

Financial Development and Poverty Reduction in Sub-Saharan Africa

Deusdedit Augustine Lemnge[†] & Gwahula Raphael[‡]

Abstract

This study examines the effects of financial development on poverty reduction in 36 Sub-Saharan African countries over the period between 2000 and 2021. The study employs the Quantile Method of Moments with fixed effects (MMQR) due to its ability to address endogeneity and outliers among economic variables. Our estimated results reveal the following pattern. First, when the level of poverty rises above the median (50th quantile), the relationship between financial development and poverty remains statistically insignificant. Second, when the level of poverty falls below the median (50th quantile), the relationship between financial development and poverty bears a negative and statistically significant coefficient. Our results also show that an increase in the level of education reduces poverty, but a higher level of income inequality increases poverty. The policy implication is that financial development initiatives are more pronounced in reducing poverty if such initiatives are simultaneously accompanied by educational and income redistribution policies.

Keywords: Financial Development; Sub-Saharan Africa; Poverty Reduction; Method of Moments Quantile Regression

JEL Classification Codes: G28, I32

[†] Corresponding Author, The Open University of Tanzania, P.O. Box 23409, Dar es Salaam, Tanzania, Email:lemnged@gmail.com

[‡] Senior Lecturer in Finance and Accounting, The Open University of Tanzania, P.O.Box 23409, Dar es Salaam, Tanzania, Email:email:gwahulagr@gmail.com, gwahula.raphael@out.ac.tz

1. Introduction

The incidence and severity of poverty across the globe is a matter of serious concern for both national governments and international organizations such as the United Nations (UN), the World Bank (WB), and the International Monetary Fund (IMF) (Leal Filho *et al.*, 2021; Liu *et al.*, 2015). Indeed, eradicating extreme poverty for all people everywhere by 2030 is a pivotal goal of the 2030 Agenda for Sustainable Development (SDGs). Based on these concerns and aspirations, substantial achievements in poverty reduction have been recorded globally over the past three decades. For example, the number of people living below poverty line in the world using \$2.15 per day (in 2017 PPP) as a threshold, has declined from approximately 2 billion people (equivalent to 38% of the global population) in 1990 to approximately 719 million people (equivalent to 9.3% of the global population) in 2020 (World Bank, 2022).

However, despite a marked decline in the number of people living below the poverty line, it is worth noting that poverty reduction has been uneven across the world. According to the UNDP (2023) and World Bank (2023a), although the poverty rate in sub-Saharan Africa (SSA) measured at US\$2.15 a day has been falling since 1990, the rate is currently disproportionate when compared with other parts of the world. The United Nations MDG report shows that the SSA and South Asia were the only regions in the world that failed to halve extreme poverty by 2015 (United Nations, 2015). Further, it is estimated that out of approximately 1.1 billion multidimensionally poorer people in the world, 534 million (equivalent to 47.8%) are living in Sub-Saharan Africa and that, out of the 22 multidimensionally poorest countries in the world, 19 are located in sub-Saharan Africa; making the SSA region as the home of poorest of the poor (UNDP, 2023).

On the other hand, the Global Sustainable Development Report (2023) recognizes financial development as a prerequisite for rapid economic growth and poverty reduction (United Nations, 2023). Financial development in its broad meaning involves improvements in all the dimensions of the financial sector such as depth and breadth as well as efficiency and stability for both financial institutions and markets (Svirydzenka, 2016; Mukherjee *et al.*, 2021). With it, there is a greater resource mobilization and the overall practice of channeling them for production in an economy (Green *et al.*, 2005; McKinnon, 1973; Shaw, 1973). Financial development is a means through which a greater number of individuals and firms can access financial products and services; including saving facilities, payment mechanisms, credit, and insurance (Demirgüç-Kunt *et al.*, 2018; Klapper, 2016; Zio, 2021). When such products are easily accessible to the poor, they provide them with an increased ability to raise financial capital, pay for education programs, afford medical services, and survive against unforeseen events (Zhuang *et al.*, 2009 & Odhiambo, 2009; Abidin, 2016; Ho & Iyke, 2017). Through such facilities, the poor can lift themselves out of the poverty status they are experiencing.

In view of the above, this study examines the effects of financial development on poverty reduction in SSA. Specifically, the study is motivated by three reasons. First, the pace of poverty reduction in SSA remains too slow despite a series of national and global strategies such as MDGs and SDGs. (World Bank, 2022; United Nations, 2023; UNDP, 2023). Second, although several countries in SSA have recorded significant progress in financial development, it is questionable whether such achievement has been accompanied by a corresponding reduction in the level of poverty (IMF, 2016; UNDP, 2023). Third, the debate on financial development and poverty reduction nexus in developing countries remains inconclusive, with some authors arguing that the relationship is

positive, others arguing the relationship is negative, and others claiming that there is no relationship at all. (Jalilian & Kirkpatrick, 2002; Levine, 2004; Odhiambo, 2009; Jeanneney & Kpodar, 2008; Ho & Lyke, 2017; Nair, 2016; Dhryfi 2013; Kaidi *et al.*, 2019).

The study contributes to the literature in three folds. First, it employs a panel quantile regression method with fixed effects, which is not only robust to outliers but also it addresses issues of endogeneity among variables (see, Byaro *et al.*, 2023a; Ma & Wang, 2022; Byaro *et al.*, 2023b). Second, unlike previous studies such as Zahonogo, 2017; Bolarinwa *et al.*, 2021; Boukhatem, 2016; Donou-Adonsou & Sylwester, 2016; and Kaidi *et al.*, 2019); which focused on mean-based estimation techniques, this study focuses on conditional quantile distribution that allows a broader assessment of the dependent variable for a meaningful policy implication (Ma & Wang, 2022; Byaro *et al.*, 2023a; Cannon, 2018). Third, in contrast to previous studies which proxied financial development mainly by using narrow-based measures such as the ratio of private credit to GDP and bank credit to GDP, this study uses a broad-based measure of financial development (financial development index) that takes into consideration the multidimensional aspect of the financial systems (Svirydzenka, 2016).

