Microfinance, Financial Development, Foreign Aid, and Income Inequality: Evidence from Sub-Saharan Africa

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ABSTRACT

This paper examines the effects of microfinance, financial development and foreign aid on income inequality for 43 Sub-Saharan African (SSA) countries. Panel data for the period 1995–2015 is examined using fixed effects, pooled ordinary least square and system generalized method of moments (GMM) estimation techniques. Findings suggest that although foreign aid plays a determining role in explaining the dynamics of inequality in SSA, it does not appear to be pro-poor. Moreover, the results reveal that both microfinance and financial development contribute to narrowing the income gap between the poor and the rich and to reducing inequality. This implies that providing access to loans through microfinance institutions or bank-based financial system offer to the poor the potential for income-generating activities. Furthermore, the empirical evidence suggests that GDP per capita growth and government expenditures appear to be pro-poor. While a rapid population growth, high levels of inflation, FDI and trade openness are correlated, positively and significantly, with greater income inequality. These results have important policy implications for SSA. Enhancing the efficiency of social protection, promoting progressive taxation and distributional effectiveness of fiscal are crucial to address income inequalities.

Keywords: Income Inequality, Microfinance, Financial Development, Foreign Aid, Sub-Saharan Africa
JEL Classifications: C23; D63; F35; O55

1. INTRODUCTION

The issue of inequality in Africa, especially in Sub-Saharan African (SSA) region has received limited attention historically from a research, policy and political perspective. However, Africa ranks as one of the regions with the highest level of inequality, following Latin America and the Caribbean (LAC). Indeed, together with LAC, SSA stands also one of the very few regions that experienced an average drop in the level of inequality when the Gini coefficient ranged from 0.472 in 1990 to 0.445 in 2011. Although the decline in the average unweighted Gini by around 3.4% points during this period, SSA remains one of the most unequal regions of the world over the last two decades.

It is well documented that extreme inequality is detrimental to growth and development as well as to peace and security like impede the sustainability of economic growth, weaken social cohesion and increasing unemployment and social tensions (Kuznets, 1955; Clarke 1995; Barro, 2000; Stewart, 2011; Voitchovsky, 2011; Stiglitz, 2012). Thus, to achieving the Sustainable Development Goals (SDGs) in SSA countries over the next 15 years, "reducing inequality within and among countries" became the overarching goal of the 2030 Agenda for Sustainable Development endorsed by world leaders in September 2015.

Meeting the SDGs objective "leaving no one behind," and reaching and sustaining income growth of the bottom 40% of the population at a rate higher than the national average' is also a target by 2030 in SSA. Hence, to overarching this objective, SSA governments, private sector actors and international organizations must pay considerable attention to the appropriate measurements as a panacea for reducing inequality. In fact, there are various ways

to narrowing the income gap between the poor and the rich and to reducing inequality, including through strengthened financial sector development and benefit from foreign aid (loans, bilateral grants, food aid, infrastructure financing, multilateral grants), as well as the rise of microfinance institutions (MFIs) as along with other benefits, these tools seem to be a panacea for channeling private saving to economic activities or create new ones (Ahlin and Jiang, 2008; Banerjee et al., 2015), helping the poor by reducing barriers to access credit, thereby increasing access of the poor to financial services, providing safety-net and consumption smoothening and increasing women's self employment opportunities and enhancing access to health and education (Morduch and Haley, 2002; Kabeer, 2005; Fishman, 2012; Kumar, 2016).

Nevertheless, there have been considerable debates, in recent times, on the motives of foreign aid and financial development as well as microfinance and its effectiveness on development and income inequality reduction. Although, there are various success reviews of foreign aid (e.g. Addison et al., 2005; Bjørnskov, 2010; Shafiullah, 2011; Olofin, 2013; Girma, 2015) and financial sector development (e.g. Li et al.,1998; Clarke et al., 2006; Beck et al., 2007; Kappel, 2010; Shahbaz et al., 2015; Jauch and Watzka, 2016; Younsi and Bechtini, 2018), and microfinance (see, e.g. Ahlin and Jiang, 2008; Kai and Hamori, 2009; Tchouassi, 2011; Bangoura et al., 2016; Lacalle-Calderon et al., 2019) it has been the topic of various criticizes that have sparkled a heated debate among researchers about the effectiveness of foreign aid (Layton and Nielson, 2008; Chong et al., 2009; Herzer and Nunnenkamp, 2012; Saidon et al., 2013; Sharma and Abekah, 2017; Younsi et al., 2019), financial development (Batuo et al., 2010; Sehrawat and Giri, 2015; Kaidi and Mensi, 2019) and microfinance (Hermes, 2014; Arif et al., 2019; Ali and Ghoneim, 2019; Castells-Quintana et al., 2019) on income inequality reduction. The nexus between foreign aid, financial development, and microfinance and its effects on income inequality still remain controversial as the true relationship has not been identified.

