Financial Development and Income Inequality:
Evidence from African Countries

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Abstract.

This paper present empirical evidence on how financial development is related to income distribution in a panel data set covering 22 African countries for the period between 1990 to 2004. A dynamic panel estimation technique (GMM) is employ and the findings indicate that income inequality decrease as economies develop their financial sector, which is consistent with the bulk of theoretical and empirical research. The result also confirm that educational attainment play a significant role in making income distribution more equal. We also find no evidence supporting the Greenwood-Jovanovic hypothesis of an inverted-U- shaped relationship between financial sector development and inequality.

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Introduction

In the 1980s and 1990s, most African countries embarked on a series of structural and policy reforms in the financial sector as part overall economic reformswith the objective of restarting economic growth as well as improving overall economic and financial sector efficiency (see World Bank 1989: Elbadawi et al. 1992). In the financial sector, the problem was financial repression, and its pervasiveness in developing countries was responsible for stifling economic growth (see Mackinnon (1973) and Shaw (1973). In the first generation of financial sector reforms, the measures adopted included abolishing explicit controls on the pricing and allocation of credit, reducing direct government intervention in bank credit decisions, relaxing the controls on international capital movements and allowing the interest rates to be market determined.. The second generation of financial sector reforms focussed on structural and institutional constraints, such as improving the legal, regulatory, and supervisory and judiciary environment, restoring bank soundness, and rehabilitating financial infrastructure. The impact of these reforms on the financial sector has generally been positive. Financial depth has improved, interest rates are largely market determined, and entry restrictions into financial sector have been relaxed. However, challenges remain, especially with respect to access to finance by the majority of the population and by SMEs remains, which remains poor. Also, the depth and breadth of the financial sector in Africa also still lags behind other regions. As such the impact of these reforms on the economy has been mixed, while their impact on poverty and income distribution has been controversial, with others arguing that it has been negative.

Economic and finance literature, however, suggests that a well-functioning financial systems has the potential to foster the accumulation of physical capital, improve economic

efficiency and thus promote long term growth, (see Levine et al. 2000; Levine 2003; Bekaert et al 2001; Minier, 2003; Christopoulos and Tsionas, 2004; and Demetrides and Andrinova,2004). This is because an effective financial system ensures that scare capital is channelled to its best alternative use. However, the development of financial markets has an impact on the distribution of income, and the direction of that impact is far from settled in the literature. Some argue that the development of financial markets has a positive impact on income distribution because more developed and freer markets widen the availability of credit, thus allowing the poor to invest in building their human and physical capital. They are presented with an opportunity to invest in their skills and those of their children and also set up new small businesses (see Banerjee and Newman, 1993). Thus, by widening the financial opportunities available to the poorer, financial markets have the effect of equalising the distribution of income.

However, others point out that since the poor do not have equal access to credit due to lack of collateral and connections, financial markets development may actually exacerbate income inequality. As such the financial reforms undertaken by many African countries to deepen and develop their financial markets may be correlated with a persistent increase in inequality. This is because those who are relatively well-off are better equipped to exploit the new financial opportunities that the liberalisation of financial market entails.

The aim of this paper is to investigate the relationship between income inequality and financial development for a panel of African countries for the period spanning 1980 to 2004. In particular, the paper seeks to investigate whether financial development has an impact on income inequality, drawing on the experience of a continent that has been implementing financial reforms amid persistently high level of inequality. We expect the empirical evidence to show that consistent with the insight of Banerijee and Newman (1993) and Galor and Zeira (1993), financial development had a significant effect in the reducing income

inequality. We also present results that are robust for the different measures of financial development and different time specification.

The main contribution of this paper is that we restrict our sample to only African countries. This is important, because as we have already noted, income inequality in Africa has remained stubbornly high, despite more than two decades of economic and financial reforms. Another innovation introduced in this paper is the consideration we give to various variables of financial development, namely the ratios of liquid liabilities to GDP, Broad Money (M2) to GDP and domestic private sector lending by banks as a share of GDP. We also construct a composite financial sector development index from these three ratios.

The structure of the paper is as follows. In Section 2, we provide a brief review of the literature on financial development and inequality. In Section 3 we discuss the trends in growth, income distribution and financial development in Africa, while in Section 4e we outline the methodology and data used in the study. Section 5 discuses the empirical results and section 6 provides the conclusion.

2. Literature Outline

The bulk of empirical research has given substantial support to the view that financial development has a significant effect on the pattern of income distribution, specifically that it reduces inequality. However, theory provides two contrasting views on the impact of finance on inequality. One view posits an inverted U-shaped relationship between financial development and inequality. One such study by Greenwood and Jovanovic (1990) on finance-growth-inequality nexus predicts a Kuznets curve relationship between finance and inequality. In the early stages of development, when the financial sector is underdeveloped, inequality increases with financial markets development. However, this would tend to reduce as the economy develops moving to the intermediate phase and then to a mature phase of

development in which more agents would see their income increase as they gain access to the financial intermediary sector, income inequality will reduce.

However, Banerjee and Newman (1993) and Galor and Zeira (1993) suggest a linear relationship between financial development and income inequality. Their basic theoretical assumption is that financial market imperfections such as financial asymmetries, transaction cost, and contract enforcement costs, may be especially binding on the poor, who lack collaterals, credit histories and network relationships. As such, even when the poor may have projects with high returns, they may still be credit rationed. This reduces the efficiency of capital allocation and limits the social mobility of the poor. Under such circumstances, income inequality rises with the development of financial markets.

