

# Financial Development and Income Inequalities in Sub-Saharan Africa : The Role of Institutional Quality

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# **Financial Development and Income Inequalities in Sub-Saharan Africa: The Role of Institutional Quality**

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**Abstract:**

The objective of this paper is to evaluate the effect of institutional quality on the financial development- income inequality nexus in sub-Saharan Africa (SSA). To this end, we estimate a dynamic panel model using data from thirty-three (33) SSA countries between 1990 and 2019 employing the generalized method of moments in system. To capture financial development, we use its fourth dimensions namely depth, efficiency, access and stability, and we construct a composite index using principal component analysis. We also use institutional quality indicators. The results show that the poor quality of institutions in SSA countries reduce the effectiveness of financial development in terms of income inequality overall. However, this effect is mitigated by financial efficiency. These results are consistent with the robustness tests. These results call for the implementation of programs to strengthen institutional quality in SSA countries.

**Keywords:** Financial development, income inequality, institutional quality, Sub-Saharan Africa.

**JEL codes:** D63, K42, G20

## 1. Introduction

The issue of income inequality has been the interest of academics and policy makers since the 1990s, giving rise to a vast literature on the levers that policymakers should use to reduce income disparities between rich and poor. One part of this literature focused on the role of financial development (Hassan and Meyer, 2021; Suhaimie et al. 2021). Theoretically, two controversial theories have been put forward to analyse the effect of financial development on income inequality, namely the widening inequality hypothesis and the narrowing inequality hypothesis. According to the narrowing inequality hypothesis (Galor and Zeira, 1993; Banerjee and Newman, 1993), financial development, through financial frictions reduction mechanisms, can reduce income inequality. Conversely, the widening inequality hypothesis (Law et al. 2014) postulates that the guarantees required by the financial system to cover credit demands tend to increase inequality. Empirically, results about the impact of financial development on income inequality are mixed. On the one hand, many studies including Demir et al. (2020) and D'Onofrio et al. (2019) have documented a negative effect of financial development on income inequality. On the other hand, Shi et al. (2022) and Chiu and Lee (2019) show that greater financial development worsens income inequality. Meanwhile, a non-linear relation has also been found between financial development and income inequality (Altunbaş and Thornton, 2019; Baiardi and Morana, 2018). While these studies highlight the lack of consensus around the issue of financial development and income inequality, the reasons for this controversy, and pathways by which financial development affects income inequality remains underexplored.

Therefore, the objective of this paper is to fill this gap by assessing the role of institutional quality on the financial development-income inequality nexus. Indeed, consistent with Chinoda and Mashamba (2021), the relation between finance and income inequality might differ across countries and is contingent upon factors such as the regulatory environment and institutional quality. This study focuses on formal institutions, defined as a set of written, explicit political, legal and economic contracts and rules whose execution should be ensured by a public entity (North, 1990). We argue that institutional quality<sup>1</sup> can modify the financial development and income inequality nexus. Three theoretical arguments can explain how institutional quality may change the extent to which financial development affects income inequality. First, according to the law and finance theory (La Porta et al. 1999), political and industrial elites, who control political institutions, may use their influence and networks to gain preferential access to finance, while reducing the availability of finance to other potential competitors. Second, democracy tend to limit the influence of narrow elite groups and redistribute political power to a larger number of people who support a well-functioning financial sector (Girma and Shortland, 2008). Third, according to Chong and Grastein (2007), good institutions help to reduce income inequality through better judicial protection and limit the illicit distribution of natural resource revenues (Arezki and Gylfason, 2011; Acemoglu et al., 2005). As a result, an inadequate institutional quality can alter the effectiveness of financial development in reducing income inequality.

Following these arguments, potentials transmission channels of the impact of institutional quality on the financial development and income inequality nexus include the tax systems, social spending, and human capital. Specifically, poor tax administration and exemptions that disproportionately favour well-connected and wealthy population groups can reduce the tax base (Rose-Ackerman, 1999) and increase income inequality. Moreover, a failing bureaucratic

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<sup>1</sup> It is said to be of good quality when they promote economic development, i.e. encourage trade through reduced transaction costs and improved trust; thereby encouraging the state to respect private property (Shirley, 2013).

system tends to increase the cost of running of the government (Bourguignon and Verdier, 2000). This reduces the resources available for other uses especially social expenditures for human capital that is useful to reduce income inequality (Mauro, 1998). Since education is a lever for redistribution, the result is greater income inequality.

This assumption is more relevant in sub-Saharan Africa (SSA), stylized facts reveal first that disparities around the world remain very high and particularly in SSA. SSA has a Gini index of about 50, which is high compared to other regions.<sup>2</sup> The share of income accruing to households in the richest decile is above average in 2019 (World Income Database (WID), 2020). At least two countries can be illustrative namely the Central African Republic and South Africa with 64% and 65%, respectively. In addition, SSA has ten (10) of the nineteen (19) most unequal countries in the world. Furthermore, the share of regional income earned by the top 10% of SSA households was estimated at 54% which is high compared to other regions (Chancel *et al.*, 2023). Also, looking at country-level income inequality, the 2020 World Income Inequality Development regional update shows that the share of income accruing to households belonging to the richest decile is estimated at 50% on average in 2019 with values ranging from 64% (Central African Republic) and 65% (South Africa)<sup>3</sup>. Second, statistics show that access to finance is lower in the poorest countries than in relatively developed countries. The financial access index in SSA is around 11.63% with nearly 60% of the population not holding bank accounts (Global Findex, 2021). Within SSA countries, there are also disparities. For example, statistics show that in Botswana, there are 481.4 deposit accounts per 1,000 adults and only 6.1 per 1,000 adults for the Democratic Republic of Congo.

Furthermore, SSA is characterized by poor quality of institutions and conflict-prone regions. Indeed, according to the State Fragility Index (2019), only one country in SSA can be considered stable. Moreover, the combined policy and institutional assessment yield a score of 3.23 in 2021 (on a scale of 1 (low) to 6 (high); World Development Indicators, 2023); which is not very high. This could largely explain why SSA countries do not benefit from the redistributive impact of financial development.

The contribution of this study to the economic literature is at two levels. First, it highlights the heterogeneous nature of the effects of financial development on income inequality in specific case of SSA, which is mainly explained by the institutional quality. Only Adams and Klobodu (2016) and Law *et al.* (2014) have highlighted this relationship. However, while the first worked on a random set of countries, the latter limited their study on the effect of corruption exclusively. Thus, we extend the literature by focusing on a set of indicators of the quality of political and economic institutions. It has been demonstrated that each of these variables is likely to differently affect economic development and therefore income inequality (Chong *et al.* Calderon, 2000). Also, each of the above-mentioned indicators can influence financial development (Pagano *et al.* Volpin, 2005). Therefore, considering each indicator has the advantage to see which variable is more relevant for the institutional environment of SSA economies and consequently to formulate appropriate economic policies.

Second, this study highlights the importance of financial development as an instrument for reducing income inequality using a multidimensional approach. Firstly, financial development is measured by its four dimensions namely financial depth, financial access, financial stability and financial efficiency. This approach allows specific policy recommendation to reduce

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<sup>2</sup>Central Europe and Southeast Asia have Gini levels of 37 and 48 respectively, according to the 2020 WID regional update.23.2

<sup>3</sup> This score ranges from 0 (no inequality) to 100 (total inequality).

income inequality. Third, we compute a composite index of financial development as in a similar exercise done by Svirydzenka (2016). However, the author includes only three dimensions on its composite index. Our study goes beyond by taking into account financial stability in the construction of the index. To this end, we use data from thirty-three countries of SSA from 1990 to 2019. Through the generalized method of moments in system, we find that financial development reduces income inequality. However, the lowest institutional quality in SSA countries tend to deteriorate this reduction.

The rest of the study is organized as follows. Section 2 focuses on literature review. Section 3 presents the methodology; section 4 discusses the results and section 5 concludes.

