



Financial development, control of corruption and income inequality

Samuel Adams & Edem Kwame Mensah Klobodu

To cite this article: Samuel Adams & Edem Kwame Mensah Klobodu (2016) Financial development, control of corruption and income inequality, International Review of Applied Economics, 30:6, 790-808, DOI: [10.1080/02692171.2016.1208740](https://doi.org/10.1080/02692171.2016.1208740)

To link to this article: <https://doi.org/10.1080/02692171.2016.1208740>



Published online: 15 Jul 2016.



Submit your article to this journal [↗](#)



Article views: 1195



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 19 View citing articles [↗](#)

Financial development, control of corruption and income inequality

Samuel Adams^a and Edem Kwame Mensah Klobodu^b

^aGhana Institute of Management and Public Administration, GIMPA School of Public Service and Governance, Accra, Ghana; ^bGhana Institute of Management and Public Administration, Business School, Accra, Ghana

ABSTRACT

This paper examines the effect of financial development and control of corruption on income inequality in 21 Sub-Saharan African (SSA) countries over the period 1985–2011 using the pooled mean group (PMG) estimator. The empirical results show that financial development measures have positive impact on income inequality, which suggest that financial development increases income inequality. On the other hand, the coefficients of control of corruption are negative and significantly related to income inequality which implies that corruption control reduces income inequality. Further, the interaction of the financial development and the control of corruption is found to be negatively and significantly related to income inequality. Equally the interaction of the financial development and transparency index (an alternate measure of corruptibility) is found to be negatively and significantly related to income inequality. These findings suggest that the control of corruption and transparency in governance are crucial in reducing income inequality in SSA.

ARTICLE HISTORY

Received 22 February 2016
Accepted 17 June 2016

KEYWORDS

Financial development;
income inequality; gini;
corruption; transparency;
Sub-Saharan Africa

JEL CLASSIFICATION

G20; O15; D73

1. Introduction

In many developing economies, a fundamental concern for governments and policy makers is the redistribution of income equitably for economic development. According to the International Monetary Fund [IMF] (2007) and complementary works by the United Nations (2013), high income inequality can be detrimental to economic stability as well as economic growth. Besides income inequality being detrimental, it also affects the quality of life of indigenes and could lead to social unrest and political instability (Jauch and Watzka 2016). Although inequalities have diminished over the period, Africa still remains the poorest in the world and the second continent on the income inequality chart after Latin America (African Development Bank [AfDB] 2012). The AfDB (2012) report reveals that six (6) out of 10 most unequal countries were in Sub-Saharan Africa, with South Africa being the highest with a Gini coefficient of about 0.70 (World Bank 2012).

In recent times, researchers, the international community, and policy makers around the world have advocated for economic and political reforms, especially of the financial sector

to promote financial development as a means of combating the persistent poor growth and high inequality in developing countries, particularly in Africa. Generally, a well-developed financial system has the potential to foster the accumulation and allocation of capital for entrepreneurial activities to promote long-term growth and reduce income inequality (Gwama 2015).

In this paper, financial development is defined as the improvement in the quality, quantity and the efficiency of the financial intermediaries (Levine 2005). In other words, enhancing financial depth helps in the reduction in agency costs such that low productivity firms get access to external finance to enter the market (Rajan and Zingales 2003a; von Ehrlich and Seidel 2015). Rajan and Zingales (2003b) assert that without vibrant, innovative financial markets, economies would invariably ossify and decline. Indeed, the authors argue that much of the prosperity, innovation, and increased opportunity in recent decades could be attributed to the development of the financial sector. In short, the essence of finance is summed up in the idea that 'one needs money to make money.'

In the last three decades, African countries have undergone two main types of financial sector reforms. The first generation of reforms involved liberalization in the banking sector, relaxation of control on international capital movements and interest rates and the second focused on improving legal, regulatory, supervisory and institutional environments as well as restoring the soundness of banks (Batuo, Guidi, and Mlambo 2010; Asongu 2013). Though the financial sectors of African countries are still relatively shallow compared to other developing regions, they are experiencing fairly rapid growth (Griffith-Jones, Karwowski, and Hlungwane 2013). According to Batuo, Guidi, and Mlambo (2010), M2 as a share of GDP rose from 31% in 1980 to about 38% in 2008. There are many, however, who fall below this average as at 2015, for example, Burkina Faso (28.1%), Cameroon (21.4%), Chad (12.7%), Democratic Republic of the Congo (11%), Niger (27), Mali and Nigeria (20%) (World Bank Group 2015). Bank deposits as share of GDP grew from 13% (in 1990–1999) to more than 20% (in 2010), while liquid liabilities share to GDP rose by more than 10% over the same period from 20 to 30% (Griffith-Jones, Karwowski, and Hlungwane 2013). Private sector credit to GDP increased from an average of 13.85% in 2002 to 16.29% in 2008 and 20.48% for the period 2008–2011 (Gwama 2015). The big question then is whether the appreciable development in the financial sector is having any impact on the lives of the poor as theory suggests. This question provides the motivation for this study.

Although the literature on financial development and economic growth is well-established (Robinson 1952; Lucas 1988; King and Levine 1993; Arestis, Chortareas, and Magkonis 2005; Sahay et al 2015), there has not been much focus on the financial development and income inequality relationship. The attention on income inequality shifts the discussion from capital to the human being at the centre of economic activity (Rajan and Zingales 2003b). There is no trade-off between financial reform, growth and income equality in the long term. In the short term, measures to avoid accumulating too much credit can, however, restrain growth temporarily. A healthy contribution of the financial sector to inclusive growth requires strong capital buffers, measures to reduce explicit and implicit subsidies to 'too big-to-fail' financial institutions and tax reforms to promote neutrality between debt and equity financing.

There is also the perception that the institutional and political economy dynamics are determinants in understanding both the challenges and the impact of financial development on income inequality but not much has been done empirically about this. Accordingly, this

study contributes to the literature by investigating the moderating role of institutional quality focusing on the control of corruption in the financial development and income inequality nexus. Chong and Gradstein (2007), for example, claim that financial development may neither improve economic wellbeing nor decrease inequality when the institutional quality is weak and Rajan and Ramcharan (2011) argue that weak political institutions could constrain the efficiency of the financial system. Courneade, Denk and Hoeller (2015) have also argued that finance could promote inclusive growth through capital buffers, government policies and regulations in managing and balancing debt and equity financing. Haber and Perotti (2007) assert that democratic corporatism, oligopolistic capture and state opportunism are the main political constraints on the development of financial system.

Finally, we extend the existing literature by using a more robust estimator, the pooled mean group (PMG) technique to control for omitted variable bias, endogeneity, country heterogeneity and unobserved long-run relationship of financial development on income inequality for the period 1985–2011. The rest of the paper is structured as follows; the next section gives a brief literature on the subject, after which the methodology is described, results discussed and concluding remarks given.

2. Literature review

Three main contrasting perspectives have been used in describing the relationship between financial development and income inequality: the income-widening hypothesis, income-narrowing hypothesis, and the hump or inverted U-shaped relationship (Banerjee and Newman 1993; Galor and Zeira, 1993; Rajan and Zingales 2003a; Clarke, Xu, and Zhou 2006; Law, Tan, and Azman-Saini 2014).