Further, the relationship between financial development and reduction in income inequality is both a correlation and is causal, and this causality may run both ways. For example, as the share of the income held by the poor grows, they may increase their demands for financial services, which may drive the positive association between finance and growth. On the other hand, by increasing growth, finance may contribute to increasing the incomes of the poor.

There is a growing empirical literature that seeks to test these theories. Recent work by Liang (2006) uses a dynamic panel estimation to investigate the association between financial development and inequality in China's rural and urban areas. The empirical results show a negative and linear relationship between financial development and inequality in both rural and urban areas but offer weak support for the inverted U-shaped relationship. Bittencourt (2006) examined the impact of financial development on earning inequality in Brazil in 1980s and 1990s and found that financial development improved access of credit to the poor, alleviated extreme inequality and consequently improved welfare without distorting economic efficiency. Also, Bulir (1998), Honohan, (2004) and Demirguc-Kunt, et al. (2004),

each using different empirical strategies for a cross section of countries, find that financial development lessens either inequality or poverty

Li Squire et al (1998, using panel data of 40 developed and less developed countries covering the period 1947 to 1994 found that a well-functioning financial sector delivers lower income inequality. Meanwhile Clarke, Xu and Zuo (2003) using the same panel data of developing and less developing countries but for the period between 1960 to 1995 also found support for the linear hypothesis: that inequality is lower in countries with better develop financial sector. They found no evidence of an inverted U-shaped relation between finance and inequality as predicted in Greenwood and Jovanovic (1990).

In this study we propose to test these alternative theories using Africa only data for the period 1990 to 2004. Our purpose is to investigate whether the developments taking place in financial sector as a result of financial reforms can reduce the persistent level of inequality. To our knowledge, this is the first study on the relationship between financial development and inequality that restricts itself only to data on Africa countries.

3. Growth, Financial Markets and Inequality in Africa

Africa's economic performance has improved significantly since the lost decades of the 1980s (see Fig. 1). Real GDP growth rebounded from 2.2% (1.9% for SSA) in 1981-94 to reach an average of 4.9% (5.32% for SSA) for the period 1995-2008. Between 2000 and 2009, real GDP growth averaged 5.2% for Africa and 5.6% for SSA. Even during the recent global financial crisis, the continent was able to weather the global downturn, which came on the heels of high global prices for energy and food, both which account for a significant share of Africa's import bill. Although real GDP growth dipped in 2009 it nevertheless remained positive, falling to 2.5% compared with 5.6 in 2008. Commodities remain the main drivers of African growth though in recent years, the continent is beginning to reap the benefits of years

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of implementing macroeconomic reforms. In most countries, inflation has fallen to single digit levels and fiscal balances are much sounder. The conducive business and investment environment as well as the improvement of the financial systems are now beginning to attract foreign capital inflows, though natural resources still drive much of the capital inflows.

Fig.1 Real GDP and Real Per Capita GDP Growth (1981-2009)
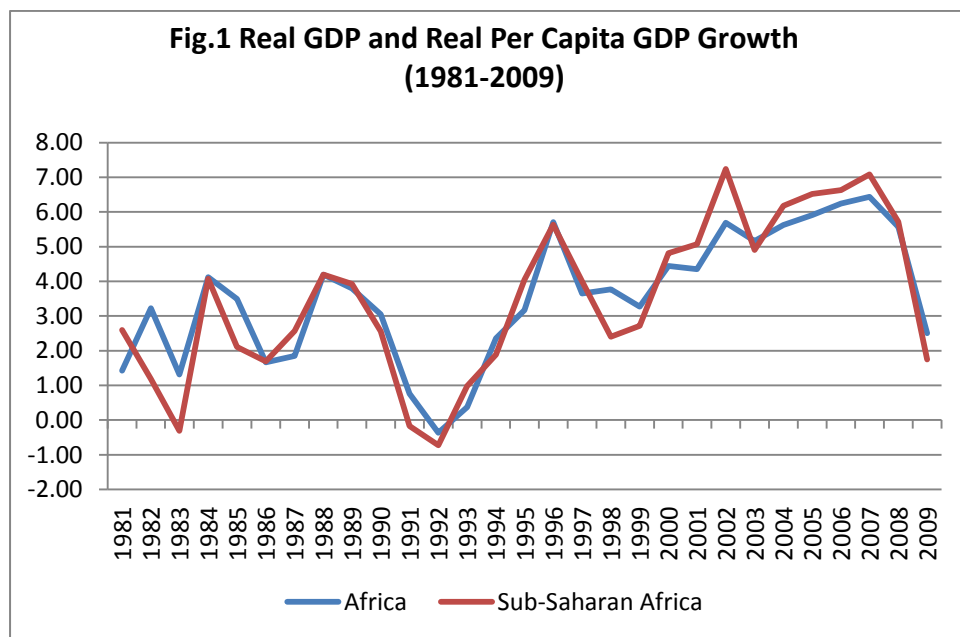
Source: African Economic Outlook database

Despite these improved economic growth rates, especially since 2000, Africa is yet to achieve rates that can make a significant dent on reducing poverty and inequality. Fig. 2 shows the trends in poverty ratios for SSA compared with other regions. For sub-Saharan Africa, the proportion of the poor surviving on less than $1.25 per day has hardly shifted between 1981 and 2005, falling from 53% to 51% between the two periods. In contrast, in East Asia and the Pacific, the head count poverty ration at $1.25 a day declined from a high 78% in 1981 to 17% in 200, while South Asia, which is a relatively comparable region with Africa, the poverty head count ratio fell from 59% to 40% between the two periods.

