Financial development and income inequality in Africa: A panel heterogeneous approach

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Abstract

Although the financial sector of Africa has witnessed massive reforms to enhance its ability to support economic activities, reduce poverty and lower income inequality, Africa remains the poorest region and the second most unequal region in the world after Latin America. Despite these established facts, little empirical research exists on the relationship between financial development and income inequality in Africa. This study investigates the finance-income inequality nexus in a balanced panel of 15 African countries using the Augmented Mean Group estimator to determine if there is a threshold level of financial development or income inequality is related to the sectoral structure of the economy.

Overall evidence suggests that the finance-inequality relationship in the sample of African countries studied is non-linear and ranges from an *inverted u-shape* to a *u-shape* depending on the measure of financial development. Policies to boost financial development should be preceded by financial inclusion but these policies should be separated. Financial inclusion policies should focus on the quality and suitability of financial products to ensure usage and avoid dominant accounts as well as consumer protection.

Keywords: Augmented mean group, financial development, heterogeneous slopes, income inequality and poverty

JEL classifications: C23, G21, D63 and I3

1 Introduction

Over the past decades the financial system of Africa has undergone massive reforms in a bid to transform the sector from a state-owned to a market-oriented financial system to enable the financial sector to perform its core mandate of financial intermediation effectively. These reforms were intended to spur financial

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development in order to mobilise more resources and fund investment projects with the greatest chance of succeeding, thereby supporting economic growth which in turn will lead to reduction in poverty and income inequality. However, this seems not to be the case in Africa. Although the region has experienced an impressive economic growth rate of about 4.8% per annum on average for more than a decade, income inequality remains high. The Africa Development Bank (AfDB, 2012, pp. 2) in their briefing notes acknowledge that Africa is the second most unequal region in the world after Latin America and that the richest in Africa captures the largest share of income. This rapid increase in income inequality threatens social cohesion in the region and is detrimental to economic growth and poverty reduction efforts. It can also have a multiplier effect on other forms of inequalities such those between men and women (Fuentes-Nieva & Galasso, 2014, pp.3). Extreme inequality can also have an adverse effect on equal political representation. For example, when the rich use their wealth to capture government policy decision making, the rules are bent in their favour at the expense of everyone else. This could cause erosion of democratic governance, pulling apart of social cohesion and increasing social unrest (Kumar, 2014). Given these destabilising effects, the World Economic Forum (2014) in their outlook on the global agenda 2014 identified widening income disparities as the second greatest risk tearing communities and societies apart in the next 12 to 18 months. Income disparity has been the major cause of unrest in Latin America, sub-Saharan Africa and Asia. The greatest challenge facing the African continent is rising levels of income disparity and poverty and it can be argued that the economic growth achieved thus far was not strong enough to exert a significant effect on poverty and income inequality. Also, one can equally attribute the persistent poverty and widening income disparities to financial exclusion in the region where only 22% of enterprises have a loan or line of credit relative to 43% in other developing economies outside Africa (Demirgüç-Kunt & Klapper, 2012b, pp. 13). Beck, Demirguc-Kunt & Levine (2007, pp. 46) established that greater financial development induces the incomes of the poor to grow faster than average per capita GDP growth, which will result in lower income inequality. Given these challenges and having spent substantial resources previously to transform the financial sector, it will be interesting to step back and ask: what is the relationship between financial development and income inequality in Africa? Is there a possibility of a threshold level of financial development that needs be reached before its effect on income inequality can be felt? And how is income inequality related to the sectoral structure of African economies? Basically, there are three tested empirical relationships between finance and income inequality. Kuznets (1955) predicts that income inequality increases at the early stages of economic development and declines at the advanced stage of GDP per capita, while Greenwood & Jovanovic (1990) theorise that income inequality increases at the early stages of financial development and falls at the advanced stage. However, Galor & Zeira (1993) and Banerjee & Newman (1993) predict that financial development reduces income inequality irrespective of the stage of development.

In this study, we investigate the relationship between financial development

and income inequality using a balanced panel of 15 African countries[1] from 1985 to 2007. We examine whether financial development has an effect on income inequality and whether this effect depends on the level of financial development or the level of economic development. Presently only two peer-reviewed papers and a working paper have attempted to investigate this relationship in Africa (Batuo, Guidi & Mlambo, 2010; Kai & Hamori, 2009, and Asongu, 2013).Apart from the inherent data limitation problems in Africa, these studies have some empirical shortcomings. Recent developments in econometric modelling emphasised that when the time (T) and cross-sectional (N) dimensions are large or when T is greater than N, standard micro-econometric techniques may yield bias and inconsistent estimates due to the potential of parameter heterogeneity across countries and serial correlation in the regressors (Baltagi, 2008, pp. 273).Thus conventional techniques such as fixed and random effects, instrumental variables or generalised method of moment (GMM) can yield unreliable and potentially misleading estimates of the values of the parameter in dynamic panel if the slope coefficients are different (Pesaran, Shin & Smith, 1999). Furthermore, arbitrary averaging of data over a fixed period without due consideration of the length of business cycle is unlikely to eliminate business cycle effects since the length of business cycle phases fluctuates and varies across countries. This process may instead induce simultaneity and the estimated parameters can easily change signs and magnitude from the underlying parameter and hence differ significantly (Ericsson et al. 2001, p. 245 and Wan, Lu & Chen, 2006, pp. 656).

This study addresses these empirical issues by employing the Augmented Mean Group (AMG) estimator developed by Eberhardt & Teal (2008) and Eberhardt (2012) that account for country-specific slope coefficients. The technique is robust to the presence of cross-sectional dependence. Thus, we contribute to the existing knowledge on the finance-inequality nexus in Africa from an empirical perspective. Secondly, the study tests each of the theories of finance-inequality in each country to provide more insights into the dynamism of this relationship. Finally, the empirical evidence adds to the limited evidence available on the relationship between income inequality and financial development in Africa.

The remainder of the paper is organised as follows: Section 2 reviews the theoretical and empirical literature and Section 3 provides stylised facts about Africa. Section 4 describes the data and Section 5 specifies the econometric modelling. Section 6 discusses the results and the conclusion is presented in Section 7.

[1] Botswana, Côte d'Ivoire, Egypt, Ethiopia, Ghana, Lesotho, Morocco, Nigeria, Malawi, Mauritania, Mauritius, Rwanda, South Africa, Tunisia, Uganda.

2 Theoretical and empirical review

2.1 Theoretical review

Economic theories have different predictions on how financial development can affect income inequality. For example, Greenwood & Jovanovic (1990) predicted that the relationship between financial development and income inequality is an *inverted u-shape*. They developed a model of economic growth, financial development and income distribution in which financial intermediaries develop to facilitate trade. Trading through financial intermediaries allows both higher and safer returns because intermediaries can pool risk across large numbers of individuals. However, there is a cost associated with investing through intermediaries and these costs are higher at the early stages of economic development because financial intermediaries are at the infancy stage. This high costs constrain investing by the poor through financial intermediaries, only the rich can afford to invest through financial intermediaries at the early stage of development. Hence, during this early stage of economic development, financial intermediaries are virtually non-existent and the growth rate of the economy is slow. As the economy approaches an intermediate phase of economic growth, financial intermediaries begin to develop. At this stage economic growth and the saving rate in the economy both increase and income inequality between the rich and the poor widens, given that the poor have lower capacity to save and therefore amass wealth at a slower pace. As the economy passes through the early to the intermediate stages of economic development, demand for financial services from the real sector grows. Financial sector development in response to these demands improve efficiency and reduce transaction costs as many people gain access, thus income inequality will start to decline. In the advanced stage of development, financial intermediaries become even more efficient and cost-effective as well as providing greater access to many people. This therefore translates into an *inverted U-shaped* relationship, with income inequality rising at the early stage of financial development and falling at the advance stage of financial development.

