The Role of Institutions in the Finance-Inequality Nexus in Sub-Saharan Africa*

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Abstract

This study contributes to the literature on income inequality by providing evidence that financial development not only impacts income distribution, but the effects can improve when there is a strong institutional framework. Using the system-generalised method of moments (sys-GMM) technique on a sample of 42 Sub-Saharan African (SSA) countries from 1996 to 2015, our major findings are summarised as follows: (1) inequality is persistent in the region (2) financial development does not significantly reduce income inequality; and (3) the control of corruption and its interaction with domestic credit exhibit an inverted-U relation with income inequality. Thus, policies that will reduce income inequality require that corruption be controlled given increase in domestic credit.

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1. Introduction

Between 1980 and up to the beginning of the millennium, most African countries embarked on various reforms required to restructure their economies and liberalise their financial markets. The outcomes, among others, include the strengthening and development of the financial sector evidenced by intense financial intermediation with growth in credit leading to faster long-run economic growth. However, despite the resurgence of growth in more than two decades, extreme poverty has not been decreasing in the continent (Asongu and Nwachukwu 2017). According to African Development Bank-AfDB (2012), in addition to being one of the poorest regions in the world, Africa is also the world's second most inequitable region after Latin America (Solt 2009; UNDP 2011 and 2013; United Nations 2013; Milanovic 2014). On the growth-inequality mix, AfDB (2012) finds that: "In the 2000s, six of the world's ten fastest-growing countries were in Africa, but this has not significantly helped to equal incomes or to redistribute wealth." Ironically, by 2010, six of the ten countries in the world with the most unequal income distribution were in the region (AfDB 2012), and the countries with the most unequal income distribution include Namibia, Comoros, South Africa, Angola, Botswana, Lesotho and Swaziland, with the sub-region of Southern Africa showing a striking concentration of countries which suffer from remarkably high income inequality levels.

The terms "financial liberalisation" and "financial development" connote different interpretations; although, there is an intrinsic relationship between them, they are often used interchangeably in empirical studies. While financial liberalisation relates to the progressive removal or elimination of restrictions, such as the liberalisation of capital accounts allowing for international movements of funds and encouraging financial innovation, financial development refers to the upgrading of the quality of financial transactions within the national context with the observance of financial depth in an economy (Gehringer 2013; Osabuohien et al. 2017). According to Mishkin (1999), the liberalisation of financial markets is central to the efficient functioning of financial markets by enabling the channelling of funds to those with the most productive investment opportunities. In essence, deregulation is beneficial in the long-run because it leads to more financial efficiency and deepening evidenced with increased lending and economic growth (Adeleye et al. 2017).

Given that in African countries the richest capture the largest share of income, could the type of institutional framework prevalent in the region be driving inequalities? This is because if institutions are weak, financial development may neither improve economic welfare nor decrease inequality due to discriminatory lending, lopsided distribution of credit, lack of judicial protection for the poor (Chong and Gradstein 2007) and pervasive corruption (Gupta, Davoodi and Alonso-Terme 2002) which allows the oligarchy or established interests to

sway finance away from the poor. Another plausible conjecture is that weak institutions tend to alter the ability of financial intermediaries to channel resources to finance productive activities efficiently. Consequently, where institutions are strong and unbiased, financial development may reduce inequality, allowing the poor to invest in human and physical capital (Demirguc-Kunt and Levine 2008). Thus, this paper presents an investigation of such evidence by analysing the influence of institutional quality on financial development in mitigating income inequality.

In an attempt to address the gap observed above and contribute to the current empirical literature, this study: (i) employs an up-to-date dataset on the Gini index (the measure of income inequality); (ii) includes wider coverage of SSA countries; (iii) extends the institutional dimensions to five, namely: control of corruption, government effectiveness, political stability, rule of law and political rights; and (iv) underscores the channel of influence by interacting the financial development variable with each of the institutions variable. The remainder of the paper is structured as follows: section 2 reviews the theoretical and empirical literature, section 3 outlines the data and methodology. Section 4 details empirical analysis, results and robustness checks while section 5 concludes with some policy recommendations.