The objective of this paper is therefore to examine and discuss the role played by foreign aid, financial development and microfinance in reducing income inequality effect. To the best of the authors' knowledge, none of the previous researches have explored the co-evolution of aid, financial development and microfinance as potential factors explaining inequality. This paper will thus try to fill this gap in the literature by examining the interaction between these factors and its effects on income inequality reduction, while controlling other variables such as per capita GDP growth, inflation, FDI net inflows, government spending, trade openness and population growth for 43 SSA countries by using panel data covering the period 1995-2015. For the empirical evidence, we employ fixed effects (FE), pooled ordinary least square (POLS) and dynamic system generalized method of moments (system-GMM) estimators.

This paper is organized as follows. The next section reviews the literature on the effects of foreign aid, financial development and microfinance on income inequality. Section 3 describes the data and the econometric methodology. Section 4 discusses the empirical results. Section 5 concludes with some suggestions.

2. LITERATURE REVIEW

2.1. Foreign Aid and Income Inequality

The relationship between foreign aid and income inequality has received substantial attention over the past two decades. The following review explains the effect of foreign aid on income inequality. Layton and Nielson (2008) investigate the foreign aid and its impact on income inequality for a panel of 82 countries over the period 1975-2005, and fail to find a significant positive relationship between foreign aid and income inequality reduction. Using cross-section and system-GMM panel techniques, Chong et al. (2009) find that foreign aid has no robust effect on income inequality for a large sample of countries over the period 1970-2002. Bjørnskov (2010) find that the interaction of foreign aid and democracy is robustly and positively related to income inequality in 88 recipient countries over the period 1960-2000. However, this study suggests that foreign aid leads to a more unequal income distribution in democratic developing countries, whereas in autocratic countries, its effects remain slight. The study of Shafiullah (2011) reveals that foreign aid helps to lessen income inequality in 94 countries over the period 1989-2008. Herzer and Nunnenkamp (2012) suggest that foreign aid exhibits an inequality rising effect on income distribution while using credible dataset from 21 recipient countries during 1970-1995.

Olofin (2013) shows that total foreign aid and food aid have statistically significant effects on income inequality in 8 West African countries over the period 1975-2010. Saidon et al. (2013) examine the effect of sectoral foreign aid on income inequality for 75 recipient countries over the period 1995-2009. Their findings indicate that aid to economic sector lead to a significant reduction in income inequality, while aid to multi-sector contributes to raise income inequality. Castells-Quintana et al. (2019) find that foreign aid has a significant impact on income inequality reduction in 18 Latin American countries for the period 1990-2008. Girma (2015) expounds that as well to fostering growth, foreign aid helps to reduce income inequality in Ethiopia. For the case of Sub-Saharan African countries, Pham (2015) finds that foreign aid contributes to worsening income inequality over the period 1990-2011. Sharma and Abekah (2017) examine the linkage between foreign aid and FDI and its effects on income inequality for a panel of 71 African and South American countries from 1970 to 2014. Their findings show that FDI leads to lessen income inequality, while foreign aid increases it. The study discloses that the extent of the effects appear stronger in South American countries rather than African ones. In a recent study, Younsi et al. (2019) investigate the effect of foreign aid on income inequality in 16 African countries over the period 1990-2011 by applying random effect and system-GMM estimators. The empirical results indicate that foreign aid leads to increases of income inequality if not accompanied by sound policies, programs and regulations.

2.2. Financial Development and Income Inequality

The linkage between financial development and inequality has received considerable attention from scholars and policymakers in the past few decades, and several studies highlighted that strong financial development contributes to reduce income inequality. For example, Li et al. (1998) prove that developed financial

sector helps to decrease income inequality in 49 developed and developing countries over the period 1947-1994. Clarke et al. (2006) examine the finance-income inequality nexus for 83 countries over the period 1960-1995.Their empirical findings reveal that in addition to fostering growth, financial development helps to reduce income inequality. Using a panel dataset covering 72 countries from 1960 to 2005, Beck et al. (2007) provide evidence that financial development excessively improves incomes of the poorest quintile and lessens income inequality. Batuo et al. (2010) examine the effect of financial development on income inequality for a panel of 22 African countries over the period 1990-2004, and fail to find any evidence of an inverted U-shaped linkage between financial development and inequality in these countries.

