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Financial institutions, poverty and severity of poverty in Sub-Saharan Africa

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Abstract

The study assesses how financial institution dynamics have affected poverty and the severity of poverty in 42sub-Saharan African countries for the period 1980-2019. In order to increase for policy relevance of the study, three financial development indicators are used, namely: financial institutions depth,financial institutions access and financial institutions efficiency. The adopted empirical strategy is a quantile regressions approach which enables the study to assess how financial institutions dynamics affect poverty and the severity of poverty throughout the conditional distribution of poverty and severity of poverty. The findings show various tendencies, *inter alia*: (i) financial institutions depth (efficiency) consistently decrease the severity of poverty (poverty headcount)and (ii) financial institutions access consistently decreases both poverty and the severity of poverty and the decreasing effect increases with increasing levels of poverty in the top quantiles and throughout the conditional distribution of the severity of poverty. Policy implications are discussed with respect of SDG1 on poverty reduction.

***Keywords*:** financial development; poverty alleviation; Africa

***JEL Classification*:** G20; I10; I20; I30; O10

1. Introduction

The purpose of this study is to assess how financial institutions in terms of depth, access and efficiency have affected poverty and the severity of poverty in Sub-Saharan Africa (SSA). The premise of the study builds on two fundamental foundations in the policy and scholarly literature, notably: (i) the importance of addressing the poverty concern in SSA in the light of the post-2015 global development agenda related to sustainable development goals (SDGs) and (ii) gaps in the literature. These two underlying premises are expanded in turn.

First, the policy syndrome of poverty is as old as humanity and policy concerns surrounding how the underlying policy syndrome can be addressed have been central in economic, social and political discussions, especially in the light of achieving most SDGs (Nwani & Osuji, 2020). The high poverty rate in SSA has left millions of people in the region without decent avenues for livelihood given the apparent unequal distribution of the fruits of economic growth, poor economic governance and entrenched inequality (Asongu & Nwachukwu, 2016; Tchamyou, 2019). In spite of some efforts that have been made in the direction of addressing poverty in SSA, the number of poor is growing in absolute terms owing to the population rising at a faster rate than the rate of poverty reduction (Asongu & le Roux, 2017). With the contemporary poverty line of 1.90 USD per person per day, in 2019, SSA edged Asia to become the region hosting the highest number of the world's poorest population (Nwani & Osuji, 2020). It is therefore of policy relevance to assess how various financial and economic outcomes affect poverty reduction in SSA, not least, because poverty eradication or SDG1 is the first bold goal of the United Nation's sustainable development agenda.A complementary motivation for the study is an apparent gap in the scholarly literature.

Second, as discussed in Section 2.2, the contemporary literature has not assessed the importance of financial development in reducing poverty as considered within the framework of this study. The closest study in the literature to the present research is by Ofori, Armah, Taale and Ofori (2021) who have assessed the effectiveness of financial development and information and communication technology (ICT) in mitigating the intensity and severity of poverty in SSA. The empirical evidence is based on panel corrected standard errors estimation and generalized method of moments (GMM) estimation techniques. The finding shows that while ICT skills mitigate poverty, the incidence is more apparent when financial development is pronounced.

The present study departs from Ofori et al. (2021) by directly assessing the nexus between financial institutions and poverty and putting into perspective the conditional distribution of poverty and the severity of poverty. Hence, the adopted estimation strategy takes into account the conditional distribution of poverty and the severity of poverty. Accordingly, it is argued in this study that the effect of financial institutional dynamics on poverty dynamics can be contingent on initial levels of poverty dynamics, such that, the effect differswhen initial levels of poverty are high compared to when initial levels of poverty are low. It follows that blanket finance-poverty policies are unlikely to succeed unless they are tailored towards existing poverty levels. The quantile regression strategy adopted in the present study takes into account initial levels of poverty in the finance-poverty nexus.

The rest of the study is structured as follows. The theoretical underpinnings and literature review are covered in Section 2 while the data and methodology are discussed in Section 3. Section 4 presents the findings while Section 5 concludes with implications and future research directions.