The second theory is based on financial market imperfections. Galor & Zeira (1993) developed a two-sector model where income distribution is linked to inheritance between generations and investment in human capital accumulation is indivisible. In the first stage, individuals can decide to invest in human capital and acquire skills or work as unskilled workers. In the second stage individuals work as skilled or unskilled labourers depending on their level of education, spend their earnings and leave inheritances. In the model individual inheritance determines whether an individual invests in human capital to become skilled or remain an unskilled worker. Furthermore, individuals who inherited little bequests can borrow to finance human capital accumulation. Lenders of capital require collateral and borrowing incurs monitoring, supervision and enforcement costs. Consequently, those who inherited sufficient bequests can finance their human capital accumulation without borrowing but those who inherited little bequests need to borrow. Because of financial market imperfections, the

poor underinvest in human capital accumulation and end up being unskilled and leaving no inheritance. Banerjee & Newman (1993) developed a model of occupational choice that focused directly on the interplay between the patterns of occupational choices in the process of economic development. In the model agents receive their initial wealth at maturity in the form of an inheritance from their parents and they may apply for a loan when economically active, but borrowing requires collateral. This is because contract enforcement is imperfect and agents can renege on their loan contracts. As a result of these capital market imperfections, credit is rationed and people can borrow only limited amounts, thus occupational choices that require high initial capital are out of reach for the poor. Thus, the poor instead opt to work for wealthier employers as wage earners, thus substituting financial contracts for wage contracts. This breaks down into a situation where the patterns of occupational choices are determined by initial wealth distribution and the structure of the occupational choices in turn determines how much people save and the type of risk they bear. These two theories suggest that if financial markets are perfect the society will achieve social efficiency. That is, brilliant children from poor backgrounds and poor entrepreneurs with potential to succeed will gain access to capital regardless of their initial inheritance. This translates into a negative linear relationship between financial development and income inequality. But, in the presence of persistent financial market imperfections, schooling and entrepreneurship will be linked to initial inheritance, dynasty connections and networks. Thus, financial development will lead to Clarke, Xu & Zou's (2006) *inequality-widening hypothesis* of financial development.

Kuznets (1955) also suggests that inequality is related to the sectoral structure of an economy and predicts an *inverted u-shape* relationship between income inequality and economic development. Kuznets (1955) argues that the per capita income in the rural agricultural sector is lower than that of the urban and industrial sectors and that this difference in income shares causes people to move from rural to the urban and industrial sectors. Hence, Kuznets (1955) predicts that income inequality will be higher during the transitional phase of an economy from agricultural to pre-industrialisation. But as the early phase of industrialisation elapses, several forces converge to enhance the economic situation of new migrants within the urban population. Thus, after a while a new generation will be born in the cities and will be able to adapt to city life, gain skills through quality education and hence stand a better chance to secure a high paying job. This translates into an *inverted u-shape* relationship between income inequality and economic development. Income inequality will rise at the transition phase and decline at the stage of full industrialisation.

In summary, each theory predicts a completely different mechanism through which financial development is linked to income inequality. These various predictions will be tested to ascertain which one applies in the context of Africa.

2.2 Empirical literature

Empirical studies on the finance-inequality relationship started only when the Deininger & Squire (1996) dataset on income inequality was made available. Even with the availability of income inequality data sets, empirical evidence still remains scant with developed economies dominating available studies. Empirical evidence from Africa is almost non-existent, with only two peer-reviewed papers and a working paper being the known available studies (Kai & Hamori, 2009; Batuo et al., 2010 and Asongu, 2013). One can generally group the studies into two categories based on the econometric methods used. The first group employs panel data techniques in a cross-country analysis (see for instance, Li, Squire & Zou, 1998; Beck et al. 2004 and 2007; Clarke et al., 2006 and 2013; Rehman, Khan & Ahmed, 2008; Kappel, 2010). The second group of studies used country-specific time series methods (e.g. Law & Tan, 2009 and Law, Tan & Azman-Saini, 2014)

One of that earliest studies, Li et al. (1998) examined the Kuznets hypothesis, looking at the international and intertemporal variation in inequality in 49 developed and developing countries from 1947-1994 using analysis of variance (ANOVA), least square dummy variable (LSDV) and random effect (RE). Income inequality was found to be stable, while income has been rising for the period under study thereby rejecting the Kuznets hypothesis. Their results further suggest that the determinants of income inequality vary only slowly within countries but are significantly different across countries.

Focusing on the finance-inequality relationship, Beck et al. (2004 and 2007) found that income inequality declines faster in countries with a well-developed financial system. Their results further suggest that well-developed financial systems induce the incomes of the poor to grow faster than the average per capita GDP growth, which lowers income inequality.

In a similarly related cross-country study Clarke et al. (2006 and 2013) investigated the relationship between finance and income inequality in 83 countries from 1960 to 1995 and recently (in the 2013 study) expanded the countries to 91 while maintaining the same period. They employed ordinary least squares (OLS) and GMM in both analyses and in the earlier study, empirical evidence strongly supports the negative linear hypothesis with some weak support for the Greenwood & Jovanovic (1990) hypothesis. Similar support for the negative linear hypothesis were found in the recent study but no support was found for Greenwood & Jovanovic (1990) while there was some modest support for the augmented Kuznets hypothesis.

Rehman et al. (2008) analysed data for 51 countries at different stages of economic growth to understand the factors driving income inequality among these groups of countries and split the data into four different income groups to test the Kuznets hypothesis. They found government spending, the literacy rate and trade openness to be the main factors driving income inequality in low, lower, middle and upper income countries. Their results showed that financial development reduces income inequality regardless of the stages of economic development and they also found support for the Kuznets *inverted u-shape* hy-

pothesis. However, Kappel (2010) found that government spending reduces income inequality in high income but not in low income countries. Evidence from regression analysis showed that inequality and poverty are not only reduced through better loan markets but also through well-developed stock markets. The results also identified ethnic diversity and land distribution as key factors driving income inequality.

Recently emerging evidence suggests the existence of a threshold effect of financial development and institutional quality on income inequality. For example, Kim & Lin (2011) employed an instrumental variable threshold regression approach for a panel of developed and developing countries and found the existence of a nonlinear threshold effect of financial development. Their results indicate that financial development (banks and stock markets) will disproportionately help the poor and reduce income inequality only when a country has reached a certain threshold level of financial development. Below such threshold level, financial development will hurt the poor and worsen income distribution. Tan & Law (2012) also found evidence of a below-threshold effect. Their results suggest that financial development will reduce income inequality at the early stage of financial development but this will only be sustainable below a certain threshold level. This plays in out in three phases: a phase where income inequality reduces with financial development, a phase of no change in income inequality with financial development, and the final phase of rising income inequality with further financial development, thus translating into a *u-shape*. Further financial development after the second phase will increase income inequality. Recently, Law et al. (2014) employed a threshold regression approach and found that financial development will reduce income inequality only after a certain level of institutional quality has been achieved. They concluded that until such institutional quality has been reached, the relationship between finance and income inequality will not exist.

We now turn to studies that focused on African countries. All the studies are cross-country in approach. Kai & Hamori (2009) is the first known peer-reviewed study in Africa which examines the effect of globalisation and financial depth on income inequality in 29 sub-Saharan Africa (SSA) countries from 1980-2002 using fixed and random effect models. Their empirical evidence revealed that globalisation worsens income inequality but that this effect dampens with economic development of countries. They argue that since globalisation is likely to benefit those with some basic level of education, there is an equalising effect of globalisation in countries where the overall standards of education are high. Furthermore, they found that financial depth reduces income inequality but its effect declines with globalisation. That is, increased globalisation shifts financial resources towards the rich and hence the gap between the rich and the poor widens.

Batuo et al. (2010) is another study that investigated the effect of financial development on income inequality in 22 African countries from 1980-2004 by testing the various theoretical hypotheses. They found empirical support for the negative linear hypothesis that financial development reduces income inequality. Meanwhile Asongu (2013) examined the channel through which investment af-

fects inequality and which channels are good for the poor in 13 African countries. The overall result revealed that financial development in Africa does not help the poor. The results showed that financial depth and activity reduces income inequality, whereas financial efficiency increases income inequality which provides support for Greenwood & Jovanovic's (1990) inverted u-shape hypothesis. That is, large average loan sizes and deposits per capita are likely to benefit the rich and well-established firms. Gries & Meierrieks (2010) also found in a group of SSA countries that weak institutional quality undermines the effectiveness of financial development to reduce income inequality in the region.