This study is organized as follows: Section two reviews the theoretical and empirical literature on the relationship between financial development and poverty reduction. The third section describes the methodology and data sources. Section four presents the empirical findings followed by a discussion. The last section concludes with policy implications.

2. Literature

2.1 Theoretical Review

Broadly speaking, there are two conflicting arguments on the relationship between financial development and poverty reduction. One part of the argument considers the poverty-reducing effects of financial development through resource allocation and distribution (McKinnon, 1973; Shaw, 1973; Levine, 2004; Jalilian & Kirkpatrick, 2002). According to this argument, financial development leverages improvement in the distribution of resources such that, the poor can increasingly take part in the economy (McKinnon, 1973; Shaw, 1973). Such poverty-reducing effects of financial development may be direct or indirect (Levine, 2004; Odhiambo, 2009; Jalilian & Kirkpatrick, 2002; Appiah *et al.*, 2022).

It is indirect when financial development leads to greater opportunity for resource mobilization that makes capital more accessible for both private and public investments leading to increased productivity that can trickle down to the poor in terms of increased employment opportunities and incomes (Levine, 2004; Zhuang *et al.*, 2009; Park & Mercado, 2015; Odhiambo, 2009; IMF, 2016). On the other hand, the poverty-reducing effects of financial development are direct when as a result of financial development, there is a decline in information, transaction, and contract enforcement costs that allow the poor to access financial products such as savings, credit, and insurance which helps them to secure capital for investments, manage investment risks and finance their education plans and lift themselves out of poverty (Jalilian & Kirkpatrick, 2002; Stiglitz, 1994; Zhuang *et al.*, 2009; Appiah *et al.*, 2020).

The second part of the argument considers the poverty-reinforcing effects of financial development through information asymmetry, adverse selection, and moral hazards (Stiglitz, 1994; Holden &

Prokopenko, 2001; Edelberg, 2004; De Haan and Sturm, 2017). According to this argument, financial development in a situation of information asymmetry may result in adverse selection and moral hazard that reinforce poverty through income inequalities. Adverse selection occurs in the financial sector because of information asymmetry between participants such as lenders and borrowers (Triki & Gajigo, 2014; Edelberg, 2004; Majic *et al.*, 2015). For example, when lenders lack the necessary information about the repayment capacity of borrowers, they either grant loans at unfavorably high-interest rates to hedge against risks of insolvency or rely on collateral and a history of previous loan repayments. Such practices are likely to exacerbate income inequality and worsen poverty in communities by favoring the rich based on collateral and positive loan repayment history (Majic *et al.*, 2015; De Haan and Sturm, 2017).

2.2 Empirical Review

The empirical studies on the financial development - poverty reduction relationship remain mixed. Appiah, *at. al.* (2020) using a fully modified ordinary least squares (FMOLS) on five African emerging economies from 1995 to 2015 found financial development proxied by liquid liability as a percentage of GDP or bank domestic credit as a percentage of GDP is useful in achieving poverty reduction. Based on similar proxies of financial development (liquid liability as a percentage of GDP or bank domestic credit as a percentage of GDP); Ho & Lyke (2017) examined the causal link between financial development and poverty reduction in China over a period between 1985 and 2014 using the Toda-Yamamoto causality test. Their findings revealed a significant influence of financial development on poverty reduction. Asare & Barfi (2021) used Autoregressive Distributed Lag (ARDL) on quarterly data from Ghana between 1990 and 2019 and found higher levels of financial sector development significantly help to reduce poverty.

Zahonogo (2017) explored the relationship between financial development and poverty, encompassing 42 sub-Saharan African countries using the system Generalized Method of Moments (GMM). His findings revealed that there exists a threshold of financial development; above this threshold the relationship between financial development and poverty levels is negative and below it the relationship becomes positive.

Kiendrebeogo & Minea (2016) found that financial development measured by private credit to GDP ratio is associated with a decline in both the proportion of poor people and the extent to which individuals' income falls below the poverty line. De Haan *et al.*, (2022) using fixed effects estimation for an unbalanced panel of 84 countries from 1974 to 2014 found that financial development proxied by either the ratio of private credit to GDP or the IMF composite index does not directly affect the poverty gap but only affects it indirectly through income inequality.

Wardana *et al.*, (2023) conducted a study in Indonesia spanning from 1986 to 2018 using several measures of financial development including the domestic credit to private sector, broad money, and financial development index. Based on the Autoregressive Distributed Lag (ARDL) bound testing approach, they found that there is a negative relationship between financial development and poverty levels. Zhang & Naceur (2019) considered the five dimensions of financial development (financial access, depth, stability, liberalization, and efficiency) across a broad sample of 143 countries. Their results were largely in line with Wardana *et al.*, (2023). They found that, while higher levels of financial liberalization tend to increase poverty, the other dimensions of financial development (depth, access, efficiency, and stability) significantly reduce it. Donou-

Adonsou & Sylwester (2016) lend further insight into the relationship between financial development and poverty through their study involving 71 developing countries over a period between 2002 to 2011. Using the two-stage least squares (2SLS) techniques they found that when the formal banking sector is dominant, financial development reduces the proportion of poor people. However, their findings revealed that, when microfinance institutions dominate the financial sector, the effects of financial development on poverty become insignificant.

Jeanneney & Kpodar (2008) contributed to this discussion by uncovering that, although financial development is associated with instabilities that tend to be regressive to the poor, the enhanced banking system that associates financial development benefits the poor in terms of easy saving facilities and smooth transaction mechanisms to the extent of outweighing the drawbacks.