## **2. Literature review**

### **2.1. Financial development and income inequality: theoretical background**

The relationship between financial development and income inequality has been widely discussed in the literature. Theoretically, there is a debate concerning the effect of financial development on income inequality driven by the narrowing inequality hypothesis and the widening inequality hypothesis. Indeed, according to the narrowing inequality hypothesis (Galor and Zeira, 1993; Banerjee and Newman, 1993), financial development reduces income inequality through the mechanisms of reduced financial frictions, education, and entrepreneurship. As a result, the resulting improvements in access to financial services and human capital tend to limit the intergenerational transmission of income inequality that previously existed (Coady and Dizioli, 2018; Shahbaz et al., 2015; Afesorbor and Mahadevan, 2016; Demirgüç-Kunt and Levine, 2009).

However, this theory is challenged with the widening inequality hypothesis. It states that greater financial development leads to increased income inequality (Law et al., 2014). This increase in inequality is explained by the fact that the poor are not able to access credit facilities due to the lack of collateral relationship established with financial institutions. They are also highly dependent on informal credit and financing and affected by exclusion (Bourguignon and Verdier, 2000, Canavire-Bacarreza and Rioja, 2008). However, these conditions are already acquired by the rich and allow them to benefit more from financial development. This ability of the rich indirectly prevents the poor and small businesses from accessing external finance (Law et al., 2014), which ex-post reduces their ability to improve their economic well-being (Ang, 2010).

### **2.1. Financial development and income inequality: empirical evidence**

Empirically, there are contrasting results on the effect of financial development on inequality. Indeed, while several studies confirm the negative effect of financial development on income inequality, the others conclude either to a positive effect, to a non-linear effect, or to the absence of an effect. For example, Kavya and Shijin (2020) study data from 85 countries (including 28 high-income countries, 41 middle-income countries and 16 low-income countries). Using GMMs, they find that financial development has reduced income inequality in countries over the period 1984-2014. This result corroborates the work of Zhang and Naceur (2019) on 143 developed and developing countries. They find that financial access, depth, efficiency and stability significantly reduced income inequality from 1961 to 2011. Tchamyou (2019) also finds that credit has contributed to reducing income inequality in 48 African countries between 2004 and 2014. Similarly, Demi et al. (2020), following D'Onofrio et al (2019), find that the development of local banks reduces income inequality in Italy by affecting geographic mobility and urbanization.

Conversely, Chiu and Lee (2019) use the PSTR model on a sample of 59 countries between 1985 and 2015 and find that financial development led to an increase in inequality over the period. De Haan and Sturm (2017) also find, using fixed-effect models, an increase in Gini coefficients following an increase in financial development for 121 countries from 1975 to 2005. Moreover, Altunbaş and Thornton (2019) find a non-linear effect of financial development on a panel of 121 countries. Using the fixed-effects model, they show that the impact of financial development on income inequality depends on a country's income level. This conclusion has been shared by Baiardi and Morana (2018) with respect to Euro area countries since the mid-1980s. However, Denk and Cournede (2015) find no significant effect of banking stability on income inequality in 33 OECD countries between 1970 and 2011.

## **2.2. Institutions, financial development and income inequality**

This relationship is still very little explored in literature, although it may be a determining factor in the fight against inequality and in achieving inclusive growth. Indeed, only two (2) studies to our knowledge have analyzed this relationship empirically. Thus, Law et al. (2014) assess the effects of formal institutions in the financial development-income inequality relationship. They use data from 81 countries between 1985 and 2010 and measure financial development by credits and the number of bank branches. Using the Generalized Method of Moments (GMM), they find that financial development only succeeds in reducing income inequality when institutional quality has reached a certain threshold. Below this threshold, formal institutions increase the widening of income inequality induced by financial development. Adams and Klobodu (2016) examine the effect of corruption in the relationship between financial development and income inequality in 21 SSA countries between 1985 and 2011. Financial development is measured by two measures: domestic credit to the private sector as a percentage of GDP and the ratio of money deposits to central bank assets. The Pooled Mean Group (PMG) estimator they use informs that controlling corruption from ICRG mitigates the perverse effects of financial development on income inequality.

However, these studies have limitations mainly due to their measure of financial development, which in reality only takes into account one or two financial dimensions. This paper addresses this limitation by considering all financial dimensions and a range of institutional indicators.

## **3. Methodology of the study**

### **3.1. Data and variables**

#### **3.1.1. Measure of income inequality**

The level of income inequality is captured by the Gini index before redistribution. The Gini coefficient is derived from the Lorenz curve and measures the dispersion of income distribution for a given population (Cao, 2023). This index varies between 0 and 1 (or 0 and 100). A value of 0 characterizes a perfect income distribution in which the entire population has the same level of income; it thus represents an absence of income inequality. A value close to 1 indicates a totally unequal income distribution.

The choice of this indicator is justified by two reasons. Firstly, this index covers the entire scale of living standards and thus summarizes how national income is shared. Also, as the SWIID data base normalizes income, this index facilitates comparisons between countries (Altunbaş and Thornton, 2019). Secondly, the choice of the Gini index before redistribution takes into account income inequality before it is redistributed by the tax system. This is because redistributive policies can blur the assessment of the real effect of financial access on income distribution (De Haan and Sturm, 2017).

### 3.1.2. Measuring financial development

This paper constructs a composite index based on four dimensions of financial development from Global Financial Development Database, namely financial depth, financial stability, financial access and financial efficiency. We use domestic credit to the private sector to capture financial depth ( $fd$ ). Regarding financial stability ( $fs$ ), the paper takes into account the resilience of banks to economic shocks by using the Z-score<sup>4</sup>, consistent with the European Central Bank (ECB, 2015) and the International Monetary Fund (IMF, 2019). It measures how far a bank is from insolvency and the probability of bank failures (Chiaramonte et al. 2016). Geographic inclusion variables including number of banks per 1,000 inhabitants and the number of bank branches per 10,000 inhabitants are used to measure financial access ( $fa$ ). Also, financial efficiency ( $fe$ ) is captured through the financial efficiency index (IMF, 2017).

To construct the composite index of financial development, we run a principal component analysis (PCA) using the fourth dimensions of financial development mentioned above. The PCA breaks down the phenomenon into several components. Each component provides information on the various dimensions of the new variable and assigns a weight ( $\alpha$ ) to each dimension according to the most relevant information. The component that is chosen is the one that loses the least information on the phenomenon and whose coefficient is greater than 1. Therefore, the composite index is obtained as follow:

$$FD_{it} = \alpha_1 fd_{it} + \alpha_2 fs_{it} + \alpha_3 fa_{it} + \alpha_4 fe_{it} \quad (1)$$

These data are mainly based on the banking sector. This choice is partly supported by the fact that according to the IMF (2019), banking systems offers a better sharing of risk over time than markets. Also, financial markets are poorly developed in developing countries. So, the impact of financing on income inequality can be better appreciated through the banking sector (Zhang and Naceur, 2019).

### 3.1.3. Measuring institutional quality

Institutional quality is measured using six governance indicators taken from the International Country Risk Guide (ICRG) database which captures various dimensions of the political and business climate in the States. According to the De Haan et Sturm (2017), political stability ( $PS$ ), voice and accountability ( $VA$ ) and regulatory quality ( $RQ$ ) reflect political institutions. Corruption ( $C$ ), rule of law ( $RL$ ) and government effectiveness ( $GE$ ) represent economic institutions. The study considers these variables because they capture the importance of the quality of institutions in countries economic processes and the role of access to finance in this regard<sup>5</sup> (Acemoglu and Robinson, 2013).