2. Brief Insights from the Literature

The empirical review is conceptualised within the two theoretical frameworks that informed this study. First is the extensive margin theory which states that financial development might operate on the extensive margin by increasing the availability and use of financial services by individuals who had not been employing those services because of price and other barriers. In essence, financial development will expand the economic opportunities of disadvantaged groups and reduce the intergenerational persistence of relative incomes (Becker and Tomes 1979 and 1986; Greenwood and Jovanovic 1990). Second is the discrimination theory of Becker (1957) which states that discrimination is cheaper when there is little competition, but such is competed away if the barriers of entrance of new firms are sufficiently low. Therefore, financial sector reforms that intensify competition will reduce discrimination and expand the economic opportunities of disadvantaged groups thereby reducing income inequality. Empirical reviews reveal that while a voluminous extant literature has documented a strong link from financial development to economic growth, a relatively small group of recent studies have explored the link between finance and income inequality (Demirgüç-Kunt and Levine 2009; Agnello, Mallick and Sousa 2012; Saran 2013).

From the empirical survey, Batuo, Guidi and Mlambo (2010) examine financial development and income inequality in 22 African countries and find evi-

dence that finance has an equalising effect on income. Their findings are corroborated by Agnello and Sousa (2012) on the study of 62 OECD and non-OECD countries from 1980 to 2006. They find access to the banking sector helps to reduces inequality and that inequality rises some periods before a banking crisis and declines afterwards. In a similar vein, Agnello, Mallick and Sousa (2012) extend the works of Abiad and Mody (2005) with an unbalanced panel data on 62 countries from 1973 to 2005 and find that financial liberalisation reduce income inequality corroborating the works of political-economy researchers (Benmelech and Moskowitz 2010; Rajan and Ramcharan 2011) while the existence of minimum amount of lending to certain 'priority' sectors[1] and trade openness exacerbates income inequality.

Similarly, Asongu (2013) investigates how financial reforms address the problem of income inequality in Africa through financial sector competition and informal sector inclusion (known as financial inclusion). The author finds that improvement of the formal financial sector reduces inequality, improvement of the semi-formal financial sector increases inequality, improvement of the informal financial sector[2] reduces inequality and improvement of the semi-formal financial sector reduces inequality. From the foregoing, it is obvious that finance has significant impact on income distribution. Financial reforms can improve the efficiency of the domestic financial systems (Čihák et al. 2013) and influence the distribution of income, as rising inequality generally reflects an unequal access to productive opportunities. Also, they can lead to a better allocation of risk and socialization of costs, which is particularly relevant during financial crises (Claessens and Perotti 2007). These outcomes, in turn, can help mitigate income inequality.

On the role of institutions, political and economic institutions are interwoven and can either be inclusive or extractive (Acemoglu and Robinson 2013). Inclusiveness fosters economic growth while the exclusive variant hampers economic growth. Under an inclusive system, the financial sector, which comprises the money and capital markets, is regulated by the central banks and exchange commission respectively, who ensure that the ethics and dictates of these markets are followed by players. Such a system supports economic activity, making it possible for firms and individuals to borrow money from banks and financial markets. Inferences can be made on the fact that if, for instance, a central bank fails in its duty to enforce rules governing money market operations,

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[1] Priority sectors are those sectors that are selected for lending by the central government, e.g. sectors involved in the production or importation of the military and defence apparatus. Such that if lending is disproportionately geared, it may hinder credit flows to small and medium scale enterprises, thus aggravating income inequality.

[2] The author defined "informal" financial sector as those whose deposits is the net difference of money supply and financial deposits (% of GDP); while semi-formal financial sector as those whose deposits is the net difference of financial and bank deposits (% of GDP).

the tendency of deposit money banks to circumvent loans or credit access to poor households will arise. The five institutional indicators encapsulate "inclusiveness" in the sense that they measure both economic (control of corruption and government effectiveness) and political (political stability, rule of law and political rights) inclusiveness.