2. Theoretical underpinnings and literature review

2.1 Theoretical underpinnings

The investigated nexus between financial institutions and poverty is informed by theoretical strands in the inclusive development literature which posit for the importance of financial development in reducing inequality and alleviating poverty (Tchamyou, Erreygers & Cassimon, 2019). Consistent with the corresponding literature, poverty reduction is possible if and when citizens are provided with financial access opportunities, especially when the poorest fraction of the population lacks basic access to commodities that enhance wellbeing owing to limited or no financial access (Beck, Demirgüç-Kunt & Levine, 2007; Tchamyou & Asongu, 2017a; Asongu & Odhiambo, 2018). These more contemporary perspectives are consistent with less contemporary scholarly views supporting the importance of enhanced financial access opportunities as a means of promoting inclusive development outcomes, *inter alia*: Greenwood and Jovanovic (1990); Galor and Zeira(1993), Galor and Moav (2004) and Aghion and Bolton (2005).

In accordance with Tchamyou et al. (2019), the relationship between financial development and poverty alleviation can be theoretically substantiated with two main underpinnings: the intensive and extensive margin theories. First, in the light of the intensive margin theory, financial development can reduce poverty when existing bank customers are provided enhanced financial access services, especially

when these existing customers entail a significant proportion of the poor population (Chipote, Mgxekwa & Godza, 2014). Second, when the attendant financial services are extended to people who did not previously have access to financial services by means of bank accounts, the extensive margin theory applies (Odhiambo, 2014; Orji, Aguegboh & Anthony-Orji, 2015; Chiwira, Bakwena, Mupimpila & Tlhalefang, 2016). The extensive margin theory is even more feasible and apparent when and/or if majority of the people without bank accounts are from the poor fraction of the population such that, improved financial access opportunities for poverty reduction are associated with extension of bank services to those who hitherto did not have access to formal bank accounts (Evans & Jovanovic, 1989; Holtz-Eakin, Joulfaian& Rosen, 1994; Black & Lynch, 1996; Bae, Han & Sohn, 2012; Batabyal & Chowdhury, 2015).

2.2 Literature review

Relative to extant literature on the dynamics of financial sector activities on poverty, a number of studies have revealed different results from different regions in the world. Although there has been a mix (some results show a positive relationship while others show a negative relationship) in the results obtained concerning the influence of financial development on poverty, the majority of the extant literature records a positive influence. Tsaurai (2020) studied the financial development-poverty nexus in BRICS (Brazil, Russia, India, China and South Africa) by using the pooled ordinary least squares, fixed effects and fully modified ordinary least squares for the period 1994 to 2013. Results from the study showed that financial development and foreign direct investments jointly influence poverty reduction.

Majid *et al.* (2019) carried out a study to investigate if financial development reduces poverty Indonesia. Data was employed from the year 1980 to 2014 and the Autoregressive Distributed Lag (ARDL) method was used to capture the long-run relationship between financial development and poverty. They equally made use of the Vector Error Correction Model (VECM) to demystify the direction of influence (the causal relationship) between financial development and poverty in Indonesia. As results, the study found that there exists a long-run relationship between financial development and poverty and that there equally exists a bi-directional relationship between financial development and poverty. Equally, Keho (2017) examined the relationship between financial development, economic growth and poverty reduction in selected African countries from the period 1970 to 2013. The study used

the (ARDL) method. Results proved a long-run relationship among the variables and financial deepening was found to have a positive effect on poverty reduction in some of the countries.

Rashid and Intartaglia (2017) examined the impact of financial development on poverty reduction in developing countries for the period 1985 to 2008. Their empirical evidence was backed by the use of the two-step system GMM estimator and consequently, results revealed that financial development significantly reduces absolute poverty but no significant results were recorded in terms of the influence of financial development on relative poverty. The findings went ahead to show that financial sector development impacts the reduction of poverty to a greater extent when there is high economic growth. Thus, a mix of measures and policies should be put in place that will enhance the reduction of both absolute and relative poverty in developing countries.

