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The relationship between financial inclusion and income inequality in sub-Saharan Africa: Evidence from disaggregated data

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Abstract

Over two decades sub-Saharan Africa has grown by an average of 4.8 percent per annum, a trend called "Africa rising in the literature" but this robust economic growth has benefited only a minority of elite individuals as poverty in the region remains high and income inequality continues to rise. This study analyses the relationship between various aspects of financial inclusion and income inequality in sub-Saharan African using the World Bank Global Findex 2011 with the intention to determine which aspects of financial inclusion have the greatest effect on income inequality. Our results show that account use for business, electronic payments and formal savings have a positive relationship with income inequality. This possibly reflects colonial institutional design as Obeng-Odoom (2016) indicated that colonial administration left behind uneven development structure which in some cases are re-enforced by current urban governance practices and processes. These colonial institutions significantly define financial sector development and shape the distribution of economic opportunities. Thus, we argue that though account ownership has improved, it does not necessarily imply an increase in credit accessibility. This is because of problems of information asymmetry associated with lack of financial infrastructure in the region that encourages banks to hold excess liquidity and thus grant fewer loans. The study accordingly recommends genuine efforts to engage in democratic governance to improve the quality and functioning of institutions to support financial sector development. Furthermore, a holistic approach to development that involves both top-down and bottom-up is recommended to encourage participation by all the sectors of the economy.

Keywords: Financial inclusion; Financial institutions; Financial services; Welfare and poverty.

1. Introduction

Over the past one-and-a-half decades, sub-Saharan Africa (SSA) has experienced robust economic growth with six countries in the region being among the ten fastest growing countries in the world (AfDB, 2012). This positive growth trend has replaced the negative image of a '*hopeless continent*' with a new term: '*Africa on the rise*' (Obeng-Odoom, 2015). However, wellbeing of Africans has not really improved as the robust economic growth seems to have mainly benefited a few wealthy elites. International headcount poverty ratio measured less than $1.25 a day only declined from 52.75 percent in 1981 to 46.85 percent in 2011 while income inequality has been rising (PovcalNet, 2014). This is likely attributed to reduction in rural poverty while urban poverty in Africa continues to rise (Obeng-Odoom, 2016) and to a lack of financial inclusion[1] (Devarajan and Fengler, 2013).

Furthermore, the financial sector of SSA has remained largely exclusive despite massive transformation and globalisation characterised by cross-border banking from emerging markets and within Africa over the past two decades (Beck 2015, and Derreumaux, 2013). For example, account ownership in SSA increased from 24 percent in 2011 to 34 percent in 2014, but access to credit increased only slightly from 4.8 percent to 6 percent over the same period (Global Findex, 2014). This reflects financial underdevelopment and the existence of market imperfections such as limited competition, information asymmetry and other institutional factors such as interest rate caps that still exist in many SSA countries (Sexagaard, 2006 and Maimbo and Gallegos, 2014). International bodies such as the World Bank, the G20[2] and more than 50 national governments in developing and emerging market economies have committed to increase financial access to the world's 2.5 billion unbanked adults (AFI, 2013, p. 1). This is motivated by increasing recognition of financial inclusion as one of the drivers of inclusive economic growth as it allows households and firms to reduce their transaction costs and the risk of dealing in cash only. It also encourages the accumulation of working capital for lumpy investment through savings and the development of entrepreneurship, and engenders greater participation of the population in economic activities (AfDB, 2013, p. 25). Consequently,

[1] Financial inclusion or financial access here refers to making financial services accessible, available and affordable to everyone with a particular focus on the poor, underserved and small and medium size enterprises (SMEs).

[2] G20 means "the group of twenty" and it is an international forum for the governments and central bank governors from 19 individual countries and the European Union.

productivity may increase, creating opportunities for the unemployed to find jobs or become self-employed, thereby reducing poverty and income inequality.