Not only is poverty high in Africa, but inequality as measured by the Gini-coefficient is also high, though Africa performs better than Latin America and the Caribbean (see Table 1). For the period 1992-2007, the Gini-coefficient for Africa averaged 0.44, while that of Latin America and the Caribbean averaged 0.51. In Table A1 we report the mean value, standard deviation, maximum and minimum of the Gini coefficient for a group of selected African countries for the period 1980 – 2004. This sample shows a large variation of the Gini-coefficient between countries. Cote d''Ivoire and Tunisia have the lowest average 0.41 and Cameroon and Lesotho have the highest average, 0.54. In general the level of income inequality in African countries has been very high and persistent over the period.

Fig. 2 Poverty Head count ratio at $1.25 a day (% of GDP)
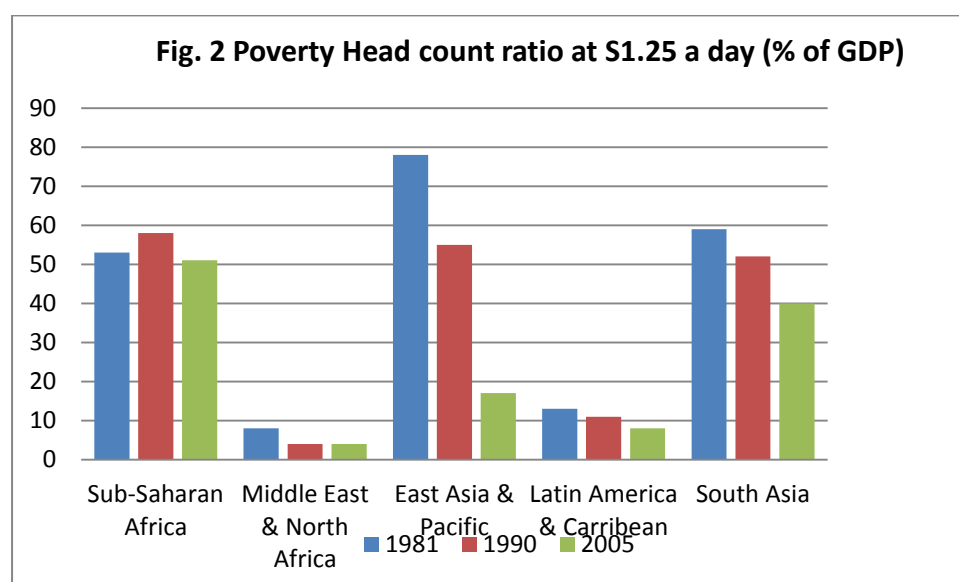
Source: World Development Indicators, World Bank

Table 1. Gini Coefficient (%) by Region

Regions	1992-2007
Sub-Sahara Africa	44
south Asia	35
East Asia -Pacific	43
Middle-east	37
Latin America	51
China	47

Source:Unido Scoreboard database

As argued in the literature, the development of financial markets is critical, not only for long term economic growth, but also for reducing inequality. Table 2compares the level of development of the financial systems in Africa with those of other regions. Compared with these regions, especially East Asia, the financial system in Africa lacks depth and breath. This is true regardless of the index of financial development used. For example, measured by broad money supply (M2) to GDP, in the 1980s, the financial systems in East Asia had the same level of depth, at 31% of GDP. However, by 2008, the financial depth in East Asia had increased four-fold to reach 130% of GDP, while that of Africa was still very low at only 38%. Trends in the other measures tell the same story of shallow financial markets.

Table 2 Financial Development Indicators

| Region	M2 as share of GDP(%)			Priv. Bank Cr. To GDP (%)			Dom. Priv. Credit to GDP(%)		
	1980	1990	2008	1980	1990	2008	1980	1990	2008
Sub-Saharan Africa	31	32	38	43	56	65	30	42	59
East Asia & Pacific	31	62	130	47	77	116	42	74	100
Latin America & Caribbean	23	17	41	41	60	62	33	30	39
South Asia	31	38	70	39	49	69	22	24	50
Middle East & North Africa	52	61	73	71	81	40	38	38	36

Source: World Development Indicators, World Bank database

For Africa, not only are the financial systems shallow, but access to finance also remains restricted. In Figs. 3 and 4, we show the relationship between poverty and access to finance (proxied by number of deposit accounts per 1,000 adults and number of loan accounts per 100,000 aduls). In general, access to finance is lower in poorer countries than in relatively developed countries. For example, in Botswana, there are 481.4 deposit accounts per 1,000 adults, compared with 33.8 for Madagascar and only 6.1 for the Democratic Republic of Congo. The figures for South Africa and Mauritius are respectively 788.1 and 2,109.9 deposit