Using a panel data for 78 developing and developed countries during 1960-2006, Kappel (2010) show that financial development remains to have a significant negative effect on inequality for middle- and high-income groups, though there is no evidence for low-income groups. Jalil and Feridun (2011) find that well-developed financial sector leads to a significant reduction in income inequality in China during the period 1978-2006. Elmi and Ariani (2011) find that financial development extensively decreases income inequality in Middle East and North of Africa region over the period 2004-2008. For Iran, Shahbaz et al. (2015) find that financial development reduces income inequality, while economic growth worsens income distribution over the period 1965-2011. Sehrawat and Giri (2015) show that financial development worsens income inequality fairly widen the gap between the poor and the rich in India for the period 1982-2012. Jauch and Watzka (2016) find a significant contribution of financial development on the growth effect of income inequality in 138 developing and developed countries over the period of 1960-2008. Similarly, Seven and Coskun (2016) show that financial development significantly contributes to reduce income inequality in 45 emerging countries over the period 1987-2011. Shahbaz et al. (2017) examine the long-run relationship between financial development and income inequality in Kazakhstan for the period 1991-2011. Their empirical results suggest that financial development significantly reduces income inequality, while economic growth worsens it, and both trade openness and inflation raise income distribution. In a recent study, Younsi and Bechtini (2018) find that financial development significantly lessens income inequality in BRICS countries by using annual panel data covering the period 1990-2015. Their findings suggest that well-developed financial sector is essential for fighting income inequality through increasing financial services availability to the poor for financing their capital investments. Based on annual panel data covering 93 democratic and 31 autocratic countries from 1980 to 2014, Kaidi and Mensi (2019) analyze the effects of financial development on income inequality and poverty, and provide empirical evidence that suggests that, in autocratic countries, financial development contributes to widening the gap between the poor and the rich and to raising poverty, while in autocratic countries, it helps to reduce income inequality and poverty.

2.3. Microfinance and Income Inequality

While the existing literature reveals that though research on the linkage between microfinance and poverty using different set of countries, data and estimation techniques are voluminous, less attention has been paid to inequality and there exist a few recent works that have addressed the relationship between microfinance and income inequality at the macro level in recent decades.

For instance, Ahlin and Jiang (2008) analyzed the long-run impacts of microcredit on development, measured by per capita income, inequality and poverty, while applying an occupational choice approach, and find that microfinance leads to lower long-run inequality and poverty by creating subsistence payoffs less widespread and rising the income of the poor people. By using the computable general equilibrium (CGE) model from 1999 to 2000, Mahjabeen (2008) shows that microfinance in Bangladesh reduces inequality and improves social welfare. The author further suggests that microfinance is one of the required critical interventions for empowering the poor people. Kai and Hamori (2009), and Tchouassi (2011) used a cross-country empirical study to explore the influence of microfinance on income inequality in developing countries, including those in Africa. The authors measured the degree of microfinance intensity by both the number of MFIs and the number of active borrowers from MFIs. The empirical results show that income inequality is negatively and significantly influenced by microfinance intensity. Their studies suggested that microfinance intensity plays an important role in creating a financial system endowed with the equalizing effect. Hermes (2014) examines the impact of microfinance intensity on income inequality for a panel of 70 developing countries over the period 2000-2008 using OLS and IV estimations and shows that the effects of microfinance on reducing income inequality are relatively small due to the small size of the microfinance sector. It is concluded that microfinance should, therefore, not be seen as a panacea for bringing down income inequality in a significant way.

Bangoura et al. (2016) examine the relationship between microfinance intensity and its effects on poverty and inequality in 52 developing countries over the period 1996-2011 by using heterogeneous panel causality techniques. Empirical results reveal that microfinance has a significant negative effect on income inequality, suggesting that countries with high level of microfinance intensity, is generally associated with a lower level of income inequality. The study further suggests that providing access to loans through microfinance offers to the poor the potential for income-generating activities. More recently, Lacalle-Calderon et al. (2019) provide evidence that microfinance has an egalitarian effect on income inequality in 85 countries over the period 2001-2012. The study further indicates that an increased in the macro-scale of microfinance activities in each country could be one effective tool for reducing country's inequality, among others. Arif et al. (2019) failed to find a significant negative effect of microfinance on income inequality in Indonesia from 2011 to 2016, suggesting that providing financial access to the poor cannot reduce the level of income inequality. Ali and Ghoneim (2019) examined the impact of microfinance on income inequality using cross-country analysis data for 30 developing countries from 2013 to 2015. Their findings suggest that microfinance is weak enough to reduce income inequality. Using a panel dataset covering 87 developing countries over the period 1995-2012, Castells-Quintana et al. (2019) show that neither microfinance nor

aid flows seem to be a panacea for reducing income inequality. The study further suggests that the effects of aid and microfinance on inequality are broadly depending on the country-specific context. While the previous studies emphasize the importance of the microfinance for the poor, it should be combined its effect with other instruments like financial development and foreign aid to effectively reduce inequalities.

3. METHODOLOGY

3.1. Data and Variables

The study employs annual time series data covering the period 1990-2015 for a panel of 43 SSA countries. The selection timeframe is due to constraints in data availability. The countries in the sample are Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Comoros, Congo, Congo Dem. Rep, Cote d'Ivoire, Djibouti, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.

The variables used in panel data models are annual growth rate of real GDP per capita (GDP in constant international dollars), inflation rate (represented by the increase in consumption price index over a 1 year period), FDI net inflows to GDP ratio, government expenditures (the value of final consumption expenditure of government relative to GDP), private credit (all funds distributed by domestic commercial banks and financial institutions to the private sector, measured by the ratio of private credit/GDP, as a proxy to measuring financial development), trade openness (the ratio exports + imports /GDP) and the rate of population growth. All data are taken from the World Bank's World Development Indicators (WDI) database (World Bank, 2015). Annual data on Gini coefficient (income inequality) are from the Standardized World Income Inequality Database (SWIID) created by Solt (2016). Net aid transfers as a share of GDP (as a proxy to measuring foreign aid) data are from the Center for Global Development (CGD) created by Roodman (2006). Data on the number of active borrowers divided by the country's total population as a proxy to measuring microfinance intensity are from Microfinance Information Exchange (MIX) market database.