In spite of its importance, the role of financial inclusion has received little empirical attention in SSA, particularly on its relationship with income inequality both at country level and across countries. Previous studies in SSA on this topic has focused on the effect of microfinance programmes on households' welfare at the micro level such as household income, business income, assets accumulation and health, education, food security and nutrition, child labour, job creation, women empowerment and housing (see Rooyen *et al*. 2012 for a systematic review). While there are some country-specific and cross-country studies on the effect of microfinance on income inequality in Africa (Copestake, 2002, Kai and Hamori, 2009, and Tchouassi, 2011), the results from these studies are not easily comparable across countries. Moreover, microfinance offers only selective financial access as opposed to access for everyone. In the developed and developing economies some evidence has been documented on the relationship between financial access and income inequality (see, for instance, Aportela, 1999, Burges and Pande, 2005, Honohan, 2007, and Beck, Levine and Levkov, 2007). These studies revealed that greater financial access reduces income inequality but such a relationship is yet to be established in SSA.

Given some evidence of financial sector development across SSA (Beck, 2015), rapid GDP growth rate but persistent poverty and rising income inequality, one crucial question that has not been answered by the existing literature is how financial access relate to income inequality? Phrased differently, what is the relationship between financial inclusion and income inequality in SSA? Financial development has received considerable research attention and, as evidenced by empirical literature on the topic, well developed financial systems are associated with higher economic growth (King and Levine, 1993 and Beck *et al*. 2007). The literature on financial development is exhaustive and a comprehensive review is documented by Levine (2005) and Aziakpono (2011). Furthermore, financial development and income inequality have been given some attention but empirical evidence on the topic remains mixed, revealing both a linear and non-linear relationship (Greenwood and Jovanovic, 1990, Galor and Zeira, 1993, Banerjee and Newman 1993, Clarke, 2006, Jalilian and Kirkpatrick, 2007 and Gwama, 2014). However, what has not been given attention is the relationship between financial inclusion and income inequality, specifically how the different aspects of financial inclusion affect income inequality.

Against this background, this study examines the relationship between financial inclusion and income inequality in 37 SSA countries using the World Bank Global Findex (2011) dataset. We employ cross-sectional regression technique in the analysis due to the nature of our data. The results show that account use for business, electronic payments and formal savings have a positive relationship with income inequality. This possibly reflect colonial institutional setting designed as Obeng-Odoom (2016) indicated that colonial administration left behind uneven development structure which in some cases are re-enforced by current urban governance practices and processes. These colonial institutions significantly influence financial sector development with British common law more favourable than French civil law and this equally shape economic opportunities (see Gwama, 2014 for details). This has led to a weak and underdeveloped financial system across sub-Saharan Africa, a situation that encourages concentration of financial services in some favoured areas and in hands of few elites. Consequently, though account ownership has improved, it does not necessarily imply an increase in credit accessibility. This is because of problems such as information asymmetry associated with lack of financial infrastructure in the region that encourages banks to hold excess liquidity and thus grant fewer loans. Our findings add to the limited existing empirical literature available within the SSA context and provide policymakers with more insights on how financial inclusion and income inequality are related.

The rest of the paper is organised as follows: Section 2 presents some stylised facts about SSA. Section 3 discusses the theoretical and empirical literature. Section 4 discusses the methodology and data sources. Section 5 reports and discusses results and Section 6 draws conclusions, makes recommendations and suggests areas for further research.

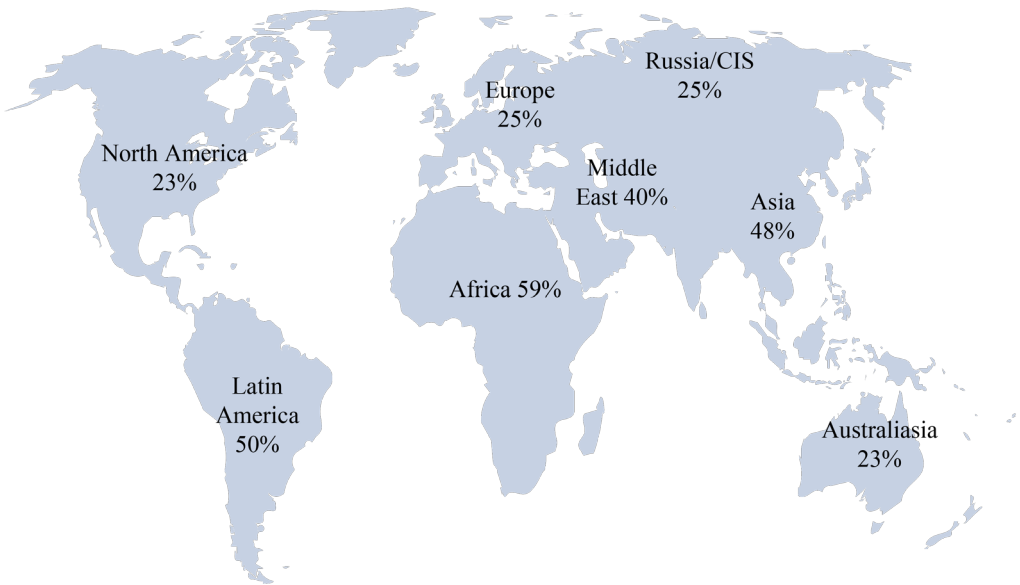
2. Stylised facts about sub-Saharan Africa

