test	Results revealed that most of the financial development dimensions that could reduce income inequality and poverty include financial access, depth, efficiency, and stability.
Park and shin (2017)	1960-2011	162 countries, including much of developing Asia	Gini- coefficient and the share of national income	The findings of the study suggested that financial development contributes to lower inequality up to a point, but as financial

Asongu and Odhiambo (2017)	2011	93 developing countries	Quantile regression	development proceeds further, it contributes to higher inequality.
Seven and Coskun (2016)	1987-2011	45 emerging countries	Dynamic panel data method	Findings showed that increasing mobile banking dynamics to certain thresholds would increase the quality of growth. Results suggested that although financial development promotes economic growth, it doesn't necessarily benefit those on low incomes in emerging countries.
Cepparulo et al. (2016)	1984-2012	58 developing countries	OLS regression, generalized method of moments	The estimates showed that the development of the institutional framework had a significant and positive effect on poverty alleviation
Zahonogo (2016)	1980-2012	42 Sub-Saharan Africa	Generalized method of moments	Results suggested that financial development impacts favorably the poverty indicators.

In this section, we have discussed the empirical review of various studies to concentrate on the effect of financial inclusion and financial development on poverty. Different types of results have been indicated in these studies. First of all, we review the effect of financial inclusion on poverty. We conclude that financial inclusion and technological adoption were capable of reducing poverty and inequality. There was a positive and significant association between financial inclusion and economic growth. Also, financial inclusion positively impacted economic growth, poverty alleviation, income inequality reduction, and financial stability in developing nations. In the next section of Table 1, we have analyzed the effect of financial development on poverty. The mechanism of financial development could reduce income inequality so the market imperfections should be reduced. Financial access, depth, efficiency, and stability could reduce income inequality. We also analyzed that financial development contributes to lower inequality up to a point, but as financial development proceeds further, it contributes to higher inequality. Financial development had a positive and significant effect on poverty reduction. In the past, researchers have examined the impact of financial inclusion on economic growth and some investigated the influences of financial development on economic growth. Scanty literature is available on the effects of financial inclusion and financial development on poverty in developing nations. The latest techniques for example, the Method of Moments of Quantile Regression (MMQR) have not been used in previous studies.

3. Model, Data and Methodology

This study has used a model to investigate how the poverty level is influenced by financial inclusion and financial development in developing nations. Poverty is used as the dependent variable while financial inclusion and financial development, GDP Per Capita, Inflation, Trade, Gini-coefficient, and Secondary School Enrollment are used as independent variables. In this study, we have used MM-QR technique.

The functional form of the model is:

$$Pov = f(FII, FDI, GDPPC, INF, TRADE, GINI, SSE) \quad (1)$$

The econometric form of the model is:

$$Pov_{it} = \beta_0 + \beta_1(FII)_{it} + \beta_2(FDI)_{it} + \beta_3(GDPPC)_{it} + \beta_4(INF)_{it} + \beta_5(TRADE)_{it} + \beta_6(GINI)_{it} + \beta_7(SSE)_{it} + \varepsilon_{it} \quad (2)$$

Where:

Pov = Poverty headcount ratio

FII = Financial Inclusion Index

FDI = Financial Development Index

GDPPC = Gross Domestic Product Per Capita

INF = Inflation, GDP Deflator (Annual %)

TRADE = Trade (% of GDP)

GINI = Gini Index

SSE = Secondary School Enrollment (as a percentage of total enrollment)

The poverty headcount ratio is used as a proxy to measure poverty. The financial inclusion index presents the usage, access, and quality of the assets of finance. The index of financial development is buildup with financial institution's index of developing nations that presents access to finance, financial depth, stability of finance, and financial efficiency. Gross Domestic Product Per Capita (GDPPC) is used as a proxy to measure the growth of the economy. The GDP deflator is used as a proxy to measure Inflation. The annual trade rate is also used to test its impact on the poverty level of developing nations. Gini coefficient is measured as a proxy of income inequality to check its effects on poverty. The Secondary School Enrollment ratio is a proxy of the Education level of developing nations and checks the impact of increasing the level of education on the poverty levels of developing countries.