Zahonogo (2016) investigated how financial development affects poverty indicators in 42 SSA countries from the year 1980 to 2012 by using the GMM estimator which is particularly appropriate when controlling for endogeneity and country specific problems. The results revealed that there exists a financial development threshold above which financial development could be associated with lower levels of poverty and below which financial development will greatly deteriorate conditions for the poor. It concludes on the premise that the relationship between financial development and poverty reduction is not the same for countries in SSA. Abosedra *et al.* (2015) carried out a study on the linkages between financial development and poverty in Egypt. Quarterly data was used from 1975Q1 to 2011Q4. For empirical evidence, they used the structural break autoregressive distributed lag-bounds approach and the results showed that financial development, proxied by domestic credit to the private sector reduces poverty. This therefore means that financial sector development is a direct channel which eases and broadens access to financial services by the poor. Their results equally showed that financial development reduces poverty through economic growth in Egypt. This translates the existence of an indirect channel in the financial development-poverty relationship.

A study carried out by Danduane (2014) on financial sector development, economic growth and poverty reduction in Nigeria, made use of times series data covering the period 1970-2011 to empirically investigate the relationship between the said variables. He adopted the ARDL model alongside the Toda and Yamamoto causality

test and the results revealed that financial sector development does not lead to poverty reduction in Nigeria. He concludes on the term that financial development although being important, is not sufficient for poverty reduction. Chemli (2014) examined the relationship between financial development and poverty reduction in eight MENA countries notably, Algeria, Egypt, Iran, Jordan, Mauritania, Morocco, Tunisia and Yemen. She employed data from 1990 to 2012 and made use of the ARDL model method of analysis. The empirical results showed that financial development works for the betterment of the poor although access to credit remains a major problem for the poor.

Uddin *et al.* (2013) investigated the relationship between financial development, economic growth and poverty reduction in Bangladesh. The study employed quarterly data for the period 1975 to 2011. They used a number of regression methods, amongst which were the ARDL, Ordinary Least Squares (OLS), Error Correction Model (ECM) and VECM. Results showed that there is a long-run relationship between financial development, economic growth and poverty reduction in Bangladesh. Fowowe and Abidoye (2013) in examining the effect of financial development on poverty and inequality in African countries found that financial development does not influence poverty and inequality in African countries in any significant way. The results were achieved by the use of the system GMM estimator after careful consideration to mark out possible data related errors.

Odhiambo (2010) in his study on financial development and poverty in Kenya, studied to find out if financial development in Kenya is a spur to poverty reduction by using the cointegration and error-correction mechanism methods in a trivariate causality model. He finds a distinct causal flow from financial development to poverty reduction. Another interesting finding from his study was a bi-directional causality between savings and poverty reduction in Kenya. To close up, Jalilian and Kirkpatrick (2005) equally carried out a study on the contribution of financial development to poverty reduction in developing countries by employing a panel data analysis for the period 1960 to 1995. They studied tested for the causal relationship between financial sector development and poverty reduction and it was established that financial development leads to poverty reduction through enhanced economic growth.

3. Data and methodology

3.1 Data

The study focuses on 42 countries in SSA for which data is available at the time of the study for the period 1980-2019[1]. As apparent in Appendix 1, the data come from two main sources, namely: the Global Findex database and World Development Indicators (WDI) of the World Bank. Consistent with Ofori et al. (2021), two main poverty indicators are employed: (i) the poverty headcount ratio at national poverty lines (% of population) to proxy for poverty and (ii) the severity of poverty generated as the squared of poverty gap index.

Three main financial institution variables are adopted, namely: financial institutions depth (FID) index; financial institutions access (FIA) index and financial institutions efficiency (FIE) index. This is consistent with financial development literature on the need to improve policy relevance by taking into account dynamics of depth, access and efficiency (Asongu & Nting, 2021). In order to control for variable omission bias, seven control variables are adopted in accordance with recent inclusive development literature (Tchamyou et al., 2019; Ofori et al., 2021; Asongu & Nting, 2021), namely: inflation, foreign aid, government expenditure, gross domestic product (GDP) growth, foreign direct investment, inequality and remittances. While inflation, foreign aid and inequality are expected to increase poverty, the expected signs from the other control variables are contingent on initial levels of poverty and the severity of poverty. What is quite evident is that the adopted control variables have been documented to influence inclusive development. Hence, we should be confident that they would display some significant nexuses, irrespective of signs.