accounts per 1,000 adults. Similar conclusions come out when looking at the number of loan accounts per 100,000 adults. In countries like Zambia, Uganda, Malawi and Ethiopia, where poverty levels are high, loan accounts penetration rates are also low.
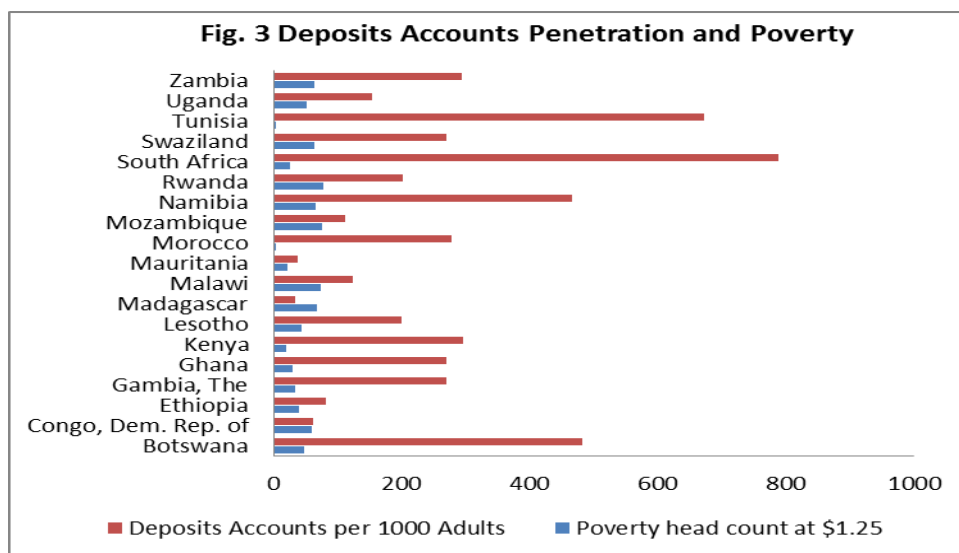
Source: Compiled from Access to Finance Report,2009, CGAP
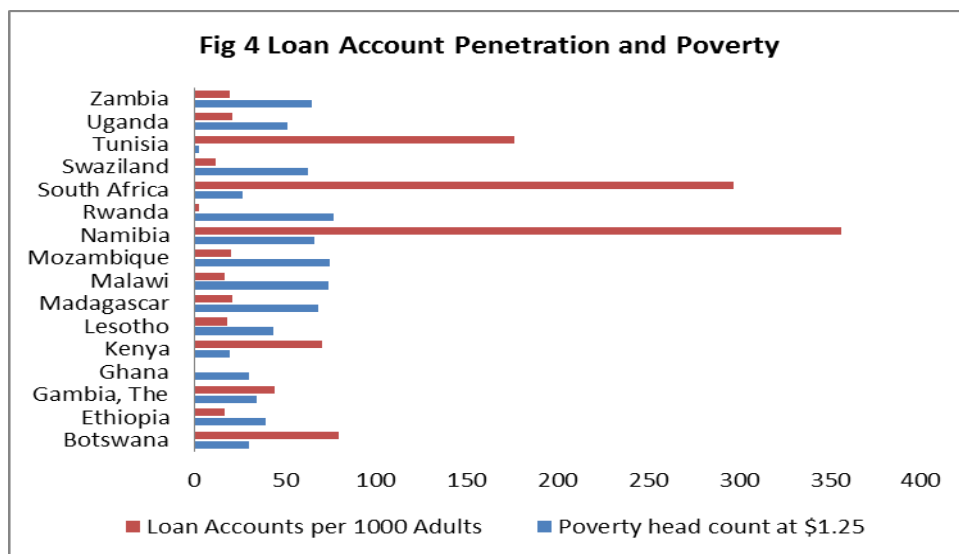
Source: Compiled from Access to Finance Report,2009, CGAP

Thus, given the relatively high levels of poverty and inequality in Africa, and the accompanying shallow financial systems and lack of access for the poor to financial services, this study has important policy implications. Importantly, it can assist in ensuring that financial policy designs take into account issues of poverty and inequality.

4. Data Description

The data used in the analysis was compiled from different sources that have been merged into an original and unique dataset. The data on inequality was obtained from a WIDER-WIID (World Institute for Development Economics Research, 2007) database that was, in turn compiled from a number of sources, including Dinninger and Squire (1996). Our sample comprises of 22 out of 53 countries for which we have data on inequality indices. We consider this dataset to be sufficient for the analysis because it contains the largest African countries in term of economic size and population. The temporal length of the dataset, which is from the period of 1980 to 2004, also allows us to gather a good number of observations on each country. We adopt the traditional approach of using Gini-coefficient as a proxy for inequality in each country.

The aggregate financial development index was constructed using the principal component analysis from the main financial development indicators, which in Africa are from the banking system: namely, liquid liabilities as a percent of GDP, M2 as a percent of GDP and domestic private credit to bank sector as a percent of GDP (See Enowbi and Mlambo, 2010). We expect these financial variables to be positive and significantly correlated with the index financial development while they are all negatively correlated with Gini coefficient. For example, Figure A2 also shows a negative and linear between Gini coefficient and financial development index from the plotted regression of the fitted values and the logarithm of the Gini coefficient.

We also include control variables in the econometric estimation. One such control variable is per capita GDP level, which is taken as a proxy for the stage development of a given economic system. According to Kuznets (1955), the relationship between inequality and economic development follow an inverted U-pattern with inequality rising at the initial stage of development and then falling at the later phases.

Another control variable used in the analysis is primary school enrolment rate, which is a proxy of human capital development. An increase in education implies an increase in the supply of skilled labour, a decrease in the relative skilled/unskilled wage and an overall decrease in income inequality. However, a steady increase in the supply of skilled labour may also keep the relative skilled/unskilled wages constant in the presence of skill biased technological change. Therefore it is important to include a proxy for the educational level in the estimation equation.