These variables range from 0 to 6 and reflect the quality of political institutions and the quality of economic institutions. A value of 6 reflects excellent quality of institutions, while a value of 0 represents poor-quality of institutions. Following Álvarez et al. (2018), an overall index of institutional quality is computed by average of the 6 indicators as follows:

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<sup>4</sup> It can be apprehended by the D CoVaR method of Adrian and Brunnermeier (2016). Although the latter measures each financial institution's contribution to systemic risk, the disadvantage is that it can only be used for institutions in the same space. Moreover, it does not take into account public financial institutions and foreign subsidiaries, which are very important in developing countries.

<sup>5</sup>The relevance of these variables is also raised by the work of Gani (2011) and Yerrabit and Hawkes (2015).

$$IQ_{it} = \frac{1}{n} \sum_{n=1}^6 (Corr_{it}; VA_{it}; PS_{it}; RQ_{it}; GE_{it}; RL_{it}) \quad (2)$$

### 3.1.4. Control variables

We follow the literature on the determinants of income inequality and select several control variables, namely growth, government expenditures, trade openness, level of education, urbanization, unemployment rate and inflation. Although some studies argued that economic growth constituted aggravating factors of inequalities, Rubin and Segal (2015) demonstrate that economic growth, measured by the growth rate of GDP per capita, helps to reduce income inequality, consistent with the trickle-down effect. Government expenditure approximated as a percentage of GDP can also determine income inequality. According to Bahmani-Oskooee and Zhang (2015), through multiplier effects, increased opportunities, and higher skills, newly established government projects could lead to higher living standards and, therefore, lower inequality. However, Clarke *et al.* (2006) showed that households may also use their political power to exploit the poor or pay less taxes. As a result, public consumption could increase inequality. Therefore, the expected sign can be either negative or positive.

With respect to trade openness, as measured by the sum of exports and imports relative to GDP, the literature suggests that trade openness reduces income inequality. According to the Heckscher-Ohlin-Samuelson theorem, in the event of trade openness, a country faces an increase in demand for the goods it specializes in. Since poor countries are specialized in low-skilled labor, an improvement in trade openness therefore leads to an increase in the wages of low-skilled workers and a reduction in the wages of high-skilled workers. This ultimately leads to a reduction in income inequality (Papanek and Kyn, 1986). The expected sign is therefore negative. Also, education, measured by the gross secondary school enrolment ratio in percentage, is a major determinant of income inequality as long as it can stop the inter- and intra-generational transmission of income inequality (Denk and Cournède, 2015). A negative sign is therefore expected.

Urbanization, measured by the proportion of the population living in urban areas, can also affect a country's income inequality in a positive way, especially if environmental and housing disparities and conditions are not addressed in urbanization policies (Ongo and Song, 2019). Ongo and Song (2019) also show that the unemployment rate measured by the number of unemployed persons aged 15 to 34 years as a proportion of the total number of this population group determine income inequality. This variable is justified because young people who are not unemployed are better invested in improving their living environment. On the other hand, a higher proportion of unemployed households would lead to an increase in income inequality (Checchi and Garcia-Peñalosa, 2010). Hence, the expected sign is positive. Finally, income inequality can also depend on inflation (*inf*). Indeed, according to Bahmani-Oskooee and Zhang (2014), the rich can better protect themselves against inflation through better access to financial markets.

### 3.2. Estimation technique

The model is specified as follows:

$$I_{it} = \alpha_i + I_{it-1} + \beta_i FD_{it} + \gamma_i X_{it} + \mu_i + \rho_t + \varepsilon_{it} \quad (3)$$

where  $i = 1, \dots, 25$  is the number of countries,  $t = 1, \dots, T$  is the period of the study.  $I_{it}$  is income inequality of country  $i$  at year  $t$ .  $FD_{it}$  is the financial development of country  $i$  in period

$t$ .  $X_{it}$  is a vector of control variables.  $\rho_t$  is the time effect;  $\mu_i$  is the country fixed effect that controls for time-invariant and country-specific unobservable characteristics; and  $\varepsilon_{it}$  is the error term. To evaluate the effect of institutions on the financial development-income inequality nexus, model 3 is specified:

$$I_{it} = \alpha_0 + \alpha_i I_{it-1} + \beta_i FD_{it} + \gamma_i Inst_{it} + \delta_i (Inst * FD)_{it} + \theta_i X_{it} + \mu_i + \rho_t + \varepsilon_t \quad (4)$$

where  $Inst_{it}$  is the institutional quality.  $(FD * Inst)_{it}$  represents the interaction effect of institutions and financial development on income inequality. The sample includes data from 33 countries in SSA from 1990 to 2019. Data on income inequality are from the SWIID database (2021). Data on financial development are from the Global Financial Development Database (2021). Data on ethnic fragmentation are from the database of Alesina *et al.* (2003). The control variables are from WDI (2021). Specifically, the moderating effect of institutions in the relationship between financial development and income inequality is measured by calculating the marginal effect as follows:

$$\frac{\partial I}{\partial FD} = \gamma_i + \delta_i Inst. \quad (5)$$

For any given value of the institutional quality, there are two cases. If  $\gamma + \delta < 0$ , institutions improve the effect of financial development on income inequality. On the other hand, if  $\beta + \delta > 0$ , institutions deteriorate the effect of financial development on income inequality. We assume that  $\delta < 0$  and  $\beta > 0$ .

The lagged dependent variable ( $I_{it-1}$ ) implies that our model is a dynamic model that has the advantage of taking into account the dynamics of the phenomenon of economic complexity. On the one hand, there is a strong chance that the lagged dependent variable introduced into the model is highly correlated with the error term, which may introduce a bias known as “Nickell's bias” (1981). On the other hand, the measure of natural resources may be endogenous with development outcomes (Brunnschweiler and Bulte, 2008; Awoa *et al.*, 2022). Thus, although the fixed effects OLS methodological approach is interesting, it does not protect from the endogeneity problem resulting in particular from measurement errors and/or reverse causality between our dependent variable and the explanatory variables. In this case, although this study deals with the effect of financial development on income inequality, reverse causality may be possible (Lo Prete, 2018). Furthermore, Bazillier *et al.* (2019) demonstrated that inequalities are likely to have an effect on credit through the credit demand channel and the credit supply channel. Moreover, some control variables clearly identify both the dependent variable and control variables. For example, education, unemployment, and trade determine both economic growth and income inequality (Sethi *et al.*, 2021).<sup>6</sup>

Therefore, we use the generalized method of moments estimator. The econometric literature notes that there are two types of GMM estimators for dynamic panels: the System GMM estimator (SYS-GMM) and the GMM first difference estimator (DIF-GMM).<sup>7</sup> We chose the

<sup>6</sup> In the early stages of economic development, where physical capital is the main driver of growth, inequality has a positive impact on development. In contrast, at later stages of economic development, when human capital becomes the main driver of economic growth, equality promotes investment in human capital and hence economic growth.

<sup>7</sup> The GMM-DIFF estimator of Arellano and Bond (1991) consists, for each period, of taking the first difference of the equation to be estimated in order to eliminate the effects specific to the different countries, and then instrumenting the explanatory variables of the equation in the first difference by their level values lagged by at least one period. However, this method does not allow us to assess the effect of time-invariant factors.

SYS-GMM estimator of Blundell and Bond (1998), which provides better results than the first difference estimator using Monte Carlo simulations. The latter gives biased results in finite samples when the number of instruments is not high. This bias is all the greater when the variables are time-invariant, or the study period is short, or when the specific effects are high. The SYS-GMM estimator overcomes this limitation. It combines level equations with difference equations. These two types of equations are estimated simultaneously. In the level equations, the variables are instrumented by their first differences, whereas for the level equations, additional moment conditions are used assuming that the explanatory variables are stationary.