Appendix 1 provides the definitions and sources of the variables while the Appendix 2 discloses the corresponding summary statistics. A correlation matrix which is provided in Appendix 3 enables to study to avoid concerns of multicollinearity that can severely affect the expected signs of the investigated nexuses (see Asongu, Biekpe & Cassimon, 2020, 2021).

3.2 Methodology

In accordance with the motivation of the research which is to assess how financial institutions affect poverty dynamics throughout the conditional distribution of poverty dynamics, a quantile regression (QR) methodology is adopted because it is

[1]The 42 countries are: "*Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo Democratic Republic; Congo Republic; Cote d'Ivoire; Ethiopia; Gabon; Gambia, The; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique; Namibia; Niger; Nigeria ; Rwanda; Sao Tome and Principe; Senegal; Seychelles; Sierra Leone; South Africa; Sudan;Tanzania; Togo; Uganda and Zambia*".

consistent with the problem statement being examined. Accordingly, with the QR technique, low, intermediate and high initial levels of the outcome variable are articulated (Billger& Goel, 2009; Asongu, 2013; Tchamyou & Asongu, 2017b; Boateng *et al*. 2018; Asongu, Soumtang & Edoh, 2021).

It is also important to emphasize that relative to the OLS technique in which the error terms are assumed to be distributed normally, with the QR approach, the residuals are not assumed to be distributed normally. Furthermore, with the QR technique, estimated parameters are obtained from various points of the conditional distribution of the dependent variable (Koenker & Bassett, 1978; Keonker & Hallock, 2001). Accordingly, the θ^{th} quantile estimator of poverty isderived by solving for the optimization problem in Equation (1), which is disclosed without subscripts for simplicity in presentation.

$$\min_{\beta \in R^k}\left[\sum_{i\in\{i:y_i\geq x_{i'}\beta\ \}}\theta\left|y_i-x_{i'}\beta\right|+\sum_{i\in\{i:y_i<x_{i'}\beta\ \}}(1-\theta)\left|y_i-x_{i'}\beta\right|\right], \quad (1)$$

where $\theta\in(0,1)$. Relative to OLS that is predominantly based on minimizing the sum of squared residuals; multiple quantiles are considered with the QR approach that is based on the sum of absolute deviations for all quantiles. For instance, in the technique, multiple quantiles such as 10th and 90thquantiles (with θ=0.10 or 0.90, respectively) are minimised by weighing approximately the residuals. The conditional quantile of poverty or y_i given x_i is:

$$Q_y(\theta / x_i) = x_{i'}\beta_\theta \quad (2)$$

where for the respective θth determined quantile, unique slope parameters are estimated. This formulation is parallel to $E(y/x)=x_{i'}\beta$ in the OLS slope in which parameters are assessed purely at the average of the conditional distribution of poverty. For the model in Eq. (2), the dependent variable y_i is the poverty or severity of poverty indicator while x_i contains a constant term,*financial institutions depth; financial institutions access, financial institutions efficiency*, *inflation, foreign aid, government expenditure, gross domestic product (GDP) growth, foreign direct investment, inequality and remittances*.

4. Empirical results

Tables 1-2 provide the empirical findings in this section. Table 1 is focused on the nexus between financial institutions and poverty headcount while Table 2 is concerned with the relationship between financial institutions and the severity of poverty. From the findings, it is apparent that the motivation for adopting the QR strategy is justified because compared to the OLS results, the QR findings are distinct in terms of significance and magnitude of significance. In other words, the responses of poverty dynamics to financial institutions dynamics differ with initial level of poverty headcount and the severity of poverty. The results as provided in Tables 1-2 are reported in terms of: (i) S-shape, (ii) U-shape, (iii)thresholds and (iv) estimated coefficients that do not belong to the first-two categories.