Dhrifi (2013) examined the direct and indirect effects of financial development on poverty reduction incorporating 89 countries over the period between 1990 and 2011 using simultaneous equations modeling. His findings indicated that, while the direct effect of financial development on poverty reduction is evident via the channels of insurance, credit accessibility, and savings; the indirect effect is insignificant and confusing. Moreover, Kaidi *et. al* (2019) attempted to use a worldwide experience from a study involving a sample of 132 countries using the three-stage least squares method from 1980 to 2014. Their findings revealed no substantial evidence of the contribution of financial development to poverty reduction. Boukhatem (2016) used the system GMM regression technique for a panel of 67 low and middle-income countries from 1986 to 2012. His findings showed that financial development benefits the wealthy while marginalizing the poor because of the requirement for collateral securities in accessing loans from the financial sector. Boukhatem's perspective strongly aligns with González (1994) who argued that financial services are helpful only to those with productive opportunities. Abdin (2016) conducted a study in Bangladesh from 1974 to 2013. His findings revealed the existence of instabilities caused by financial development, which in turn exacerbates poverty. Bolarinwa *et al* (2021), in their study based on Africa using the system GMM over a period between 1996 and 2015, found no substantial effect of the overall financial development on poverty reduction.

In a nutshell, it is apparent that the empirical relationship between financial development and poverty reduction is largely inconclusive. For example, Appiah, *at. al.*, 2020; Ho & Lyke, 2017; Asare & Barfi, 2021; Kiendrebeogo & Minea, 2016) found a negative relationship; while Boukhatem, 2016; Abdin, 2016) found a positive relationship. Moreover, (Kaidi *et. al.*, 2019; Bolarinwa *et.al.*, 2021) found no relationship at all.

3.Data Sources and Methodology

3.1 Data Sources

The study employs unbalanced panel data covering the period from 2000 and 2021 for 36 Sub-Saharan African countries. (see, Appendix 1 for a list of countries included in the study). While financial development data were extracted from the IMF databank (IMF, 2023), data for the rest of the variables used in this study were extracted from World Development Indicators (World Bank, 2023).

The dependent variable is the poverty level proxied by the headcount ratio at \$2.15 a day (2017 PPP) (POVH). The poverty headcount ratio is the proportion of people in the population living

below the poverty line (World Bank, 2023). The indicator is selected not only because it has been used by several previous studies (Singh, 2015; Donou-Adonsou & Sylwester, 2016; Zahanogo, 2017) for comparison, but also because it fits the World Bank definition of poverty as the inability to afford a minimum standard of living (World Bank, 1990). However, the headcount ratio has the disadvantage of being unable to accommodate changes taking place in the income of the poor. Hence, to address this flaw, like Kiendrebeogo & Minea (2022) and Zahanogo (2017), this study employs an alternative indicator; the poverty gap at \$2.15 a day (2017 PPP) (POVG). The poverty gap is the ratio by which the mean income of the poor falls below the poverty line. (World Bank, 2023).

Our main independent variable is financial development (FD). Just like De Haan *et. al* (2022) and Bolarinwa *et.al* (2021); we measure financial development using the IMF composite financial development index. The Financial Development Index (FD) is a relative ranking of countries on the depth, access, and efficiency of their financial institutions and financial markets. It is an aggregate of the Financial Institutions Index and the Financial Markets Index. The index is considered to be more comprehensive by taking into consideration the multidimensional aspect of the financial systems from both financial institutions and markets (Svirydzenka, 2016).

Following the complex nature of poverty and the fact that omitting variables from the model leads to bias and inconsistent results (Frolich, 2008); the study includes inflation rate (INF), economic growth (GDP), gross secondary school enrolment (ENRL), Government final consumption expenditure (GFCE), and income inequality (GIN) as control variables (Moreno, 2011; Rewilak, 2017; Bolarinwa *et al.*, 2021). More formally; the inflation rate was included to account for the effects of changes in purchasing power with an expectation of a positive relationship with poverty indicators; such a positive relationship with poverty indicators is also expected from income inequality proxied by the Gini coefficient that was included to account for the effects of resource distribution. Economic growth measured by GDP per capita was included to account for the contribution of income with an expectation of a negative relationship with poverty indicators; such a negative relationship with poverty indicators is also expected from government final consumption expenditure and secondary school enrolment rate which were included to account for the redistributive effects of government spending and effects of human capital respectively.

3.2 Model Specification

The study employs a panel quantile regression method with fixed effects to estimate the effect of financial development on poverty levels in SSA. This method is useful in this study for the following reasons: First, it is robust to outliers and can control for endogeneity (Ma & Wang, 2022; Machado & Silva, 2019), it can accommodate large variations of poverty and financial development data among countries in SSA where there are policy variations as well (World Bank, 2023; IMF, 2023). Second, since Zahanogo (2017) claimed the existence of a nonlinear relationship between financial development and poverty levels in sub-Saharan Africa, the method is more useful due to its flexibility in capturing nonlinear relationships (see Cannon, 2018). Third, since the method is less sensitive to distributional assumptions and utilizes assumptions from the entire distribution while taking advantage of repeated observations in panel data (see, Ma & Wang, 2022), it best suits the situation of limited data availability on poverty headcount ratio and poverty gap in this study.

The baseline panel quantile regression model with fixed effects is specified as:

$$P_{it} = \alpha_{\tau} + \beta_{\tau}X'_{i,t} + (\delta_i + \theta'_{i,t}\gamma) + \varepsilon_{i,t} \quad (1)$$

Where; P_{it} is the dependent variable (poverty level) of country i at time t ; α_{τ} is the intercept term associated with τ^{th} quantile; $X'_{i,t}$ is a vector of explanatory variables for country i at time t ; β_{τ} is the parameter associated with τ^{th} quantile capturing the location effect, $(\delta_i + \theta'_{i,t}\gamma)$ is the scale effect capturing additional factors influencing the conditional mean of the dependent variable with the components of individual-specific effects (δ_i) and time-varying effects (θ'). Given the location and scale effect, the conditional quantile regression model is given as:

$$Qp_{it}(\tau/x'_{it}) = \alpha_{\tau} + \beta_{\tau}X'_{i,t} + (\delta_i + \theta'_{i,t}\gamma) + \varepsilon_{i,t} \quad (2)$$