Apart from cross-country studies, there are also single country studies that have examined this dynamic relationship between financial development and income inequality. However, none of these studies looked at African countries. The negative linear hypothesis of Galor & Zeira (1993) and Banerjee & Newman (1993) enjoy overwhelming support from single country studies regardless of the method used in the analysis (see Shahbaz & Islam, 2011; Bittencourt, 2010; Liang, 2006; Hoi & Hoi, 2012). In contrast, Ang (2010) found that underdevelopment of the financial sector in India hurt the poor more than the rich. Law & Tan (2009) failed to find any statistically significant effect of financial development on income inequality in Malaysia. Instead they found a statistically significant effect of institutional quality[2] in reducing income inequality. The findings also identified real GDP per capita and inflation that were statistically significant in reducing income inequality. They concluded that in order to reduce income inequality efforts should be directed at improving economic development and maintaining low levels of inflation.

The foregoing review clearly shows that empirical evidence, although not clear cut, is mostly focused on developed and developing countries and there are presently only two published papers from Africa. Secondly, apart from single country studies outside Africa that have employed ARDL in their analysis, most cross-country studies applied the conventional method of data averaging which is not in line with empirical modelling for heterogeneous non-stationary panel data. This study argues that assuming homogeneity of slope coefficient when in fact the slopes are different may lead to misleading inferences.

3 Some stylised facts about Africa

African countries remain among the poorest countries in the world, and the region also has been among the highest unequal countries with six out of the ten most unequal countries in the world in 2010 being from Africa (AfDB, 2012, pp. 2). Besides having the lowest average per capita income compared to other regions, sub-Saharan Africa has the highest headcount poverty ratios. As shown

[2] Institutional quality refers to five measures of political risk services (PRS): (i) corruption, (ii) rule of law, (iii) Bureaucratic Quality, (iv) Government Repudiation of contracts, and (v) Risk of Expropriation; and six measures from the World Governance Indicators: a) voice and accountability, b) political stability and lack of violence, c) government effectiveness, d) regulatory quality, e) rule of law, and f) control of corruption.

in Figure 1, the headcount poverty ratio which was 56.75% in 1990 has dropped only by 13.85% over two decades to 42.65% in 2012. In contrast, East Asia and Pacific and South Asian regions which had a headcount poverty ratio above 50% in 1990 witnessed a significant drop to 7.21% and 18.75% respectively by 2012.

Secondly, although Africa as a whole has witnessed robust GDP growth for over a decade and a half, living standards of Africans have not improved in line with the growth in GDP. Figure 2 illustrates GDP per capita growth over five year intervals across regions. Figure 1 connects with Figure 2 as regions with rapid decline in headcount poverty also showed an improvement in the living standards. SSA again shows the lowest level of GDP per capita growth, which may suggest that the economic growth experienced over the past decades was not high enough to lower poverty significantly. It could also be as a result of economic growth being concentrated in the formal sectors while enormous untapped productive resources in the informal sectors are being excluded, thus perpetuating income inequality in the region. For instance, some of the most unequal countries in the world are based in the SSA region: South Africa, Botswana, Lesotho, Angola, Comoros, Namibia, Swaziland and Central Africa Republic (AfDB, 2012, pp.4).

Could the relatively high income inequality and poverty rate despite the high growth rate be attributed to the state of the financial system in Africa? In the past three decades many SSA countries have adopted several financial sector reforms which put emphasis on market-oriented policies. For instance, in the 1980s and 1990s many of the countries in the region adopted the structural adjustment programme which emphasised the liberalisation and opening of the financial sectors as opposed to government-controlled eras of the past. A look at indicators of financial development in the region reveals that although the region has experienced some progress in the financial sector, the sector remains largely underdeveloped and among the least developed in the world. The level of financial exclusion also remains very high, with only 35% of the adult population having access to the banking sector and other financial institutions (Global Findex, 2014). A cursory look at the indicators of financial development vis-à-vis the Gini coefficient, a measure of income inequality, in Figures 3 and 4 seems to suggest some correlation between income inequality and financial development. One can observe that in countries where the domestic private credit as a ratio of GDP is rising, the Gini coefficient tends to fall. This can easily been seen in Egypt, Ethiopia, Malawi and Mauritius. On the other hand, in countries where domestic private credit declines there are also some indications that the Gini coefficient rises. This is evident in Côte d'Ivoire, Ghana, Lesotho and Mauritania. What is not clear, though, is the extent to which the level of financial development explains the behaviour of income inequality in these countries. Moreover, it is not obvious from the simple graphs whether the relationship between financial development and income inequality is linear or non-linear. These can only be established using more advanced econometric techniques.

In the next section we turn our attention to the methods that the study uses to accomplish this.

4 Data Description

Several sources have been used to collect data for this study. Financial development indicators are sourced from the World Bank global financial development (WBGFD) database. Financial development is proxied using the domestic credit to private sector (% of GDP), a ratio widely used in the finance-growth literature (Beck, Levine & Loaya, 2000; Beck et al. 2004). WBGFD defines this ratio as financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequality securities, and trade credits and other accounts receivable that establish a claim for payment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data is available such as finance and leasing companies, money lenders, insurance corporations, pension funds and foreign exchange companies. Domestic credit therefore reflects the degree to which the private sector has access to financial intermediation. Secondly, bank deposits represent the total value of demand, time and savings deposits at domestic money banks as a share of GDP. Deposit money banks comprise commercial banks and other financial institutions that do not accept transferable deposits but incur liabilities such as time and savings deposits. These two measures are deflated by the end-of-year consumer price indices (Beck, Demirgüç-Kunt & Levine, 1999, pp. 6)

The Gini coefficient data are sourced from the Standardised World Income Inequality Dataset (SWIID) created by Solt (2009). The SWIID combines information from other income inequality datasets[3] to create a standardised income inequality dataset with greater coverage that maximises comparability of available income inequality data for the broadest possible sample of countries and years. The SWIID uses the Luxembourg Income Study (LIS) dataset to serve as the base for standardisation (Solt 2009, pp. 1).

Despite the wide coverage of SWIID, the limitations of the dataset as discussed by Jenkins (2015), Wittenberg (2015) and Ferreira, Lustig & Teles (2015) are highly acknowledged. This includes the strong assumption of constant ratios of Gini coefficients across series within groups of country year observations and the use of the five year smoothing algorithm that is likely to prevent abrupt changes[4]. Despite these limitations highlighted by the above authors the SWIID

[3] The United Nations University World Income Inequality Dataset version 2.0c, the OECD Income Distribution Database, the OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean generated by CEDLAS and the World Bank, Eurostat, the World Bank's PovcalNet, the UN Economic Commission for Latin America and the Caribbean, the World Top Incomes Database and national statistical offices around the world.

[4] Finally, they also indicated that the imputation procedure introduces variability in the data that needs to be accounted for in any empirical analysis. Jenkins (2015, pp. 39-40) in a regression analysis illustrates that ignoring the multiple imputation when analysing the data may not lead to larger standard errors provided that the sample is drawn from the same region. The SWIID has 46 African countries with varying country and year observations. Some countries have very few observations and for the purpose of this study, we focus on countries with sufficiently long periods. This reduces the sample to only 15 African countries

has been used in empirical analysis and has been published in peer-reviewed journals such as Law et al. (2014); Solt (2009); Solt et al. (2011); Solt (2015) and Sturm & De Haan (2015). At the moment and based on the research question we are trying to answer, the SWIID is preferred secondary source data in terms of coverage, quality and comparability. Other variables such as GDP per capita, inflation rate, trade openness, gross primary school enrolment and value added by the manufacturing sector to GDP are used as control variables. These indicators are sourced from the World Bank World Development Indicator Database, 2014.