The study used panel data from 134 developing countries over the period 2011 to 2021 because the data on financial inclusion is provided from 2011. Data are collected from different sources like the World Development Indicators (WDI) and the International Financial Statistics (IFS). Data on GDP per capita, Inflation, Trade, Gini-coefficient, and Secondary School Enrollment are taken

by the World Development Indicators (WDI), data on financial inclusion are collected from IFS, and financial development data are collected from the World Bank Database.

We found how financial inclusion and financial development influence poverty in developing nations through The Method of Moments of Quantile Regression (MM-QR) technique. Panel data from 2011 to 2021 is collected for developing nations.

3.1. Method of Moments-Quantile Regression (MM-QR)

MM-QR technique is used to examine the influence of financial inclusion and financial development on poverty in developing nations. Firstly, Santos Silva and Machado (2019) proposed the MM-QR test in their study. This technique (MM-QR) shows the relationship between the variables by different quantiles. MM-QR approach is quite different from other regression methods as it estimates the results by moment conditions and assumes the absence of moments function. In 1978 Bassett and Koenker presented the panel quantile regression method. Quantile regressions are best to estimate the outlier effects. In some cases where the conditional means are weak between two variables, it is the most appropriate method to be used (Coad and Binder, 2011). When our model has strong individual effects and also holds endogenous independent variables then the MM-QR approach should be used.

In quantile regressions, the dependent variable's average and median values are the main concern while in MM-QR approach we replaced these values with the quantiles that distribute the dependent variables according to the scale-location family (Silva and Machado, 2019).

The general equation of MMQR is:

$$Q_{\text{poverty}}(\tau / \gamma_i, \delta_t, X_{it}) = \gamma_i + \delta_t + \eta_{1,\tau}(FII)_{it} + \eta_{2,\tau}(FDI)_{it} + \eta_{3,\tau}(GDPPC)_{it} + \eta_{4,\tau}(INF)_{it} + \eta_{5,\tau}(TRADE)_{it} + \eta_{6,\tau}(Gini)_{it} + \eta_{7,\tau}(SSE)_{it} + \varepsilon_{it} \quad (3)$$

4. Results and Discussions

4.1. Summary Statistics and Correlation Analysis

This section shows the descriptive analysis of all variables. In Table 2, PHCR represents the poverty headcount ratio, 16.32 is the mean value of PHCR the highest value of PHCR is 91 and the lowest value is 0.00, and the value of standard deviation is 19.6. It means the data of PHCR are 19.60 points away from the average. The value of skewness is positive which means data are skewed positively. The kurtosis value of PHCR is 4.23 which is greater than 3 which means the probability distribution is leptokurtic. The probability of the JB test is 0.000, which shows that the data is not normally distributed.

Table 2: Summary Statistics of Key Variables (2011-2021)

	PHCR	FII	FDI	GDPPC	INF	TRADE	GINI	SSE
Mean	16.325	0.000	0.000	1.508	7.684	74.336	38.679	63.888
Median	6.700	-0.126	-0.311	2.047	4.026	69.667	38.600	70.656
Maximum	91.000	3.919	4.027	96.956	604.946	347.997	63.000	99.840
Minimum	0.000	-2.162	-1.219	-48.392	-30.200	4.128	24.000	5.078
Std. Dev.	19.609	1.000	1.000	6.219	24.283	34.811	7.487	23.076
Skewness	1.443	0.683	1.621	1.128	15.586	1.982	0.132	-0.514
Kurtosis	4.238	3.481	5.486	52.147	325.612	12.979	2.529	2.081
Jarque-Bera	210.685	129.569	251.820	143214.500	6141059.000	5956.759	5.575	38.494
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000

FII represents financial inclusion index, the mean value of FII is 0.000, 3.919 is the maximum value of FII and the minimum value is -2.162, the standard deviation of FII is 1.000 which is very high and shows a greater dispersion of data from the mean value. FII is positively skewed. The kurtosis is 3.481, which is higher than 3, financial inclusion index is highly peaked. The Jarque-Bera test value is less than 0.10%, which shows that the data is not normally distributed.

FDI presents the financial development index, the average value of FDI is 0.000, the highest value is 4.027, and the lowest value is -1.219. The Standard deviation value of FDI is 1.000 which shows dispersion from the mean value. It is positively skewed as the mean value of FDI is higher than its median. 5.486 is the kurtosis value of FDI, so it is leptokurtic. The p-value of the Jarque-Bera test represents that at a 10% level data is not normally distributed.