The advocates of the inequality-narrowing hypothesis argue that when the financial sector grows, the poor are able to gain access to credit (Clarke, Xu, and Zhou, 2006; Beck, Demirgüç-Kunt, and Levine 2007; Hamori and Hashiguchi 2012). Galor and Zeira (1993) and Banerjee and Newman (1993) propose that the degree of income inequality related to initial wealth distribution may decrease if financial market development increases economic opportunities of the disadvantaged agents. Kim and Lin (2011) suggest that by easing financial frictions and hence by allowing more poor people and entrepreneurs to access and obtain external finance, financial development may improve the allocation of capital and reduce income inequality. Supporting the inequality-narrowing hypothesis, Law, Tan, and Azman-Saini (2014) argue that financial development has significant effects on income inequality when the financial system is embedded within a sound institutional framework. The appropriate institutional infrastructure helps to improve the domestic financial system through a better allocation of risk and socialization of costs especially during financial crises (Claessens and Perotti 2007). Agnello, Mallick, and Sousa (2012) explain the benefits of financial development through what they call ‘quality effect’ on allocative efficiency by equalizing access to credit. Clarke, Xu, and Zhou (2006) make a similar argument in their assertion that finance might be an equalizer for people with talents, ambition, and persistence. Similarly, Rajan and Zingales (2003a, 92) state that the revolution in financial markets is ‘opening the gates of the aristocratic clubs to everyone.’ Jauch and Watzka (2016) examine the case for 138 developed and developing countries using credit to GDP as a financial development measures and report that financial development has a positive effect on income inequality.

Empirically, Hamori and Hashiguchi (2012) examine an unbalanced panel of 125 countries for the period 1963–2002 and find that financial deepening reduces income inequality. Using a panel data for 91 developing and developed countries for the period 1960–1995, Clarke, Xu, and Zhou (2006) report that inequality is lower in countries with developed financial markets and intermediaries. Beck, Demirgüç-Kunt, and Levine (2007) investigate the effect of financial development on income inequality for 72 developing and developed countries over the period 1960–2005 and report that financial development disproportionately boosts incomes of the poorest quintile and reduces income inequality. The authors observe that about 40% of the long-run impact of financial development on the income growth of the poorest quintile is the result of reductions in income inequality, while 60% is due to the impact of financial development on aggregate economic growth. Likewise, employing panel data set of 50 low-income developing countries over the period of 1970–2008, Agnello, Mallick, and Sousa (2012) demonstrate that financial development has a significant negative effect on income inequality for 62 countries for 1973–2005 and conclude that removal of policies towards directed credit and excessively high reserve requirements reduce inequality.

Other studies are however not optimistic. For example, Prete and Lo (2013) using cross section and panel regression techniques on a sample of advanced and developed economies, finds that the financial development-inequality nexus is not robust. In a related study of African countries, Fowowe and Abidoye (2013) show that financial development as measured by private credit and broad money (M2) are not significantly related to poverty and inequality in African countries. Another study of 39 African countries by Balamouné-Lutz and Lutz (2004) find that financial development and foreign direct investment have insignificant impact on rural-urban income inequality while openness to trade reduces it. Additionally, Law and Tan (2009) in an examination of the finance-inequality link of Malaysia over the period 1980–2000 demonstrate that the relationship is not robust.

The income-widening view, however, proposes that financial development is positively related with income inequality, which implies that financial development increases income inequality because it benefits the rich and well-connected at the expense of the poor. According to this hypothesis, the poor are not able to access credit facilities due to lack of collateral and established relationship with financial institutions. Canavire-Bacarreza and Rioja (2008) have mentioned that ‘given their lack of collateral and scant credit histories, poor entrepreneurs may be the most affected by financial market imperfections such as information asymmetries, contract enforcement costs, and transactions costs’. This ‘tyranny of collateral’ according to Rajan and Zingales (2003b) is what makes it possible for the rich to benefit more from financial development. The ability of the rich and large firms to offer collateral and pay back loans indirectly prevents small firms from accessing external finance and consequently reduces the ability of the poor to improve their economic wellbeing (Ang 2010). This argument is supported by the critics of financialization and the popular press who depict financiers as greedy middlemen who serve only the interest of the rich and well connected. This is supported by Tiwari, Shahbaz, and Islam’s (2013) study of India for the period 1960–2008, which shows that financial development contributed to the increasing disparities between rural and urban earnings. Jauch and Watzka (2016) examine the case for 138 developed and developing countries using credit to GDP as a financial development and report that financial development has a positive effect on income inequality. In a study of OECD countries, Assa (2012) reports that financialization has detrimental effects

on income inequality, economic growth, and unemployment. Related to these negative effects, Kedrosky and Stangler (2011) claim that the financialization of the US economy led in part to the financial crisis of 2008. Freeman (2010) also argues that financial development does not only reduce growth and unemployment but leads to a reduction in public goods provision. In the long run, financial development results in a shift from management capitalism to finance capitalism so that business is no more seen as creation of value by productive enterprises but as assets to be bought and sold for maximizing profits through financial strategies' (Batt and Appelbaum 2013; Strouss et al. 2014). A similar argument is made by Dabla-Norris et al. (2015) in their assertion that excessive financial development could lead to resources being diverted to the financial sector away from more productive sectors. Cecchetti and Kharroubi (2015) explain that financial development could have negative effects on allocative efficiency and on the crowding out of human capital away from the real sector and to the financial sector when it expands rapidly. Indeed, Courneade, Denk and Hoeller (2015) provide evidence in the OECD to show that financial expansion fuels greater income inequality because higher income earners can benefit more from the greater availability of credit and because the sector pays high wages. The financial sector pays wages which are above what employees with similar profiles earn in the rest of the economy. This premium is particularly large for top income earners.

Besides the inequality-widening and narrowing hypotheses, there is a group of studies that shows that the relationship between financial development and income inequality is nonlinear which supports Greenwood and Jovanovic's (1990) suggestion that a hump or inverted U-shaped relationship exists between the two variables. Thus income inequality first rises as the financial sector develops but later declines as more people gain access to the system (Clarke, Xu, and Zhou, 2006; Kim and Lin 2011). While the early stages of increasing inequality is attributed to fixed cost, the latter stage is associated with the lowering cost of financial services (Roine, Vlachos, and Waldenström 2009; Ang 2010). This is consistent with Kuznets' (1955) hypothesis that market forces first increase and then decrease economic inequality over time as the economy develops. Even though Kuznets' (1955) model was more speculative (5% empirical and 95% speculation, see, page 26) as he himself noted, many studies have provided evidence to support the Kuznets hypothesis (Barrios and Strobl 2005). One of the key forces driving this inequality is the concentration of savings among rich households, however as a country moves to higher income levels, political pressures for income redistribution, the emergence of new industries, rising importance of services sector incomes (that rely more on individual excellence), and urbanization, all of which, according to Kuznets (1955), tend to help reduce inequality. Myrdal (1958) describes the Kuznets model with backwash and spread effects, where initial development benefits a few people but in the long run the benefits are spread for all.