However, empirical studies on impact of quality institutions are wide-ranging, mixed and diverse. To some, higher levels of institutional quality are associated with economic growth (Zak and Knack 2001; Easterly, Ritzen and Woolcock 2006; Green 2011) via support to small and medium scale enterprises (Rus and Iglič 2005) and the promotion and enforcement of contracts, which enhances innovation and human and physical capital accumulation (Latusek and Cook 2012; Andriani and Sabatini 2015). Others argue differently but reaching the same conclusion that the absence of quality institutions (i.e., the absence of the rule of law and the prevalence of corruption) is the 'grease' that oils the wheels of economic growth (i.e., a blessing), that is, a way of getting around burdensome bureaucratic regulations or circumventing bureaucratic inefficiencies (Kaufmann 1997; Holmes 2000). However on a study of 19 South Asian countries given a shadow economy framework (which is one in which economic activities are often criminal, unreported, unrecorded, illegal or at least 'informal'), Kar and Saha (2012) argue that extra-legal dimensions of the shadow economy are capable of cornering resources and raising inequality. Since these countries cannot ignore the economic trade-offs, strong economic and political tension exists between maintaining extra-legal activities, lowering growth and lowering inequality, which are posed against economic growth via proliferation of the formal economy where the rules are stricter. This approach supports the "sand" hypothesis.

Thus, in this study we propose to test the role of institutions using SSA data for the period 1996 to 2015. The aim is to examine whether the developments taking place in the financial sector as a result of financial reforms can reduce the persistent level of inequality given the quality of institutions prevalent in the region. To our knowledge, this study is one of the very studies that explores the relationship between financial development and income inequality to explore this path of analysis restricted only to data on SSA countries.

3. Methodology and Data

3.1 Empirical Model and Estimation Technique

Following Beck, Levine and Loayza (2000) and Calderón and Servén (2004) that have used this estimation approach in solving the endogeneity problem by exploiting the time series variation in the data, controlling for unobserved group-specific effects, and allowing for the inclusion of a lagged dependent

variable, we first run the estimation using annual data, which is then transformed to an average of five-year periods due to fact that inequality data are highly persistent. Since our focus is on the long run trend rather than on the behaviour over the business cycle, using data averaged over a period of five years would smooth out short term fluctuation. Lastly, an attempt was made to identify the relevant determinants of inequality, as measured by the Gini index, first with a baseline model, the subsequent inclusion of the institutions variables and their interactions with financial development in chronological order.

The empirical model specification is given as:

$$(1) \qquad lngini_{it} = \Phi lngini_{it-1} + \beta FD_{it} + \gamma Z'_{it} + \varphi X'_{it} + \mu_i + \partial_t + e_{it}.$$

where $lngini$, is the natural logarithm of the Gini index; $lngini_{it-1}$ is the natural logarithm of the lagged Gini index, FD is the proxy for financial development; Z' is the vector of institution variables; X' is the vector of control variables; μ is the unobserved country-specific fixed effects; ∂ is the time trend; Φ, β, γ and φ are parameters; i is the number of cross-sections ($=1,…,N$); t is the number of time series ($=1,…,T$) and e is the error term. The inclusion of the control variables is to determine whether the effect of financial development on inequality still holds true after considering the effects of these covariates on inequality. In this model specification,[3] the endogenous variable is the lagged log of Gini index and others are treated as weakly exogenous (FD) and strictly exogenous (Z';and X').

Since a static[4] model will not capture the short and long-run impacts of the regressors on the dependent variable, we use a dynamic model and the sys-GMM estimator to capture the persistent nature of income inequality, address the problems of omitted variables, measurement error, endogeneity, and country-specific heterogeneity. The consistency of the system-GMM estimator is assessed by two specification tests. The Hansen test of over-identifying restrictions tests for the overall validity of the instruments and the second test examines the null hypothesis that the error term is not serially correlated. Failure to reject both null hypotheses gives support to the model (Arellano and Bond 1991; Arellano and Bover 1995; Blundell and Bond 1998; Osabuohien, Efobi and Gitau 2015). This study reports p-values of Arellano-Bond AR(2) tests as contained in section 4.

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[3] The following instrumental variables are used: the GMM instrument is one-period lagged values of the logged Gini index; other instruments are broad money supply (% of GDP), gross fixed capital formation (% of GDP) and government final consumption expenditure (% of GDP).

[4] In the initial version, we started with the use of the static model; thanks to one of the anonymous reviewers who advised us to concentrate on the dynamic model with a view of capturing the proper influence of the variables.