3.2. Descriptive Analysis

Table 1 provides summary statistics for the dependent and explanatory variables used in the empirical analysis. It is shown that the average unweighted Gini for all countries is 43.65 with a standard deviation of 9.351 and a coefficient of variation of 0.214. This indicates that heterogeneity in inequality across countries, which was originally linked to land tenure and resource endowment, has become more acute. The average of net FDI inflows to GDP ratio is 5.248 with a standard deviation of 5.266. In addition, per capita GDP growth for our sample period 1990 to 2016 grew at an annual average growth rate of 1.27%. Inflation grew at annual rate of 9.165% with a standard deviation of 10.351 for the same period. Whilst net aid transfers as a share of GDP (foreign aid) grew at annual rate of 9.467%. However, on

average, the highest level of net aid transfers as a share of GDP (95.530) is shown in Congo democratic in 2003, while the lowest level (-0.253) is shown in Mauritius for the same year. Regarding the microfinance intensity, we observe that the number of active borrowers per capita from MFIs varies largely across countries and ranges from a minimum of 0.167 to a maximum of 4.845. This large range shows a contrasted performance among SSA in terms of microfinance loans.

The descriptive statistics show that the SSA countries also vary in terms of private domestic credit, government spending and trade openness, which vary from minimums of 0.761, -1.854 and 2.811 to maximums of 148.643, 49.992 and 225.021, respectively. Concerning the population growth rate, SSA still registers the most rapid demographic growth in the world (2.74% in 2015) over the last two decades, the lowest population growth rate (-4.445) is shown in Rwanda in 1995, while the highest growth rate (6.631) is shown in Liberia in 2000, with an average growth rate of 2.408. It is worth noting that all countries with fertility rates of at least 6.0 children per woman (Niger, Mali, Burundi, Tanzania, Republic of the Congo and Nigeria) are associated with low Gini indices below 0.44, while most countries that have advanced in the demographic transition – such as Botswana, Namibia, Seychelles and South Africa – are associated with Gini indices above 0.6. However, the results reveal that the SSA countries are widely heterogeneous and depict a large gap with regard to the considered macroeconomic and demographic variables.

Table 2 presents the pairwise correlations for our main variables. From pairwise correlations, we can observe that values are never higher than 0.5%, indicating no serious problems of collinearity. Indeed, foreign aid and financial development appear negative and statistically significant correlation with income inequality. These negative coefficients indicate that income inequality is lower in SSA countries in which the shares of net aid transfers and private domestic credit are higher. Similarly, microfinance seems to have negative correlation with income inequality, which means lower income inequality is associated with higher microfinance intensity. The GDP per capita growth and government expenditures are correlated, negatively and significantly with lower income inequality. While, trade openness, FDI net inflows, inflation and population growth are, positively and significantly, correlated with higher income inequality. The found signs between income inequality and the control variables largely corroborate the findings in earlier studies on the determinants of income inequality (Maddala G.S and Wu S 1999).

Table 1: Descriptive statistics

Variables	Mean	Std. dev.	Min.	Max.
INEQ	43.650	9. 351	29.800	65.800
GDP_GR	1.271	5.076	–47.805	36. 981
INFL	9.165	10.351	–7.764	72.812
NAT	9.467	9.748	–0.253	95.530
FDI	5.248	5.266	–8.588	54.162
NOAB	2.305	9.853	0.167	4.845
PRIV	10.831	8.962	0.761	148.643
GOV	15.395	5.679	–1.854	49.658
TRADE	65.435	28.345	2.811	225.021
POP-GR	2.408	1.358	–4.444	6.631

Source: Authors' compilations from SWIID, WDI, CGD and MIX databases

Table 2: Correlation matrix

		1	2	3	4	5	6	7	8	9	10
1	INEQ	1.000									
2	GDPGR	−0.108*	1.000								
3	FDI	0.125*	0.116*	1.000							
4	PRIV	−0.269*	0.172*	0.385*	1.000						
5	NOAB	−0.385*	0.095*	0.271	0.334*	1.000					
6	INFL	0.212*	−0.049*	−0.054*	−0.072*	−0.167	1.000				
7	GOV	−0.136*	−0.051*	0.202*	0.280*	0.188*	−0.021*	1.000			
8	NAT	−0.285*	−0.094*	−0.078	−0.164*	0.092	−0.048	−0.085*	1.000		
9	TRADE	0.113*	−0.083*	0.305	0.264*	0.108	−0.035*	0.334*	−0.265*	1.000	
10	POPGR	0.208*	−0.105*	−0.212	0.141	−0.185*	0.093	−0.248*	0.115*	−0.218*	1.000