Kim and Lin (2011) find that the benefits of financial development on income distribution occur only if the country has reached a threshold level of financial development. Below this critical threshold, financial development hurts the poor and exacerbates income inequality. Tan and Law (2012) examine the case for 35 developing countries for 1980–2000 and find a nonlinear relationship between financial development and income inequality, but unlike Greenwood and Jovanovic (1990), it is U-shaped and not inverted U-shaped. This means financial development benefits both the rich and poor until it reaches a threshold after which any further increase in financial development would have a detrimental effect on the distribution of income. This reflects the inefficiency of financial markets in improving

economic inequality when the threshold level is overshot. In a related study, Law, Tan, and Azman-Saini (2014) find that the relationship between financial development and income inequality is dependent on the quality of institutions. The empirical evidence based on the threshold regression approach shows that financial development tends to reduce income inequality only after a certain threshold level of institutional quality has been achieved. The authors assert that until the institutional quality threshold is reached, financial development does not exert a significant impact on income inequality.

The review of the empirical literature indicates that the effect of financial development on income inequality and economic growth is influenced by data heterogeneity, observed and unobserved country-specific effects as well as the methodologies employed. Accordingly, we control for these factors in our analysis of the impact of financial development on income inequality by using a panel data set of developing countries over the period 1985–2011. Moreover, the moderating effect of the control of corruption on the financial development-income inequality link is investigated. The data and empirical methodology used are described next.

3. Methodology

The empirical analysis is based on a panel data set consisting of yearly data from 1985 to 2011, made up of 21 Sub-Saharan African (SSA) countries (see Appendix Table A5 for list of countries). The number of countries has been limited due to the quest to have a longer time span for the sample. Also, the time span of the data set (1985–2011) was constrained by the availability of the control of corruption variable from the international country risk guide (ICRG). For purposes of robustness, Williams's (2011) transparency index is used as a measure of control of corruption. In order to achieve a stationary variance, all the variables were transformed into natural logarithms except corruption control variables ($CORR_{it}$). Following the finance-income inequality literature we specify our model to include control of corruption:

$$GINI_{it} = \alpha_i + \theta_1 FINDEV_{it} + \theta_2 GDP_{it} + \theta_3 CORR_{it} + \varepsilon_{it} \quad (1)$$

Where $Gini_{it}$ is a measure of net income inequality of country i in period t ; $FINDEV_{it}$ represent two financial development measures¹– (1) domestic credit to private sector as a share of GDP henceforth domestic credit ($FINDEV_1$) and (2) deposit money as a ratio of Central bank Assets, henceforth deposit money ($FINDEV_2$); GDP_{it} is real GDP per capita; and $CORR_{it}$ denotes control of corruption. Corruption threatens foreign investment by distorting the economic and financial environment thereby reducing the efficiency of government and business. The control of corruption index ranges from 0 to 1, with high values denoting a transparent economy while low values denote a corrupt economy. Since this Equation (1) imposes no restrictions on our parameters, we introduce an interaction effect² in our model to capture the complementary role of control of corruption in the finance-inequality nexus and thus re-specify the model as:

$$GINI_{it} = \alpha_i + \theta_1 FINDEV_{it} + \theta_2 GDP_{it} + \theta_3 CORR_{it} + \theta_4 FINDEV_{it} \times CORR_{it} + \varepsilon_{it} \quad (2)$$

The study employs interaction effect ($\theta_4 FINDEV_{it} \times CORR_{it}$) to capture the moderation role of corruption control on the relationship between financial development and income distribution. Whereas the control of corruption variable, $CORR_{it}$ was obtained from the ICRG,

transparency index (an alternate measure of corruptibility) comes from Williams (2011). Williams (2011) transparency index ranges from 0 to 100, higher values indicate high transparency while lower values indicate low transparency. Williams' (2011) transparency index constitutes an aggregated data from World Bank and International Monetary Fund (IMF). Financial development variables, $FINDEV_{it}$ and real GDP per capita, GDP_{it} from the Financial Development and Structure Database by Beck, Demirgüç-Kunt, and Levine (2000) and World Bank's World Development Indicators (World Bank 2015), respectively. Finally, data on income inequality ($GINI_{it}$) is obtained from The Standardized World Income Inequality Database (SWIID) by Solt (2016) scaled between 0 and 100; higher values denote high income inequality and lower values denote low income inequality. Consequently, we employ a condensed model (i.e. we exclude control variables such as trade openness, population and inflation) due to the implementation of a PMG cointegration framework. A cointegration framework controls for omitted variable bias and specification problem. Once cointegration is established, it implies that error term of regression equation is stationary. In other words, no relevant integrated variables are omitted or no misspecification problem is present. Any omitted nonstationary variable that is part of the cointegration relationship would enter the error term, thereby producing nonstationary residuals (see Chintrakarn and Herzer 2012; Herzer and Vollmer 2012).

Recent novelties in econometrics involve estimating dynamic heterogeneous panels with large number of cross sections (large N) and large time series (large T) component due to the availability of data over long period of time. Mean group (MG) and Pooled Mean Group (PMG) estimators proposed by Pesaran and Smith (1995) and Pesaran, Shin and Smith (1997, 1999), respectively are suitable for estimating dynamic heterogeneous panels³ with large N and large T characteristic. Unlike traditional fixed and random effect models that impose homogeneity on slope parameters, the MG and PMG estimators allow for heterogeneity of slope parameters. More specifically, whereas the MG estimator relies on averaging coefficients of time series, PMG relies on a combination of pooling and averaging coefficients. Further, the PMG estimator allows the parameters (intercepts, short-run coefficients and error variances) to differ freely across groups, but constrains the long-run estimates to be the same. The MG estimator, however, does not take account of the fact that certain parameters may be the same across groups, thus making PMG a desirable estimator. Advantages of MG and PMG estimates include provision of consistent estimates as compared with dynamic fixed effect models such as Arellano and Bond (1991) and Arellano and Bover (1995) generalized method of moments estimator and ability to provide unbiased estimates when panel data indeed has large cross sections and time series components. Both estimators are also useful for capturing cointegration, long run relationships among variables while controlling for cross-sectional independence in panel data (see Appendix Table A4). Consequently, the PMG estimator seems to be a good possibility for the estimation of our panel dataset recognizing its merits.

3.1. Estimation Strategy

The financial development-income inequality nexus is analysed in a two (2) step process. To begin with, the order of integration of the variables is assessed to inform us the properties of our variables (i.e. whether they are stationary or have unit root process). Afterwards, PMG,

MG and Dynamic Fixed effects (DFE) estimators are employed. The use of DFE estimator enables us to compare our estimates with earlier studies.

3.2. Panel unit root tests

The outcome of the panel unit root tests of LLC (Levine, Lin, and Chu 2002) and IPS (Im, Pesaran, and Shin 2003) are indicated in Table 1. Both tests provide strong evidence that variables have a unit root in levels. Since the unit root hypothesis can be rejected for first differences, it can be concluded that all series are integrated of the same order one ($I(1)$).

3.3. The MG and PMG estimators

The MG and the PMG estimators operate under an autoregressive distributed lag framework (ARDL) specified as:

$$GINI_{it} = \sum_{j=1}^p \rho_{ij} GINI_{it-j} + \sum_{j=0}^q \delta'_{ij} X_{it-j} + v_i + \varepsilon_{it} \quad (3)$$

Where the number of countries = 1,2,...,21; the number of periods $t = 1,2,...,27$; X_{it} is a $K \times 1$ vector of explanatory variables; δ_{ij} are $K \times 1$ the coefficient vectors; ρ_{ij} are scalars and v_i is the country-specific effect.