Where: τ = is the τ^{th} quantile range

3.3 Estimation Techniques

The study employs the Quantile Method of Moments with fixed effect (MM-QR) developed by Machado and Silva (2019) to examine whether financial development affects poverty levels differently along the conditional quantiles in the distribution of poverty levels. The selected quantile range include 10th, 30th, 50th, 70th, and 90th to provide a good representation of variable relationship across the lower and upper halves of the distribution and hence enable a broad assessment of both linear and non-linear relationships. Hence, grounded on the baseline model (models 1 & 2), the study estimated the following model:

$$POV_{it}(\tau/x'_{it}) = \beta^{\tau}_{it} + \beta^{\tau}_1 FD_{i,t} + \beta^{\tau}_2 GDP_{i,t} + \beta^{\tau}_3 INFL_{i,t} + \beta^{\tau}_4 ENRL_{i,t} + \beta^{\tau}_5 GFCE_{i,t} + \beta^{\tau}_6 GINI_{i,t} \quad (3)$$

Where: POV = Poverty indicator for country i at time t ; τ = the τ^{th} quantile range; β^{τ}_{it} = non-addictive fixed effects; $FD_{i,t}$ = Financial Development of country i at time t which is the main explanatory variable. Along with the main explanatory variable, control variables included are INF = inflation rate; GDP = GDP per capita; $ENRL$ = Gross secondary school enrolment, $GFCE$ = general government final consumption expenditure, and $GINI$ = Gini Coefficient (both for country i at time t).

4. Results and Discussion

4.1 Descriptive Analysis

Table 1 presents summary statistics for the study variables. For poverty indicators (headcount ratio and poverty gap) we find large deviation of poverty levels among countries in SSA. The deviations are greater for the poverty headcount ratio at \$2.15 a day (2017 PPP) with a maximum rate of 91.5 and a minimum rate of 0.1% compared to the poverty gap at \$2.15 a day (2017 PPP) with a maximum rate of 58.5% and the minimum rate of 0. This means that, throughout the data period from 2000 to 2021, while the richest economy of sub-Saharan Africa experienced up to 0.1% of her population living below the poverty line at \$2.15 a day (2017 PPP), the poorest economy experienced up to 91.5% of her population below the defined poverty line. Also, over the same span of data period, while the richest economy of sub-Saharan Africa experienced up to no income shortfalls below the poverty line for her population on average, the poorest economy over the same period experienced up to 58.5% income shortfalls below the poverty line for her poor population

on average. Similarly, data shows a large deviation of financial development achieved among countries in SSA over the same span period. This is shown by the maximum financial development index achieved of 0.593 compared to the minimum of 0.026 achieved with the mean of 0.143 and standard deviation of 0.103. Following limited observations on the poverty gap, headcount ratio, and gini coefficient variables compared to other variables, the study is conditioned to select a proper methodology that can accommodate limited data availability which in this case is quantile panel regression.

Table 1: Summary Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
POVH	245	39.619	21.174	.1	91.5
POVG	244	15.086	11.138	0	58.5
FD	792	.143	.108	.026	.593
GDP (log)	792	7.085	.894	5.542	9.302
INF	765	9.123	30.446	-16.86	513.907
GFCE (log)	737	21.216	1.336	17.392	24.973
ENRL	515	43.415	23.718	6.197	114.715
GINI	246	43.098	7.813	29.6	64.8

Source: Authors estimates, (2023)

Table 2: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) POVH	1.000							
(2) POVG	0.964	1.000						
(3) FD	-0.277	-0.287	1.000					
(4) GDP (log)	-0.733	-0.649	0.095	1.000				
(5) INF	-0.076	-0.035	-0.097	0.091	1.000			
(6) GFCE (log)	-0.284	-0.293	0.139	0.520	0.166	1.000		
(7) ENRL	-0.286	-0.299	0.453	0.086	-0.023	0.153	1.000	
(8) GINI	0.057	0.144	-0.127	0.390	-0.063	0.302	-0.139	1.000

Source: Authors estimates, (2023)

Table 2 presents results for correlation coefficients between variables employed. The third row of the table shows that the financial development index is negatively correlated with poverty indicators both for headcount ratio and poverty gap. The relationship sign and associated coefficients suggest the possible poverty reduction effect of financial development. The overall pairwise correlation coefficients between variables are fairly moderate suggesting low multicollinearity. The high correlation between the poverty gap ratio and poverty headcount ratio could not affect our estimation since they are aimed at different models, the approach that further improved the multicollinearity case.

4.2 The Results

Tables 3 and 4 provide quantile regression results based on methods of moments on the relationship between explanatory variables and poverty indicator for headcount ratio and poverty gap respectively at \$2.15 a day (2017 PPP). The two tables show that, in moving from the 10th quantile towards the median, the relationship between financial development and poverty levels for both the poverty headcount ratio and poverty gap progressively declined before it became insignificant for quantiles above the median.

Table 3: Financial Development and Poverty Headcount Ratio

VARIABLES	$\tau = 0.10$	$\tau = 0.30$	$\tau = 0.50$	$\tau = 0.70$	$\tau = 0.90$
FD	-0.059*** (0.02)	-0.048*** (0.018)	-0.039** (0.017)	-0.029 (0.019)	-0.019 (0.022)
GDP (log)	-0.239*** (0.016)	-0.228*** (0.014)	-0.219*** (0.015)	-0.210*** (0.017)	-0.200*** (0.021)
INF	-0.07 (0.225)	-0.043 (0.172)	-0.022 (0.144)	0.001 (0.141)	0.024 (0.168)
GFCE (log)	0.033*** (0.009)	0.026*** (0.008)	0.021** (0.009)	0.015 (0.011)	0.009 (0.014)
ENRL	-0.0276* (0.016)	-0.029** (0.013)	-0.030** (0.013)	-0.031** (0.014)	-0.032* (0.017)
GINI	1.053*** (0.154)	0.942*** (0.129)	0.853*** (0.124)	0.759*** (0.135)	0.662*** (0.157)
Constant	1.049*** (0.191)	1.193*** (0.157)	1.309*** (0.147)	1.432*** (0.154)	1.558*** (0.188)
Observations	158	158	158	158	158

Note: *** P < 0.01 and **p < 0.05 and * p < 0.1 show significance at 1%, 5% and 10% respectively.