3.2 Data and Descriptive Statistics

The Gini index which is drawn from Lahoti, Jayadev and Reddy (2016) is the measure of income inequality, the outcome variable. It is the most used measure of income equality and ranges from 0 (perfect income equality) to 1 (perfect income inequality), and countries with Gini indices closer to 0 (European countries) are more equal than those closer to 1, i.e., Latin America and African countries (UNDP 2011 and 2013). The index is widely used, perhaps owing to its easy computation and availability relative to other income measures. It can be measured using gross income or net income, income or expenditure, data per capita or data per household (Milanovic 2014; Solt 2016). However, variations in defining the measure of the Gini index itself can undermine international and intertemporal comparability of any data (Deininger and Squire 1996; Milanovic 2014; Solt 2014; Lahoti, Jayadev and Reddy 2016). The undermining may be as a result of different income definitions (gross income or net income) used across or even within countries and different reference units.

The financial development and control variables are from the World Development Indicators (WDI) of the World Bank (2016a) while the measures of institutional quality are from World Governance Indicators (WGI) of the World Bank (2016b) and Freedom House (2017). We point out here that most institutional indicators and their respective databases have been criticized for biases and are not completely free of errors. However, these are still the best data sets available for cross-country studies (Kar and Saha 2012). Domestic credit to the private sector is the proxy for financial development, the control variables are inflation rate, per capita gross domestic products (GDP) and age dependency ratio, while the measures of institutional quality are control of corruption, government effectiveness, political stability, rule of law and political rights.

On the *a priori* expectations, *domestic credit to private sector* (% of GDP), which is the measure of financial efficiency and development, shows the ability of banks to transform their mobilised deposits into household credits, and in line with the discussion of inequality, this would allow individuals at the lower end of the income distribution to have easier access to credit to fund investment ideas more efficiently, thus reducing inequality. The *per capita GDP* controls for the level of economic development and it is expected that inequality falls as the average income of the population increases. The *age dependency ratio* measures the ratio of the working age group between $15-64$ years and as the ratio increases, we expect a reduction in income inequality. *GDP growth rate* and the *inflation rate* are expected to exert a negative effect on inequality. Lastly, for all the governance variables, empirical evidence supports that quality institutions enhance government's role in resource allocation, increases the level of social services available to the poor, increases growth and investment, and that policies that improves institutional quality will most likely reduce in-

equality. The description of each variable and data sources are in Appendix
Table A3 while we show the summary statistics and *a priori* expectations in
Table 1.

Table 1

Variables Statistics and a priori Expectations

Variables	Obs	Mean	SD	Min	Max	*a priori*
Gini Index	817	0.437	0.079	0.296	0.875	NA
Dom. Credit by Banks	796	17.534	16.558	0.154	108.022	negative
Financial System Dep.	751	22.694	18.160	1.690	97.820	negative
GDP per capita	831	1556.211	2367.205	72.527	15695.898	negative
Age Dependency	840	86.500	14.150	40.618	112.973	negative
GDP Growth Rate	831	4.890	6.138	–37.011	106.270	negative
Inflation Rate	830	21.474	211.41	–29.69	5399.51	negative
Control of Corruption	838	–0.572	0.602	–2.386	1.250	negative
Govt. Effectiveness	838	–0.673	0.596	–1.980	1.040	negative
Political Stability[*]	840	–0.521	0.947	–2.990	1.190	negative
Rule of Law	840	–0.654	0.653	–2.230	1.060	negative
Political Rights	840	4.217	1.852	1.000	7.000	negative

Note[*]: The ranking of the institutional variables are –2.5 (very weak) to +2.5 (very strong), but
we observed some countries below the "very weak" rank for *political stability*. The countries are:
Congo, DR: –2.99 (1997), –2.83 (1996), –2.78 (1999), –2.58 (2000); Central Afr. Rep.: –2.69
(2014); Sudan: –2.65 (2009, 2010), –2.51 (1996); Liberia: –2.55 (1996); Burundi: –2.51 (2004).

Source: Authors' computations.