*Indicates significance at 10% level

3.3. The Empirical Model

To examine the effects of foreign aid, financial development and microfinance on income inequality in SSA countries, we consider the model specification as follows:

$$Y_{it} = \beta_0 + \beta_i\,X_{it} + v_i + \varepsilon_{it} \tag{1}$$

In the above Eq. (1), $i = 1,\ldots, N$ represents the country and $t = 1,\ldots,$ T represents the time period, Y_{it} is the dependant variable; X_{it} is the vector of exogenous explanatory variables; v_i represents the country effect, and ε_{it} refers to the stochastic disturbance term. The fixed effect (FE) model assumes that the country effect still remains constant over time and across units while the slope coefficients β are constrained across-sectional units. Although the individual country specific intercept is not constant over time rather random. The random effect (RE) model assumes that v_i are uncorrelated with regressors/predictors. If the regressors are correlated with v_i and they are correlated with the composite error term ($v_i + \varepsilon_{it}$) and RE regression is inconsistent (Baum, 2006).

BHowever, to ensure the appropriateness between FE and RE model in the empirical estimations, we apply the Hausman test (Hausman, 1978). Indeed, the rejection of the null hypothesis means that there exists a systematic difference in the coefficients of FE and RE estimators, thus we need to employ FE rather RE model. Therefore, we use FE panel model after the rejection of the null hypothesis that takes the following form:

$$INEQ_{it} = \beta_0 + \beta_1\,GDPGR_{it} + \beta_2\,NAT_{it} + \beta_3\,PRIV_{it} + \beta_4\,NOAB_{it} + \beta_5\,FDI_{it} + \beta_6\,GOV_{it} + \beta_7\,TRADE_{it} + \beta_8\,INFL_{it} + \beta_9\,POP_{it} + v_i + \varepsilon_{it} \tag{2}$$

where INEQ represents income inequality measure, GDPGR is real GDP per capita growth , NAT is net aid transfers as a share of GDP (as a proxy for foreign aid), PRIV is private domestic credit to GDP ratio (as proxy for financial development), NOAB is the number of active borrowers divided by the country's total population, FDI is foreign direct investment net inflows as a share of GDP, GOV is government expenditure as a share of GDP, TRADE is trade openness, INFL is inflation rate, POP is population growth, v_i represents the country effect, and ε_{it} refers to the stochastic error term or disturbance that cannot be estimated for by the independent variables.

However, in order to solve the problems of heteroskedasticity and serial autocorrelations in our model specification, and ensure the statistical appropriateness and robustness of the results, we adopt two different sensitivity analyses. First, pooled ordinary least square (POLS) estimators are applied. Second, the robustness of results is checked by applying the dynamic system generalized method of moments (system-GMM) estimators proposed by Arellano and Bover (1995), and Blundell and Bond (1998). This specification commonly uses a set of instruments to deal with endogeneity problems.

Therefore, to examine the dynamic relationships between foreign aid, financial development, microfinance and income inequality, we adopt the dynamic GMM model as follows:

$$INEQ_{it} - \gamma INEQ_{it-1} = \beta_0 + \beta_1\,GDPGR_{it} + \beta_2\,NAT_{it} + \beta_3\,PRIV_{it} + \beta_4\,NOAB_{it} + \beta_5\,FDI_{it} + \beta_6\,GOV_{it} + \beta_7\,TRADE_{it} + \beta_8\,INFL_{it} + \beta_9\,POP_{it} + v_i + \varepsilon_{it} \tag{3}$$

By using the system-GMM approach, we intend to ensure that if there is an evidence of serial correlation in the dependent variable, as the regression is performed with a lagged dependent variable then the problem of serial autocorrelation of the error term in the dynamic panel model can be limited hence system-GMM could resolve this problem by taking IV instruments (Blundell and Bond, 1998). In addition, further diagnostic tests are performed to check for over-identifying restrictions of the model and also zero autocorrelation in first-differenced errors to statistically confirm the fitness of the model hence the performance of Hansen test to find AR1 and AR2 values for autocorrelation in the residuals. Indeed, AR2 value cannot be rejected under no circumstance for the acceptance of zero second-order autocorrelation evidence (Hansen, 1982). Accordingly, all the regression results (column 1- 4) presented in Table 3 confirm that there is no autocorrelation problems in the level series and over identified restriction are valid in the models.