5 Empirical framework and econometric specification

The study employs the augmented mean group (AMG) estimator which accounts for slope heterogeneity in non-stationary macro panel time series (Eberhardt & Teal, 2008). The AMG estimator is feasible to analyse non-stationary panel data with heterogeneous slope even if the variables are not co-integrated

The AMG estimator

We adopt the Eberhardt (2012) empirical modelling: for i =1 . . ., N and t = 1... T,

$$y_{it} = \beta_i^{/} x_{it} + u_{it}, u_{it} = \alpha_i + \lambda_i^{/} f_t + \varepsilon_{it} \tag{1}$$

$$x_{mit} = \pi_{mi} + \delta_{mi}^{/} g_{mt} + \rho_{1mi}^{f} 1_{mt} + ... + \rho_{nmi} f_{nmt} + v_{mit} \tag{2}$$

where $m = 1, ..., k$ and $f_{.mt} \subset f_t$

$$f_t = \omega^{/} f_{t-1} + \varepsilon_t \text{ and } g_t = \kappa^{/} g_{t-1} + \varepsilon_t$$

where x_{it} is a vector of observable covariates. u_{it} represents the unobservable which are modelled as a combination of group-specific effects α_i and a set of common factors f_t with group specific factor loadings λ_i. Equation 2 provides additional representation of the k observable regressors modelled as a linear function of unobserved common factors f_t and g_t with country respective loading factors. Finally, equation 3 shows how the unobservable factors evolve with the possibility of non-stationarity factor ($\omega = 1, k = 1$). The above framework introduces cross-sectional dependence in the observables and unobservables because some of the unobservables driving variations in y_{it} also drive variation inx_{it}. This causes endogeneity where the regressors are correlated with the unobservables (u_{it}) preventing the true identification of β_i separately from λ_i and ρ_i (Eberhardt, 2012, pp. 62).

The AMG solves this identification problem by using a two-stage regression procedure that includes a common dynamic process to each panel in the regression at stage two extracted from stage one with T-1 dummy in first difference

with complete data from 1985 to 2007. Thus, the selection criteria for the countries used in this analysis is based on data availability.

pooled regression. This is shown below.

$$\text{AMG Stage (i): } \Delta y_{it} = b^{/}\Delta x_{it} + \sum_{t=2}^{T} c_t \Delta D_t + \varepsilon_{it} \Rightarrow \hat{C}_t \equiv \hat{\mu}_t^{\bullet} \tag{3}$$

$$\text{AMG Stage (ii): } y_{it} = \alpha_i + b_i^{/} x_{it} + c_i t + d_i \hat{\mu}_t^{\bullet} + \varepsilon_{it} \tag{4}$$

$$\hat{b}_{AMG} = N^{-1} \sum_{i} \hat{b}_i$$

Stage (i) represents an OLS regression with T-1 year dummies in first differences from which the coefficients of the year dummies are collected and relabelled as $\hat{\mu}_t^{\bullet}$. (ii) $\hat{\mu}_t^{\bullet}$ is included in each of the N standard country regression with a linear trend to account for omitted idiosyncratic processes evolving in a linear fashion over time. Also $\hat{\mu}_t^{\bullet}$ can be subtracted from the dependent variable, meaning a common process is imposed on each country with a unit coefficient (Eberhardt &Teal, 2008, pp. 16 and Eberhardt 2012, pp.65).

5.1 Econometric specification of the model

The study adopts the empirical specification of Clarke et al. (2013, pp. 501) given as:

$$LogInequality_{it} = \alpha_i + \delta_i t + f(finance_{it}) + \beta_2 CV + \varepsilon_{it} \tag{5}$$

where α_i are country specific fixed effects, δ_{it} represents country specific time trends, which captures any country-specific omitted variables that are either relatively stable over time or evolve smoothly overtime. LogInequality represents the natural log of Gini net. Finance is measured by two proxies: domestic credit to GDP and bank deposits to GDP, CV is a set of control variables, i and t represent country and time period respectively and ε_{it} is the error term. The focus is on finance and following the theoretical discussion in section3, the functional form to be estimated is given as:

$$\begin{aligned} LogInequality_{it} = \alpha_i + \delta_i t + \beta_1 \log fin_{it} + \beta_2 \log fin_{it}^2 + \beta_3 \log Y_{it} \\ + \beta_4 \log Y_{it}^2 + \beta_5 \log \text{mod sec}_{it} + \beta_6 \log \text{inf}_{it} + \beta_7 \log trade_{it} + \varepsilon_{it} \end{aligned} \tag{6}$$

Mod sec used as a proxy for the modern sector, is value added by the manufacturing sector to GDP, Y is the natural log of GDP per capita. We expect β_1 to be negative and significant, holding β_2 constant for the *linear hypothesis* to hold. Secondly, for the *inverted u-shaped hypothesis*, β_1 should be positive and significant while β_2 should be negative and significant. However, if the coefficients of β_1 happen to be negative and significant and those of β_2 are positive and significant, a *u-shape* relationship is suggested (below threshold). For the *Kuznets inverted u-shaped hypothesis*, the coefficient of β_3 should be positive and significant while β_4 should be negative and significant. If β_3 is positive

and significant it means inequality is likely to be higher in countries with large modern sectors and vice versa.

A set of control variables are included to account for other factors that are likely to influence income inequality. For example, inflation is included in order to capture macroeconomic instability, since a high inflation rate hurts the poor more than the rich because the rich can easily hedge their exposure with sophisticated financial instruments. Also if prices increase the purchasing power of the poor will be impacted more severely than the rich. Thus higher inflation is expected to have a positive effect on income inequality. The effect of globalisation on income inequality is captured by trade openness, while the role of the government to redistribute wealth is captured through government spending. The exact effect of these two variables on income inequality is less clear. However, if β_7 is negative and significant, it means globalisation reduces income inequality.

5.2 Panel Unit Root Tests

Two panel unit root and stationarity tests can be distinguished from the literature: the first generation test, which assumes cross-sectional independence in the panel, and the second generation test, which allows for cross sectional dependence in the panel (Baltagi, 2008, pp. 275-284). We employ two different types of tests in this analysis: the Im, Pesaran and Shin (2003) first generation test, and the Pesaran (2007) cross-sectional augmented (CIPS) panel unit root which is a second generation test. The starting point of Im et al. (2003) (henceforth IPS) is to assume that the stochastic process y_{it} is generated by the first order autoregressive process as:

$$y_{it} = (1 - \rho_i)\mu_i + \rho_i y_{i,t-1} + \varepsilon_{it},\ i = 1 \dots\ N, t = 1 \dots\ T,$$

where initial values y_{i0} are given, the interest will be to test the null hypothesis of unit roots $\rho_i = 1$ for all i then the equation can be expressed as:

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \varepsilon_{it},$$

where $\alpha_i = (1 - \rho_i)\mu_i, \beta_i = -(1 - \rho_i)$ and $\Delta y_{it} = y_{it} - \Delta y_{i,t-1}$. The null hypothesis under the IPS (2003) is that each series have a unit root, $H_0 : \beta_i = 0$ for all i against the alternative hypothesis that some but not all of the individual series has a unit root, $H_1 : \beta_i < 0, i = 1, 2...N, \beta_i = 0, i = N_1 + 1, N_1 + 2, ..., N$. This alternative formulation allows the autoregressive coefficients (β_i) to vary cross groups (Im et al., 2003, pp. 56).

The study also conducted the Pesaran (2007) cross-sectional augmented (CIPS) panel unit root test. The test augments the standard ADF regression with cross-sectional averages of lagged levels and first differences of the individual series. The standard panel unit root tests are then based on the simple averages of individual cross-sectional augmented ADF (CADF) statistics. Separate cross-sectional augmented ADF (CADF) regressions are then estimated for each country, which allows for different autoregressive parameters for each

panel member (Pesaran, 2007, pp. 265). The CADF model is stated formally as:

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{i,t-1} + \sum_{j=0}^{p} d_{ij} \Delta \bar{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij} \Delta y_{i,t-j} + \ell_{it} \quad (7)$$

where $\bar{y}_t$ is the cross-sectional mean of y_{it}, . The null hypothesis is that all series are non-stationary (H0: bi = 0) for all i and is tested against the alternative hypothesis that at least one of the individual series in the panel is stationary ($H_1 : b_i < 0$) for at least one i. The CIPS statistic is calculated as the averages of the individual CADF statistics as follows:

$$CIPS = N^{-1} \sum_{i=1}^{N} t_i \quad (8)$$

where t_i is the OLS t-ratio of b_i in equation 3 above.