The systemic GMM strategy uses lagged difference variables for level series and lagged levels of endogenous variables for difference series. Indeed, to address endogeneity problems due to reverse causality, one option is to find a robust instrument for measuring natural resources (Awoa *et al.*, 2023). However, since pure exogenous instruments that vary across countries and over time are scarce, ordinary instrumental variable (IV) estimators may not adequately address endogeneity bias (Lewbel, 2012; Farhadi *et al.*, 2015). SYS-GMM is also more effective at mitigating the problem of instrument weakness by using additional moment conditions. However, a well-known drawback of the SYS-GMM method is that it presents the problem of instrument proliferation. The number of instruments increases quadratically with the study duration  $T$  when estimates are made using GMM (Roodman, 2009). To correct this problem of instrument proliferation, we use the approach developed by Roodman (2009). To limit the proliferation of instruments, he recommends limiting the maximum lag of instrumental variables or using the collapse command in Stata<sup>8</sup>. In practice, to ensure that the instrumentation method is appropriate, we use a range of tests. The first is the Hansen (1982) J overidentification test. The second is the residual autocorrelation test of Arellano and Bond (1991). Thus, the instrumentation technique is validated if the null hypothesis of autocorrelation of residuals is rejected at first order and not at second order, and if Hansen's J test is not rejected.

## 4. Results

### 4.1. Descriptive statistics

According to Table A.1 in the appendix, we note that the average income inequality is around 63% for the Gini index before redistribution. Since the Gini index ranges from 0 to 100, these statistics clearly show the high level of inequality in the region, with a minimum level of around 30%. In addition, countries make extensive use of taxes and transfers to influence or modify income distribution. This is reflected in the Gini index after redistribution, which averages around 60.43%. Although it is still very high, it is still lower than before redistribution. Thus, even though the distribution of income after taxes and social transfers still varies greatly from one country to another, it tends to affect the initial distribution of income downwards. The most unequal countries before taxes and transfers generally remain so afterwards, if they tend to redistribute more.

Second, Table A.1 shows that financial development remains low on average. Indeed, the composite financial development index averages around 17 percent. This relatively low level reflects the weakness and inadequacy of financial services and instruments in most SSA countries (even though financial systems are more developed and healthier than in 1990). Specifically, the  $F_d$ ,  $F_e$ ,  $F_a$ , and  $F_s$  average 26.1, 24.40, 11.63, and 17.83 respectively. All these variables are very marginal compared to the figures for MENA or other regions which are above 40%, despite the reforms in the financial sector. However, the analyses show that financial

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<sup>8</sup> The estimates were carried out in Stata 17 software using the `xtabond2` command. This can be used to implement the two solutions proposed by Roodman (2009).

systems are performing better in terms of efficiency and financial depth in the financial development process. This can be explained by the increased importance of bank deposits and thus a lower ratio between narrow and broad money.

Also, we note that the average level of unemployment in the region is now around 8.9% of the labor force. This rate varies between approximately 1% and 44%. It should therefore be put into perspective because it conceals employment disparities between the sub-regions. The urbanization rate, on the other hand, averages around 35.8%. This level may reflect the fact that SSA countries still have more rural and landlocked areas than urban regions. The statistics also show that the countries in the sample are performing well in terms of GDP per capita growth at around 4.44% compared to the other regions, which are around 3.3% according to World Bank Annual Report. This level reflects the good economic health of the countries and the effectiveness of government policies with respect to economic activity. Government spending, on the other hand, averages only 25.9% of GDP. Although in some countries it is as high as 539.23.

Finally, the table shows a rather satisfactory openness of African economies to the rest of the world. The average level of trade openness recorded in the region is 73.56, which suggests that the financial liberalization reforms of the 1980s were relatively successful.

With respect to the institutional variables, it should be recalled that these variables fall within an interval of 0 to 6. 6 reflects very good institutional quality and 0 reflects poor quality of formal institutions. In view of the performance, we can conclude that the formal institutions of the countries in the region are of poor quality. Indeed, the analysis shows that, on average, SSA countries have an overall level of institutional quality of 1.22 out of 6. This level is well below the average and highlights the fact that the countries of the region are lagging in terms of the efficiency, reliability and credibility of their institutions. Efforts by African governments in governance are therefore recommended to improve their formal institutions.

Specifically, the variables also show very low levels. Indeed, the statistics show that the countries in the sample had a political stability index of 0.703 and a regulatory quality of 0.557 out of 6 over the period studied. These statistics reflect the fragility of states and the inability of governments to implement effective policies. The levels of control of corruption and government effectiveness are 0.367 and 0.318 respectively. Rule of law and voice and accountability also score low (0.487 and 0.468). This weakness reflects the lack of confidence of the population in the political system, which is manifested by very high rates of abstention from electoral processes. The political and economic environment is not sufficiently favorable to protect agents from expropriation by entrepreneurs.

#### **4.2. Effect of Financial development on Income Inequality in SSA**

Table 1 presents the direct relationship between financial development and income inequality in SSA. In column (1), the effect of financial access on income inequality is tested without control variables. In columns 2 to 8, the control variables are introduced successively in the model. The results show that a financial system with guaranteed access and services contributes in reducing income inequality in SSA countries. Certainly, a one-unit increase in financial access contributes in reducing income inequality by 0.1430 (column 8). This has led to a reduction in income inequality in the region, which is consistent with the inequality narrowing hypothesis of Galor and Zeira (1993). In fact, according to Shahbaz et al. (2015), when poor people's access to resources is guaranteed, they can invest in human capital. This increases the economic opportunities of disadvantaged people and the growth of productive activities (Afesorgbor and Mahadevan, 2016; Daisaka et al., 2014) and subsequently reduces income inequality.

Table 1: Effect of financial access on income inequality in SSA

	Income inequality							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>L. Gini</b>	0.080 (0.197)	0.080** (0.033)	0.948*** (0.040)	0.942*** (0.017)	0.513*** (0.123)	0.607*** (0.199)	0.542*** (0.0736)	0.3868*** (0.1112)
<b>FDI</b>	-0.095 (0.063)	-0.095*** (0.023)	-0.089 (0.155)	-0.011* (0.006)	-0.233*** (0.0544)	-0.104** (0.0428)	-0.127* (0.0772)	-0.1430** (0.0609)
<b>Trade</b>		0.0440 (0.0279)	0.00231 (0.0217)	0.266** (0.123)	-0.200* (0.117)	-0.101** (0.0437)	-0.104** (0.042)	-0.1165*** (0.0415)
<b>Urbanization</b>			15.644 (35.183)	1.581 (2.417)	0.0846** (0.0413)	0.199* (0.116)	0.579** (0.241)	0.0147*** (0.0041)
<b>Education</b>				0.263 (0.344)	0.221 (0.134)	0.0998 (0.182)	-0.140 (0.156)	0.076 (0.93)
<b>Economic growth</b>					0.0579 (0.0724)	-0.0159 (0.0681)	0.0195 (0.0149)	-0.1774 (0.1843)
<b>unemployment</b>						0.0662 (0.0607)	0.823* (0.429)	0.0193*** (0.006)
<b>Public expenditures</b>							0.482** (0.228)	0.1636*** (0.0564)
<b>Inflation</b>								0.0193*** (0.006)
<b>Constant</b>	39.448* (21.315)	39.448** (33.004)	48.441 (11.167)	85.224 (67.603)	16.49*** (3.760)	31.79*** (8.032)	32.37*** (6.950)	33.2626** (13.1266)
<b>Observations</b>	633	633	633	633	633	633	633	633
<b>Instruments</b>	6	6	5	14	19	19	20	18
<b>AR1</b>	0.507	0.0298	0.0603	0.0977	0.000144	0.000863	0.00497	0.0046
<b>AR2</b>	0.359	0.138	0.324	0.357	0.154	0.136	0.899	0.188
<b>Hansen p-value</b>	0.130	0.175	0.0925	0.927	0.329	0.281	0.281	0.189

Source: Author's estimate. Dependant variable: Gini index.