In principle, cointegration is present when variables of interest are nonstationary ($I(1)$ process) while the error term is stationary ($I(0)$ process). A key feature of cointegrated variables is their responsiveness to any deviation from long-run equilibrium, thus short run-dynamics of variables in the system are influenced by the deviation from equilibrium

Table 1. Panel-Based Unit root test.

Variables	Deterministic terms	LLC statistics	IPS
Levels			
GINI	Constant, trend	1.8096	-1.5808
FINDEV ₁	Constant, trend	0.5483	-0.3601
FINDEV ₂	Constant, trend	-1.3635*	-1.5922
GDP	Constant, trend	-0.2707	1.1593
CORR	Constant, trend	-0.2868	-0.6627
TRANS	Constant, trend	0.0710	-0.5201
FINDEV ₁ *CORR	Constant, trend	1.7657	0.2948
FINDEV ₂ *CORR	Constant, trend	-3.2910*	-3.4440**
FINDEV ₁ *TRANS	Constant, trend	1.7657	5.3238
FINDEV ₂ *TRANS	Constant, trend	25.5589	9.7341
First differences			
GINI	Constant	-10.8699***	-12.0806***
FINDEV ₁	Constant	-14.0610***	-15.2653***
FINDEV ₂	Constant	-16.2749***	-15.8962***
GDP	Constant	-12.1157***	-11.9337***
CORR	Constant	-15.9757***	-13.7768***
TRANS	Constant	-20.3835***	-18.8801***
FINDEV ₁ *CORR	Constant	-16.7123***	-14.6432***
FINDEV ₂ *CORR	Constant	-16.5907***	-14.0147***
FINDEV ₁ *TRANS	Constant	-16.7123***	-2.6671***
FINDEV ₂ *TRANS	Constant	24.0179	-0.2289

***, **, * denote significance at 1, 5 and 10%, respectively.

(Blackburne and Frank 2007). The presence of a cointegrating vector leads us to reparameterize (3) into the error correction model:

$$\Delta GINI_{it} = \phi_i(GINI_{it-1} - \theta'_i X_{it}) + \sum_{j=1}^{p-1} \rho_{ij}^* GINI_{it-j} + \sum_{j=0}^{q-1} \delta'_{ij} X_{i,t-j} + v'_i + \varepsilon_{it} \quad (4)$$

In particular, the error-correction term (i.e. speed of adjustment parameter) and the long-run coefficients are of primary interest. If parameter ϕ_i is zero then there would be no evidence for cointegration or long-run relationship. However, a negative sign imply that the variables show a return to a long-run equilibrium in case of any distortions. θ'_i contains long-run estimates of the variables (i.e. variables are cointegrated).

4. Results and discussion

4.1. Descriptive statistics

Descriptive Statistics are reported in Tables A1 and A2 in the appendix. South Africa has the highest income inequality (59.1) followed by Zambia (55.1), with Tanzania, having the least Gini (38.0) over the period 1985–2011 (Table A1). Many studies on South Africa suggest that race, gender, and location have been key determinants of inequality (Leibbrandt, Woolard, and Bhorat 2000; Magruder 2010). The legacy of past policies of segregation and discriminatory system of apartheid which was heavily biased; providing health, education and housing services to the white minority, to the detriment of the black population. Also, labor market policies were aimed at protecting the position of white workers through active policies such as job reservation, while inferior education, influx control and the Group Areas Act ensured little competition from other race groups (Woolard 2002; Lehohla and Shabalala 2014). Further, the massive investment in state education for white schoolchildren in the 1950s and 1960s resulted in white workers securing the skills that enabled them, in the 1970s and 1980s to command high incomes. Accordingly, it can be argued that restrictive past economic practices prevented much of the population from vertical mobility within the labor market, leading to a skewed income distribution which was in turn reinforced by an unequal distribution of skills and training.

Concerning stability, Botswana has the most stable income inequality over the period. In contrast, Cameroon has the most volatile income inequality over the period 1985–2011 as indicated by the coefficient of variation (CV). Using the mean as a measure of central tendency and taking standard deviation into consideration, descriptive statistics indicate that the region is generally characterized by high income inequality, good economic growth prospects, relatively low control of corruption and fairly developed financial system (Table A2). The correlation matrix also reveals that Gini and independent variables are related positively, except with transparent variable which is negative and not significant (Table A3).

4.2. Results from short and long run models for linear hypothesis

The long run PMG estimates indicate that financial development has a significant positive relationship with income inequality, which implies that financial development increases income inequality in the region (Table 2). Precisely, a 0.01 (1%) increase in financial depth

Table 2. Short and Long run models for linear hypothesis using domestic credit.

Dependent variable: GINI	PMG	MG	DFE
Speed of adjustment	-0.0658 (0.0238)***	-0.3842 (0.0601)***	-0.1015 (0.0166)***
Long run coefficients			
FINDEV ₁	0.7582 (0.1310)**	0.6953 (0.5755)	0.1044 (0.1135)
GDP	-0.2899 (0.1417)***	-0.6546 (0.7443)	-0.1452 (0.2869)
CORR	-2.5306 (0.5910)**	-5.1687 (5.0041)	-0.4532 (0.4163)
FINDEV ₁ *CORR	-0.7429 (0.2352)***	-1.6333 (1.5827)	-0.1423 (0.1176)
Short run coefficients			
ΔFINDEV ₁	-0.1104 (0.0827)	-0.1323 (0.1019)	0.0044 (0.0267)
ΔGDP	0.1928 (0.1055)*	0.1910 (0.1243)	0.0973 (0.0640)
ΔCORR	-0.4141 (0.4118)	-0.4021 (0.4549)	-0.0523 (0.0878)
ΔFINDEV ₁ *CORR	0.2297 (0.2015)	0.2764 (0.2294)	0.0182 (0.0381)
_cons	0.2239 (0.0825)	0.8434 (0.3679)	0.3608 (0.2012)
Hausman test		2.7000 [0.6087]	0.000 [1.0000]
Number of countries	21	21	21
Number of observations	513	513	513
Log-Likelihood	1071.1067	1071.1067	1071.1067

***, **, * denote significance at 1, 5 and 10%, respectively, standard error in parenthesis () and *p*-value in square brackets [].

increases income inequality by about 0.075 (0.75%) in the long run given that other factors are held constant in the model. Likewise, MG and DFE estimates show a positive relationship between financial development and income inequality, however, coefficients are not statistically significant. This is consistent with the income-widening hypothesis but contradicts the findings of Batuo, Guidi, and Mlambo (2010), who find that financial development is negatively related to income inequality in the SSA region. Moreover, the PMG estimates show that in the long run GDP per capita growth in the region reduces income inequality as expected. Concerning the control of corruption variable, PMG estimate is negatively and significantly related to income inequality, meaning that control of corruption in the region have been effective in allocating credit to the private sector.