4. EMPIRICAL RESULTS

4.1. Results of Fixed Effects Regressions

Table 4 reports the results based on FE estimation specification in which income inequality as the dependent variable. Column (1) provides interesting insight regarding the behaviour of some control variables (i.e. real GDP per capita growth, FDI net inflows, inflation, government expenditures, trade openness and population growth). While Columns (2-4) show interesting results of foreign

Table 3: Effects of foreign aid, financial development and microfinance on income inequality (POLS regressions)

Variables	(1)	(2)	(3)	(4)
GDP_GR	−0.058** (0.021)	−0.055** (0.023)	−0.062** (0.026)	−0.050** (0.020)
POP_GR	0.305** (0.101)	0.285** (0.114)	0.251** (0.106)	0.245** (0.087)
INFL	0.025*** (0.049)	0.035*** (0.053)	0.035*** (0.051)	0.038*** (0.062)
GOV	−0.167** (0.050)	−0.155** (0.043)	−0.178** (0.065)	−0.188** (0.077)
FDI	0.105** (0.022)	0.102** (0.031)	0.097** (0.032)	0.092** (0.021)
TRADE	0.025** (0.031)	0.019** (0.025)	0.017** (0.022)	0.015** (0.020)
NAT		−0.008*** (0.002)		
PRIV			−0.020** (0.005)	
NOAB				−0.014*** (0.003)
_cons	0.344*** (13.80)	0.375*** (8.11)	0.358*** (8.63)	0.365*** (8.11)
F statistic	26.45***	28.74***	30.57***	35.38***
Observations	1118	1118	1118	1118
N Countries	43	43	43	43

Robust standard errors in parentheses. ***, ** indicate statistical significance at 1% and 5% level, respectively

Table 4: Effects of foreign aid, financial development and microfinance on income inequality (FE regressions)

Variables	(1)	(2)	(3)	(4)
GDP_GR	−0.063** (0.031)	−0.065** (0.028)	−0.061** (0.026)	−0.054** (0.020)
POP_GR	0.295** (0.113)	0.254** (0.110)	0.248** (0.113)	0.229** (0.116)
INFL	0.028*** (0.066)	0.035*** (0.061)	0.041*** (0.067)	0.039*** (0.065)
GOV	−0.156** (0.058)	−0.168** (0.049)	−0.162** (0.054)	−0.170** (0.058)
FDI	0.101** (0.032)	0.088** (0.038)	0.089** (0.024)	0.095** (0.028)
TRADE	0.018** (0.023)	0.020** (0.023)	0.015** (0.021)	0.014** (0.020)
NAT		−0.008*** (0.002)		
PRIV			−0.018*** (0.005)	
NOAB				−0.013*** (0.003)
_cons	0.345*** (12.86)	0.351*** (7.98)	0.355*** (9.27)	0.382*** (6.10)
F statistic	22.76***	15.65***	17.54***	16.49***
R-squared	0.288	0.341	0.345	0.383
Hausman test	12.88***	20.61***	17.75***	15.34**
Observations	1118	1118	1118	1118
N Countries	43	43	43	43

Robust standard errors in parentheses. ***, ** indicate statistical significance at the 1% and 5% levels, respectively

aid, financial development and microfinance, and its relationships with income inequality separately.

With respect to the interesting variables and their interactions with income inequality, FE estimates show that although foreign aid plays a determining role in explaining the dynamics of inequality in SSA, and its relationship with income inequality is statistically established at 1% significance level, it does not appear to be pro-poor. We can therefore infer that aid-giving organizations alone are unlikely to end extreme inequality in SSA countries. This result may be explained by the inability of SSA to reducing inequality through foreign aid alone, but there exist other subsidies as along with other benefits that lead to lower long-run inequality by creating subsistence payoffs less widespread and rising the income of the poor. However, reducing inequalities depends mainly on a powerful targeting of aid flows and increased accountability on both sides of donors' organizations and recipients' countries. For this raison, donors should be revisit their strategies and distribute aid according to the specific needs of each state and exercise all the prudential steps and assessments to ensure that aids are used effectively to combating inequality. Our results corroborate the previous studies of Bjørnskov (2010), Shafiullah (2011), Olofin (2013), Saidon et al. (2013), Girma (2015), Pham (2015), Castells-Quintana et al. (2019) and Younsi et al. (2019), suggesting that foreign aid is weak enough to reduce income inequality, and that

the impact of foreign aid on bringing down income inequality in a significant way is mainly depending on the deepen level of responsibility and a good coordination and controls of aid flows by the donors' organizations to improve the conditions and the income of the poor.

The results also show that the effect of financial development is −0.018, which means that 1% increase in the level of financial development decreases by 0.018% income inequality. This suggesting accessing to finance through bank-based financial system contributes positively to not only narrowing the income gap between the poor and the rich, but also reducing income inequality at the macro level. Our results are consistent with previous studies by Clarke et al. (2006), Beck et al. (2007), Elmi and Ariani (2011), Jauch and Watzka (2016), Shahbaz et al. (2017), and Younsi and Bechtini (2018), concluding that well-developed financial system offers to the poor the potential for income-generating activities and helps to lessen income inequality. Yet, our results are inconsistent with those of Batuo et al. (2010), Kappel (2010), Sehrawat and Giri (2015), and Kaidi and Mensi (2019), suggesting that financial development helps the poor and the rich in the same proportions. Besides, Kim and Lin (2011), Sehrawat and Giri (2015), and Kaidi and Mensi (2019) argued that the use of a sample of countries with different levels of financial development may obscure the different roles played by this development in reducing inequalities.