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Regarding the control variables, the estimate shows that unemployment and urbanization contribute to the widening gap between the rich and poor. The relation between unemployment and income inequality is consistent with the findings of Martinez et al. (2001). In fact, despite educational facilities, some countries are not able to guarantee employment for their population. Therefore, the lack of work leads to a lack of income on the part of job seekers. As a result, those who have income earn even more because they have a job, while the income of the unemployed continues to decline. Regarding the effect of urbanization, the results corroborate

the work of Ongo and Song (2019) and can be explained by the failure to account for the disparities identified in the inclusive urbanization policies of SSA.

Trade openness has a negative effect of around 0.116 on income inequality. This result is similar to the findings of Nnyanzi (2016) and can be explained theoretically. According to the Heckscher-Ohlin-Samuelson theory, in the case of trade openness, a country faces an increase in demand for the goods it specializes in. As DCs are specialized in low-skilled labor, an improvement in trade openness leads to an increase in the wages of low-skilled workers. Conversely, there is a reduction in the remuneration of highly skilled workers, which ultimately leads to a reduction in income inequality (Jaumotte *et al.*, 2013). Results also show that public spending reduce income inequality. According to Mosley *et al.* (2004), public spending devotes resources to health, basic education or infrastructure sectors. This results in a reduction in income inequality (Anderson *et al.*, 2018). Furthermore, results also indicate that the growth rate has a positive effect on income inequality, while education has a negative effect. However, these effects are statistically insignificant. Finally, the coefficient of inflation on income inequality is significantly positive. This conclusion is similar to that of Law and Tan (2009). It can be explained by the fact that returns on inflation-indexed assets in SSA are productive enough not to alter the initial distribution of agents' income (Varoudakis, 1995).

#### 4.3. Effect of institutional quality in financial development and income inequality nexus in SSA

Table 2 presents the effect of institutional quality on financial development-income inequality nexus in SSA. Columns 1 to 5 present the results with the composite index of financial development, financial access, financial depth, financial stability, and financial efficiency respectively. The results call to two main conclusions. First, according to Table 1, the sign of financial development is on average always negative and significant. Indeed, the coefficient associated to the financial development index variable is -1.454. This indicates that when the level of financial development is high, the level of inequality tends to reduce, confirming the existence of negative and linear relationship (Galor and Zeira, 1993; Banerjee and Newman, 1993). The broadening of financial base helps disadvantaged socio-economic groups to borrow and invest in income-generating activities in the mid and long term.

Table 2: *Effect of institutional quality on financial development-income inequality nexus*

	Income inequality				
	(1)	(2)	(3)	(4)	(5)
	Financial development (FD)	FD=Financial access	FD=Financial depth	FD=Financial stability	FD=Financial efficiency
L. Gini	0.382*** (0.075)	0.357*** (0.095)	0.301*** (0.063)	-0.159 (0.114)	0.105** (0.050)
Institutional quality	-1.541 (3.694)	-18.37 (8.259)	-1.905*** (0.4460)	-6.901*** (1.745)	-9.196*** (1.608)
Financial Development	-1.454*** (0.442)	-3.707*** (1.058)	-2.266*** (0.326)	-8.672*** (1.997)	3.843*** (0.724)
Financial Development*Institutional quality	0.889*** (0.307)	2.600*** (0.750)	1.521*** (0.214)	6.337*** (1.505)	-3.153*** (0.601)
Economic growth	-0.130* (0.0756)	-0.127 (0.150)	-0.070 (0.047)	-0.397*** (0.068)	-0.073 (0.058)
Public expenditures	0.229** (0.106)	0.253** (0.127)	0.222*** (0.059)	0.096 (0.125)	0.124* (0.066)
Inflation	-0.044 (0.046)	-0.038 (0.034)	0.017 (0.021)	0.017 (0.032)	0.118** (0.059)

Trade openness	-0.060*** (0.019)	-0.077*** (0.027)	-0.025*** (0.008)	0.0007 (0.029)	-0.0074 (0.011)
Urbanization	0.132*** (0.032)	0.141*** (0.037)	-0.017 (0.045)	0.098** (0.042)	0.102*** (0.030)
Unemployment	0.041 (0.098)	0.082 (0.106)	-0.008 (0.070)	0.267*** (0.072)	0.027 (0.077)
Education	0.389 (0.304)	-0.102 (0.475)	0.480** (0.214)	-0.315 (0.396)	-0.198 (0.436)
Instruments	26	26	26	25	26
Number of countries	33	33	33	33	33
Wald	0	0	0	0	0
AR1	0.00042	0.0005	0.0007	0.0408	0.0017
AR2	0.757	0.626	0.615	0.251	0.725
Hansen	0.453	0.344	0.139	0.131	0.560

Source: Author's estimates from Stata 17. Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Second, the results show positive signs associated with the interaction of financial development and institutional quality. In fact, the coefficient of the interaction between financial development and institutional quality is positive<sup>9</sup>. This reflects the fact that the impact of financial development on inequality is reversed given the low quality of institutions. This result supports that the poor quality of institutional quality in SSA countries (according to the stylized facts) attenuates the redistributive effect of financial development on inequality. Consequently, although financial development initially reduces inequality, the magnitude of this effect diminishes with the weak governance.

Moreover, from Table A.1, the region's institutional variables are very low levels<sup>10</sup>. Therefore, the weakness of formal institutions in the region reduces the magnitude of the effectiveness of financial development on income inequality. Consistent with Chinoda and Mashamba (2021), when institutions are weak, the benefits of financial deepening may excessively accrue to the rich who have collateral and/or higher incomes. Our results are therefore consistent with the predictions of Chong and Calderon (2000) that in countries with low institutional quality, policies to mitigate inequality fail and inequality grows. Indeed, they put forward the prediction that poor countries with high levels of income inequality will remain trapped in inequality unless a sound and credible institutional climate is established.

In addition, Figure 1 shows the evolution of the effect of financial development as a function of institutions. Below the horizontal axis, financial development has a negative effect on income inequality. Above it, the effect is positive. It shows that the institutions in SSA negatively affect the way financial development affects income inequality. Within this range, financial development reduces the level of income inequality, but this redistributive effect becomes less significant. From the marginal effects, it appears that the poor institutional quality of SSA countries reduces the effectiveness of financial development in reducing income inequality, as demonstrated by Asongu *et al.* (2020). This is more consistent with the findings of Law *et al.* (2014) who argued that institutional quality improves the effect of financial development on income inequality only when it has reached a threshold greater than 1.255.

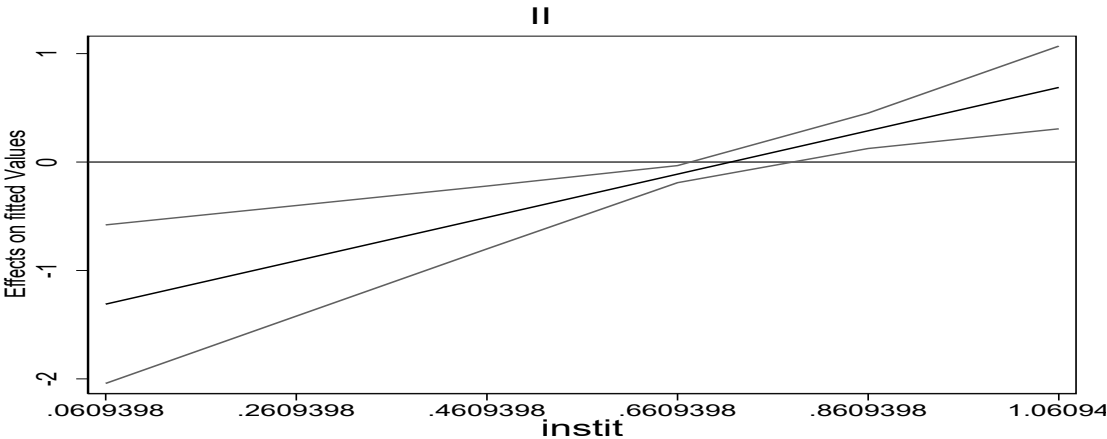
However, as this quality does not exceed 1 in our sample, we can understand why an additional unit of governance is not sufficient to improve the effectiveness of financial system development in terms of reducing inequality. This result can be explained by the fact that poor

<sup>9</sup> This is reflected by the calculation of the margin effects.