Standard errors in parentheses ()

Source: Authors estimates, (2023)

Table 4: Financial Development and Poverty Gap

Variables	$\tau = 0.10$	$\tau = 0.30$	$\tau = 0.50$	$\tau = 0.70$	$\tau = 0.90$
FD	-0.019** (0.009)	-0.018** (0.009)	-0.017* (0.010)	-0.015 (0.013)	-0.013 (0.019)
GDP (log)	-0.097*** (0.006)	-0.097*** (0.007)	-0.097*** (0.009)	-0.097*** (0.012)	-0.097*** (0.018)
INF	0.001 (0.108)	0.042 (0.091)	0.075 (0.087)	0.116 (0.096)	0.173 (0.121)
GFCE (log)	0.009* (0.005)	0.005 (0.004)	0.003 (0.005)	-0.001 (0.006)	-0.005 (0.008)
ENRL	-0.0158** (0.007)	-0.016** (0.007)	-0.016** (0.007)	-0.016* (0.009)	-0.016 (0.012)
GINI	0.526*** (0.064)	0.531*** (0.0579)	0.534*** (0.063)	0.539*** (0.078)	0.546*** (0.109)
Constant	0.437*** (0.0909)	0.536*** (0.0791)	0.612*** (0.080)	0.710*** (0.094)	0.845*** (0.131)
Observations	158	158	158	158	158

Note: *** $P < 0.01$ and ** $p < 0.05$ and * $p < 0.1$ show significance at 1%, 5% and 10% respectively. Standard errors in parentheses ()

Source: Authors estimates, (2023)

On control variables, there are slight variations in the relationship between financial development and poverty levels for headcount ratio and poverty gap. For the headcount ratio the results show that; while the inflation rate is insignificant for all quantiles, GDP per capita, Gini coefficient and education were significant for all quantiles. Further, government expenditure was significant for lower quantiles up to the median (50th quantile) and insignificant for higher quantiles.

For the poverty gap; the results show that, while the inflation rate is similarly insignificant for all quantiles, it is only GDP per capita and Gini coefficient that were significant in all quantiles. Further, while secondary school enrolment was found to have a significant relationship only up to the 70th quantile, government expenditure was significant only for the 10th quantile.

4.2 Robustness Analysis

In terms of robustness check, an additional control variable was introduced as an attempt to check the sensitivity of the model upon lessening the potential omitted-variable bias. Since institutional quality (GOV) is one of the variables that have also been applied by several poverty models (see, Zahonogo, 2017), the study included it, proxied by the average of Kaufmann *et al.* (1999) six measures of institutions namely: rule of law, voice and accountability, control of corruption, regulatory quality, government effectiveness, political stability and absence of violence. The variable is relevant since it can account for the contribution of governance and the institutional environment in determining poverty levels.

Table 5: Additional Control on Financial Development and Poverty Headcount Ratio

VARIABLES	$\tau = 0.10$	$\tau = 0.30$	$\tau = 0.50$	$\tau = 0.70$	$\tau = 0.90$
FD	-0.064*** (0.021)	-0.052*** (0.018)	-0.042** (0.017)	-0.030 (0.019)	-0.019 (0.022)
GDP (log)	-0.241*** (0.018)	-0.233*** (0.015)	-0.225*** (0.016)	-0.217*** (0.019)	-0.209*** (0.025)
INF	-0.016 (0.266)	-0.003 (0.207)	0.008 (0.167)	0.021 (0.147)	0.034 (0.162)
GFCE (log)	0.035*** (0.010)	0.029*** (0.009)	0.024** (0.010)	0.019 (0.012)	0.013 (0.015)
ENRL	-0.025 (0.017)	-0.026* (0.015)	-0.027** (0.014)	-0.029* (0.015)	-0.030* (0.017)
GINI	0.913*** (0.160)	0.845*** (0.137)	0.784*** (0.134)	0.718*** (0.152)	0.653*** (0.183)
GOV	0.035 (0.029)	0.028 (0.023)	0.021 (0.020)	0.014 (0.023)	0.008 (0.030)
Constant	1.101*** (0.194)	1.212*** (0.161)	1.313*** (0.150)	1.421*** (0.157)	1.528*** (0.190)
Observations	152	152	152	152	152

Note: *** P < 0.01 and **p < 0.05 and * p < 0.1 show significance at 1%, 5% and 10% respectively.

Standard errors in parentheses ()

Source: Authors estimates, (2023)

Table 6: Additional Control on Financial Development and Poverty Gap

VARIABLES	$\tau = 0.10$	$\tau = 0.30$	$\tau = 0.50$	$\tau = 0.70$	$\tau = 0.90$
FD	-0.020** (0.010)	-0.018** (0.009)	-0.017* (0.010)	-0.016 (0.013)	-0.014 (0.019)
GDP (log)	-0.096*** (0.008)	-0.097*** (0.007)	-0.098*** (0.009)	-0.098*** (0.013)	-0.099*** (0.018)
INF	0.019 (0.126)	0.052 (0.108)	0.079 (0.100)	0.120 (0.103)	0.168 (0.123)
GFCE (log)	0.008* (0.005)	0.006 (0.005)	0.004 (0.005)	0.001 (0.006)	-0.003 (0.008)
ENRL	-0.015* (0.008)	-0.016** (0.007)	-0.016** (0.008)	-0.016* (0.010)	-0.017 (0.012)
GINI	0.487*** (0.066)	0.496*** (0.062)	0.503*** (0.068)	0.514*** (0.088)	0.527*** (0.118)
GOV	0.007 (0.014)	0.007 (0.012)	0.006 (0.012)	0.006 (0.015)	0.006 (0.021)
Constant	0.456*** (0.096)	0.539*** (0.082)	0.608*** (0.083)	0.711*** (0.099)	0.831*** (0.133)
Observations	151	151	151	151	151

Note: *** P < 0.01 and **p < 0.05 and * p < 0.1 show significance at 1%, 5% and 10% respectively.