6 Discussion of results

The unit root test results are reported in Table 1. The Im et al. (2003) test failed to reject the null of unit root at levels only for Gini net and inflation rate at 10% and 1% respectively. On the other hand, the CADF test rejected the null of unit root at levels for all the variables but failed to reject the null of unit root at first difference. Thus, the overall evidence suggests that the variables are integrated of order I (1) except for Gini net and inflation rate in the case of Im et al. (2003). This suggests the possibility of a long-run relationship between the two measures of income inequality and financial development.

A second concern for longer time series panel data is the problem of cross-section dependence. Therefore, a fixed effect model was estimated and tested for cross-sectional dependence. The Pesaran's test reported an average absolute value of the off-diagonal elements of 0.37 and a test statistic of 2.37 for the Frees' Q distribution which is greater than the critical value. Hence, the null of cross-sectional independence is strongly rejected. As a robustness check, individual variables were tested for cross-sectional dependence and the results are reported in Table 2.Apart from Gini net and government spending, the rest of the variables show evidence of cross-sectional dependence, justifying the use of the methodology proposed earlier.

Next we discuss the results of Equation 8 as stated in section 5.1. The model was estimated using domestic credit and bank deposits to GDP as measures of financial development. Our interest is on country-specific parameters and not the aggregate average and these results are not discussed but are available on request. First, the study finds no statistically significant evidence for the negative linear hypothesis for all the countries studied with the exception of Côte d'Ivoire when bank deposits are used as a measure of financial development (Table 4).Secondly, using domestic credit to GDP as a measure of financial

development, the inverted u-shape hypothesis of Greenwood & Jovanovic (1990) was statistically significant at least 5% in Botswana and Lesotho. Meanwhile for Ghana, Côte d'Ivoire, Nigeria and South Africa, the evidence suggests a u-shape relationship which corroborates Tan & Law's (2012) findings from a sample of 35 developing countries. Tan & Law (2012) argue that financial development will reduce income inequality even at the early stages of financial development up to a certain threshold level, beyond which further financial development will increase income inequality. Thus, the point where further financial development increases income inequality is what Clarke et al. (2006) term the inequality-widening hypothesis of financial development. This is re-enforced in countries with weak institutions and where the rich can prevent new firms from gaining access to finance. This effectively increases barriers and reduces the ability of the poor to improve their economic situation (Clarke et al., 2006). Thirdly, the Kuznets (1955) hypothesis is supported only in Lesotho and Uganda. This suggests that income inequality will increase in the early phase of development in these countries and decline as the countries attend higher levels of development.

We also use a second proxy for financial development to ascertain whether the finance-inequality relationship is sensitive to the choice of financial development proxy. Thus, when bank deposits is used as a measure for financial development, the Greenwood and Jovanovic (1990) hypothesis is supported in Botswana and Rwanda. Again the u-shape relationship is supported now in Egypt, Ghana, Morocco, South Africa, Tunisia and Uganda while the Kuznets (1955) hypothesis is supported only in Botswana and Lesotho (Table 4).This u-shape (inequality-widening) relationship between finance and inequality observed in these African countries is likely to trace the evolution of financial market policies in the region. That is, from financial repression to liberalisation and now financial inclusion aim at correcting market failures of the free market system. Thus, the massive financial reforms embarked on by many African countries in the 1980s succeeded to end misallocation of funds and corruption within the financial sector but at the expense of the rural poor. Financial services that were previously provided to the rural poor by state-owned banks (rural banks, cooperatives) were withdrawn and commercial banks concentrated their activities in the urban areas on the few wealthy elite, government and big corporate firms (Culpeper, 2012). This, has led to bank concentration, limited competition and shallow outreach of banking services especially in the rural areas.

Finally, the study fails to find any statistical significant evidence of the finance-inequality nexus in Ethiopia, Malawi, Mauritania and Mauritius. This suggests that the link between income inequality and financial development as measured by domestic credit and bank deposits to GDP is rather weak in these countries. Although these results seem strange there are in line with recent empirical evidence reviewed in section 2 (Law & Tan, 2009; Kim & Lin, 2011; Law et al., 2014). These recent findings of no relationship between finance and income inequality is associated with the quality of institutions and it is not surprising that the weak institutional quality in Africa may play a role in the above findings. This is an aspect that was not considered in the study and

interested scholars can pursue this argument further. Furthermore, Honohan (2007), in a sample of 160 developed and developing countries, equally found that domestic credit lacks the explanatory power to explain variation in income inequality as measured by the Gini coefficient.

As a robustness check to the model, residuals of the estimated model were generated and subjected to further tests to ensure there was no evidence of cross-sectional dependence and also that the residuals are stationary. The results of the Pesaran (2004) and the Pesaran (2007) tests confirmed that there is no evidence of cross-sectional dependence and that the residuals are stationary. These results are reported at the end of Tables 3 and 4.

The implication of these results is that financial sector policies in Africa, which has traditionally focused mainly on depth dimension "credit granted "and not "how many people have access to finance", is not enough to improve well-being. Table 5 provides a summary of financial inclusion for these countries.

Table 5 illustrates account penetration using information from World Bank global financial inclusion (Findex 2011 & 2014 surveys). Each year has three columns: overall account penetration, the proportion of overall account penetration held by the 40% poorest and 60% richest of the total population age 15 and above respectively. The Findex categorised the population into two segments: the 40% poorest and 60% richest.

Apart from Mauritius, South Africa and Botswana, which had above 50% financial inclusion by 2014, other countries have less than 50% account penetration. The 40% bottom poorest that constitute a significant share of the total population are largely excluded and this reduces the potential market size and obscures the link between finance and inequality. Thus, financial inclusion of this market segment needs to be strengthened to foster shared prosperity and increase their income share and hence encourage inclusive growth. This is supported by recent evidence that a one percentage point increase in the income share of the 20% bottom poor has a greater impact on GDP growth than the same increase in the income share of the top 20% richest (Dabla-Norris, Kochhar, Suphaphiphat, Ricka & Tsounta, 2015).This study therefore argues that income inequality in Africa can be reduced if financial deepening is preceded by suitable and quality financial inclusion that enables the poor and underserved to realise their potential. For example, the poor can use access to save for education of their children, plan for retirement and accumulate assets to insure against risk. Poor talented and underserved small micro-entrepreneurs can borrow to finance their investment projects rather than depending on their meagre savings. Rural farmers can borrow to buy inputs for the farming season such as seeds, pesticides or fertilisers and this will increase rural agricultural outputs. All in all, successful financial inclusion strategies have the potential to connect the informal to the formal sector and this ensures shared prosperity that is associated with a reduction in poverty and income inequality. The drive for an inclusive financial system is feasible but it will require a well-coordinated effort from the private and public sector. The public sector will need to build the necessary institutions to support financial inclusion initiatives and ensure financial inclusion does not compromise consumer welfare and hence impact

financial stability negatively.

7 Conclusion

This study has examined the relationship between financial development and income inequality in a balanced panel of 15 African countries from 1985 to 2007. We examine whether financial development in Africa has an effect on income inequality and whether this effect depends on the level of financial development or economic development. The analysis used SWIID version 4.1 created by Solt (2009) while acknowledging the limitations of the dataset discussed earlier. Taking these limitations into account, we failed to find evidence of a statistically significant negative linear relationship between finance and income inequality for the African countries studied except for weak evidence in Côte d'Ivoire. The Greenwood and Jovanovic (1990) inverted u-shape hypothesis was supported in Botswana, Lesotho and Rwanda but this relationship varied depending on the measure of financial development. Meanwhile, the u-shape relationship between finance and income inequality was supported in Egypt, Côte d'Ivoire, Ghana, Morocco, Nigeria, South Africa, Tunisia and Uganda but the results were not statistically significant across the two measures of financial development. This suggests a differentiated effect of finance on income inequality depending on how financial development is measured and the u-shape is suggestive of financial market imperfections resulting in limited competition and restrictive access.