However, the contradicting result is due to the fact that in a system with less developed financial intermediation, expansion of the banking sector could raise inequalities and is detrimental to the poor. However, in the developed banking system regime, financial development positively affects income distribution and, more interestingly, improves the income of the poor. Thus, a better allocation of resources to the private sector and a relaxation of credit constraints might contribute to reducing inequalities in countries with a developed banking system. However, it deteriorates the income distribution in countries where the banking system is under-developed (Dollar and Kraay, 2002; Clarke et al. 2006). In addition, a common empirical finding in the recent literature is that market-based financial and bank-based financial system imperfections could produce income inequality by hurting lenders and assisting entrepreneurs through its effect of declining the rental rate of capital (see e.g. Westley, 2001; Mookherjee).

The empirical evidence also suggests that microfinance has a positive and statistically significant impact on income inequality reduction at 1% significance level. The effect of microfinance is –0.013, which implies a 1% increase in microcredit leads income inequality to decrease by 0.013%. This indicating further that accessing microfinance credits seems to improve the income of the poorest and leads to a reduction in inequality, thus indicating that we can deduce that providing access to finance through microfinance institutions (MFIs) offer to the poor the potential for income-generating activities. The results also reveal that higher levels of microfinance contribute to narrowing the income gap between the poor and the rich. Our findings are in line with the past empirical studies of Ahlin and Jiang (2008), Mahjabeen (2008), Kai and Hamori (2009), Tchouassi (2011), Bangoura et al. (2016) and Lacalle-Calderon et al. (2019). Yet, our findings are inconsistent with the studies of Hermes (2014), Ali and Ghoneim (2019), Arif et al. (2019) and Castells-Quintana et al. (2019), suggesting that providing financial access to the poor through MFIs is weak enough to reduce income inequality. These studies further suggest that the effect of microfinance on bringing down income inequality in a significant way is broadly depending on the country-specific context.

With respect to the control variables, it seems that, at first sight, GDP growth appears to be an equalizer. The effect of GDP growth is –0.063, which means that 1% increase in economic growth may lead income inequality to decrease by 0.063%. This tends to suggest that economic growth is pro-poor in some SSA countries. We also find that the coefficient estimates as evident in Table 4 show that high levels of inflation are correlated, positively and significantly, with greater income inequality. For example, it shows that a 1% increase in inflation leads to a rising in income inequality by 0.028%. While inflation remains harmful for inequality and poverty as well as growth process. This is true independently from the levels of financial sector development and microfinance intensity. The result supports the idea that inflation rate hurts the poor by redistributing incomes to the detriment of those already living in precarious conditions and least accessing financial instruments to hedge against price instability. Moreover, the empirical results show that government expenditures play a significant role in reducing income inequality. For example, it

shows that a 1% rise in government expenditures generates a significant decrease in income inequality by 0.156%. We can conclude that government expenditures are one of the main contributing resources for the financing of different sectors such as enhancing quality health and education systems, and bridging the infrastructure deficit that impedes private sector development. While, public expenditures in SSA are improving, but still remain relatively low. This result is consistent with the empirical findings of Claus et al. (2012), Martinez-Vasquez et al. (2012) and Anderson et al. (2017), suggesting that government expenditures seem to be an effective tool for redistributing income and reducing income inequality.

With respect to population growth, a negative and significant relationship is established between income inequality and population growth. The effect of population growth is 0.295, which means that a 1% increase in population growth leads GINI index to rise by 0.295%. This implies a rapid increase in population in SSA will lead to less equal distribution of income and thus leads to worsen inequality by altering the distribution of income among labour earnings, profits, rent and interest. However, most countries that classified in demographic transition in SSA tend to have higher level of inequality. For instance, Botswana, Namibia, Seychelles and South Africa have Gini coefficients greater than 0.6 (IMF, 2015). We also find that FDI and trade openness worsen income inequality. It shows that a 1% increase in FDI level and trade openness increase inequality by 0.101% and 0.018% points, respectively. This result could be explained by the fact that the negative distributional effect of international openness is uncertain under a less developed banking system. When private credit is considered, FDI and trade openness is not found to be pro-poor. However, trade openness is unlikely to be reducing inequality when the poor do not have access to credit (Hamori and Hashiguchi, 2012; Franco and Gerussi, 2013). In addition, FDI cannot help to absorb labor demand and employment opportunities, and in fact reducing income inequality (Velde and Morrissey, 2010; Lee et al., 2013).

4.2. Robustness Analysis

To check the robustness of our results, we estimate the data through POLS and system-GMM estimators. The estimation results are reported in Tables 3 and 5.