Standard errors in parentheses () Source: Authors estimates, (2023)

The results for robustness analysis in Tables 5 and 6 show that, although the institutional quality variable is statistically insignificant, its inclusion leaves the main results of the model stable for both headcount ratio and poverty gap. Hence we conclude that the model is robust and not dependent on specific variable choices.

4.4 Discussion

The mixed results obtained show that the relationship between financial development and poverty levels in SSA remains inconclusive as explained in both theoretical and empirical literature (see, Levine, 2004; Jalilian & Kirkpatrick, 2002; Park & Mercado, 2015; Odhiambo, 2009; Appiah *et al.*, 2020; Asare & Barfi, 2021; De Haan *et al.*, 2022; Kaidi *et al.*, 2019; Boukhatem, 2016; Abdin, 2016). However, the application of quantile panel regression in this study enables us to illustrate with ease the implication of the relationship through conditional quantiles over the distribution of poverty levels in SSA.

The declining significant relationship between financial development and poverty levels, as we move from lower quantiles to upper quantiles means that the effect of financial development on poverty reduction depends on the poverty status of an economy. That is, when poverty is above 50%, financial development has no significant contribution to poverty reduction, and otherwise the contribution is negative and statistically significant. The implication is that moderate-income poverty (preferably below 50% for both headcount ratio and poverty gap) is associated with attributes that are more supportive for individuals to access the benefits expected from the financial sector that relates to poverty reduction.

According to Sneyd (2017), high levels of poverty are associated with lack of education, diseases, unemployment, lack of durable goods, limited information availability, high birth and mortality rates, limited participation in decision-making, and social exclusion. Since most of such characteristics go contrary to the formal and informal requirements for both accessing financial services such as credit and savings facilities, and their effective economic contribution; with high levels of extreme poverty, financial development does not work so much in supporting poverty reduction. That is, less poverty is associated with decreased scale of the impediments to both access and effective contribution of financial products and services to people. This is in line with what Boukhatem (2016) and Gonzalez (1994) found, because the poor do not have the required collateral securities a requirement for accessing loans, financial development benefits the rich more, and, financial services are helpful to the poor only if they have productive opportunities.

In SSA, countries with high poverty rates above 50% such as the Democratic Republic of Congo, Burundi, and Niger are fewer, compared to the ones with poverty levels below 50% such as South Africa, Mauritius, and Gabon. However, with income inequality and social classes, it means there are still a good number of individuals from less poor countries who are too poor to access efficient financial services and products to get out of poverty. Hence, given the high levels of extreme poverty in SSA and the demonstrated relationship between financial development and poverty levels, the region's financial development cannot guarantee a solution to its crawling poverty reduction.

However, the argument does not ignore the effective role of financial development in poverty reduction advocated by several studies including Park & Mercado (2015); Odhiambo (2009);

Appiah *et al.* (2020); Asare & Barfi (2021). The negative and significant relationship observed along the lower quantiles means the study results acknowledge the fact that financial development needs some supplementary conditions to effectively work on poverty reduction.

The negative and statistically significant relationship between poverty indicators and both education variables and income variables across all the quantiles indicates that they are important factors contributing positively to poverty reduction in SSA. Similar results were also found by Zahonogo (2017) and Kaidi *et al.* (2019). Additionally, the positive and statistically significant relationship between poverty indicators and the Gini coefficient, which is similar to what Zhang & Naceur (2019) found indicates that income inequality has a detrimental effect on poverty levels in SSA. The overall implication is that, given the statistically insignificant relationship between financial development and poverty levels for the lower income segment of the population in SSA; when financial development initiatives are integrated with measures for capacity building and equality in resource distribution targeting the lower income segment of the population, poverty reduction can be more effective in SSA.

Surprisingly, the coefficient for government expenditure was positive and statistically significant only in the lower quantiles for both the headcount ratio and poverty gap. This was different from expectations implying that, higher government expenditure in SSA does not help in poverty reduction through a redistributive income effect in SSA. This can be explained by the mismanagement of government expenditure that is broadly discussed for most developing countries and the World Bank's observation that poor countries collect more tax from the poor in terms of indirect taxes such that, there is less redistributive effect in the economy (World Bank, 2022).

5. Conclusion and Policy Recommendations.

This study examines the effects of financial development on poverty reduction in SSA over the past three decades using the Quantile Method Moments (MM-QR) with a fixed effect. Two poverty indicators are used: headcount ratio and poverty gap ratio. The study covers a sample of 36 countries in sub-Saharan Africa over the period between 2000 to 2021, controlling for GDP per capita, inflation rate, education, Government expenditure, and income inequality. The selected methodology is favored due to its capacity to address issues of endogeneity and being robust to outliers.

Key findings show that, as the poverty level proxied by both the headcount ratio and poverty gap increases towards the upper quantile, its negative relationship with financial development declines and becomes insignificant after the 50th quantile. Additionally, while education and income appear to reduce poverty throughout the quantile distribution, higher income inequality increases poverty. The implication is that moderate-income poverty (preferably below 50% for headcount ratio and poverty gap) is associated with attributes such as higher production capacity, better resource distribution, and knowledge that are more supportive for individuals to access the benefits expected from financial development. Since for much of SSA extreme poverty is substantially high, financial development does not guarantee a solution to the region's poverty reduction.

The study findings suggest that to achieve satisfactory poverty reduction outcomes in SSA, there is a need for greater attention to the lower-income segment of the population. That is, if our interest

is to achieve poverty reduction with the help of the financial sector, financial development initiatives need to go along with additional measures such as human capacity development and equality in resource distribution targeting the lower income segment of the population. Through such integration, the extremely poor will be lifted to the level that they can productively participate in the financial sector, leading to an increased contributive role of financial development towards reduction.