The Kuznets (1955) inverted u-shape relationship between GDP per capita and income inequality is supported in Botswana and Lesotho using both measures of financial development and in Uganda only using domestic credit. Finally, there is no statistically significant evidence for the finance-inequality nexus in Ethiopia, Malawi, Mauritania and Mauritius.

Based on these findings, policies to foster financial deepening should be accompanied by financial inclusion. However, financial deepening and financial inclusion policies should be separated. Financial inclusion policies should focus on the quality and suitability of financial products to ensure usage and avoid dominant accounts. Secondly, given the rural nature of most African countries and their heavy reliance on rural agriculture for subsistence livelihood, there is need for a well-thought-through public private partnership to deliver financial services in the rural areas in order to support rural agricultural productivity as well as boost rural income.

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Table 1: Panel unit root tests

Variables	Deterministic terms	CADF test (Pesaran 2007)	Im *et al.* (2003)
Levels		**Z(t-bar)**	**W-t-bar**
Log Gini net	Constant	0.49 (0.69)	-1.58 (0.06)*
Log primary school enrolment	Constant and trend	-0.46 (0.32)	1.46 (0.93)
Log domestic credit/GDP	Constant and trend	4.47 (1.00)	3.91 (1.00)
Log domestic credit/GDP Sq	Constant and trend	5.35 (1.00)	3.85 (0.99)
Log bank deposit/GDP	Constant and trend	1.69 (0.95)	-0.59 (0.27)
Log bank deposit/GDP Sq	Constant and trend	1.58 (0.94)	-0.59 (0.28)
Log government spending	Constant and trend	2.19 (0.99)	-0.97 (0.17)
Log trade	Constant and trend	3.44 (1.00)	0.43 (0.67)
Inflation	Constant	1.50 (0.93)	-4.87 (0.00)***
Log GDP per capita	Constant and trend	1.67(0.95)	1.87(0.97)
Log GDP per capita sq	Constant and trend	1.85 (0.97)	2.01 (0.98)
Log modern sector/GDP	Constant and trend	3.47(1.00)	-1.02(0.15)
First differences			
Δ Log Gini net	Constant	-4.05 (0.00)***	-2.75 (0.00)***
Δ Log primary school enrolment	Constant	-3.01 (0.00)***	-7.07 (0.00)***
Δ Log domestic credit/GDP	Constant	-6.88(0.00)***	-8.25 (0.00)***
Δ Log domestic credit/GDP Sq	Constant	-6.88 (0.00)***	-8.17 (0.00)***
Δ Log bank deposit/GDP	Constant	-3.81 (0.00)***	- 7.80 (0.00)***
Δ Log bank deposit/GDP Sq	Constant	-3.78 (0.00)***	-7.68 (0.00)***
Δ Log trade	Constant	-7.18 (0.00)***	-9.33 (0.00)***
Δ Government spending	Constant	-4.99 (0.00)***	-9.25 (0.00)***
Δ Inflation	Constant	-9.02(0.00)***	---
Δ Log GDP per capita	Constant	-6.13 (0.00)***	-7.26 (0.00)***
Δ Log GDP per capita Sq	Constant	5.81(0.00)***	-7.15 (0.00)***
Δ Log modern sector/GDP	Constant	-3.17(0.00)***	-9.59 (.00)***

***, ** and * indicate 1%, 5% and 10% levels of significance. The null hypothesis of all three tests is that the panels contain unit roots. Δ is the first difference operator. Lag selection in IPS is automatic using AIC and 2 lags for CADF at levels.

Source: By Authors

Table 2: Pesaran (2004) Cross-sectional dependence test

Variables	Test-statistics	P-value
Log Gini net	-1.66	0.10
Log domestic credit to GDP	5.48	0.00
Log bank deposits to GDP	6.37	0.00
Log GDP per capita	20.98	0.00
Log government spending to GDP	-0.64	0.52
Inflation	10.01	0.00
Log primary enrolment	15.52	0.00
Log trade openness	8.31	0.00
Log value added by manufacturing sector to GDP	5.45	0.00

Source: By Authors

Table 3: Country specific parameters using domestic credit to GDP

Variables	Domestic credit	Domestic Credit Sq	GDP per capita	GDP per Capita Sq	Modern Sector	Common dynamic process	Country trend
Botswana	0.509**	-0.265**	0.384	0.066	-0.138**	-0.543	0.003*
	(2.02)	(-2.13)	(1.00)	(-1.19)	(-2.01)	(-0.77)	(1.67)
Côte d'Ivoire	-3.230***	1.242***	-2.346	0.384	0.077	2.271**	0.004**
	(-4.75)	(4.95)	(-0.65)	(0.61)	(0.95)	(2.33)	(2.19)
Egypt	-0.041	0.037	-0.814	0.139	-0.070	0.220	-0.003**
	(-0.09)	(0.27)	(-1.04)	(1.13)	(-1.00)	(0.51)	(-2.70)
Ethiopia	0.282	-0.161	-0.229	0.074	-0.077	3.716**	-0.002
	(0.47)	(-0.56)	(-0.05)	(0.08)	(-0.65)	(2.26)	(-0.54)
Ghana	-0.746**	0.514***	0.838	-0.138	0.993**	1.381	0.001
	(-2.44)	(2.91)	(0.52)	(-0.47)	(2.09)	(0.83)	(0.25)
Lesotho	0.912***	-0.413***	2.107***	-0.364***	0.078	1.769***	-0.008***
	(2.90)	(-2.81)	(3.04)	(-2.74)	(0.82)	(2.66)	(-3.07)
Malawi	0.177	-0.065	-2.317	0.544	0.299***	0.094	-0.007***
	(0.46)	(-0.30)	(-0.74)	(0.80)	(3.89)	(0.15)	(-4.59)
Mauritania	-0.006	0.023	-3.479	0627	-0.033	-0.436	-0.002
	(-0.16)	(1.21)	(-1.01)	(1.02)	(-0.45)	(-0.43)	(-1.16)
Mauritius	0.846	-0.256	-6.429***	0.943***	1.501***	4.444**	0.004
	(0.36)	(-0.38)	(-2.80)	(2.79)	(4.05)	(4.07)	(0.84)
Morocco	-0.077	0.022	-1.923***	0.300***	-0.002	0.575**	0.003***
	(-0.63)	(0.51)	(-4.85)	(4.90)	(-0.02)	(1.95)	(2.81)
Nigeria	-1.002*	0.389*	0.464	-0.102	0.011	-0.392	0.003
	(-1.89)	(1.69)	(0.93)	(-1.01)	(0.08)	(-0.34)	(1.17)
Rwanda	-0.325	0.159	-2.640	0.529	0.056	2.441**	0.016***
	(-0.24)	(0.20)	(-1.33)	(1.27)	(0.63)	(2.41)	(9.84)
South Africa	-0.675*	0.164*	0.001	0.000	-0.050	-0.235**	0.001**
	(-1.93)	(1.93)	(0.00)	(0.00)	(-1.33)	(-2.54)	(2.09)
Tunisia	0.688	-0.174	-0.693	0.089	0.081	1.210***	0.003*
	(0.18)	(-0.16)	(-2.27)	(1.13)	(0.71)	(3.81)	(1.90)
Uganda	-0.224	0.169	4.883***	-1.035***	0.079	-1.590	0.004
	(-1.23)	(0.90)	(3.60)	(-3.60)	(0.67)	(-1.57)	(1.07)
No of countries	15	15	15	15	15	15	15
Total of obs	345	345	345	345	345	345	345
Diagnostic test							
Pesaran xtcd test:- 0.16P-value:0.872							
PESCADF test: Z(t-bar): -7.30P-value: 0.00							
RMSE0.010							