Chuhan-Pole *et al*. (2014) predict the economic growth rate for SSA in 2015-2016 to be about 5.2 percent, up from 4.6 percent in 2014, and will rise further to 5.3 percent by 2017. However, the main concern is how to ensure that such a prospective growth is inclusive as past experience has shown that economic growth seems to have historically benefited only a few elites as evidence by the high proportion of people in SSA (46.85percent as of 2011) surviving on $1.25 or less a day (PovcalNet, 2014). The resultant wealth concentration in the hands of a few individuals in the region has resulted in a millionaire growth boom. For example, it is projected that after ten years, the number of millionaires in Africa

including SSA will reach 59 percent - higher than any other region in the world (Frank, 2015). This continued increase in wealth concentration is probably the reason why income inequality keeps rising despite robust growth over two decades. See Figure 1 below.

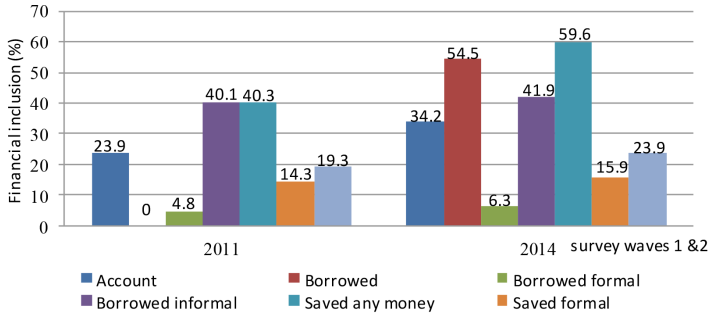
Furthermore, SSA has huge unmet demand for financial services and accordingly high potential for financial sector expansion as illustrated by Figures 2, 3 and 4. Overall, account penetration has increased from 24 percent in 2011 to 34.2 percent in 2014, although there is huge unmet demand for loans and saving facilities both by the poorest 40 percent of the population and in the rural areas. The poorest 40 percent of the population and the rural dwellers that are often excluded from the formal financial system show strong demand for borrowing and saving facilities (Figures 3 and 4). This suggests unexplored opportunities presented by the poorest and informal sector that can be harnessed to promote inclusive economic growth.

Figure 1: 10 Years predicted regional growth in millionaires



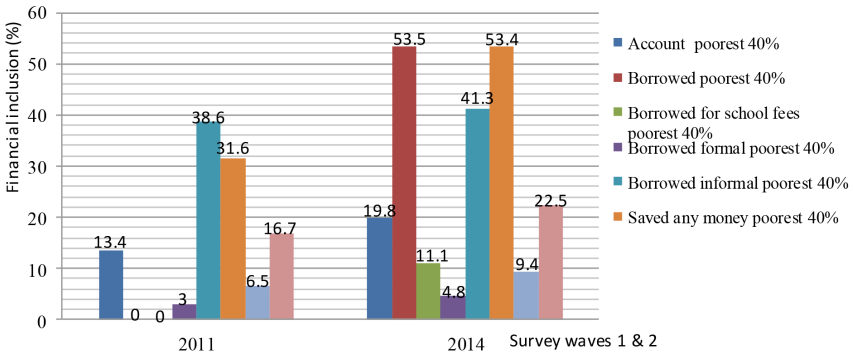
Source: Authors using data from Frank, 2015:19