From Table 1, a cursory look at the data reveals that countries in the South-
ern African sub-region make up the largest proportion of those with high in-
equality. South Africa recorded the highest Gini index in the sample (0.875 for
2009) and has the highest number of index above 0.65 followed by Namibia
and Lesotho. The country with the lowest Gini index was Ethiopia (with 0.296
for 2004) and also has the highest number of index below 0.30 followed by
Sao Tome and Principe. On institutional quality, the majority of the countries
did poorly with few having good ratings with some specific measures. The cor-
relation matrix (Table 2) informs the study about potential relationships be-
tween inequality and other variables. Domestic credit and financial system de-
posit exhibit a positive correlation with the Gini index; of the four control vari-
ables, age dependency and GDP growth rate exhibit a negative correlation
while out of the five institutional variables only political rights indicate a nega-
tive correlation. This may be due to the different computational dynamics used
by the different data sources.

Table 2
Correlation Matrix

Variables	Gini	Dom.Cr.	FSD	GDPpc	Age	Gr.	INF	Corr.	GE	PS	RoL	PR
Gini Index	1.000											
Dom. Credit	0.235	1.000										
Fin. Sys. Dep.	0.160	0.842	1.000									
GDP per capita	0.214	0.506	0.630	1.000								
Age Dep.	−0.253	−0.668	−0.744	−0.739	1.000							
GDP Gr. Rate	−0.101	−0.042	−0.034	−0.044	0.127	1.000						
Inflation Rate	0.039	−0.060	−0.061	−0.030	0.058	0.000	1.000					
Cont. of Corr.	0.344	0.611	0.678	0.486	−0.624	0.004	−0.077	1.000				
Govt. Eff.	0.333	0.666	0.706	0.525	−0.595	0.062	−0.060	0.861	1.000			
Political St.	0.229	0.417	0.549	0.465	−0.441	0.069	−0.112	0.714	0.703	1.000		
Rule of Law	0.242	0.613	0.709	0.497	−0.553	0.055	−0.101	0.861	0.896	0.817	1.000	
Pol. Rights	−0.148	−0.526	−0.554	−0.237	0.436	−0.091	0.066	−0.654	−0.660	−0.620	−0.692	1.000

Source: Authors' computations

4. Empirical Results

4.1. Results and Discussion

The results from the dynamic model are reported in Table 3. Column [1] is the result from the baseline model, while columns [2] to [6] are those with each measure of institutional quality and their interactions with financial development. From the baseline model, the *lag of the logged Gini index* is statistically significant (0.9185) at the 1% level, evidencing the persistency of income inequality in the region.

Table 3

System GMM Estimates (Dependent Variable: Gini (log))

Variables	[1]	[2]	[3]	[4]	[5]	[6]
Constant	0.4314	0.4422	0.3234	0.8910	–0.0489	
	(1.68)	(1.25)	(0.68)	(1.16)	(–0.09)	
log Gini Index_1	0.9185***	0.7792***	0.6672***	0.6954***	0.5931***	0.8731***
	(10.87)	(4.87)	(2.88)	(6.10)	(3.12)	(6.21)
Domestic Credit	–0.0012	–0.0013	0.0021	–0.0023	0.0006	–0.0018
	(–0.93)	(–0.38)	(0.43)	(–0.89)	(0.11)	(–0.97)
log GDP per capita	–0.0180	–0.0316	–0.0560	–0.0035	–0.0914	0.0057
	(–1.32)	(–0.60)	(–0.83)	(–0.06)	(–0.82)	(0.11)
Age Dependency	–0.0024	–0.0042*	–0.0045	–0.0061*	–0.0071	–0.0021
	(–1.24)	(–1.69)	(–1.00)	(–1.72)	(–1.59)	(–1.01)
GDP Growth	0.0003	0.0001	0.0020	0.0011	0.0022	0.0016
	(0.04)	(0.01)	(0.71)	(0.31)	(0.59)	(0.40)
Inflation	–0.0000	0.0000	0.0000	–0.0000	0.0001	–0.0000
	(–0.30)	(0.35)	(0.28)	(–0.22)	(0.48)	(–0.14)
Control of Corruption		0.0666**				
		(2.45)				
Dom.Crdt.*Corr.		–0.0037*				
		(–1.90)				
Govt. Effectiveness			0.0484			
			(1.06)			
Dom.Crdt.*Govt. Eff.			–0.0052			
			(–1.59)			
Political Stability				0.0069		
				(0.25)		
Dom.Crdt.*Pol. Stabil.				–0.0024		
				(–1.52)		
Rule of Law					0.0912	
					(0.86)	
Dom.Crdt.*Rule of Law					–0.0052	
					(–1.44)	
Political Rights						0.0117
						(0.47)
Dom.Crdt.*Pol. Rights						0.0008
						(1.18)