As evident from the POLS and system-GMM estimations, we find confirmation that foreign aid, financial development and microfinance have played a determining role in explaining the dynamics of inequality in SSA countries. These interesting results confirm what found in FE regressions, which expected that strengthened financial sector development and benefit from foreign aid as well as the rise of microfinance institutions (MFIs) seem to be a panacea for channeling private saving to economic activities and helping the poor by reducing barriers to access credit, thereby increasing access of the poor to financial services, providing safety-net and consumption smoothening. Moreover, similarly to the FE regressions, we found that GDP growth and government expenditures appear to be pro-poor. Furthermore, when the specifications are tested with the POLS and system-GMM estimators (Tables 3 and 5), we find confirmation that the

Table 5: Effects of foreign aid, financial development and microfinance on income inequality (system-GMM regressions)

Variables	(1)	(2)	(3)	(4)
GDP_GR	−0.050** (0.019)	−0.050** (0.021)	−0.049** (0.028)	−0.048** (0.024)
POP_GR	0.531** (0.023)	0.449* (0.014)	0.396* (0.014)	0.351* (0.024)
INFL	0.025** (0.069)	0.031*** (0.074)	0.037*** (0.072)	0.035** (0.071)
GOV	−0.168* (0.099)	−0.176* (0.076)	−0.198* (0.069)	−0.205* (0.088)
FDI	0.108** (0.032)	0.097* (0.024)	0.092** (0.028)	0.103** (0.036)
TRADE	0.015** (0.022)	0.017** (0.021)	0.012** (0.028)	0.013** (0.018)
NAT		−0.006** (0.002)		
PRIV			−0.018** (0.005)	
NOAB				−0.013*** (0.004)
_cons	0.351*** (10.05)	0.368*** (10.46)	0.325*** (9.36)	0.346*** (6.53)
Observations	1098	1098	1098	1098
N Countries	43	43	43	43
Hansen test (P-value)	0.254	0.328	0.345	0.438
AR1 (P-value)	0.054	0.056	0.031	0.058
AR2 (P-value)	0.295	0.328	0.366	0.345

Robust standard errors in parentheses. Hansen test for over identified restriction for the instrument used in the model, AR1 test and AR2 test for detect autocorrelation in the level series.
***, **, * indicate statistical significance at the 1%, 5% and 10% levels, respectively

factors of FDI, trade openness, population growth and inflation are always correlated, positively and significantly, with greater income inequality.

In summary, it is worth mentioning that, by using the POLS and system-GMM estimators, we see that the coefficients of all the variables remain same sign and significance even magnitudes are also almost same as in the FE estimates, thus confirming that our results are robust.

5. CONCLUSION AND POLICY IMPLICATIONS

This study examines the relationship between foreign aid, financial development and microfinance and its effects on income inequality in SSA. The need to examine these dynamics is more important than ever, given the target of "leaving no one behind." However, SSA region remains one of the most unequal regions worldwide, with 11 of the world's 19 most unequal countries in the region, and the high level of inequality recorded in SSA poses a serious challenge to realizing the overarching goal of "leaving no one behind" by 2030.

By using a panel data for the period 1995-2015, and FE, POLS and system-GMM estimation techniques, our empirical results suggest that though the factors of foreign aid, financial development and microfinance seem to be relevant in explaining the inequality dynamics in the majority of SSA, nevertheless, its rising effects in reducing inequality still remain relatively low. Interestingly, we note unequal distribution of national resources is an important factor driving inequality in Africa and SSA specially. However, fiscal space (tax-GDP ratio) in SSA is still relatively low. Moreover, tax composition tends to favour indirect taxes such as the VAT, which tend to be less progressive than direct taxes, such as the income tax. Spending on social protection in SSA is improving but still remains relatively lower. Besides, it is shown that although subsidies and transfers are equalizing, inequality-induced tax regressivity is a widespread incidence, where the most SSA countries with a revenue-to-GDP ratio of 20% and above have Gini coefficients as high as 0.5. In this regard, addressing unequal access to land, enhancing the efficiency of social protection policies, promoting progressive taxation and distributional effectiveness of fiscal instruments are vital to address income disparities in SSA.

To achieving and sustaining income growth of the bottom 40% of the populations at a rate higher than the national average, towards achieving the SDGs by 2030, SSA governments must pay special attention to fiscal (taxes) and public expenditure policies. Practically speaking, in order to reducing poverty and income inequality simultaneously, the following incentive policies are required: (i) Given that the cost of microfinance is relatively high, governments should play a potential role by lowering the cost of access to microfinance through subsidies and encouraging innovation and diffusion of new technologies into the financial system; (ii) Governments can improve financial access by promoting competition between financial intermediaries, which would lead to better allocational efficiency; (iii) Governments can increase both direct taxation and well-targeted social expenditures. Indeed, increases in tax-revenue would allow greater government expenditures to reach distributional goals. Thus, tax reform system in SSA should pay attention to lowering income tax rates while widening the tax base, i.e. removing tax incentives, exemptions and concessions. This would reduce the economic, compliance as well as administrative costs of taxation and would likely augment tax-revenue; (iv) Governments can also play a determinant role by implementing macroeconomic policies that reflect the emerging deindustrialization and increased the productivity of the informal sectors.

Finally, to promote achievement of the distributional objectives in SSA, growth should focus on sectors where most of the vulnerable and marginalized households and the bottom 40% make their livelihoods, including agriculture, micro and small-scale activities.

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