Table 3: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
GINI	516	3.8	0.11	3.5	4.15
LIQUID LIABILITIES (GDP)	571	3.3	0.52	1.9	4.5
INFLATION	499	2.3	1.13	-2.4	6.4
HUMAN CAPITAL	333	1.3	0.99	-12.9	2.4
GDP PER CAPITA	564	6.3	1.02	4.5	8.6
DOMESTIC CREDITE TO PRIVATE SECTOR (GDP)	553	2.8	0.88	0.43	4.9
M2	563	2.8	0.54	1.7	4.5
INDEX OF FINANCAIL DEVELOPMENT	552	5.3	1.02	2.9	7.65
MODERNSECTOR	562	6.06	0.71	3.6	7.14

Other control variables are the rate of inflation as proxy for macroeconomics policies and the sum of the added value of Manufacture and service sectors as share of GDP as a proxy for the development of the modern sector. This follows from Kuznets who argued that income inequality depends on the sectoral structure of an economy. The data on these control variables was collected from the World Development Indicator (WDI, World Bank, 2007). Table 3 presents descriptive statistics of the variables

5. Hypothesises and Methodology.

In this section we discuss the empirical model used to estimate the relationship between financial development and income inequality. In particular, we are interested in identifying whether there is a linear or inverted U-shaped relationship between finanicail development and inequality following the hypotheses suggested by Banerijee and Newman (1993) and Galor and Zeira (1993) and Greenwood-Jovanovic (1990). In order to test the linear hypothesis, our econometric specification is expressed as follows:

$$\mathbf{Gini}_{it} = \alpha + \beta_0 \mathbf{Gini}_{i,t-1} + \beta_1 \mathbf{Fin.dev}_{i,t} + \beta_2 \mathbf{Y}_{i,t} + \beta_3 \mathbf{Y}^2 + \sum_k \gamma_k \mathbf{X}_{i,tk} + \mu_i + \varepsilon_{i,t}$$

(1)

Where i and t denote country and time period, respectively. Gini is the Gini coefficient and Financial development (Fin.dev) is the aggregate index of financial development. As explained above, we use a composite index as well as alternative measures of financial development, namely, M2, private sector credit, and liquid liabilities, all as rations to GDP). Y is the logarithm of GDP per capita, and $\mathbf{Y}^2$ is its squared term. X is a set of control variables that include: primary school enrolment as proxy of human capital, of manufacturing and services value-added as proxy of modern sector, and inflation as proxy of macroeconomic policies. The terms μ_i and ε_t respectively denote a country effect capturing unobserved country characteristics and an error term.

In order to verify the inverted U- shaped hypothesis relationship between finance and inequality (Greenwood-Jovanovic, 1993), *Fin.dev.SQ*, the squared term of financial development index, is added in above equation. The econometric model now is expressed as the follows:

$$\mathbf{Gini}_{it} = \alpha + \beta_0 \mathbf{Gini}_{i,t-1} + \beta_1 \mathbf{Fin.dev}_{i,t} + \beta_2 \mathbf{Fin.dev}^2 + \beta_3 \mathbf{Y}_{i,t} + \beta_4 \mathbf{Y}^2 + \sum_k \gamma_k \mathbf{X}_{i,tk} + \mu_i + \varepsilon_{i,t}$$

(2)

The aim of using the square of the variable is to examine whether the relationship between finance and financial development is linear or not. If the coefficient of *fin. dev.SQt* is negative and significant while the coefficient of *Fin. dev.* is also positive and significant, then we can support the hypothesis of the inverted U-shaped relationship that implying that as the development in finance widens, its incremental effect of income inequality diminishes. On the other hand, a positive sign of both variables would indicate increasing returns, while if the signs are reversed, that is if the coefficient of *fin dev.SQ* is positive and that *fin.dev.* is negative, then we have evidence that supports the critical mass theory. This would suggest that the development of the financial sector would not significantly affect income inequality, until a critical mass of financial development is achieved.

The problems of possible endogeneity bias due to interaction between the financial development and income inequality, autocorrelation, individual specific heteroscedasticity, and omitted variable bias are overcome by employing the system GMM-estimator (Generalized method of m oment) developed by Blundell and Bond (1998), which relies on using instrumental variables. System GMM combines equations in first difference with equation in levels, using lagged internal instruments in difference equations. Estimates in the next sub section are based on a one step system estimator, with robust standard errors. The validity of additionally included instruments is tested by means of a Hansen test for over identifying restrictions. Consistency of estimates requires that error terms are not second-order serially correlated, so we report P-values of Arellano-Bond-AR (2) –tests.

In this paper, we follow the pattern of authors as Beck, Levine and Loayza (2000), Calderon and Serven (2004), that have taken advantage of this method to solve the problem of endogenity by exploiting the time series variation in the data, accounting for unobserved individual specific effects, and allowing for the inclusion of lagged dependent variable as regression. Thus, we first run the estimation using annual data, which is then transformed to

an average of five years periods due to fact that inequality data of 1980 to 2004 are highly persistent. Since our focus is on 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.

6. Empirical Results

Regression results for the basic model with financial development measured by the standard quantity indicator (Table 4) are consistent with the linear hypothesis suggested by Galor and Zeira (1993) and Banerjee and Newman (1993). Similar to studies such as by Clarke, G. At al. (2003), we find no evidence supporting the inverted U- shaped hypotheses as argue by Greenwood-Jovanovic, (1993). Considering our key variables, the coefficients on Gini and financial development index are significantly negative both annually and for the averaged five year dataset. In table 4, when finance is measured by a composite index, all the three regression have the expect sign. In regression (1), we find the coefficient of financial development to be negative and significant at 1% level, and at 5% level for regressions (2) and (3).