Turning to the interaction effect of financial development and control of corruption, the coefficient in the PMG estimation is negative and significant in the long-run (See Table 2). The effect of FINDEV₁ on the Gini, when one considers the interaction term, is as follows:

$$\frac{\partial GINI_{it}}{\partial FINDEV_{it}} = 0.7582 - 0.7429 * CORR_{it}$$

Where $0 < CORR_{it} < 1$.

Thus, when $CORR_{it} = 1$ the effect is $0.0153 \cong 0$ and when $CORR_{it} = 0$ the effect equals 0.7582. As a result, financial development has a larger positive effect (i.e. 0.7582) on income inequality in the presence of high corruption (i.e. when $CORR_{it}$ is low). In other words,

higher corruption (i.e. lower $CORR_{it}$) associates with an increasing positive effect on inequality. Alternatively, the effect of $CORR_{it}$ on the Gini, considering the interaction term, is as follows:

$$\frac{\partial GINI_{it}}{\partial CORR_{it}} = -2.5306 - 0.7429 * FINDEV_{it} \text{ where } 5 < FINDEV_{it} < 8$$

Thus, as financial development increases (higher $FINDEV_1$), there is a negative effect on inequality that gets bigger. Conversely, lower financial development (lower $FINDEV_1$) associates with a diminishing negative effect on inequality. The negative coefficient on the interaction term in Table 2 therefore implies that SSA's financial development in the presence its control of corruption measures has led to a reduction of income inequality in the region. This is consistent with studies by Law, Tan, and Azman-Saini (2014) and Rajan and Ramcharan (2011) which emphasize that institutional quality is important in determining the effect of financial development on income distribution. Additionally, these results suggest that in the long-run financial development helps to decrease income inequality in the presence of an efficient institutional infrastructure.

The results from estimating Equation (2) using deposit money ($FINDEV_2$) as an alternative indicator of financial development are reported in Table 3. As expected, while deposit money is positively associated with income inequality, GDP per capita and control of corruption are negatively associated with income inequality. Using the effect with the interaction term, the effect of $FINDEV_{two}$ on inequality is sometimes negative. That is, more financial

Table 3. Short and long run models for linear hypothesis using deposit money.

Dependent Variable: GINI	PMG	MG	DFE
Speed of adjustment	-0.0507 (0.0266)**	-0.3862 (0.0868)***	-0.1029 (0.0167)***
Long run coefficients			
$FINDEV_2$	0.8400 (0.1741)***	-4.7465 (3.8944)	0.0717 (0.3160)
GDP	-0.4864 (0.1833)***	-4.1053 (4.2745)	0.0165 (0.2772)
CORR	-3.3155 (1.0624)***	-65.1456 (54.7403)	-0.0029 (1.8461)
$FINDEV_2 * CORR$	-1.0791 (0.3054)***	14.5496 (12.2192)	0.0149 (0.4408)
Short run coefficients			
$\Delta FINDEV_2$	-0.0144 (0.2944)	-3.4267 (3.5886)	0.0205 (0.0240)
ΔGDP	0.2721 (0.1375)	0.1446 (0.1420)	0.0870 (0.0612)
$\Delta CORR$	0.1897 (2.4562)	-29.8860 (30.7421)	0.0859 (0.2189)
$\Delta FINDEV_2 * CORR$	0.0034 (0.5403)	6.5417 (6.6897)	-0.0243 (0.0547)
_cons	0.1821 (0.1036)	1.7980 (1.7768)	0.3426 (0.1525)
Hausman test		3.97 [0.4094]	0.00 [1.000]
Number of countries	21	21	21
Number of observations	489	489	489
Log-Likelihood	981.1673	981.1673	981.1673

***, **, * denote significance at 1, 5 and 10%, respectively, standard error in parenthesis () and p -value in square brackets [].

development leads to lower income inequality, when $CORR_{it}$ is equal to, or greater than, 0.778. The effect is given by:

$$\frac{\partial GINI_{it}}{\partial FINDEV_{it}} = 0.8400 - 1.0791 * CORR_{it}$$

Where $0 < CORR_{it} < 1$.

Similar to previous findings (see Table 2), the negative coefficient of the term suggest that financial development in the presence of SSA's corruption control measures tend to reduce inequality (Table 3).

Afterwards, Equation (2) is estimated using Williams' (2011) transparency index (an alternative measure of control of corruption). The results are reported in Tables 4 and 5. Table 4 indicates that the coefficient of financial development (i.e. domestic credit ($FINDEV_1$)) is positively and significantly associated with income inequality. The coefficient of transparency is positively and significantly associated with income inequality, while GDP per capita and the interaction term are negatively and significantly associated with income inequality. Precisely, when transparency is greater or equal to 33.97⁴, more financial development leads to lower income inequality given by:

$$\frac{\partial GINI_{it}}{\partial FINDEV_{it}} = 3.288 - 0.0968 * TRANS_{it}$$

Where $10 < TRANS_{it} < 74$.

Table 4. Short and long run models for linear hypothesis using domestic credit.

Dependent variable: GINI	PMG	MG	DFE
Speed of adjustment	0.0049 (0.0075)	-0.4212 (0.0686)***	-0.1166 (0.0157)***
Long run coefficients			
$FINDEV_1$	3.2888 (1.3953)**	-0.8347 (0.5707)	-0.1541 (0.1520)
GDP	-2.8341 (0.9662)***	0.1465 (0.5625)	0.2232 (0.2832)
TRANS	0.2922 (0.1270)**	-0.5812 (0.4209)	-0.0169 (0.0082)**
$FINDEV_1 * TRANS$	-0.0968 (0.0418)**	0.0200 (0.0134)	0.0039 (0.0023)*
Short run Coefficients			
$\Delta FINDEV_1$	-0.0299 (0.0730)	0.1181 (0.1036)	-0.0189 (0.0348)
ΔGDP	0.2583 (0.1094)	0.0912 (0.1330)	0.0842 (0.0601)
$\Delta TRANS$	-0.0009 (0.0034)	0.0092 (0.0069)	-0.0007 (0.0009)
$\Delta FINDEV_1 * TRANS$	0.0009 (0.0015)	-0.0018 (0.0023)	0.0008 (0.0051)
_cons	-0.0621 (0.0810)	1.6843 (0.4307)	0.3525 (0.1777)**
Hausman test		125.47 [0.000]	0.000 [1.000]
Number of countries	21	21	21
Number of observations	495	495	495
Log-Likelihood	1041.049	1041.049	1041.049

***, **, * denote significance at 1, 5 and 10%, respectively, standard error in parenthesis () and *p*-value in square brackets [].

Table 5. Short and long run models for linear hypothesis using deposit money.