FIGURE 2: ACCESS AND USE OF FINANCIAL SERVICES IN SSA



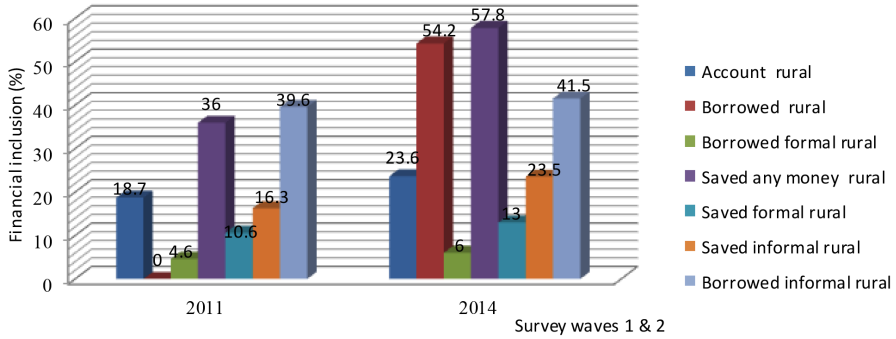
Source: Authors' calculation based on Global Findex data

FIGURE 3:THE POOREST 40PERCENT OF THE POPULATION - ACCESS AND USE OF FINANCIAL SERVICES IN SSA



Source: Authors' calculation based on Global Findex data

FIGURE 4:INFORMAL ACCESS AND USE OF FINANCIAL SERVICES IN SSA



Source: Authors' calculation based on Global Findex data

The growth potential of the informal sector has largely remained unrealised due to the sector's limited access to economic resources. As such, the current growth model in SSA, which focuses on the formal sector and is driven mainly by mining, oil and gas, is not sufficiently broad-based as it employs very few people. The Chuhan-Pole *et al*. (2014) report pointed out that such a narrow focus has serious implications for poverty reduction and that growth in the agricultural and services sectors in SSA has led to more poverty reduction than growth in industry. Thus, the integration of the informal sector, with a particular focus to increase rural agricultural productivity in order to boost rural income, will play a critical role in reducing poverty and income inequality. Such a structural transformation requires more investments in rural public goods and services such as education, health care, rural roads and electrification. The financial sector can drive this process of inclusive growth by providing financial access to all who can use it and have a need for it, in particular the poorest 40 percent and rural small and medium enterprises (SMEs).

3. Literature review

3.1. Theoretical background

3.1.1. Conceptual framework

There is no universally accepted definition of financial inclusion since the term is multidimensional by nature and varies depending on the specific agenda of countries. Generally, however, financial inclusion covers all initiatives directed towards making formal financial services available, accessible and affordable to everyone in a given society with a particular focus on those previously excluded from the formal financial sector (AfDB 2013, p. 25). This includes activities of participants in the formal and semi-formal sectors such as commercial banks, development finance institutions, post offices, microfinance banks, credit unions and financial cooperatives. The concept of financial inclusion therefore stretches beyond improving 'access to credit' to include facilitating 'access to savings', enhancing risk management and ensuring the development of an efficient financial infrastructure that allows individuals and firms to fully participate in the economy while protecting consumer rights (AfDB 2013, p. 25). See World Bank (2008); AFI (2010); ACCION (2009) and Gardeva and Rhyne (2011) for other definitions.

It worth noting that access to financial services and the actual use thereof are two distinct concepts. Some individuals may have access but decide not to

use it because of religious, cultural or other reasons. Such voluntary financial exclusion may occur as a result of indirect usage through a family member or lack of demand for financial services. Conversely, some individuals may have the need for financial services but face serious physical barriers to access and such are involuntarily excluded. Involuntary financial exclusion is a problem and can be caused by one of the followings: (i) remoteness of the places where households live, (ii) unfavourable conditions attached to financial products, (iii) the prices of the products offered are not affordable, (iv) lack of knowledge of available financial products due to a lack of marketing, and (v) self-exclusion for fear of rejection (Kempson and Whyley 1999, p. 2).