<sup>10</sup> On a scale of 0 to 6, the countries in the sample have average levels below 1, indicating very low institutional quality.

institutional quality in an economy introduces (accentuates) a component of uncertainty in economic transactions. Moreover, it decreases the government's ability for efficient and effective policies (Alvarez et al. 2018). This uncertainty increases transaction costs and can thus alter both redistributive policies and the effect of financial development on addressing income inequality.

Figure 1: Marginal effects of the financial development effect on income inequality depending on institutional quality in SSA

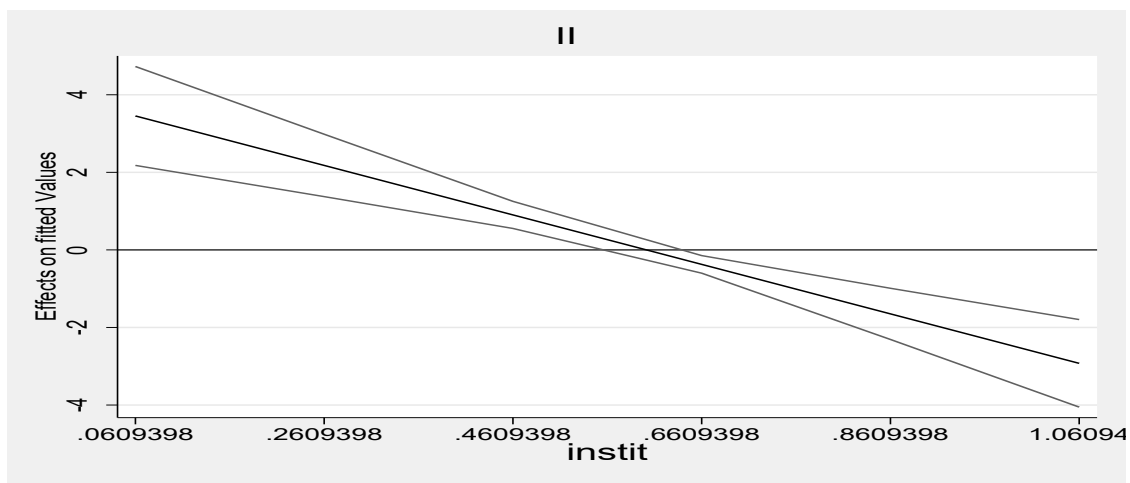


Source: Author's construction

**4.4. Results by financial development dimensions used**

Table 2 also shows that the coefficients associated with 3 financial dimensions are negative while those associated with their interactions are significant and positive. This result suggests that institutional quality in SSA reduces the effect of financial access, depth and stability on income inequality by 2.6, 1.52 and 6.33 percentage points respectively. Thus, financial deepening, financial stability and financial accessibility follow the same trend as financial development. In so doing, the analysis of their marginal effects remains the same as in Figure 1. However, the regression with the financial efficiency index is different. Financial efficiency increases income inequality by 3.843. However, the "financial efficiency\*institutional quality" variable is significant and negative. The current institutional environment enhances the effect of financial efficiency. These results are consistent with Chisadza and Biyase (2023) who find that when we disaggregate the financial development index into its sub-components, there are different effects on inequality in developing countries. Figure 2 presents the marginal effects of the financial efficiency effect on income inequality in SSA. It highlights an appreciation of the effect of financial efficiency induced by the quality of institutions. This result reflects the promotion of governance in the fight against the unequal distribution of income in the countries.

Figure 2: Marginal effects of the financial efficiency on income inequality given institutional quality in SSA



Source: Author's construction.

#### 4.5. Taking into account individual institutional variables

Table 3 presents the effect of institutional quality in the financial development-income inequality relationship as a function of the type of institutional variable. Control of corruption and government effectiveness are associated with positive coefficients of 1.065 and 2.933 points. On the other hand, the voice and responsibilities variable decreases income inequality by 6.198 points. The coefficients of the interactions "financial development\* regulatory quality" and "financial development\*rule of law" are positive at 0.498 and 2.945 respectively.

Table 3: Effect of each institutional variable on financial development-income inequality nexus in SSA

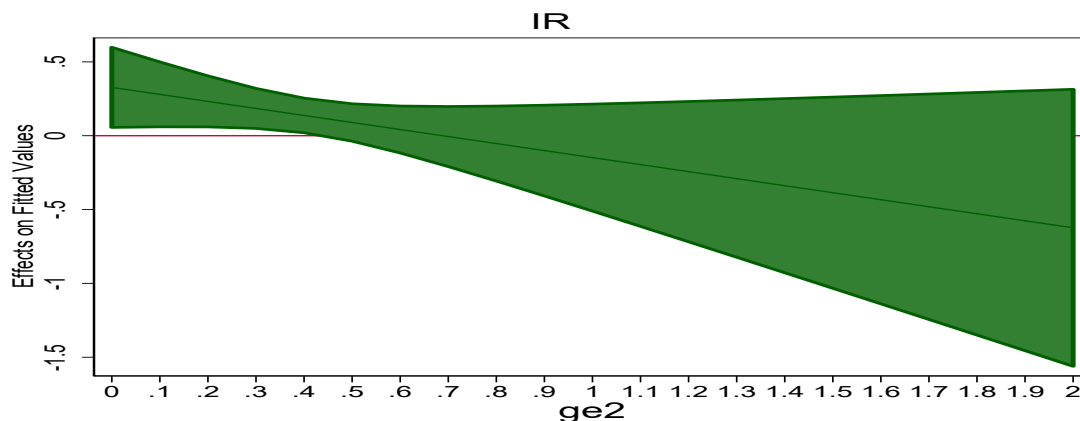
	Income inequality					
	(1) IQ=corruption	(2) IQ=regulatory quality	(3) IQ= government effectiveness	(4) IQ =Political stability	(5) IQ =Voice and accountability	(6) IQ= rule of law
L. Gini	0.347*** (0.071)	0.475*** (0.075)	0.235*** (0.060)	0.358*** (0.064)	0.299*** (0.101)	0.291*** (0.103)
Financial development	0.063 (0.053)	-0.351 (0.227)	0.327** (0.138)	-0.252 (0.558)	-0.280 (0.252)	-1.358*** (0.335)
Institutional quality (IQ)	1.065*** (0.3290)	-4.425 (5.270)	2.933*** (.9848)	7.695 (9.441)	-6.198* (3.585)	7.625 (7.674)
Financial development *institutional quality	-0.167 (0.139)	0.498* (0.302)	-0.475 (0.300)	0.375 (0.718)	0.445 (0.375)	2.945*** (0.710)
Economic growth	0.049 (0.105)	0.067 (0.140)	-0.138 (0.126)	-0.088 (0.110)	-0.487** (0.208)	-0.068 (0.151)
Public expenditures	0.213** (0.106)	0.235*** (0.083)	0.0085 (0.075)	0.164* (0.084)	0.396*** (0.099)	-0.044 (0.093)
Inflation	-0.139** (0.065)	0.022 (0.035)	-0.021 (0.071)	-0.109** (0.048)	-0.080*** (0.017)	-0.119*** (0.045)
Trade openness	-0.060 (0.040)	-0.086*** (0.028)	0.010 (0.034)	-0.045 (0.034)	-0.033 (0.035)	-0.025 (0.018)
Urbanization	0.092*** (0.035)	0.104*** (0.035)	0.107** (0.054)	0.060* (0.035)	0.031 (0.059)	0.041 (0.032)
unemployment	0.345*** (0.065)	0.160** (0.079)	0.215*** (0.072)	0.247*** (0.058)	0.225*** (0.086)	0.468*** (0.084)
Education	-0.032 (0.280)	0.134 (0.209)	-0.545 (0.439)	0.129 (0.280)	0.074 (0.423)	-0.367 (0.306)