Dependent variable: GINI	PMG	MG	DFE
Speed of adjustment	−0.0815 (0.0253)***	−0.3493 (0.0753)***	−0.1224 (0.0168)***
Long run coefficients			
FINDEV ₂	2.4073 (0.3262)***	20.5769 (19.0000)	0.0109 (0.2924)
GDP	−0.7645 (0.1525)***	−0.3904 (0.6987)	0.1693 (0.2695)
TRANS	0.1936 (0.0310)*	−1.5832 (1.4964)	−0.0156 (0.0262)
FINDEV ₂ *TRANS	−0.0487 (0.0074)***	0.3485 (0.3259)	0.0022 (0.0061)
Short run coefficients			
ΔFINDEV ₂	5.6085 (5.2893)	−0.1065 (0.2526)	−0.0011 (0.0528)
ΔGDP	0.2746 (0.1258)**	0.2659 (0.1731)	0.0765 (0.0592)
ΔTRANS	0.1497 (0.3945)	0.0051 (0.0289)	−0.0002 (0.0051)
ΔFINDEV ₂ *TRANS	−0.0909 (0.0858)	−0.0006 (0.0065)	0.0022 (0.0013)
_cons	−0.8645 (0.2682)	22.5312 (24.3251)	0.3592 (0.2153)
Hausman test		2.32 [0.6778]	0.000 [1.000]
Number of countries	21	21	21
Number of observations	471	471	471
Log-Likelihood	970.0553	970.0553	970.0553

***, **, * denote significance at 1, 5 and 10%, respectively, standard error in parenthesis () and *p*-value in square brackets [].

In the same way, the negative coefficient of interaction term imply that financial development leads to lower income inequality in the presence of effective corruption control (Table 4).

The results from Table 5 indicate that financial development (i.e. deposit money (FINDEV₂)) is positively and significantly related to income inequality which is consistent with previous findings (see Tables 2, 3 and 4). Equally, whereas GDP per capita is negatively related to income inequality, transparency is positively related with income inequality at the 10% significance level. Also, the interaction variable is negative and significant at the 1% level of significance. This confirms our assertion that more financial development leads to lower income inequality. Specifically, when TRANS is greater than or equal to 49.43⁵, more financial development leads to lower income inequality which is given by:

$$\frac{\partial GINI_{it}}{\partial FINDEV_{it}} = 2.4073 - 0.0487 * TRANS_{it}$$

Where $10 < TRANS_{it} < 74$.

Correspondingly, low income inequality has been released through the complementary role of financial development and control of corruption as indicated by the negative coefficient of the interaction term.

It is worth mentioning that Hausman test confirms that the PMG is the most consistent estimator in all our computations. For instance, in Table 2 the Hausman Statistic 2.7 with

p -value 0.6087 fails to reject the null hypothesis that the PMG is the efficient estimator as compared to the MG. Also, Table 3 indicates that a Hausman Statistic 0.000 with p -value 1.0000 which fails to reject the null hypothesis that FE estimator is affected by simultaneity bias. Therefore, FE model is preferred over MG model. Thus, affirming that PMG is the most consistent followed by MG and DFE the least. Moreover, most of the short run coefficients were not significantly related to inequality.

The coefficient of the speed of adjustment term is negative and significant at 1% as expected in all our models. This implies an error correction model in which the short run dynamics of the variables are influenced by the deviation from equilibrium. For example, the deviations from equilibrium of our preferred estimator (i.e. PMG) are corrected at a rate of 6.5% annually (Table 2). Moreover, omitting South Africa (the country with the highest inequality in our sample) from the analysis yields similar results.

5. Conclusion

This paper examined the relationship between financial development and income inequality in 21 SSA countries over the period 1985–2011. The study contributes to literature by employing PMG technique to control for omitted variable bias, endogeneity, country heterogeneity and unobserved long-run relationship. Further, the moderating role of control of corruption on the financial development economic growth relationship is examined.

The empirical results show that financial development measures have positive impact on income inequality. However, the interaction of the financial development and the control of corruption is found to be negatively and significantly related with income inequality. Equally, the interaction of the financial development and transparency is found to be negatively and significantly related with income inequality. This suggests that the control of corruption institutions and transparency are crucial to distributing income equitably in the region. Accordingly, SSA countries are encouraged to promote policies to enhance institutional development to promote both economic growth and equity in the distribution of income to ensure sustainable development, which the continent desperately needs. Obviously, this must begin from within and as the study results show, improving government effectiveness through the control of corruption and transparent government decision making are sure ways to enhance the quality of financial system and reduce income inequality.

Notes

1. The measures of financial development used measure the depth of financial institutions in the region, stock market development measures available have inadequate observations for regression estimate.
2. We introduce interaction effect rather than threshold modelling in Law, Tan, and Azman-Saini (2014) due to sample size, converting panel data to cross section yields 21 observation which is inadequate for threshold modelling.
3. For both stationary and nonstationary regressors (see Pesaran, Shin, and Smith 1999).
4. On the average approximately 95% of the countries in the sample lie above transparency value of 33.97. Guinea is the only country that has an average transparency value below 33.97.
5. Approximately ten per cent of the countries (i.e. South Africa and Botswana) have an average transparency value above 49.43.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

- African Development Bank. 2012. "Income Inequality in Africa. Briefing Notes for AfDB's Long Term Strategy Briefing." Note 5. Tunis: African Development Bank .
- Agnello, Luca, Sushanta K. Mallick, and Ricardo M. Sousa. 2012. "Financial Reforms and Income Inequality" *Economics Letters* 116 (3): 583–587. doi:10.1016/j.econlet.2012.06.005.
- Ang, J. B. 2010. "Finance and Inequality: The Case of India." *Southern Economic Journal* 76 (3): 738–761.
- Arellano, Manuel, and Olympia Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68 (1): 29–51. doi:10.1016/0304-4076(94)01642-D.
- Arellano, Manuel, and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58 (2), 277–297. doi: 10.2307/2297968.
- Arestis, Philip, Georgios Chortareas, and Georgios Magkonis. 2005. "The Financial Development and Growth Nexus: A Meta-Analysis." *Journal of Economic Surveys* 29 (3): 549–565. doi:10.1111/joes.12086.
- Asongu, Simplice A. 2013. "How do Financial Reforms Affect Inequality Through Financial Sector Competition? Evidence from Africa." *SSRN Electronic Journal* 33 (1): 401–114. doi: 10.2139/ssrn.2493335.
- Assa, J. 2012. "Financialization and its Consequences: The OECD Experience." *Finance Research* 1 (1): 35–39.
- Bali moune-Lutz, Mina, and Stefan H. Lutz. 2004. "Rural-Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening." Centre for European Economic Research Working Paper B06.
- Banerjee, Abhijit V., and Andrew F. Newman. 1993. "Occupational Choice and the Process of Development." *Journal of Political Economy* 101: 274–298. doi:10.1086/261876.
- Barrios, S., and E. Strobl. 2005. "The Dynamics of Regional Inequalities." *Economic Papers* 229: 1–38.
- Batt, Rosemary, and Eileen Appelbaum. 2013. "The Impact of Financialization on Management and Employment Outcomes." Upjohn Institute Working Paper No. 13–191. <http://ssrn.com/abstract=2235748>.
- Batuo, Michael Enowbi, Francesco Guidi, and Kupukile Mlambo. 2010. *Financial Development and Income Inequality: Evidence from African Countries*. African Development Bank.
- Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine. 2000. "A New Database on Financial Development and Structure." *World Bank Economic Review* 14: 597–605.
- Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine. 2007. "Finance, Inequality and the Poor." *Journal of Economic Growth* 12 (1): 27–49. doi:10.1007/s10887-007-9010-6.
- Blackburne, E. F., and M. W. Frank. 2007. "Estimation of nonstationary heterogeneous panels." *Stata Journal* 7 (2): 197.
- Canavire-Bacarreza, Gustavo J., and Felix K. Rioja. 2008. *Financial Development and the Distribution of Income in Latin America and the Caribbean*. IZA DP No. 3796, Bonn.
- Cecchetti, Stephen G., and Enisse Kharroubi. 2015. "Why Does Financial Sector Growth Crowd out Real Economic Growth?" BIS Working Paper No. 490. Available at: <http://ssrn.com/abstract=2564267>.
- Chintrakarn, Pandej, and Dierk Herzer. 2012. "More Inequality, More Crime? A Panel Cointegration Analysis for the United States." *Economics Letters* 116 (3), 389–391. doi:10.1016/j.econlet.2012.04.014.
- Chong, Alberto, and Mark Gradstein. 2007. "Inequality and Institutions." *Review of Economics and Statistics* 89 (3): 454–465. doi:10.1162/rest.89.3.454.
- Claessens, Stijn, and Enrico Perotti. 2007. "Finance and Inequality: Channels and Evidence." *Journal of Comparative Economics* 35 (4): 748–773. doi:10.1016/j.jce.2007.07.002.