No. of Obs.	669	669	669	669	669	669
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of Instruments	41	41	41	41	41	41
F Statistic	54.303	41.543	9.405	30.900	16.179	18.704
GMM Instrument Lag	1	1	1	1	1	1
AR(1)	0.24	0.249	0.247	0.256	0.300	0.207
AR(2)	0.626	0.555	0.492	0.570	0.619	0.575
Hansen test	0.062	0.407	0.328	0.304	0.336	0.379

Note: Robust options used; *t*-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ indicate significance at 1%, 5% and 10% respectively. Estimations are done using *xtabond2* routine in Stata.

Source: Authors' computations.

Columns [2] to [6] show the role of institutions in the finance-inequality nexus captured by interacting financial development with the five institutional variables. We find that across all model specifications, the past inequality level is a strong predictor of its current level. This denotes that inequality tends to be somewhat path-dependent, which suggests that a country's inequality level in the present year has a strong influence in determining her level of inequality the following year. Likewise, the age-dependency ratio is negative and statistically significant only in columns [2] and [4]. However, financial development though statistically insignificant is negative across all model specifications. Notably, column [2] gives evidence of an inverted-U relationship of corruption and its interaction with financial development. The coefficient of corruption (0.0666) is positive and statistically significant at the 5% level while its interaction with domestic credit (–0.0037). The interpretation is that the marginal effect of change in the control of corruption has a negative impact on income inequality given an increase in domestic credit. Other interaction terms are negative but statistically not significant, evidencing that institutions have an equalising effect on inequality if they are strong and efficient. Given the choice of one lag length, the specification test results of the AR(2) reveal that the models do not suffer from second-order serial correlation, and the Hansen test results show that the instruments used are not over-identified. Thus, well conjectured inferences can be made from our results.

Some salient points can be deduced from the results. Firstly, the negative but insignificant coefficients of the measure of financial development across all model specifications are likely indications of the under-developed state of sub-Saharan Africa's financial system. A pointer that the present state of the financial systems is not robust enough to be a contributory drive towards reducing income inequality in the region. The second point is that the interaction of domestic credit and corruption has an equalising effect on income inequality in the sense that if corruption is controlled given increase in credit, then income inequality will abate.

4.2. Robustness Checks

Our robustness checks are in two forms. In the first, since the sys-GMM is fragile to arbitrary lag limits, we test for the use of 2 lags (see Table 4) and our results are significantly different from those of Table 1. The notable differences is that across all specifications, no institutional variable nor the interaction term is significant, and the models suffer from second-order autocorrelation with a statistically significant AR(2). While in similarity, the measure of financial development is negative and statistically not significant in four models, columns [1] to [4]; and all the institutional variables have a mix of positive and negative coefficients, though not statistically significant.

Table 4

System GMM Estimates (Dependent Variable: Gini (log)) – Robustness Checks 1

Variables	[1]	[2]	[3]	[4]	[5]	[6]
Constant	0.2226	–0.1171	0.2165	–0.2245	–0.2854	–0.0285
	(0.73)	(–0.31)	(0.31)	(–0.33)	(–0.79)	(–0.05)
log Gini Index_2	0.9710***	1.0298***	0.9021***	0.9507*	0.9539***	1.0826***
	(6.31)	(3.70)	(3.66)	(1.87)	(5.05)	(7.06)
Domestic Credit	–0.0003	–0.0004	–0.0004	–0.0017	0.0000	0.0006
	(–0.18)	(–0.13)	(–0.13)	(–0.41)	(0.01)	(0.14)
log GDP per capita	–0.0184	0.0264	–0.0167	0.0652	0.0383	0.0056
	(–0.55)	(0.50)	(–0.18)	(0.57)	(0.76)	(0.09)
Age Dependency	–0.0014	–0.0000	–0.0020	–0.0028	–0.0000	–0.0015
	(–1.04)	(–0.00)	(–0.64)	(–0.45)	(–0.02)	(–0.45)
GDP Growth	–0.0020	–0.0062	–0.0028	0.0020	–0.0032	0.0028
	(–0.21)	(–1.08)	(–0.35)	(0.34)	(–0.34)	(0.47)
Inflation	–0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(–0.43)	(0.11)	(0.18)	(0.11)	(0.01)	(0.16)
Control of Corruption		0.0249				
		(0.30)				
Dom.Crdt.*Corr.		–0.0027				
		(–0.80)				
Govt. Effectiveness			0.0077			
			(0.08)			
Dom.Crdt.*Govt. Eff.			–0.0016			
			(–0.98)			
Political Stability				–0.0296		
				(–0.48)		
Dom.Crdt.*Pol. Stabil.				–0.0023		
				(–0.41)		
Rule of Law					–0.0155	
					(–0.24)	
Dom.Crdt.*Rule of Law					–0.0014	
					(–0.53)	
Political Rights						0.0311
						(0.66)