GDPPC shows the GDP per capita growth, 1.508% is the average value of GDPPC, 96.956% is the highest value of GDPPC and -48.392% is the lowest value. The value of standard deviation is 6.219 which is very high that presents dispersion in data. GDPPC is negatively skewed. The kurtosis is 52.147%, which is higher than 3, which shows GDPPC is heavier tail/leptokurtic. The results of Jarque-Bera show that it is not normally distributed at level 10%.

INF presents an annual inflation rate, 7.684% is the average value of INF, its highest value is 604.946%, and its lowest value is -30.200%. The value of standard deviation is 24.283, which means data is highly dispersed. INF is positively skewed. It has the highest value of kurtosis which is 325.6%, which means it is leptokurtic. INF is also not normally distributed.

Trade has an average value of 74.33%, the highest value of trade is 347.997%, and the lowest value is 4.128%. 34.811 is the standard deviation of trade. Trade is positively skewed. The kurtosis is 12.979%, it is leptokurtic. The probability of the JB test shows that at a 10% level, it is not normally distributed.

GINI represents the Gini-coefficient, 38.6 is its mean value and 63, and 24 are its maximum and minimum values respectively. The value of standard deviation is 7.487. It is positively skewed. 2.52 is its kurtosis value which is less than 3, which means it is platykurtic. The Gini coefficient at level 10% is not normally distributed, its p-value is 0.06 which is less than 0.10.

SSE presents secondary school enrollment, its mean value is 63.888%, the maximum value is 99.840%, and 5.078% is the minimum value of SSE. 23.076 is the standard deviation value of SSE, which shows the dispersion of data from the mean value. SSE has a median value greater than the average value, which shows the negative skewness of the data. The kurtosis value of SSE is 2.081%, which is smaller than 3, data is platykurtic. At a 10% level of significance, SSE is not normally distributed.

Table 3: Correlation Analysis of Key Variables

	PHCR	FII	FDI	GDPPC	INF	TRADE	GINI	SSE
PHCR	1.000							
FII	-0.012	1.000						
FDI	-0.217	0.157	1.000					
GDPPC	0.060	-0.015	0.147	1.000				
INF	-0.185	-0.105	-0.254	-0.368	1.000			
TRADE	-0.114	0.116	0.467	0.043	-0.425	1.000		
GINI	-0.074	-0.108	-0.013	0.023	-0.068	-0.456	1.000	
SSE	-0.709	-0.183	0.294	-0.124	0.222	0.432	-0.058	1.000

Table 3 shows the correlation analysis between key variables. Results show that the financial inclusion index, financial development index, inflation, trade, and Gini coefficient have a weak negative relationship with the poverty headcount ratio. In contrast, secondary school enrollment strongly correlates negatively with the poverty headcount ratio. While GDP per capita is weak and positively correlated with poverty headcount ratio. The financial development index and trade have a weak positive relationship with the financial inclusion index. However, GDPPC, INF, GINI, and SSE are weak negatively correlated with the financial inclusion index. GDPPC and SSE have a weak positive relationship with FDI, but INF and GINI have a weak negative relationship with FDI. Trade has a moderate positive relationship with FDI. GDPPC has a weak negative relationship with INF and SSE, but a weak positive relationship with Trade and GINI. INF has a weak negative relationship with GINI, a moderate negative relationship with trade, and a weak positive relationship with SSE. Trade has a moderate positive relationship with SSE and a moderate negative relationship with GINI. Furthermore, GINI and SSE are weak negatively correlated with each other.

4.2. Unit Root Analysis

This section represents the unit root analysis of key variables. Table 4 shows the results of the Unit Root Analysis. The second-generation Im-Pesaran-Shin test is used to check the stationarity and non-stationarity of the variables.