- Clarke, George R. G., Xu Lixin Colin, and Heng-fu Zou. 2006. "Finance and Income Inequality: What do the Data Tell Us?" *Southern Economic Journal* 72: 578–596. doi:10.2307/20111834.
- Cournede, Boris, Oliver Denk, and Peter Hoeller. 2015. 'Finance and Inclusive Growth'. OECD Economic Policy Paper, No. 14. doi:10.2139/ssrn.2649801.
- Dabla-Norris, Era, Si Guo, Vikram Haksar, Minsuk Kim, Kalpana Kochhar, Kevin Wiseman, and Aleksandra Zdzienicka. 2015. *The New Normal: A Sector-Level Perspective on Growth and Productivity Trends in Advanced Economies*. IMF Staff Discussion Note. Washington: International Monetary Fund.
- Fowowe, Babajide, and Babatunde Abidoye. 2013. "The Effect of Financial Development on Poverty and Inequality in African Countries." *The Manchester School* 81 (4): 562–585.
- Freeman, Richard B. 2010. "It's Financialization!." *International Labour Review* 149(2), 163–183. doi:10.1111/j.1564-913X.2010.00082.x.
- Galor, Oded, and Joseph Zeira. 1993. "Income Distribution and Macroeconomics". *Review of Economic Studies* 60 (1), 35–52. doi:10.2307/2297811.
- Greenwood, Jeremy, and Boyan Jovanovic. 1990. "Financial Development, Growth, and the Distribution of Income". *Journal of Political Economy* 98 (5, Part 1): 1076–1107. doi:10.1086/261720.
- Griffith-Jones, Stephany, Ewa Karwowski, and Nshalati Hlungwane. 2013. "Policy and Research Issues on Finance and Growth for Sub-Saharan Africa." March: UNDESA.
- Gwama, Michael. 2015. "Explaining Weak Financial Development in Africa." *African Review of Economics and Finance* 6 (2): 69–87.
- Haber, Stephen, and Enrico Perotti. 2007. "The Political Economy of Finance." Amsterdam School of Economics Research Institute (ASE-RI) uvapub:96673.
- Hamori, Shigeyuki, and Yoshihiro Hashiguchi. 2012. "The Effect of Financial Deepening on Inequality: Some International Evidence." *Journal of Asian Economics* 23 (4): 353–359. doi:10.1016/j.asieco.2011.12.001.
- Herzer, Dierk, and Sebastian Vollmer. 2012. "Inequality and Growth: Evidence from Panel Cointegration." *Journal of Economic Inequality* 10 (4): 489–503. doi:10.1007/s10888-011-9171-6.
- Im, Kyung So, M. Hashem Pesaran, and Yongcheol Shin. 2003. "Testing for unit roots in heterogeneous panels." *Journal of Econometrics* 115 (1): 53–74. doi:10.1016/S0304-4076(03)00092-7.
- International Monetary Fund. 2007. "Globalization and Inequality." In *Outlook: Globalization and Inequality*, edited by World Economic. Washington, D.C.: International Monetary Fund.
- Jauch, Sebastian, and Sebastian Watzka. 2016. "Financial Development and Income Inequality: a Panel Data Approach." *Empirical Economics* 51(1): 291–314.
- Kedrosky, Paul, and Dane Stangler. 2011. 'Financialization and Its Entrepreneurial Consequences.' Ewing Marion Kauffman Foundation Research Paper. Available at: <http://ssrn.com/abstract=1798605>.
- Kim, Dong-Hyeon, and Shu-Chin Lin. 2011. "Nonlinearity in the Financial Development-Income Inequality Nexus." *Journal of Comparative Economics* 39 (3): 310–325. doi:10.1016/j.jce.2011.07.002.
- King, Robert G., and Ross Levine. 1993. "Finance and Growth: Schumpeter Might Be Right." *Quarterly Journal of Economics* 108 (3): 717–737. doi:10.2307/2118406.
- Kuznets, S. 1955. "Economic Growth and Income Inequality." *The American Economic Review* 45 (1): 1–28.
- Law, S. H., and H. B. Tan. 2009. "The role of financial development on income inequality in Malaysia." *Journal of Economic Development* 34 (2): 153.
- Law, Siong Hook, Hui Boon Tan, and W. N. W. Azman-Saini. 2014. "Financial Development and Income Inequality at Different Levels of Institutional Quality." *Emerging Markets Finance and Trade* 50 (suppl. 1): 21–33. doi:10.2753/REE1540-496X5001S102.
- Lehohla, Pali, and Nozipho Shabalala. 2014. "Inequality in South Africa." *Development* 57 (3–4): 497–511. doi:10.1057/dev.2015.33.
- Leibbrandt, Murray, Ingrid Woolard, and Haroon Borat. 2000. "Understanding Contemporary Household Inequality in South Africa." *Journal for Studies in Economics and Econometrics* 24 (3): 31–52.
- Levine, Ross. 2005. "Finance and Growth: Theory and Evidence." *Handbook of Economic Growth* 1: 865–934.