Prior to presenting the findings, it is worthwhile to clarify the notion of thresholds as employed in this study. Such a notion of threshold is consistent with Asongu (2014, 2017) when the responses of the outcome variable to the independent variable of interest are assessed throughout the conditional distribution of the outcome variable. A positive threshold is employed when estimated coefficients reflect either an increasing positive or increasing negative tendency from bottom to top quantiles. In the same vein, a negative threshold is used when estimated coefficients reflect a decreasing positive or decreasing negative tendency throughout the conditional distribution of the attendant poverty distribution. Conversely, an S-shape is apparent when throughout the conditional distribution of poverty: (i) the effects of estimated coefficients decrease and then increase before decreasing again throughout the poverty distribution and (ii) the impacts of estimated coefficients increase and then decrease before increasing again throughout the poverty distribution. U-shapes and inverted U-shapes are by definition apparent in an S-shaped tendency.

The following findings are apparent in Table 1 on the nexus between financial institutions and poverty headcount: (i) financial institutions depth increases poverty, with an inverted U-shape tendency from the median to the 90th quantile of the poverty distribution; (ii) financial institutional access decreases poverty, with a positive threshold from the median to the 90th quantile of the poverty distribution; (iii) financial institutions efficiency decreases poverty with an S-shape tendency throughout the conditional distribution of poverty.

The following findings are apparent in Table 2 on the nexus between financial institutions and the severity of poverty: (i) financial institutions depth decrease the severity of poverty with a positive threshold from the 25th to the 90th quantitle; (ii) financial institutions access decrease poverty with a positive threshold throughout

the conditional distribution of the severity of poverty and (iii) financial institutional efficiency increases poverty in the bottom quantiles, the effect is negative in the top quantile of the severity of poverty distribution. Most of the control variables are significant.

Overall, the main differences between Table 1 and Table 2 are that: (i) while financial institutions depth increases poverty headcount in the top quantiles, it decreases the severity of poverty from the 25th to the 90th quantile and (ii) financial institutions efficiency, which previously decreased poverty headcount throughout the conditional distribution now only decreases the severity of poverty in the top quantile, with the effect positive in the bottom quantile of the same distribution. What is also apparent is that, financial access consistently decreases both poverty headcount and the severity of poverty and the decreasing effect increases with increasing levels of poverty headcount in the top quantile and throughout the distribution of the severity of poverty. It follows that at least for the top quantile of poverty distribution and throughout the conditional distribution of the severity of poverty, the decreasing response of poverty to financial institutions access is an increasing function of the levels of poverty. In other words, the effect of financial institutions access in decreasing poverty is consistently higher with increasing levels of poverty.

Table 1: Financial institutions and poverty headcount

	Dependent variable: Poverty headcount					
	OLS	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**
Constant	**54.703*** **	**38.758*** **	**43.726*** **	**49.833*** **	**63.257*** **	**75.995*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Financial Institutions Depth	**17.047*** **	**15.978*** **	-5.333	**22.956*** **	**31.845*** **	**18.275*** **
	(0.000)	**(0.000)**	(0.127)	**(0.000)**	**(0.004)**	**(0.000)**
Financial Institutions Access	**-16.088*** **	**-60.879*** **	-4.407	**-6.246***	**-13.278*** **	**-20.024*** **
	(0.000)	**(0.000)**	(0.297)	**(0.052)**	**(0.004)**	**(0.000)**
Financial Institutions Efficiency	**-18.386*** **	**-11.897*** **	**-9.957*** **	**-18.843*** **	**-27.994*** **	**-18.262*** **