Table 4: Unit Root Test

Variables	Cross-Section-Dependence based Im-Pesaran-Shin (CSDIPS) Unit Root Test					
	Without Trend			With Trend		
	Lags	Zt Statistics	P-Value	Lags	Zt Statistics	P-Value
PHCR	1	12.875	0.000	1	13.093	0.000
FII	0	8.664	0.000	0	8.159	0.000
FDI	0	0.644	0.789	0	0.432	0.982
GDPPC	0	19.754	0.000	0	18.752	0.000
INF	0	12.752	0.000	0	9.761	0.000
TRADE	0	11.009	0.000	0	8.642	0.000
GINI	0	8.433	0.000	0	6.24	0.000
SSE	0	4.773	0.000	0	5.711	0.000

Table 4 shows that the poverty headcount ratio with and without trend is stationary at lag (1). The financial inclusion index, GDP per capita, inflation, trade, Gini coefficient, and SSE are stationary with and without a trend at lag (0), except the financial development is non-stationary with and without a trend at lag (0).

4.3. Cross-Sectional Dependence Test

This section presents the cross-sectional dependence test. Table 5 shows the results of Pesaran's cross-sectional dependence (CD) test which is used to check whether the cross-sectional dependence exists between the variables or not.

The outcomes of the CD test reject the null hypothesis (no cross-sectional dependence) and accept the alternative hypothesis that cross-sectional dependence exists between the cross-sectional units/ variables.

4.4. Slope Homogeneity Test

This section presents the slope homogeneity test. Two tests are used Delta and HAC Robust Adjusted Delta test to check the presence of heterogeneity in the model. The results of the Delta test and HAC Robust Adjusted Delta show that there exists heterogeneity in the model or that the slope of coefficients is different across all cross-sectional units.

Table 5: Pesaran's Cross-Sectional Dependence (CD)Test

Variable	CD-test	P-Value
PHCR	12.220	0.023
FII	10.860	0.000
FDI	11.440	0.000
GDPPC	7.552	0.000
INF	4.994	0.000
TRADE	7.172	0.000
GINI	8.332	0.000
SEE	7.521	0.000

Table 6: Slope Homogeneity Test

Model: PHCR/ FII, FDI, GDPPC, INF, TRADE, GINI, SSE			
Delta Test			
UnAdjusted	P.Value	Adjusted	P.Value
15.326	0.000	14.886	0.000
HAC Robust Adjusted Delta Test			
UnAdjusted	P.Value	Adjusted	P.Value
-14.890	0.000	-17.972	0.000

4.5. Method of Moments of Quantile Regression (MM-QR) Results

Now we present the results of the Method of Moments of Quantile Regression (MM-QR) technique. The poverty headcount ratio (PHCR) is the dependent variable and the financial inclusion index (FII) is the first independent variable. The outcome shows that financial inclusion is negatively and significantly influenced poverty in 50th, 75th, and 90th quantiles while at the 25th quantile, it is negatively insignificant. Financial inclusion reduces poverty by increasing savings and investment, encouraging productivity, and providing job opportunities to poor people in the economy (Aracil et al., 2021). Financial inclusion helps individuals to invest their savings in productive ways and also encourages them to efficiently participate in the workforce. Financial inclusion indirectly reduces poverty by providing easy access to credit and by offering other services for day-to-day transactions associated with consumption, investment, and development of the economy. Financial inclusion indirectly creates job opportunities for the poor and also promotes health and education facilities through government expenditures (Shi and Qamruzzaman, 2022). Financial inclusion can reduce poverty and inequality by providing access to credit and the availability of savings services and by encouraging personal investments in new businesses (Von Fintel and Orthofer, 2020; Kunt et al., 2017).⁶

The quantile estimations represent that the explanatory variable financial development index (FDI) has a negative and significant impact on poverty in the 25th, 50th, and 75th quantile, but negatively insignificant at the 90th quantile. Financial development can reduce poverty in different ways (directly / indirectly). Firstly, financial development reduces the market deficiencies that will increase the availability of formal finance to individuals (Jalilian and Kirkpatrick, 2002; Stiglitz, 1993). Secondly, Financial development helps the poor to save more and also gives them opportunities for employment and easy access to bank loans so they can start their small businesses and earn high incomes hence poverty is reduced (World Bank, 2001; Odhiambo, 2010). McKinnon (1973), said that the savings rate increases through financial development which reduces the borrowing cost, and as a result, investment increases hence poverty is reduced. Financial development can reduce poverty by promoting growth, lowering the wealth gap, encouraging development, and also providing job opportunities to the poor. The financial institutions have to increase credit, and job opportunities, encourage innovations, and also promote economic activities so financial development can effectively work to reduce poverty in an economy. Financial development can reduce poverty by providing financial literacy to the poor, and accessibility of financial services to individuals, introducing a program of conditional cash transfer (CCT) is a way to reduce poverty and improve the health and education system of developing countries, lastly investing in capital for the improvement of human capital Becker (2010), defined as the training, health, and education of poor (Taiwo et al., 2024). Financial development can also reduce poverty by enhancing the economic growth of an economy (De Haan et al., 2022).⁷