- Levin, Andrew, Chien-Fu Lin, and Chia-Shang James Chu. 2002. "Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties." *Journal of Econometrics* 108 (1): 1–24. doi:10.1016/S0304-4076(01)00098-7.
- Lucas, Robert E. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics* No. 22 (1): 3–42. doi:10.1016/0304-3932(88)90168-7.
- Magruder, Jeremy R. 2010. "Intergenerational Networks, Unemployment, and Persistent Inequality in South Africa." *American Economic Journal: Applied Economics* 2 (1): 62–85. doi:10.1257/app.2.1.62.
- Myrdal, G. 1958. "Rich lands and Poor: The Road to World Prosperity." *The American Economic Review* 48 (4): 678–681.
- Pesaran, M. Hashem, Yongcheol Shin, and Ron P. Smith. 1997. *Pooled Estimation of Long-Run Relationships in Dynamic Heterogeneous Panels*: University of Cambridge, Department of Applied Economics.
- Pesaran, M. Hashem, and Ron P. Smith. 1995. "Estimating long-run relationships from dynamic heterogeneous panels." *Journal of Econometrics* 68 (1): 79–113. doi:10.1016/0304-4076(94)01644-F.
- Pesaran, M. Hashem, Yongcheol Shin, and Ron P. Smith. 1999. "Pooled mean group estimation of dynamic heterogeneous panels." *Journal of the American Statistical Association* 94 (446): 621–634. doi:10.1080/01621459.1999.10474156.
- Prete, Lo, and Anna Lo. 2013. "Economic Literacy, Inequality, and Financial Development." *Economics Letters* No. 118 (1): 74–76. doi:10.1016/j.econlet.2012.09.029.
- Rajan, Raghuram G., and Luigi Zingales. 2003a. "The Great Reversals: the Politics of Financial Development in the Twentieth Century." *Journal of Financial Economics* 69 (1): 5–50. doi:10.1016/S0304-405X(03)00125-9.
- Rajan, Raghuram G., and Rodney Ramcharan. 2011. "Land and Credit: A Study of the Political Economy of Banking in the United States in the Early 20th Century." *Journal of Finance* No. 66 (6): 1895–1931. doi:10.1111/j.1540-6261.2011.01694.x.
- Rajan, Raghuram, and Luigi Zingales. 2003b. *Saving Capitalism from the Capitalists*. 2121. New York: Crown Business.
- Robinson, Joan. 1952. *The Rate of Interest and Other Essays*. London: MacMillan.
- Roine, Jesper, Jonas Vlachos, and Daniel Waldenström. 2009. "The Long-Run Determinants of Inequality: What Can We Learn from Top Income Data?" *Journal of Public Economics* No. 93 (7–8): 974–988. doi:10.1016/j.jpubeco.2009.04.003.
- Sahay, Ratna, Martin Cihak, Papa N'Diaye, Adolfo Barajas, Diana Ayala Pena, Ran Bi, Yuan Gao et al. 2015. "Rethinking Financial Deepening: Stability and Growth in Emerging Markets." International Monetary Fund.
- Solt, F. 2016. "The Standardized World Income Inequality Database." *Social Science Quarterly*. doi:10.1111/ssqu.12295.
- Strouss, L., A. Mackley, U. Guillen, D. A. Paul, and R. Locke. 2014. "Complementary and Alternative Medicine Use in Women During Pregnancy: Do Their Healthcare Providers Know?" *BMC Complementary and Alternative Medicine* 14 (1): 1–9.
- Tan, H. B., and S. H. Law. 2012. "Nonlinear Dynamics of the Finance-inequality Nexus in Developing Countries." *The Journal of Economic Inequality* 10 (4): 551–563.
- Tiwari, Aviral Kumar, Muhammad Shahbaz, and Faridul Islam. 2013. "Does Financial Development Increase Rural-Urban Income Inequality? Cointegration Analysis in the Case of Indian Economy." *International Journal of Social Economics* 40 (2): 151–168.
- United Nations. 2013. *Report on the World Social Situation 2013: Inequality Matters*. New York: Department of Economic and Social Affairs.
- von Ehrlich, Maximilian, and Tobias Seidel. 2015. "Regional Implications of Financial Market Development: Industry Location and Income Inequality." *European Economic Review* No. 73: 85–102. doi:10.1016/j.eurocorev.2014.10.008.
- Williams, Andrew. 2011. "Shining a Light on the Resource Curse: an Empirical Analysis of the Relationship between Natural Resources, Transparency, and Economic Growth." *World Development* No. 39 (4): 490–505. doi:10.1016/j.worlddev.2010.08.015.
- Woolard, Ingrid. 2002. *An Overview of Poverty and Inequality in South Africa*. HSRC: Unpublished briefing paper, Pretoria.

World Bank Group. 2015) *World Development Indicators 2015*. World Bank Publications.
 World Bank. 2012. *South Africa Economic Update: Focus on Inequality of Opportunity*. July 2012 Issue.
 Washington, D.C.: World Bank.

Appendix

Table A1. Income Inequality Profile of Sub-Saharan African (SSA) countries in the sample.

Country	Mean	SD	Min	Max	CV
Botswana	54.1	1.9	49.8	58.1	3.5%
Burkina Faso	51.1	10.0	38.1	69.6	19.5%
Cameroon	52.7	18.6	40.7	99.6	35.3%
Côte d'Ivoire	42.3	3.9	35.0	47.5	9.3%
Gambia	50.3	6.6	42.1	66.2	13.1%
Ghana	39.3	4.6	34.3	50.9	11.8%
Guinea	39.6	2.6	34.3	46.6	6.6%
Guinea-Bissau	45.8	7.3	34.7	57.2	16.0%
Kenya	46.1	5.7	35.7	54.0	12.3%
Madagascar	41.3	3.1	36.5	45.8	7.5%
Malawi	47.9	8.6	30.7	59.7	17.9%
Mali	39.1	2.7	33.1	44.1	6.8%
Niger	42.4	4.2	35.4	50.6	9.8%
Nigeria	45.5	3.3	38.9	51.0	7.3%
Senegal	42.5	4.4	36.9	55.2	10.3%
Sierra Leone	50.8	9.2	33.2	68.4	18.0%
South Africa	59.1	2.1	55.7	65.7	3.6%
Tanzania	38.0	2.8	33.5	43.9	7.2%
Uganda	40.8	2.3	36.0	44.7	5.7%
Zambia	55.1	3.4	47.5	61.2	6.1%
Zimbabwe	53.3	6.3	41.4	64.3	11.9%
Panel Results	46.7	8.9	30.7	99.6	19.0%

Table A2. Descriptive statistics of variables.

Variables	Obs.	Mean	SD	Min	Max
GINI	555	3.8240	0.1737	3.4982	4.6007
FINDEV ₁	563	6.3172	0.8288	5.1879	8.7987
FINDEV ₂	542	2.5021	0.8494	-0.2203	5.0760
GDP	523	4.0885	0.4790	2.5186	4.6021
CORR	565	0.4355	0.1663	0.0000	1.0000
TRANS	546	41.5037	11.3201	10.0000	74.0000

Table A3. Correlation matrix.

	GINI	FINDEV1	FINDEV2	GDP	CORR	TRANS
GINI	1.0000	0.3014***	0.2785***	0.2243***	0.1360**	-0.0489
FINDEV ₁		1.0000	0.6777***	0.6130***	0.0004	0.3289
FINDEV ₂			1.0000	0.4906***	0.1335**	0.4834***
GDP				1.0000	0.0004	0.3392***
CORR					1.0000	-0.1151
TRANS						1.0000

***, **, * denote significance at 1, 5 and 10%, respectively; Bonferroni-adjusted significant levels.

Table A4. Test for cross-sectional dependency.

Panel model	Friedman test	Frees test
Fixed Effect	-	5.846
Random Effect	14.977	5.527

***, **, * denote significance at 1, 5 and 10%, respectively; Both Fixed Effects and random effect models fail to reject the null hypothesis of cross-sectional independence in the data set.

Table A5. List of countries.

ID	Country	ID	Country	ID	Country
1	Burkina Faso	8	Madagascar	15	Zimbabwe
2	Cameroon	9	Malawi	16	Zambia
3	Côte d'Ivoire	10	Mali	17	Uganda
4	Gambia, The	11	Niger	18	Tanzania
5	Ghana	12	Nigeria	19	Sierra Leone
6	Guinea-Bissau	13	Senegal	20	Guinea
7	Kenya	14	South Africa	21	Botswana