In table 5 we report on the results for individual e financial variables. All of them have negative signs and are statistically significant. Whatever measure of financial development variable used, the marginal impact of financial development on income inequality is such that when the level of financial development is high, the level of inequality tends to reduce, thus, confirming the existence of negative and linear relationship *à la* Galor and Zeira (1993) and Banerjee and Newman (1993). Our results show that a 1 percent rise in financial development is associated to a reduction of income inequality between the ranges of 0.02 to 0.05 per cent.

When we consider the inverted U- shaped hypotheses suggested by Greenwood-Jovanovic, (1993), by including the squared term of financial development index in the main equation, the results in table 6 shows that the linear relationship coefficient is negative and significant whilst the non-linear relationship coefficient is significantly positive. Lack of evidence for the inverted U-shaped hypotheses may be suggesting that those countries that are at an early stage of development and have a relatively advanced financial sector can have the advantage of reducing income inequality, while for those with underdeveloped financial sectors, income inequality tends to increase. Similar results are found when we use the non-overlapping 5 year period, which we included to avoid the fact that yearly dates might be subject to business cycle fluctuations.

As regard the control variables, the coefficient of the education variable is found to be significant and positive, demonstrating that education is an important variable in the debates on income inequality. Our result shows that improvement in education tends to create a larger gap on income distribution, suggesting that spending more on education and expanding the coverage to further education would have bigger distributional impact. The modern sector, proxied by manufacturing and services value added has a positive and significant coefficient, indicating that countries with a small sized modern sector, which is characteristic of most African countries, tend to have higher inequality. Inflation has regressive effect on inequality but is not significant. In the regressions, there is no evidence of the Kuznets curve; both the coefficient of income and the inverse of the income do not have the expected positive sign even if they are in some cases significant. For each regression, we tested the specification of the equation with Hansen test for instrument validity, and then with the serial correlation test for second order serial correlation. The test results suggest that our instruments are valid, and there exist no evidence of second serial correlation in our estimation. The results are statistically and economically significant and robust for a broad range of financial

development measures, estimation and specification and time periods, which highlight the substance of these finding.

6. Conclusion and Policy Implication

The purpose of this paper has been to analyse if the on-going development of the financial sector in African countries has an effect on income inequality. The theoretical literature following Galor and Zeire (1993) and Banerjee and Newman (1993) predicts a negative and linear relationship between finance and income inequality, while Greenwood and Jovanovic (1990) suggest an inverted U-shaped relationship. Using data restricted only to African countries for the period of 1980-2004 and applying the generalized method of moment (GMM) techniques, this study test the alternative hypotheses by investigating the impact of financial development on the distribution of income in African countries. Our empirical result show that the alternative financial development variables and the composite index predict a negative and linear relationship between finance and Gini Coefficients while the inverted U-shaped relationship is not established.

The significance of these results is that financial development is essential for reducing income inequality in African countries. Widening the access to financial markets, especially by targeting those at the lower income cohort and the rural population would help to reduce the persistent income inequality gap that exists in African countries, especially between urban and rural areas. It is, therefore, important to consider in particular policies that can promote financial development in the rural areas, where poverty is concentrated. Financial sector policy reforms should focus on encouraging better access to financial service by the poor segments of the society and the more dis-empowered communities within these countries. The poor and rural segments of these countries are facing an intractable problem which is that of high price or outright unavailability of credit. Primarily because of weak institutional

infrastructure in rural areas, formal sector banks have faced seemingly insurmountable information asymmetries and consequently have experienced persistently high costs and default rates.

One possible avenue for improving access of the poor, especially the rural population to financial services would more likely include establishing microfinance institution or cooperative banks rather than fully fledged commercial banks. Microfinance institutions would help to alleviate poverty and over time, grow domestic credit demand slowly despite weak formal institution, legal and otherwise. Microfinance is a form of financial development that, at least in its initial stages, can thrive without relying heavily on government regulation or support, or strong legal institutions that permit the poor to borrow against their assets, with can contribute toward a more equal distribution of income but also reduce poverty index at the same time GDP growth will be enhanced.

This demonstrate the importance of credit allocation and, how it can help in the reduction of inequality because more access to credit market particularly by the poor, will enable them to make productive investment like investment in education of their children and small manufacturing sectors.

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Table 4: Financial Development and Income Inequality in African   Countries: Test for the linear hypothesis 1990-2004

Dependent variable: Log.Gini	Reg. 1	Reg. 2	Reg. 3
Log. Gini_1	0.82***	0.85***	0.84***
	(0.00)	(0.00)	(0.00)
Index financial develops.	-0.016***	-0.030**	-0.033**
	(0.006)	(0.016)	(0.029)
Log. GDPPC	-0.25**	-0.11	-0.11
	(0.032)	(0.567)	(0.51)
Log. GDPPC SQ.	0.019**	0.007	0.01
	(0.036)	(0.583)	(0.495)
Log. Inflation	-0.01	-0.001	0.005
	(0.75)	(0.713)	(0.295)
Log. Human capital.		0.014***	0.014***
		(0.00)	(0.001)
Modern Sector	0.033***		0.016
	(0.00)		(0.211)
Constant	1.38***	1.20	1.02*
	(0.004)	(0.151)	(0.085)
Hansen Test	1.000	0.844	0.475
AR(2)	0.81	0.485	0.73
Observations	267	243	157
Countries	23	22	23

Notes: this hypothesis suggests a negative and linear relationship between finance and inequality (e.g., Galor & Zeire (1993); Banerjee & Newman (1993). ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level; for all regression, P- values are presented in parentheses.