The findings of the table show that GDPPC (GDP per capita growth) is negatively significant at a 1% level of significance across all quantiles except the 25th quantile. At the 25th quantile, it is negative and insignificant. GDP per capita growth can indirectly reduce poverty as the income of the individual increases and can increase the market demand for goods and services in the economy money circulates in the market in this way poverty is reduced (Dahliah and Nur, 2021).

⁶ Financial inclusion can insignificantly associated with poverty due to poor credit availability, increasing cost of financial transactions, and little access to finance for poor.

⁷ Due to low financial inclusion and absence of institutional quality financial development can't reduce poverty. Financial development mostly benefited the rich people because they have security of repayment, while poor peoples are excluded from formal sector due to absence of such guarantees. Lack of financial literacy, availability of finance, and low credit are the main reasons due to which financial development do not reduce poverty effectively (Taiwo, 2024).

Table 7: MM-QR Results of Poverty

Variables	(1) Location	(2) Scale	(3) Q 0.25	(4) Q 0.50	(5) Q 0.75	(6) Q 0.90
FII	-0.990 (0.998)	-3.183*** (0.631)	-0.813 (0.824)	-4.442** (1.767)	-1.834*** (0.550)	-2.461*** (0.485)
FDI	-0.260*** (0.0415)	-0.170*** (0.0251)	-0.435*** (0.0770)	-0.192*** (0.0366)	-0.115*** (0.0286)	-0.0158 (0.0283)
GDPPC	-1.439*** (0.240)	-1.154*** (0.152)	-0.188 (0.460)	-2.093*** (0.227)	-2.463*** (0.124)	-2.690*** (0.105)
INF	0.513*** (0.0379)	0.210*** (0.0240)	0.741*** (0.0749)	0.394*** (0.0376)	0.327*** (0.0194)	0.285*** (0.0165)
TRADE	-1.156*** (0.159)	-0.393*** (0.101)	-0.730*** (0.273)	-1.379*** (0.124)	-1.506*** (0.0900)	-1.583*** (0.0804)
GINI	0.806*** (0.113)	0.0546 (0.0713)	0.747*** (0.185)	0.837*** (0.0809)	0.854*** (0.0654)	0.865*** (0.0590)
SSE	-0.529*** (0.0961)	-0.296*** (0.0582)	-0.224 (0.160)	-0.648*** (0.0833)	-0.781*** (0.0697)	-0.954*** (0.0700)
Constant	-1.651*** (0.242)	-1.236*** (0.146)	-0.377 (0.491)	-2.147*** (0.218)	-2.706*** (0.159)	-3.428*** (0.156)

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Furthermore, it shows that Inflation (INF) has a positive and significant impact on PHCR at a 1% level of significance through all quantiles. Inflation increases poverty through inflation tax due to which real income decreases and secondly the prices of commodities increase which can reduce the real wages. Chani et al. (2011), argue that real income is reduced due to inflation can increase poverty. Chaudhary (2008), Ravallion (1998), Powers (1995), and Cardoso (1992) found that poverty is positively associated with inflation.

However, trade has a significant and negative association with the Poverty headcount ratio at a 1% significance level. Due to trade openness, the flow of capital, goods, and services increases in developing nations which can significantly improve the economic condition of these countries hence poverty is reduced (Santos-Paulino, 2012).

The Gini coefficient is positively significant with the dependent variable as the increase in income inequality can increase poverty. When income inequality is reduced in a country people can gain growth mostly poor people benefit from this growth. When income distribution is normal in a country that will reduce poverty as the income of the poor rises. A little progress to decrease inequality can have a great influence on poverty alleviation. Thus, growth and equal distribution of income (equity) play a major role in poverty alleviation (Luebker, 2012).