Note: t-stats are in brackets, ***,** and* represent 1%, 5% and 10% respectively

Source: By Authors

Table 4: country specific parameters using bank deposit to GDP

Variables	Bank deposit	Bank deposit Sq	GDP per Capita	GDP per Capita Sq	Modern Sector	Common dynamic process	Country trend
Botswana	0.827***	-0.322***	0.603***	-0.086**	-0.082*	0.470	-0.0004
	(3.70)	(-3.98)	(2.55)	(-2.48)	(-1.60)	(1.44)	(-0.30)
Côte d'Ivoire	-4.587*	1.680	-5.769**	1.025**	0.061	0.309	-0.002***
	(-1.83)	(1.53)	(-2.15)	(2.20)	(0.65)	(0.46)	(-2.73)
Egypt	-11.024**	3.061**	-2.300***	0.386***	0.052	0.718***	-0.003**
	(-2.56)	(2.56)	(-3.04)	(3.10)	(1.01)	(2.99)	(-2.10)
Ethiopia	-0.385	0.098	-3.315	0.750	-0.108	1.931	-0.005
	(-0.09)	(0.07)	(-0.98)	(1.00)	(-0.98)	(1.55)	(-1.20)
Ghana	-1.773***	0.880***	-1.199	0.233	0.711	1.192	0.003
	(-3.64)	(2.99)	(-0.66)	(0.67)	(1.48)	(0.92)	(0.37)
Lesotho	0.817	-0.115	3.687***	-0.677***	0.074	0.765*	-0.003
	(0.32)	(-0.13)	(3.14)	(-3.07)	(0.73)	(1.90)	(-1.26)
Malawi	0.573	-0.226	-2.499	0.576	0.287***	-0.343	-0.006***
	(0.62)	(-0.49)	(-0.70)	(0.74)	(4.04)	(-0.57)	(-3.24)
Mauritius	0.509	-0.110	-5.707*	0.828*	1.448***	3.668***	0.003
	(0.08)	(-0.07)	(-1.71)	(1.75)	(3.94)	(5.75)	(0.82)
Morocco	-0.831**	0.231**	-1.484***	0.229***	0.072	0.393***	0.005***
	(-2.56)	(2.23)	(5.07)	(4.92)	(1.42)	(4.41)	(5.40)
Nigeria	-0.250	0.042	-0.448	0.074	0.074	0.033	0.003
	(-0.44)	(0.17)	(-1.36)	(1.09)	(0.76)	(0.04)	(1.20)
Rwanda	5.446***	-2.778***	-2.293**	0.459**	-0.008	1.084***	0.017***
	(-4.85)	(-4.82)	(-2.40)	(2.31)	(-0.18)	(2.95)	(20.58)
South Africa	-2.789***	0.851***	0.035	-0.004	-0.003	-0.138***	0.0002*
	(-2.89)	(2.96)	(0.20)	(-0.18)	(--0.12)	(-3.02)	(1.71)
Tunisia	-5.625**	1.721**	-0.456	0.055	-0.019	1.182***	0.002
	(-2.18)	(2.15)	(-0.89)	(0.72)	(-0.17)	(5.31)	(1.24)
Uganda	-1.296***	0.892***	-0.992	0.198	-0.054	1.322	-0.006
	(-3.78)	(3.57)	(-0.55)	(0.52)	(-0.53)	(1.36)	(-1.28)
No of countries	14	14	14	14	14	14	
Total of obs	322	322	322	322	322	322	
Diagnostic test							
Pesaran xtcd test:-0.18P-value:0.861							
PESCADF test: Z(t-bar): -9.37P-value: 0.00							
RMSE:0.009							

Note: t-stats are in brackets, ***,** and* represent 1%, 5% and 10% respectively

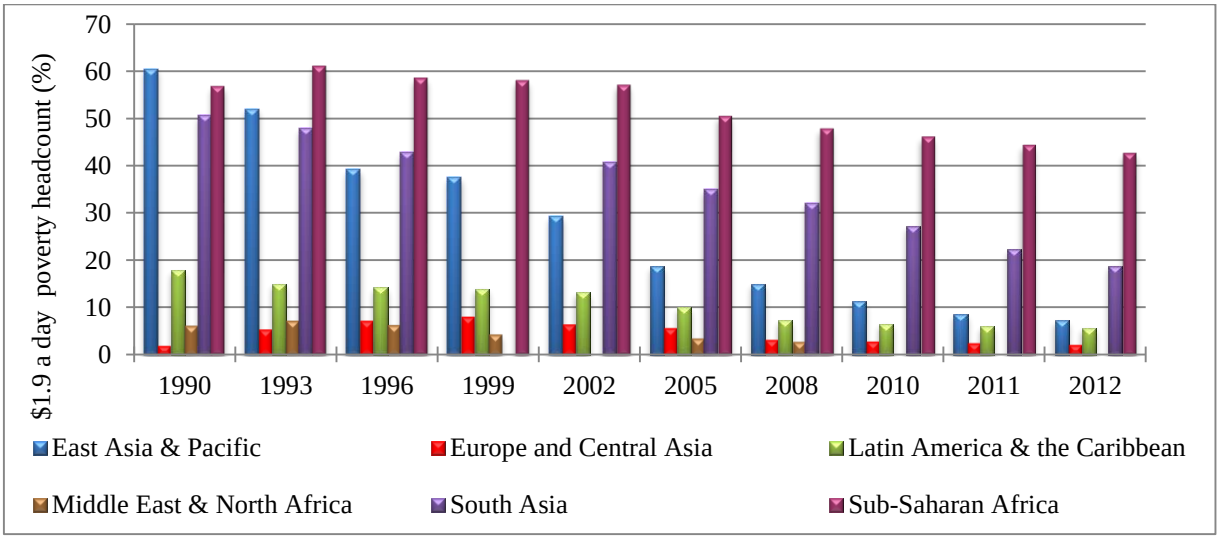
Source: By Authors

Table 5: Financial inclusion

Countries	2011 Account	40%poorest	60% richest	2014 Account	40% poorest	60% richest
Botswana	30.26	16.13	39.87	51.96	33.52	59.82
Côte d'Ivoire				34.32	6.41	20.96
Egypt	9.72	3.99	13.56	14.13	4.97	19.53
Ethiopia				21.79	15.93	25.70
Ghana	29.43	16.67	38.10	40.51	24.35	41.55
Lesotho	18.50	9.60	24.65			
Malawi	16.54	10.75	20.46	18.09	9.61	20.58
Mauritania	17.46	8.49	23.25	22.87	9.93	27.66
Mauritius	80.12	69.95	86.90	82.21	71.42	89.33
Morocco	39.07	27.28	47.40			
Nigeria	29.67	12.82	40.91	44.44	33.81	51.46
Rwanda	32.76	32.04	33.25	42.12	14.65	54.85
South Africa	53.65	38.79	63.64	70.32	56.47	77.32
Tunisia				27.43	17.20	33.91
Uganda	20.46	10.91	27.07	44.45	13.52	37.39

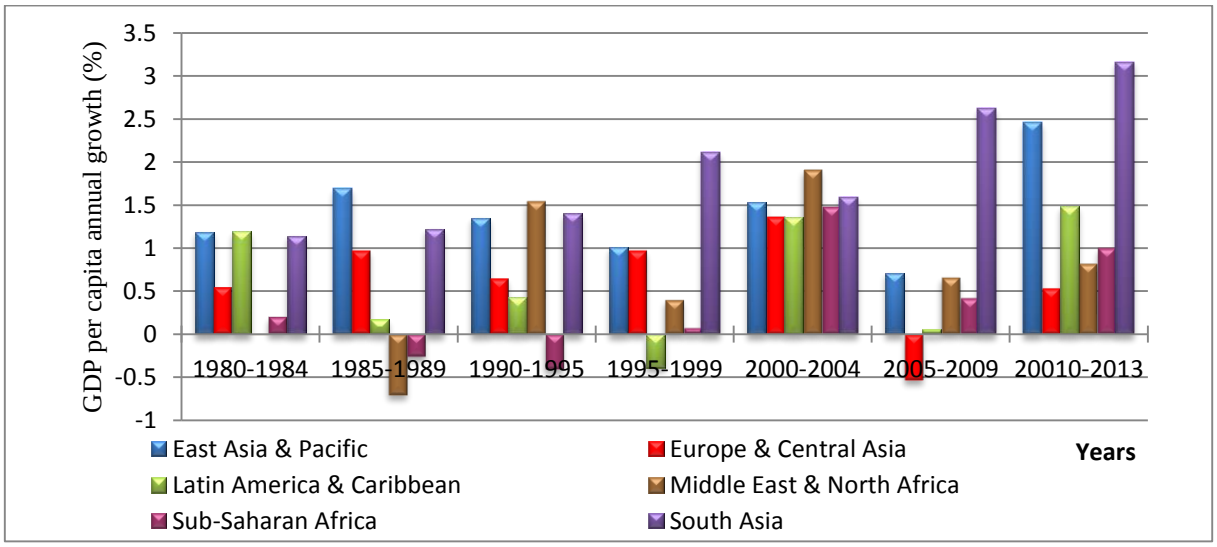
Source: Global Findex, 2014

Figure 1: Poverty headcount ratio at $1.9 a day (PPP) (% of population)