Instruments	24	25	24	24	23	24
Number of countries	33	33	33	33	33	33
Wald	0	0	0	0	0	0
Ar1	2.96e-05	0.000147	0.000190	0.000254	0.000317	0.00281
Ar2	0.454	0.165	0.857	0.335	0.113	0.408
Hansen	0.334	0.286	0.541	0.118	0.243	0.201

Source: Author's estimates from Stata 17. Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Beyond these results, the analysis of marginal effects firstly shows that control of corruption, political stability, quality of regulation, and voice and accountability do not affect the effect of financial development on income inequality. Secondly, the SSA entitlement rule strongly and significantly reduces the effect on income inequality over the studied period. Thirdly, government effectiveness positively influences the effect of financial development on income inequality in SSA. Indeed, Figure 3 shows that financial development increases income inequality in SSA, but this increase evolves at a decreasing rate as the quality of public services, and the credibility of governments improve. This result suggests that the quality of public policy making, and implementation plays an important role in the effectiveness of financial development in reducing income inequality in SSA.

Figure 3: Marginal effects of the financial development effect by government effectiveness



Source: Author's construction

#### 4.6. Results by a concurrent measure of income inequality

To test the robustness of the results, we use Gini index after tax because there is a debate between pre-tax and post-tax Gini use. Since income inequality depends on how taxes and transfers are redistributed between the incomes of the rich and the poor (Bergh, 2005), redistributive policies can therefore act significantly and correct the first income distribution (Jauch and Watzka, 2016). To account for this first correction, Gini after tax tend to be interesting.

Overall, the results show that the poor institutional quality worsens the effect of financial development on income inequality in SSA. This effect is the same for the dimensions of financial access, depth and stability. With respect to financial efficiency, the tests show that institutional quality increases its effect on income inequality. While these estimates confirm our main results for all measures of financial development, the results are rather mitigated for the institutional variables. Table 4 presents the results of these estimates. Columns (1) to (7) present the estimates with corruption, government effectiveness, regulatory quality, political stability, voice and accountability and rule of law respectively. Results indicate that only the coefficients

of the interaction of financial development and regulatory quality, political stability, voice and accountability and rule of law respectively are significant and positive. Moreover, the analysis of marginal effects shows that the institutional variables that affect the effect of financial development on income inequality in SSA are political stability and the voice and accountability variable.

*Table 4: Results with Gini index after redistribution*

Variables	Income inequality						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Institutional quality	Corruption	Government effectiveness	Regulatory quality	Political stability	Voice and accountability	Rule of law
L. Gini	0.489*** (0.132)	0.604*** (0.123)	0.527*** (0.139)	0.606*** (0.117)	0.503*** (0.149)	0.458*** (0.159)	0.576*** (0.192)
Financial development	-2.052*** (0.677)	0.017 (0.127)	-0.041 (0.115)	-0.863* (0.466)	-3.636*** (1.363)	-1.038** (0.472)	-2.333* (1.280)
Institutional quality (IQ)	-2.082 (6.875)	13.27* (7.886)	10.47* (5.573)	-15.68 (14.49)	-20.11 (17.84)	-0.670 (14.66)	-23.00 (17.66)
Financial development *institutional quality	1.422*** (0.482)	-0.022 (0.234)	0.247 (0.308)	1.146* (0.622)	4.773*** (1.759)	1.445* (0.792)	5.008* (2.580)
Economic growth	0.0447 (0.322)	0.204 (0.246)	0.076 (0.274)	0.110 (0.249)	-0.050 (0.255)	0.045 (0.285)	-0.303 (0.418)
Public expenditures	0.159 (0.143)	0.212 (0.162)	0.179* (0.109)	0.288* (0.163)	0.002 (0.110)	0.482* (0.251)	0.018 (0.255)
Inflation	-0.041 (0.120)	0.114 (0.135)	0.0006 (0.030)	0.032 (0.091)	0.033 (0.040)	0.011 (0.102)	-0.062 (0.155)
Trade openness	-0.031* (0.017)	-0.128** (0.061)	-0.069 (0.058)	-0.111** (0.053)	-0.018 (0.016)	-0.167** (0.074)	-0.056 (0.074)
Urbanization	0.039 (0.054)	0.069 (0.055)	0.076 (0.072)	0.085* (0.049)	0.066 (0.074)	0.167* (0.096)	0.0009 (0.120)
Unemployment	-0.012 (0.174)	0.243** (0.114)	0.203* (0.107)	0.172 (0.139)	0.138 (0.133)	-0.064 (0.217)	0.413** (0.185)
Education	-0.399 (0.464)	-0.219 (0.209)	-0.710* (0.380)	-0.032 (0.438)	-0.148 (0.537)	-0.383 (0.639)	-0.634 (0.917)
Instruments	26	24	25	24	25	25	24
Number of countries	33	33	33	33	33	33	33
Wald	0	0	0	0	0	0	0
Ar1	0.00339	0.000961	0.000693	0.00283	0.000778	0.0143	0.00337
Ar2	0.212	0.205	0.211	0.149	0.736	0.524	0.118
Hansen	0.64	0.360	0.453	0.546	0.175	0.637	0.498

Source: Author's estimates from Stata 15. Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

#### 4.7. Taking into account social and geographic factors

To further control for omitted variable bias, social and geographic factors are introduced in the econometric analysis. First, we control for the importance of social variables through social conditions and religious tensions from International Country Risk Guide (ICRG, 2020). Second, we add in the analysis the geographic characteristics since they are considered to be

the cause of the underperformance of former colonies (Keneck and Nvuh, 2021; Bloom et al., 1998). Consequently, geographic location has important effects on income levels through its effects on transportation costs, illness burdens, and agricultural productivity. We measure geographic characteristics by distance to the sea (landlocked) and distance to the equator (latitude) following La Porta et al. (1999).

Table 5 presents the results of these estimates. Columns 1 to 4 present the results by adding distance to equator, landlocked, social conditions, and religious tensions respectively. Regarding geographic factors, distance to sea and the equator significantly reduce income inequality. as far as socio-cultural variables are concern, social conditions have a negative effect on income inequality, while religious tensions increase them. However, these two effects remain statistically insignificant. Moreover, the analyses show that, although they affect income inequality differently, all these factors do not call into question the robustness of the main results. The level of institutional quality in SSA hinders financial development to reduce inequality.

*Table 5: Results using social and geographic variables.*

	Income inequality			
	Geography		Socio-cultural	
	(1)	(2)	(3)	(4)
<b>FDI*IQ</b>	0.776*** (0.197)	1.135*** (0.335)	1.1013** (1.3764)	0.7513*** (1.0139)
<b>Distance to equator</b>	-0.553** (0.220)			
<b>Landlocked</b>		-0.209*** (0.0493)		
<b>Social conditions</b>			-1.6650 (3.2474)	
<b>Religious tensions</b>				0.8652 (1.2588)
<b>Constant</b>	6.461 (11.11)	19.35* (11.71)	41.3368*** (7.6502)	32.9992*** (4.5936)
<b>Instruments</b>	18	14	18	18
<b>Hansen</b>	0.53	0.61	0.105	0.602
<b>AR1</b>	0.00296	0.00014	0.0019	0.0028
<b>Ar2</b>	0.33	0.286	0.541	0.201
<b>Control variables</b>	Yes	Yes	Yes	Yes

*Source: Author's estimate. Dependant variable: Gini index.*

*Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .*

## 5. Conclusion

The objective of this paper was to assess the effect of institutional quality in the relationship between financial development and income inequality in 25 SSA countries over the period 1990 to 2019. For this purpose, our empirical strategy is based on the generalized method of moments in system. The results of this study show that in SSA, the relationship between financial development and income inequality is affected by the level of institutional quality. Indeed, quality of institutions in SSA countries worsens the effect of financial development on income inequality over the studied period. More specifically, the institutional quality of SSA decrease the effect of financial access, depth, and stability. However, they improve the effect of financial efficiency in addressing income inequality in the region. Also, only the variables government

effectiveness, voice and accountability, political stability, and regulatory quality seem relevant for SSA.