The poverty headcount ratio is significant and negatively associated with secondary school enrollment (SSE) at the 50th, 75th, and 90th quantile but it is insignificant at the 25th quantile. Poverty can be reduced by secondary education because people can achieve better job opportunities and can live a prosperous life by getting standard education facilities (Shi and Qamruzzaman, 2022).

5. Conclusions and Policy Recommendations

The general objective of the study is to examine the influences of financial development and financial inclusion on poverty in developing nations. Financial inclusion increases economic growth to reduce poverty. A developed financial sector can help the poor to have access to finance so financial development can also reduce poverty. The study uses panel data from 134 developing countries from 2011 to 2021 to analyze the effect of financial inclusion on poverty and also examine the influence of financial development on poverty in developing countries. The research uses a model in which poverty is the dependent variable and financial inclusion, financial development, GDP per capita, Gini-coefficient, trade, inflation and SSE were used as independent variables. The poverty headcount ratio is used to measure poverty financial inclusion and the financial development index was used to detect their influence on poverty. The most recent approach that is Method of Moments of Quantile Regression (MM-QR) was used for panel of countries. Firstly, statistical description and correlation between the variables were estimated, results depict that poverty has a weak negative relationship with financial inclusion, financial development, inflation, trade, and Gini coefficient while SSE has a strong negative relationship with poverty and GDPPC is weak positively correlated with poverty. The latest Im-Pesaran-Shin unit root test is used to test the stationarity of the series, results show that the dependent variable poverty at lag (1) is stationary while the independent variables are stationary at lag (0) with and without a trend. The cross-sectional dependence test of Im-Pesaran (CD) is also applied to analyze is there any cross-country dependence exists in our data. Results of the CD test represent that the p-value of all the variables is less than 0.10% which confirms that cross-sectional dependency exists between key variables. To analyze the slope of the explanatory variables Delta and HAC Robust Adjusted Delta tests were used results of these tests show that the variables are not the same across all units. The impact of the independent variables on the dependent variable is represented by the results of the MMQR technique. The results of the MMQR technique are shown by the 25th, 50th, 75th, and 90th quantiles.

Financial inclusion has a negative and significant impact on poverty as financial inclusion increases poverty reduction in developing countries due to the increase in financial inclusion savings and investments increases that provide more jobs to the poor people so poverty reduces.

There is a negative impact of financial development on poverty as the developed financial sectors of developing countries can reduce poverty through financial availability and access to the formal sector. The development of the financial system can increase the saving rate in developing nations. Financial inclusion and financial development can directly and indirectly reduce poverty in

developing countries by encouraging economic growth and enhancing the accessibility of financial services. Financial inclusion and financial development are significantly and negatively impacted on poverty levels in developing nations as both can reduce poverty. Based on the results of the study, the policy recommendations are given as:

- The results of the study show that financial inclusion has negative impact on poverty in developing countries. So, it is recommended that government should promote financial inclusion by providing greater accessibility, better quality and awareness of its usage in order to reduce the poverty in developing countries.
- The outcomes of the study indicate that financial development is negatively related with poverty in developing countries. So, it is recommended that policymakers should improve the financial development by providing greater accessibility of financial institutions (through increase in bank accounts, bank branches, market capitalization, value traded and non-financial corporate bonds), improve the financial stability (by improving the bank z-score and stabilize the stock price volatility), provides more efficiency of financial institutions (by increasing the bank lending deposit and stock market turnover ratio) and enhance the financial depth (by improving the private credit by deposit money banks, deposit money banks assets and stock market capitalization).
- The findings of the study illustrate that poverty is negatively affected by GDP per capita growth in developing countries. So, it is suggested that planners should implement such policies that will increase the GDP per capita in developing countries hence poverty will be reduced.
- The results shows that inflation is positively related with poverty. So, it is recommended that government and central bank should implement such fiscal and monetary policies that improve the price stability or reduce inflation to reduce the poverty in developing countries.
- The outcomes show that trade is negatively associated with poverty. So, government should encourage trade to reduce the poverty in developing countries.
- The results show that secondary school enrollment also has a negative impact on poverty. So, planners should implement such policies that promote the secondary school enrollment in developing countries to reduce poverty.
- The findings illustrate that poverty is positively affected by income inequality. So, policymakers should implement such polices that reduce the income inequality in order to reduce the poverty in developing countries.

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