Based on the broad measure of financial development (financial development index) that this study has employed, we could not specifically examine the dimension of financial development which is more sensitive to poverty levels across the quantile distribution. Given the various dimensions of financial development (financial depth, access, efficiency, and stability); it could also be valuable to examine each dimension to unveil the area of financial development with a greater effect on poverty reduction across the conditional quantiles. Since such an approach has been beyond the scope of this study, we propose further studies on such areas for specificity in policy directives.

Acknowledgement

We would like to thank anonymous reviewers and editors of this journal for helpful comments that enriched earlier versions of this study. The views and opinions expressed in this study are those of the authors and do not necessarily reflect those of the Editorial Board of the African Journal of Economic Review.

References

- Abdin, J. (2016). Financial development and poverty reduction: Exploring the links between the issues using evidence from Bangladesh. *International Journal of Financial Research*, 7(4), 44-65.
- Appiah, M., Frowne, D. I., & Tetteh, D. (2020). Re-examining the nexus between financial development and poverty reduction: evidence from emerging economies. *Applied Economics Journal*, 27(2), 125-144.
- Asare, P., & Barfi, R. (2021). The impact of the Covid-19 pandemic on the Global Economy: emphasis on poverty alleviation and economic growth. *Economics*, 8(1), 32-43.
- Bolarinwa, S. T., Adegboye, A. A., & Vo, X. V. (2021). Is there a nonlinear relationship between financial development and poverty in Africa? *Journal of Economic Studies*, 48(7), 1245-1266.
- Boukhatem, J. (2016). Assessing the direct effect of financial development on poverty reduction in a panel of low- middle-income countries. *Research in International Business and Finance*, 37, 214-230.

- Byaro, M., Kinyondo, A., & Lemnige, D. A. (2023). Does sub-Saharan Africa's rapid population growth have positive or negative effects on aggregate domestic investment? A panel quantile regression. *World Affairs*, 00438200231168288.
- Byaro, M., Rwezaula, A., & Ngowi, N. (2023). Does internet use and adoption matter for better health outcomes in sub-Saharan African countries? New evidence from panel quantile regression. *Technological Forecasting and Social Change*, 191, 122445.
- Cannon, A. J. (2018). Non-crossing nonlinear regression quantiles by monotone composite quantile regression neural network, with application to rainfall extremes. *Stochastic environmental research and risk assessment*, 32, 3207-3225.
- De Haan, J., & Sturm, J. E. (2017). Finance and income inequality: A review and new evidence. *European Journal of Political Economy*, 50, 171-195.
- De Haan, J., Pleninger, R., & Sturm, J. E. (2022). Does financial development reduce the poverty gap? *Social Indicators Research*, 161(1), 1-27.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2020). The Global Findex Database 2017: Measuring financial inclusion and opportunities to expand access to and use of financial services. *The World Bank Economic Review*, 34(Supplement_1), S2-S8.
- Dhrifi, A. (2013). Financial development and poverty: What role for growth and inequality. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(4), 119-129.
- Donou-Adonsou, F., & Sylwester, K. (2016). Financial development and poverty reduction in developing countries: New evidence from banks and microfinance institutions. *Review of development finance*, 6(1), 82-90.
- Edelberg, W. (2004). Testing for adverse selection and moral hazard in consumer loan markets. *Available at SSRN 515903*.
- Frolich, M. (2008). Parametric and nonparametric regression in the presence of endogenous control variables. *International Statistical Review*, 76(2), 214-227.
- Gonzalez Vega, C. (1994). Do financial institutions have a role in assisting the poor?
- Green, C. J., Kirkpatrick, C. H., & Murinde, V. (2005). How does finance contribute to the development process and poverty reduction? *Finance and Development: Surveys of Theory, Evidence and Policy*, 1-26.
- Ho, S. Y., & Iyke, B. N. (2017). Does financial development lead to poverty reduction in China? Time series evidence. *Journal of Economics and Behavioral Studies*, 9(1 (J)), 99-112.
- Holden, P., & Prokopenko, V. (2001). Financial development and poverty alleviation: issues and policy implications for developing and transition countries.

- IMF. (2016). *Financial development in Sub-Saharan Africa: promoting inclusive and sustainable growth*. International Monetary Fund.
- IMF. (2023). Financial Development Data. Online: <https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B&sId=1480712464593>
- Jalilian, H., & Kirkpatrick, C. (2002). Financial development and poverty reduction in developing countries. *International journal of finance & economics*, 7(2), 97-108.
- Jauch, S., & Watzka, S. (2016). Financial development and income inequality: a panel data approach. *Empirical Economics*, 51, 291-314.
- Jeanneney, S. G., & Kpodar, K. (2008). Financial development and poverty reduction: can there be a benefit without a cost?
- Kaidi, N., Mensi, S., & Ben Amor, M. (2019). Financial development, institutional quality, and poverty reduction: worldwide evidence. *Social Indicators Research*, 141, 131-156.
- Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999). Aggregating governance indicators (Vol. 2195). World Bank. *Development Research Group, Macroeconomics and Growth, and World Bank Institute, Governance, Regulation, and Finance*.
- Kiendrebeogo, Y., & Minea, A. (2016). Financial development and poverty: evidence from the CFA Franc Zone. *Applied Economics*, 48(56), 5421-5436.
- Klapper, L., El-Zoghbi, M., & Hess, J. (2016). Achieving the sustainable development goals. *The role of financial inclusion*. Available online: <http://www.ccgap.org>. Accessed, 23(5), 2016.
- Leal Filho, W., Lovren, V. O., Will, M., Salvia, A. L., & Frankenberger, F. (2021). Poverty: A central barrier to the implementation of the UN Sustainable Development Goals. *Environmental Science & Policy*, 125, 96-104.
- Levine, R. (2004). Finance and growth: theory and evidence [Working Paper 10766]. *Recuperado de* <http://www.NBER.org/papers/w10766.pdf>.
- Liu, Q. Q., Yu, M., & Wang, X. L. (2015). Poverty reduction within the framework of SDGs and Post-2015 Development Agenda. *Advances in Climate Change Research*, 6(1), 67-73.
- Ma, W. and Wang, L. (2022). Improved composite quantile regression and variable selection with nonignorable dropouts. *Random Matrices: Theory and Applications*, 11(01), p.2250010.
- Machado, J. A., & Silva, J. S. (2019). Quantiles via moments. *Journal of Econometrics*, 213(1), 145-173.
- Majic, T., Pongrac, B., & Richter, G. (2015). Information asymmetry and moral hazard in financial economics. *Tehnički glasnik*, 9(2), 209-215.