	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Inflation	**0.001*** **	**0.001** **	**0.001***	**0.001***	0.0009	0.0003
	(0.000)	**(0.031)**	**(0.088)**	**(0.040)**	(0.254)	(0.634)
Foreign Aid	**0.380*** **	**0.381*** **	**0.481*** **	**0.399*** **	**0.341*** **	**0.191*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Government Expenditure	0.010	0.012	0.008	0.008	-0.002	-0.0008
	(0.322)	(0.450)	(0.647)	(0.520)	(0.915)	(0.963)
GDP growth	**-0.222*** **	**-0.298*** **	**-0.293*** **	**-0.208*** **	-0.119	-0.146
	(0.004)	**(0.000)**	**(0.001)**	**(0.002)**	(0.210)	(0.114)
Foreign Direct Investment	**0.121** **	0.104	**0.189** **	0.048	-0.015	**0.168** **
	(0.020)	(0.130)	**(0.010)**	(0.383)	(0.848)	**(0.032)**
Inequality (Gini)	**0.036** **	**0.074*** **	**0.039***	**0.051*** **	0.014	**-0.040***
	(0.023)	**(0.001)**	**(0.086)**	**(0.003)**	(0.565)	**(0.096)**
Remittances	**0.063*** **	**0.100*** **	**0.095*** **	0.013	-0.043	-0.036
	(0.000)	**(0.000)**	**(0.000)**	(0.500)	(0.137)	(0.202)
Trade	**-0.059*** **	**-0.075*** **	**-0.074*** **	-0.009	0.010	**-0.045*** **
	(0.000)	**(0.000)**	**(0.000)**	(0.408)	(0.531)	**(0.004)**
R^2/Pseudo R^2	0.278	0.245	0.153	0.188	0.182	0.095
Fisher	**65.54*** **					
Observations	1680	1680	1680	1680	1680	1680

*,**,***: significance levels of 10%, 5% and 1% respectively. OLS: Ordinary Least Squares. R^2 for OLS and Pseudo R^2 for quantile regression. Lower quantiles (e.g., Q 0.1) signify nations where poverty headcount is least.

Table 2: Financial institutions and severityof poverty

	Dependent variable: Severity of Poverty					
	OLS	Q.10	Q.25	Q.50	Q.75	Q.90
Constant	**13.396*** **	**-1.425** **	**-1.778***	**4.605** **	**15.495*** **	**33.381*** **
	(0.000)	**(0.023)**	**(0.079)**	**(0.016)**	**(0.000)**	**(0.000)**
Financial Institutions Depth	**-16.635*** **	1.380	**-3.214***	**-10.949*** **	**-16.477*** **	**-31.151** **
	(0.000)	(0.192)	**(0.060)**	**(0.001)**	**(0.008)**	**(0.038)**
Financial Institutions Access	**-42.995*** **	**-10.327*** **	**-17.062*** **	**-22.523*** **	**-34.263*** **	**-69.390*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Financial Institutions Efficiency	-3.859	**3.960*** **	**9.432*** **	**12.203*** **	5.684	**-20.408***

	(0.325)	**(0.000)**	**(0.000)**	**(0.000)**	(0.193)	**(0.054)**
Inflation	**0.002*** **	**0.002*** **	**0.002*** **	**0.001*** **	**0.008*** **	0.0005
	(0.000)	**(0.000)**	**(0.000)**	**(0.006)**	**(0.000)**	(0.859)
Foreign Aid	0.012	**0.032** **	**0.096*** **	**0.155*** **	**0.305*** **	-0.112
	(0.781)	**(0.010)**	**(0.000)**	**(0.000)**	**(0.000)**	(0.524)
Government Expenditure	-0.005	**0.010***	**0.017** **	**0.030***	-0.006	0.029
	(0.729)	**(0.057)**	**(0.044)**	**(0.059)**	(0.823)	(0.698)
GDP growth	-0.112	-0.022	**-0.125*** **	**-0.136***	**-0.300***	-0.250
	(0.324)	(0.390)	**(0.003)**	**(0.090)**	**(0.052)**	(0.504)
Foreign Direct Investment	-0.047	**0.045** **	0.052	0.069	-0.082	-0.339
	(0.539)	**(0.042)**	(0.142)	(0.308)	(0.528)	(0.283)
Inequality (Gini)	**0.119*** **	-0.0007	**0.024** **	**0.045** **	**0.078***	**0.299*** **
	(0.000)	(0.919)	**(0.028)**	**(0.030)**	**(0.053)**	**(0.002)**
Remittances	**-0.092*** **	**0.031*** **	**0.022***	0.031	-0.048	**-0.285** **
	(0.000)	**(0.000)**	**(0.080)**	(0.204)	(0.302)	**(0.013)**
Trade	**0.064** **	**0.009** **	0.004	**-0.033** **	0.009	**0.265*** **
	(0.015)	**(0.032)**	(0542)	**(0.017)**	(0.711)	**(0.000)**
R^2/Pseudo R^2	0.116	0.026	0.073	0.090	0.097	0.142
Fisher	**35.31*** **					
Observations	1680	1680	1680	1680	1680	1680