Table 5: Individual Financial Variables and Income Inequality in African   Countries: Test for the linear hypothesis, 1990-2004

Log. Gini_1	0.85***	0.89***	0.86***
	(0.00)	(0.00)	(0.00)
Log.M2	-0.034**		
	(0.026)		
Log. Liquid liabilities		-0.029**	
		(0.029)	
Log. Dom. credit to private sector.			-0.011**
			(0.042)
Log. GDPPC	0.07	-0.11	0.045
	(0.708)	(0.150)	(0.506)
Log. GDPPC. QS.	-0.005	0.008	-0.004
	(0.709)	(0.142)	(0.476)
Log. inflation	-0.002	0.001	-0.003
	(0.654)	(0.846)	(0.253)
Log. Human capital.	0.01*	0.008	0.005
	(0.077)	(0.249)	(0.364)
Modern sector	0.005	0.012*	-0.001
	(0.473)	(0.063)	(0.933)
Constant	0.38	0.79**	0.42**
	(0.459)	(0.042)	(0.027)
Hansen test	0.999	0.992	1.000
AR(2)	0.588	0.855	0.844
Observation	210	211	205
Countries	22	22	22

Table 6: Financial Development and Income Inequality in African Countries: Test for the U-shaped hypothesis; 1990-2004

	Reg.1	Reg.2	Reg3.
Log.Gini_1	0.79***	0.85***	0.77***
	(0.00)	(0.00)	(0.001)
Index financial develops	-0.21*	-0.122**	-0.31**
	(0.086)	(0.014)	(0.028)
Index financial develops SQ.	0.019*	0.001**	0.02**
	(0.094)	(0.025)	(0.036)
Log. GDPPC	-0.038	0.060*	-0.12
	(0.745)	(0.098)	(0.293)
Log. GDPPC SQ.	0.001	-0.004*	0.007
	(0.842)	(0.084)	(0.372)
Log. Inflation		-0.002	0.009
		(0.421)	(0.477)
Log. Human capital.	0.014***	0.009**	0.008
	(0.013)	(0.032)	(0.212)
Modern Sector		0.001	0.046*
		(0.887)	(0.070)
Constant		0.831***	1.80
		(0.001)	(0.108)
Hansen Test	0.477	1.000	0.376
AR(2)	0.319	0.874	0.509
Observations	156	151	151
Countries	22	22	22

Notes: this hypothesis suggests a inverted U shaped relationship between finance and inequality (e.g., Greenwood and Newman (1990).
***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level; for all regression, P- values are presented in parentheses.

Table 7: Financial Development and Income Inequality in African Countries: Test for the linear hypothesis using average of Five year 1980-2004

Log. Gini coff.	0.32**	0.49**
	(0.044)	(0.021)
Financial develops.	-0.05**	-0.272**
	(0.018)	(0.050)
Financial develops. SQ.		0.021*
		(0.060)
Log. GDPPC	0.29	1.44**
	(0.361)	(0.050)
Log. GDPPC. SQ	-0.018	-0.09**
	(0.382)	(0.045)
Log. Inflation.	0.006	0.002
	(0.798)	(0.916)
Modern sector	0.001	0.016
	(0.958)	(0.774)
Constant	1.71	-2.88
	(0.215)	(0.257)
Hansen	0.619	0.506
AR(2)	0.115	0.180
Observation	78	78
Countries	22	22

Figure A2: The Relationship between Financial Development and Income Inequality
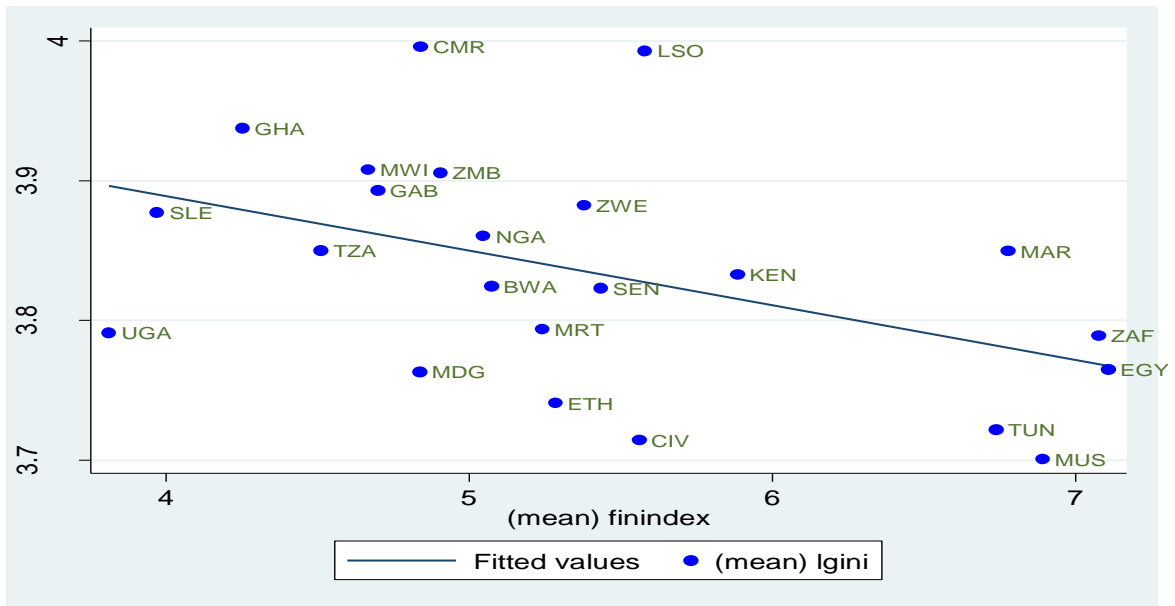