- McKinnon, R.I. (1973). Money and capital in economic development (Washington, DC: Brookings Institution, 1973). *McKinnon Money and Capital in Economic Development 1973*.
- Moreno, S. (2011). Financial development and poverty in developing countries: a causal analysis. *Empirical Economics*, 41, 57-80.
- Mukherjee, P., Roy Chowdhury, S., & Bhattacharya, P. (2021). Does financial liberalization lead to financial development? Evidence from emerging economies. *The Journal of International Trade & Economic Development*, 30(8), 1263-1287.
- Nair, T. S. (2016). In pursuit of an inclusive finance-scape in India: Changing course, shifting goals. *Social Development Report 2016*, 279-94.
- Nanda, V. P. (2015). The journey from the millennium development goals to the sustainable development goals. *Denv. J. Int'l L. & Pol'y*, 44, 389.
- Odhiambo, N. M. (2009). Finance-growth-poverty nexus in South Africa: A dynamic causality linkage. *The Journal of Socio-Economics*, 38(2), 320-325.
- Park, C. Y., & Mercado, R. (2015). Financial inclusion, poverty, and income inequality in developing Asia. *Asian Development Bank Economics Working Paper Series*, (426).
- Rewilak, J. (2017). The role of financial development in poverty reduction. *Review of development finance*, 7(2), 169-176.
- Shaw, E.S. (1973). Financial Deepening in Economic Development. New York: *Oxford University Press*.
- Singh, R. J., & Huang, Y. (2015). Financial deepening, property rights, and poverty: Evidence from Sub-Saharan Africa. *Journal of Banking and Financial Economics*, (1 (3)), 130-151.
- Sneyd, A. (2015). The poverty of 'poverty reduction': the case of African cotton. *Third World Quarterly*, 36(1), 55-74.
- Stiglitz, J.E. (1994). The role of the state in financial markets. *The World Bank economic review*, 7(suppl_1), Washington, DC: World Bank, pp.19-52.
- Svirydzenka, K. (2016). *Introducing a new broad-based index of financial development*. International Monetary Fund.
- Triki, T., & Gajigo, O. (2014). Credit bureaus and registries and access to finance: new evidence from 42 African countries. *Journal of African Development*, 16(2), 73-101.
- United Nation. (2023). Global sustainable development report 2023. Online: <https://reliefweb.int/report/world/global-sustainable-development-report-2023-times-crisis-times-change-science-accelerating-transformations-sustainable-development>

- United Nations Development Programme (UNDP). (2023). The global Multidimensional Poverty Index (MPI) 2023. Online: <https://hdr.undp.org/system/files/documents/hdp-document/2023mpireportenpdf.pdf>
- United Nations, 2015. The Millennium Development Goals Report. Online: https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20%28July%201%29.pdf
- Wardana, W.W., Diwanegara, R., Prisandy, R.F. and Rohim, A. (2023). Does Financial Development Alleviate Poverty? Empirical Evidence from Indonesia. *Journal of Developing Economies (JDE)*, 8(1).
- World Bank. (1990). Adjustment Lending Policies for Sustainable Growth. *Policy and Research Series*, Washington D. C., World Bank.
- World Bank. (2018). Poverty and Shared Prosperity 2018: *Piecing Together the Poverty Puzzle*, Washington DC.
- World Bank. (2022). Poverty and shared prosperity 2022: *Correcting course*. The World Bank.
- World Bank. (2023a). *March 2023 Update to the Poverty and Inequality Platform (PIP): What's New* (No. 27). The World Bank.
- World Bank. (2023b). *World development indicators 2023*. Online: <https://databank.worldbank.org/source/world-development-indicators>
- Zahonogo, P. (2017). Financial development and poverty in developing countries: evidence from Sub-Saharan Africa. *International Journal of Economics and Finance*, 9(1), pp.211-220.
- Zhang, R., & Naceur, S. B. (2019). Financial development, inequality, and poverty: Some international evidence. *International Review of Economics & Finance*, 61, 1-16.
- Zhuang, J., Gunatilake, H. M., Niimi, Y., Khan, M. E., Jiang, Y., Hasan, R., ... & Huang, B. (2009). Financial sector development, economic growth, and poverty reduction: A literature review. *Asian Development Bank Economics Working Paper Series*, (173).
- Ziolo, M., Bak, I., & Cheba, K. (2021). The role of sustainable finance in achieving sustainable development goals: Does it work? *Technological and Economic Development of Economy*, 27(1), 45-70.

Appendix 1: List of countries included in the analysis

S/N	Country	S/N	Country	S/N	Country
1.	Angola	13.	Ethiopia	25.	Mozambique
2.	Benin	14.	Gabon	26.	Namibia
3.	Botswana	15.	Gambia, The	27.	Niger
4.	Burkina Faso	16.	Ghana	28.	Nigeria
5.	Burundi	17.	Guinea	29.	Rwanda
6.	Cabo Verde	18.	Guinea-Bissau	30.	Senegal
7.	Cameroon	19.	Kenya	31.	Sierra Leone
8.	Chad	20.	Lesotho	32.	South Africa
9.	Congo, Dem. Rep.	21.	Madagascar	33.	Sudan
10.	Congo, Rep.	22.	Mali	34.	Tanzania
11.	Côte d'Ivoire	23.	Mauritania	35.	Togo
12.	Eswatini	24.	Mauritius	36.	Uganda