In light of these findings our results suggest two recommendations. First, the financial system must, in the quest to reduce income inequality, be part of a solid institutional framework combined with an amelioration of its performance in terms of financial service provision. More precisely, this recommendation calls on the authorities of SSA countries to improve the rule of law to better circumscribe contracts and allow for effective implementation of redistributive policies. Second the results suggest that governments should improve their capacity to formulate and implement policies and regulations on the one hand, and their capacity to implement their stated programs on the other hand. Increased stability will tend to improve the business climate and make investment attractive. While these results highlight the crucial role of institutional quality, it must be recognized that income inequality remains high in SSA countries, marked by significant cultural dominance and transmission of circumstances. Unlike the present study, future studies could explore the mediating role of culture in the relationship between financial development and income inequality.

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## APPENDIX

**Table A.1: Descriptive statistics of the model**

Variables	Observ	Mean	Std dev	Min	Max
Gini index	956	60.42	238.51	29.80	78.96
Urbanisation	1107	35.85	15.20	5.41	87.36
Unemployment	1107	8.90	7.45	0.30	44.15
Economic growth	1052	4.44	8.90	-51.03	149.97
Inflation	1043	87.84	1094.24	-11.68	24411.03
Education	870	4.32	3.66	1.01	44.33
Government Expenditures	912	25.94	27.14	2.14	539.23
Opening	1043	73.56	45.37	11.08	531.73
Financial Stability Index	1077	17.83	8.22	1.01	100
Financial Efficiency Index	1069	24.40	8.95	0	100
Financial Depth Index	1051	26.15	14.41	0.24	86.32
Affordability Index	721	11.63	14.79	0.21	99.25
Financial Development Index	700	17.85	7.093	-20.36	48.95
GE	855	0.318	0.228	0	1
RQ	775	0.557	0.195	0	1
RL	775	0.487	0.189	0	1
Co	855	0.367	0.18	0	0.833
PS	775	0.703	0.152	0.083	0.972
VA	775	0.468	0.214	0	0.917
QI	775	1.222	0.327	0.123	2.023

*Source: author's construction*

**Table A.2: PCA Results on FD (with PCA/correlation, SEs and tests are approximate)**  
*Principal components/correlation      Number of comp. =      4      Trace =      4*

	Coef.	Std.Err.	z	P>z	[95%Conf. Interval]	
<b>Eigenvalues</b>						
Comp1	2.150	0.115	18.710	0.000	1.925      2.376	
Comp2	0.945	0.050	18.850	0.000	0.847      1.043	
Comp3	0.702	0.037	18.930	0.000	0.630      0.775	
Comp4	0.203	0.011	18.760	0.000	0.181      0.224	
<b>Comp1</b>						
Fd	0.617	0.015	40.720	0.000	0.587      0.646	
Fe	-0.448	0.029	-15.290	0.000	-0.506      -0.391	
Fs	0.271	0.041	6.540	0.000	0.190      0.353	
Fa	0.587	0.020	29.950	0.000	0.549      0.626	
<b>Comp2</b>						
Fd	-0.231	0.040	-5.830	0.000	-0.309      -0.154	
Fe	-0.213	0.111	-1.910	0.056	-0.432      0.005	
Fs	0.890	0.048	18.560	0.000	0.796      0.984	
Fa	-0.331	0.048	-6.840	0.000	-0.426      -0.236	
<b>Comp3</b>						
Fd	0.184	0.041	4.480	0.000	0.103      0.265	
Fe	0.863	0.031	28.030	0.000	0.803      0.923	

Fs	0.365	0.113	3.220	0.001	0.143	0.587
Fa	0.297	0.050	5.950	0.000	0.199	0.395
Comp4						
Fd	0.730	0.011	67.530	0.000	0.708	0.751
Fe	0.094	0.026	3.640	0.000	0.043	0.144
Fs	-0.039	0.023	-1.730	0.084	-0.084	0.005
Fa	-0.676	0.014	-49.990	0.000	-0.703	-0.650

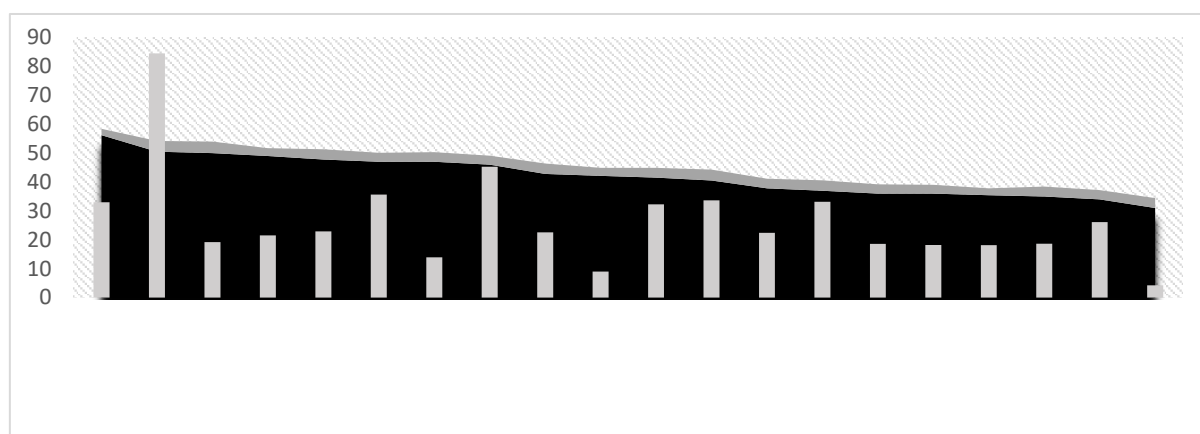
LR test for independence:  $\chi^2(6) = 864.69$  Prob >  $\chi^2 = 0.0000$  LR  
test for sphericity :  $\chi^2(9) = 865.41$  Prob >  $\chi^2 = 0.0000$   
Source: author's estimate

Table A.3: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Gini index	1.000								
(2) Financial access	-0.093** (0.037)	1.000							
(3) Institutional quality	0.108*** (0.003)	0.077** (0.038)	1.000						
(4) Unemployment	0.131*** (0.000)	-0.002 (0.960)	0.233*** (0.000)	1.000					
(5) Trade	-0.129*** (0.000)	0.223*** (0.000)	-0.052** (0.091)	-0.208*** (0.000)	1.000				
(6) Education	-0.107*** (0.003)	0.232*** (0.000)	0.011 (0.704)	-0.119*** (0.000)	0.043** (0.015)	1.000			
(7) Urbanization	-0.084** (0.020)	0.345*** (0.000)	0.225*** (0.000)	0.030 (0.319)	0.305*** (0.000)	0.032 (0.285)	1.000		
(8) Public expenditures	0.018 (0.651)	0.340*** (0.000)	-0.122*** (0.000)	-0.014 (0.666)	0.162*** (0.000)	-0.021 (0.534)	0.043** (0.019)	1.000	
(9) Economic growth	-0.087* (0.018)	-0.038 (0.315)	-0.008 (0.798)	0.047 (0.130)	0.018* (0.057)	-0.006 (0.847)	-0.023** (0.454)	0.105*** (0.002)	1.000

Source: Authors. P-value in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Figure A.1: Combined analysis between income inequality, financial development and institutional quality in SSA



Source: authors's construction.



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