Dom.Crdt.*Pol. Rights						0.0004
						(0.30)
No. of Obs.	635	635	635	635	635	635
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of Instruments	39	39	39	39	39	39
F Statistic	74.883	10.637	23.541	17.866	20.457	25.572
GMM Instrument Lag	2	2	2	2	2	2
AR(*1*)	0.77	0.319	0.695	0.617	0.736	0.423
AR(*2*)	0.040	0.105	0.079	0.086	0.057	0.021
Hansen test	0.078	0.323	0.444	0.306	0.114	0.158

Note: Robust options used; *t*-statistics in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1 indicate significance at 1 %, 5 % and 10 % respectively. Estimations are done using *xtabond2* routine in Stata.

Source: Authors' computations.

The second form of robustness is using another measure of financial development, namely financial system deposits (% of GDP), often used in the empirical literature (Levine 2008; Demirgüç-Kunt and Levine 2009; Law, Tan and Azman-Saini 2014) to capture the depth of liquid liabilities with which financial intermediation hinges. Thus, it is expected that more financial liquidity enhances credit dissemination and hence lowers inequality, *ceteris paribus*. The results displayed in Table 5 shows that inequality is persistent in the region and is evident across all model specifications. The finance variable is positive, though not significant. This is contrary to *a priori* expectations. However, the results of the specification tests show that the models are well specified and therefore means that the results of this study are robust and can be relied upon for useful inference.

Table 5

System GMM Estimates (Dependent Variable: Gini (log)) – Robustness Checks 2

Variables	[1]	[2]	[3]	[4]	[5]	[6]
Constant	0.5927	0.3462	0.4637	*–0.0455*	0.5711*	0.2866
	(1.13)	(1.20)	(0.60)	*(–0.04)*	(1.77)	(0.51)
log Gini Index_1	0.8480***	0.8489***	0.6719***	0.7825**	0.8068***	0.8914***
	(5.40)	(8.31)	(2.98)	(2.47)	(4.21)	(5.95)
Fin. Sys. Deposits	0.0009	0.0004	–0.0006	0.0014	0.0007	0.0018
	(0.26)	(0.24)	(–0.29)	(1.44)	(0.21)	(0.25)
log GDP per capita	–0.0577	–0.0200	–0.0261	0.0187	–0.0447	–0.0274
	(–0.88)	(–0.75)	(–0.37)	(0.16)	(–1.25)	(–0.50)
Age Dependency	–0.0039	–0.0038*	–0.0068	–0.0034	–0.0052**	–0.0038
	(–0.99)	(–1.71)	(–1.52)	(–0.46)	(–2.03)	(–0.96)
GDP Growth	0.0004	–0.0002	–0.0023	–0.0030	–0.0005	–0.0002
	(0.08)	(–0.06)	(–0.54)	(–0.57)	(–0.08)	(–0.07)