*,**,***: significance levels of 10%, 5% and 1% respectively. OLS: Ordinary Least Squares. R^2 for OLS and Pseudo R^2 for quantile regression. Lower quantiles (e.g., Q 0.1) signify nations where severity of poverty is least.

5. Concluding implications and future research directions

The study has assessed how financial institutions dynamics have affected poverty and the severity of poverty in Africa using data from 1980 to 2019 from 42 sub-Saharan African countries. In order to increase for policy relevance of the study, three financial development indicators have been used, namely: financial institutions depth, financial institutions access and financial institutions efficiency. The adopted empirical strategy is a quantile regressions approach which has enabled the study to assess how financial institutions dynamics affect poverty and the severity of poverty throughout the conditional distribution of poverty and the severity of poverty. The findings provided show various U-shape, S-shape, inverted U-shape and threshold tendencies, notably: financial institutions depth (efficiency) consistently decrease the severity of poverty (poverty headcount) while financial institutions access consistently decreases both poverty headcount and the severity of poverty and the decreasing

effect increases with increasing levels of poverty headcount in the top quantiles and throughout the distribution of the severity of poverty. It follows that at least for the top quantiles of poverty and throughout the conditional distribution of the severity of poverty, the decreasing response of poverty to financial institutions access is an increasing function of the levels of poverty. In other words, the effect of financial access in decreasing poverty is consistently higher with increasing levels of poverty and the severity of poverty.

The findings above clearly show that blanket financial development policies designed to reduce poverty are unlikely to be effective unless these policies are contingent on initial levels of poverty and tailored towards different initial levels of poverty. The policies should also be contingent on the financial policy instruments being leveraged upon. For instance, we have shown that the financial institutions access mechanism is the most effective financial instrument in reducing poverty and the severity of poverty. Moreover, the financial institution access should be considered by policy makers with specific knowledge of the fact that its effect in decreasing poverty consistently increases with increasing levels of poverty. The findings obviously have policy implications in terms of SDG1 on poverty reduction.

Poverty reduction is an issue everywhere in the world and in all its forms. Moreover, itis the first bold initiative of the SDGs agenda or SDG1 of ending poverty. In SSA where the concern is most apparent in the light of the narrative in the introduction, financial institutions (especially the financial access channel) should be improved in the sub-region as a means to reducing poverty and the severity of poverty. When such financial access resources are being mobilized, policy makers should also bear in mind the fact that for similar cross-country financial access resources, the effect on reducing poverty is higher in countries where poverty is comparatively higher and vice versa.

The findings in this study obviously leave room for further research especially as it pertains to considering other poverty measurements and mechanisms by which such poverty proxies can be addressed. Moreover, it would be interesting to provide policy makers and scholars with insights into whether the findings established in this study withstand empirical scrutiny within the framework of other regions in the world.

Appendices

Appendix 1: Definitions and sources of variables

Variables	Definitions	Sources
Poverty Headcount	Poverty headcount ratio at national poverty lines (% of population)	WDI (World Bank)
Severity of poverty	"Poverty severity, which measures the degree of inequality among the poor by putting more weight on the position of the poorest". Squared of poverty gap index	Generated
Financial Institutions Depth Index	"*The Financial Institutions Depth (FID) Index, which compiles data on bank credit to the private sector, pension fund assets, mutual fund assets, and insurance premiums (life and non-life) as percentages of GDP*".	Findex (World Bank)
Financial	"*The Financial Institutions Access (FIA) Index,*	Findex (World