Figure A1: Pattern of Financial development Index and Gini Coefficient of Each Country
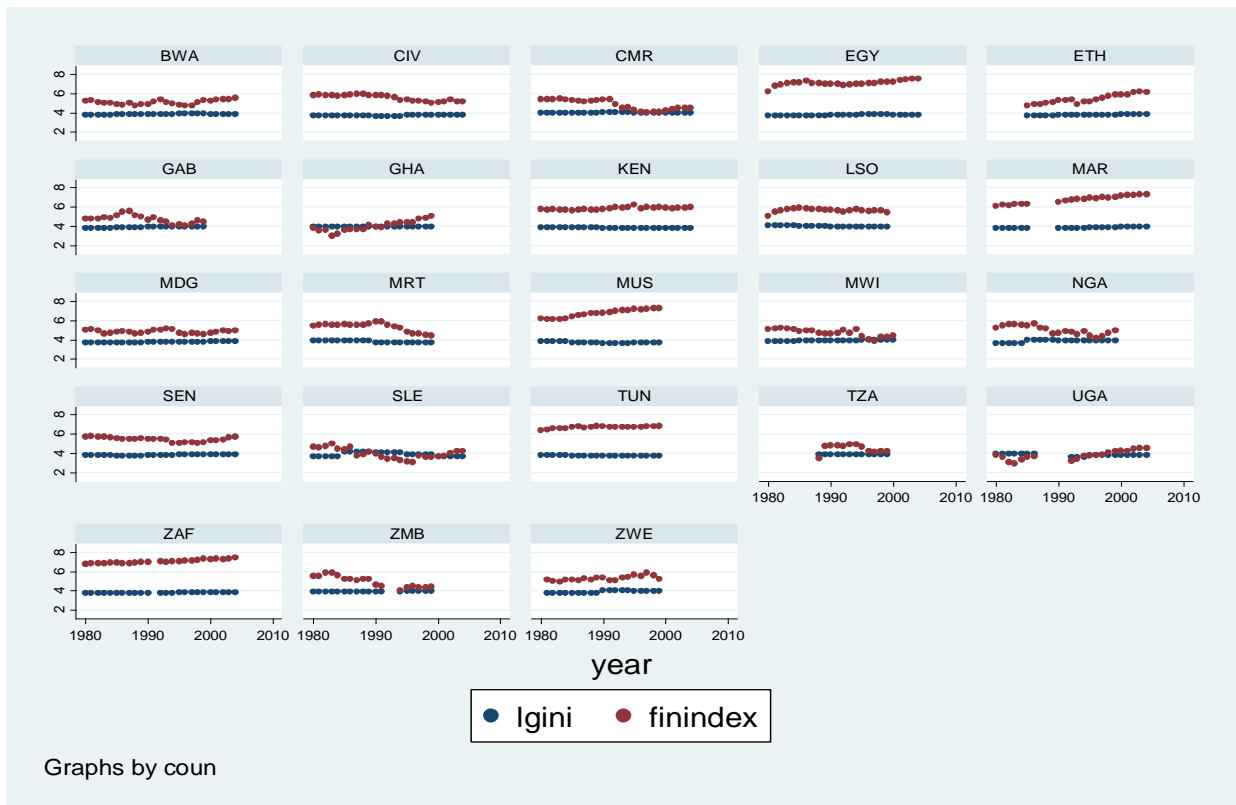
Table 2: Correlation Table

	Gini	Liq.liab.	Pri.credit	Ln.M2	fin.dev.	GDPPC	Mod.Sect.	Inflat.	Hum.Cap.
Gini	1.00								
liquid liab.	-0.35	1.000							
Private credit	-0.38	0.847	1.000						
M2	-0.36	0.98	0.74	1.000					
Index fin.dev.	-0.39	0,94	0.90	0.95	1.000				
GDP per capita	-0.25	0.50	0.58	0.52	0.58	1.000			
Modern sector	-0.19	-0.51	0.63	0.52	0.60	0.34	1.000		
inflation	-0.24	-0.20	-0.32	-0.24	-0.28	-0.23	0.34	1.000	
Human capital	-0.13	0.27	0.34	0.29	0.33	0.24	0.38	-0.13	1.000

Table A1: Descriptive statistics of each country Gini indexes ; 1980-2004

Country	Mean	Std. Dev.	Min	Max
Botswana	45.8	2.3	44	50.3
Ivory Coast	41	2.7	37.6	44
Cameroon	54.3	1.1	52,5	55.8
Egypt	43.3	2.02	40.7	46.2
Ethiopia	49	2.8	45	52.3
Ghana	51.3	1,08	49.8	52.5
Kenya	46.2	1.32	44.6	47.8
Lesotho	54.3	3.7	51.16	60
Morocco	47	2.07	45.42	50.9
Madagascar	43	2.07	40.5	47.5
Mauritania	44.8	6.01	38.9	51.1
Mauritius	40.5	3.2	37.9	51
Malawi	49.8	2.35	46.5	52.6
Nigeria	47.85	5.84	38.7	54.2
Senegal	45.7	2.04	42.4	47.8
Sierra Leone	49	10.05	38.7	63.7
South Africa	44.21	0.70	43.3	45.3
Tanzania	47	1.5	44.5	48.4
Tunisia	41	1.2	40.5	43.3
Uganda	44.6	5	36.5	50
Zambia	49.75	2.8	47.6	54.54
Zimbabwe	48.8	5.3	43	56.3