Continued next page

Table 5 continued

Variables	[1]	[2]	[3]	[4]	[5]	[6]
Inflation	0.0000	0.0000	0.0000	–0.0001	0.0000	–0.0000
	(0.02)	(0.24)	(0.10)	(–0.37)	(0.15)	(–0.49)
Control of Corruption		0.0533				
		(1.00)				
Fin. Sys.Dep.*Corr		–0.0031				
		(–1.38)				
Govt. Effectiveness			0.0075			
			(0.07)			
Fin. Sys.Dep.*Govt. Eff.			–0.0024			
			(–0.59)			
Political Stability				–0.0374		
				(–0.29)		
Fin. Sys.Dep.*Pol. Stabil.				–0.0010		
				(–0.24)		
Rule of Law					0.0180	
					(0.20)	
Fin. Sys.Dep.*Rule of Law					–0.0019	
					(–0.51)	
Political Rights						0.0248
						(0.63)
Fin. Sys.Dep.*Pol. Rights						–0.0003
						(–0.23)
No. of Obs.	645	645	645	645	645	644
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of Instruments	40	40	40	40	40	40
F Statistic	40.874	27.937	14.175	174.302	49.604	26.926
AR(1)	0.242	0.233	0.221	0.262	0.247	0.236
AR(2)	0.566	0.581	0.575	0.806	0.605	0.596
Hansen test	0.201	0.582	0.981	0.89	0.501	0.381

Note: Robust options used; *t*-statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ indicate significance at 1%, 5% and 10% respectively. Estimations are done using *xtabond2* routine in Stata.

Source: Authors' computations.

5. Conclusion

Given the sparse literature on the finance-inequality nexus in Sub-Saharan Africa (SSA), this study examines the impact of financial development on income inequality and the role of quality institutions in the region using a panel data of 42 countries from 1996 to 2015. The study contributes to the finance-inequality literature by providing evidence that controlling corruption given increase in domestic credit has an equalising effect on the Gini index. Evidence is also provided on the persistency of inequality in SSA given the positive coefficient of the lagged Gini index. The negative but statistical insignificance of the measure of financial development is an indication of the under-developed state of the financial systems prevalent in the region, which are not robust in

contributing significantly to the reduction of inequality. Likewise, all the measures of institutional quality are statistically insignificant although they possess negative coefficients. On the role of quality institutions, our results show the tendency for improved income distribution if institutions are efficient. This assertion is supported with the statistical significance of the inverted-U relationship of corruption and its interaction with domestic credit on the Gini index. The governments of SSA need frantic efforts and policies directed towards reducing inequality. This needs to ensure that credit is not exclusively meant for the rich (as it currently stands). Although comprehensive, there are further research questions relating to both income inequality and credit growth that remain to be answered. Data limitations can restrict the ability to test a range of hypotheses, and identifying causal effects is a serious challenge. It is important to test the impact of other financial variables, such as the number of branch networks of banks, the liquidity ratio, the cash reserve ratio and international capital flows. This can be taken up in subsequent research.

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Appendix

Table A1

Variables Description, Sources and Scope

Variables	Description	Sources, Scope
Gini Index	Measure of income inequality. Ranges between 0 (perfect equality) and 1 (perfect inequality).	Lahoti et al., (2016), 1996 – 2015
Dom. Credit by Banks	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	WDI (2016), 1996 – 2015
Financial System Dep.	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.	WBGFDD (2016), 1996 – 2015
GDP per capita (US$)	This is gross domestic product divided by midyear population.	WDI (2016), 1996 – 2015
Age Dependency	Age dependency ratio is the ratio of dependents–people younger than 15 or older than 64–to the working-age population–those ages 15-64.	– do –
GDP Growth Rate (%)	Annual percentage growth rate of GDP at market prices based on constant local currency.	– do –
Inflation Rate	Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole.	– do –
Control of Corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Ranges from –2.5 (very corrupt) to +2.5 (least corrupt)	WGI (2016), 1996 – 2015
Govt. Effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Ranges from –2.5 (least effective) to +2.5 (most effective)	– do –

Table A1 continued

Variables	Description	Sources, Scope
Political Stability	Political Stability and Absence of Violence / Terrorism measures perceptions of the likelihood of political instability and / or politically-motivated violence, including terrorism. Ranges from –2.5 (least stable) to +2.5 (most stable).	– do –
Rule of Law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Ranges from –2.5 (very weak) to +2.5 (very strong).	– do –
Political Rights	Measure of political rights of the citizenry. Ranges from 1 (highest degree of freedom) to 7 (lowest degree of freedom).	FIW (2017), 1996 – 2015

Source: Authors'.

A2 List of Countries

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Democratic Republic of Congo, Congo Republic, Cote d'Ivoire, Ethiopia, Gabon, Gambia Ghana, Guinea and Guinea Bissau. Others are: Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda and Zambia.