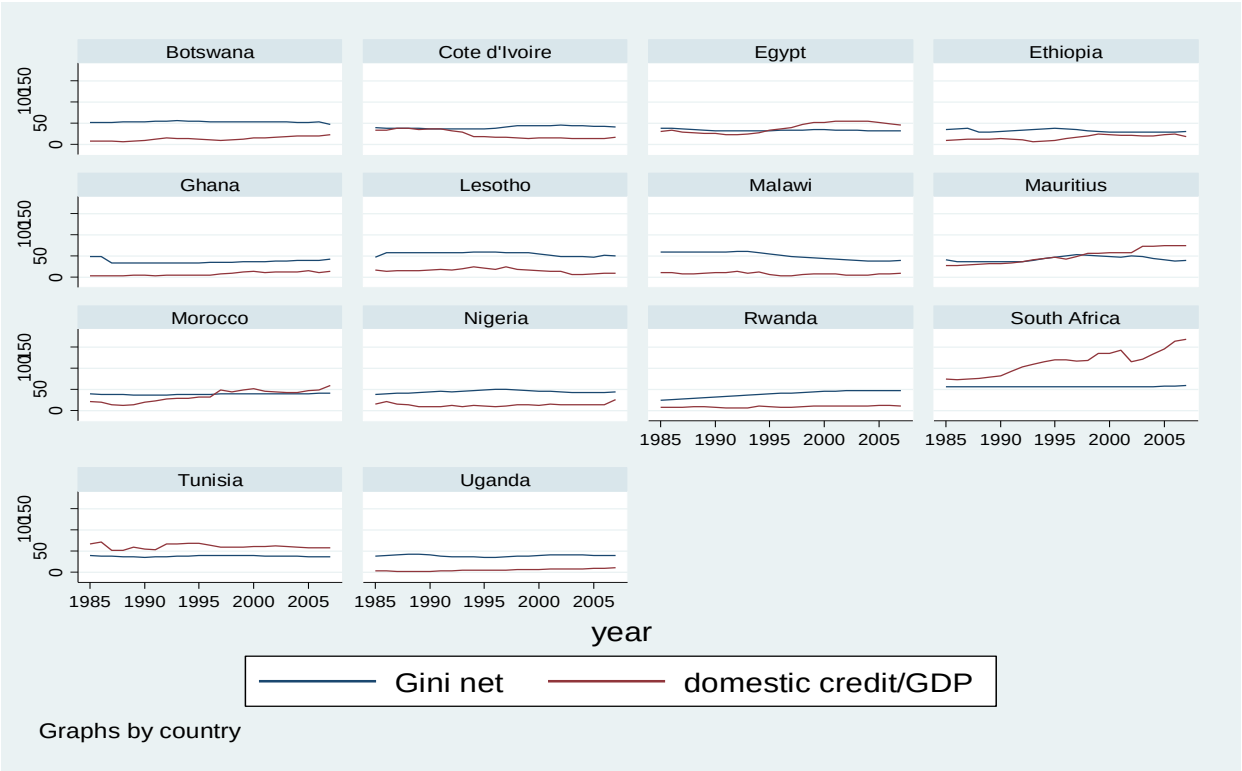
Source: PovcalNet

Figure 2: Relative standards of living of SSA and other regions: 1980-2013



Source: World Development Indicators, 2015

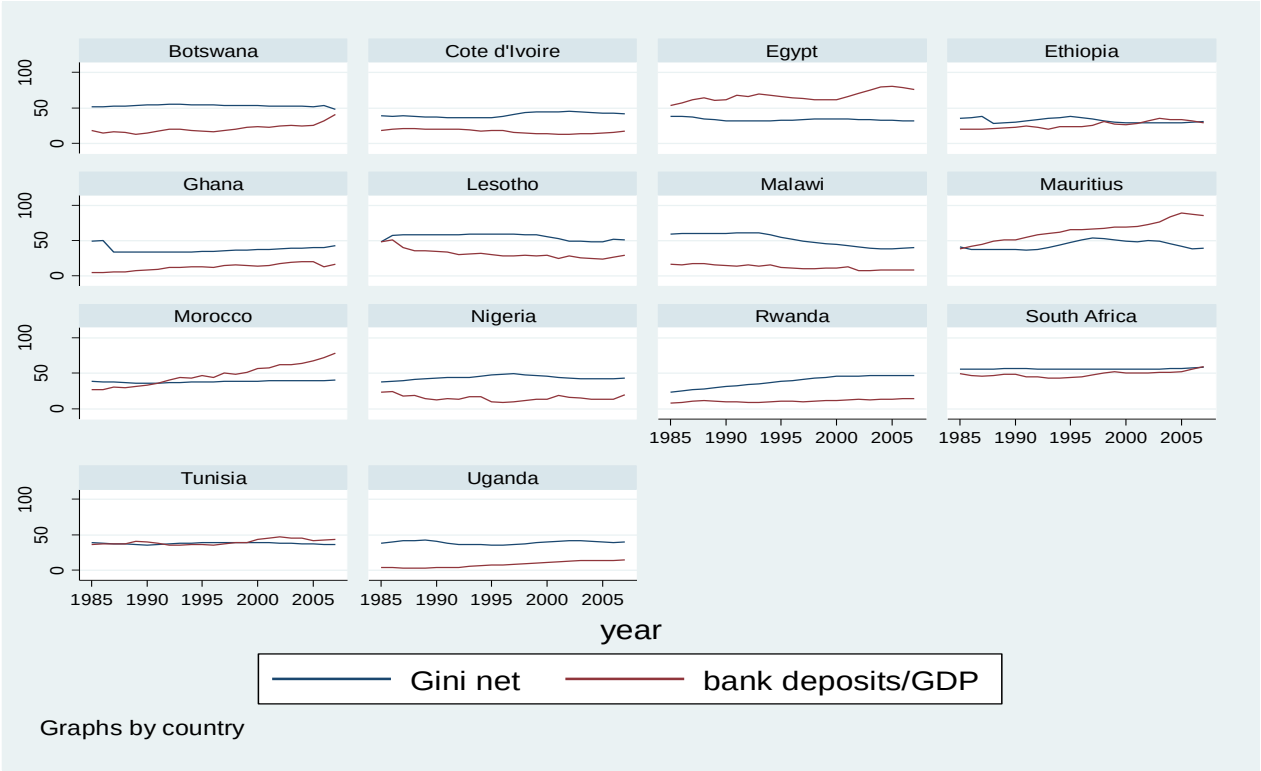
Figure 3: Gini net[1] and domestic credit to GDP



Source: SWIID Version 4.1 created by Solt, 2009

[1]Gini net is the estimate of Gini index of inequality in equalised household disposable income post tax and post transfers, and Gini market (gross) is the estimate of Gini index of inequality in equalised household market (pre-tax and pre-transfer) income using Luxembourg Income study data as the standard (Solt, 2014, pp. 2)

Figure 4: Gini net and bank deposits/GDP



Source: SWIID Version 4.1 created by Solt, 2009