Institutions Access Index	*which compiles data on the number of bank branches and the number of automatic teller machines (ATMs) per 100,000 adults*"	Bank)
Financial Institutions Efficiency Index	"*The Financial Institutions Efficiency (FIE) Index, which compiles data on the banking sector's net interest margin, the lending–deposits spread, the ratios of non-interest income to total income and overhead costs to total assets, and the returns on assets and equity*".	Findex (World Bank)
Inflation	Inflation, consumer prices (annual %)	WDI (World Bank)
Foreign Aid	Net Official Development Assistance received (% of GNI)	WDI (World Bank)
Government Expenditure	General government final consumption expenditure (% of GDP)	WDI (World Bank)
Economic growth	GDP growth (annual %)	WDI (World Bank)
Foreign Investment	Foreign direct investment, net inflows (% of GDP)	WDI (World Bank)
Income Inequality (Gini)	"The Gini coefficient is a measurement of the incomedistribution of a country's residents".	WDI (World Bank)
Remittances	Remittance inflows (%GDP)	WDI (World Bank)
Trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI (World Bank)

GDP: Gross Domestic Product. GNI: Gross National Income. WDI: World Development Indicators. IMF: International Monetary Fund.

Appendix 2: Summary Statistics

	Mean	S.D	Min	Max	Obs
Poverty Headcount	48.215	14.055	7.900	73.200	1680
Severity of Poverty	16.529	22.480	0.000	169.299	1681
Financial Institutions Depth	0.097	0.147	0.000	0.880	1680
Financial Institutions Access	0.077	0.128	0.000	0.880	1680
Financial Institutions Efficiency	0.494	0.199	0.000	0.990	1680
Inflation	32.026	593.191	-13.056	23773.13	1680
Foreign Aid	11.345	11.527	-0.250	94.946	1680
Government Expenditure	5.353	25.868	-17.463	565.538	1680
GDP growth	3.635	5.173	-50.248	35.224	1680
Foreign Direct Investment	2.938	6.456	-28.624	103.337	1680
Inequality (Gini)	53.250	19.829	0.000	86.832	1680
Remittances	4.385	17.842	0.000	235.924	1680
Trade Openness	67.240	35.588	6.320	311.354	1680

SD: Standard Deviation. Min: Minimum. Max: Maximum.

Appendix 3: Correlation matrix (uniform sample size: 1680)

	PovHC	SoPov	FID	FIA	FIE	Infl	NODA	Gov.	GDPg	FDI	Gini	Remit	Trade
PovHC	1.000												
SoPov	0.071	1.000											
FID	-	-	1.000										

	0.069	0.207											
FIA	-0.264	-0.283	0.412	1.000									
FIE	-0.338	-0.146	0.312	0.305	1.000								
Infl	0.055	0.066	-0.025	-0.022	0.001	1.000							
NODA	0.375	0.084	-0.251	-0.164	-0.246	-0.013	1.000						
Gov.	-0.044	-0.023	0.036	0.018	0.073	-0.095	0.092	1.000					
GDPg	-0.111	-0.036	0.001	0.029	0.069	-0.062	-0.017	0.146	1.000				
FDI	0.004	-0.050	0.058	0.196	-0.010	-0.017	0.069	0.031	0.081	1.000			
Gini	0.120	0.139	0.001	-0.156	-0.034	0.012	0.097	0.017	0.005	-0.094	1.000		
Remit	0.082	-0.046	0.111	-0.013	-0.052	-0.009	0.034	0.088	0.031	0.014	0.044	1.000	
Trade	-0.146	-0.054	0.255	0.380	0.005	-0.028	-0.056	0.083	0.059	0.308	-0.040	0.305	1.000

PovHC: Poverty Headcount. SoPov: Severity of Poverty. FID: Financial Institutions Depth. FIA: Financial Institutions Access. FIE: Financial Institutions Efficiency. Infl: Inflation. NODA: Foreign Aid. Gov: Government Expenditure. GDPg: Gross Domestic Product growth. FDI: Foreign Direct Investment. Gini: the Gini Coefficient. Remit: remittances.

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