3.1.2. Financial inclusion and income inequality

According to the World Bank (2008, pp. 11 & 101), the immediate outcome of improve access to finance on income inequality is not clear cut. However, calibrated general equilibrium model suggest that direct financial access to the poor may not be the most effective channel through which finance reduces poverty and income inequality. The greatest quantitative effect of financial access on income inequality is likely to come through the indirect labour market channel. The direct effect occur if the poor and those with low incomes gain direct access to financial services in the form of, for example, a formal bank account, credit, micro-insurance and the payment system. Formal account ownership serve as entry point into the formal financial system and allows individuals to manage risk appropriately, build working capital, create a credit history through savings and smooth consumption during times of adverse shock. If accumulated savings are used for micro-enterprise development or pay for the further education of the children of the poor and those with low incomes, such savings could lower income inequality in both the present and future generations. The future generation in particular would have a better chance to secure a decent job or to become an entrepreneur, thereby breaking the cycle of poverty.

Conversely, the indirect effect of financial access on income inequality manifests itself through the labour market channel. How the labour market channel affects income inequality, however, depends on the scale of access gained, the initial economic conditions and labour productivity. If wider financial access is gained, the effect on income inequality would be spread over a larger population and its effect may start to materialise almost immediately. Wider access to financial services entails increased competition within financial intermediaries, which in turn is likely to reduce intermediation costs and improve access to credit for

potential entrepreneurs. This encourages new start-ups by talented but poor entrepreneurs who without access will not be able to develop and flourish. Over time this is likely to increase productivity as the new entrants use their new fortunes to create jobs through the expansion of their businesses (Klapper, Laeven and Rajan, 2006). As new entrepreneurs gain increased access to credit, the short-run increase in income inequality may be minimal. Alternatively, income inequality will widen in the short run if only a few entrepreneurs gain access since the entrepreneur experiences an immediate boost in income which his/her neighbours may not experience (World Bank, 2008). However, in the long run, income inequality will gradually decline as the entrepreneurs create more jobs and offer better wages. To this end, Gine and Townsend (2004) in the case of Thailand used general equilibrium models with micro data that account for the labour market effects to suggest that the most pertinent effect of financial access has on income inequality is not through direct access to credit by the poor, but through labour market effects. In other words, increased wages as a result of competition and the inclusion of a greater proportion of the population into the formal economy have a greater effect on income inequality.

Thus, in the absence of financial market imperfections, individuals with the greatest entrepreneurial ability will gain access to credit to finance their projects, suggesting that entrepreneurial activity will be defined as a function of ability and not parental wealth. Thus, the return on investment for entrepreneurship will be a function of how the business idea was articulated and executed and not on dynastic assets. In such a situation the resources of the society will be channelled to talented and innovative individuals and not to those with the most assets historically (Demirgüç-Kunt and Levine 2009). Hence, when financial markets are competitive and efficient, individual occupational choices to become either wage earners or entrepreneurs are determined by talent and not dynastic assets (Banerjee and Newman 1993).

This theoretical exposition suggests that the effect of financial inclusion on income inequality may be positive in the short run. However, depending on the distribution of entrepreneurial ability, wealth and the productivity of labour and capital, income inequality will fall in the long run. Since the desired effect on income inequality can only be observed over the long run, it is possible that financial inclusion may increase income inequality in the short run, particularly when the financial sector is highly exclusive.

3.1.3. Empirical literature

While early evidence (Beck *et al*. 2007) suggest that financial inclusion reduces poverty and income inequality, such evidence is still in its infancy. A very limited number of empirical studies examine the effect of financial inclusion on income inequality. In the interest of readability, the literature review will be divided into two sections: African studies and studies outside Africa. Furthermore, since there are limited empirical studies on the effects of financial access on income inequality, the literature review will also include some relevant country-specific studies that examine the effect of financial access on household income.

At the time of writing, just three empirical studies were found that examined the effect of microfinance on income inequality in Africa (Copestake, 2002, Kai and Hamori, 2009 and Tchouassi, 2011). The conventional belief from the donor community is that by improving access to finance for the poor, microfinance reduces market distortion which, in turn, reduces income inequality. However, because of the quest to achieve financial sustainability, microfinance can both reduce and increase income inequality. Copestake (2002), following this line of argument, developed a group base lending model to examine the divergent effects of the Christian Enterprise Trust of Zambia microcredit scheme operated on the Zambian Copperbelt on income distribution. The author regressed the real household income per adult equivalent against the value of the loan before multiplying the answer by a dummy set of one for households below the poverty line, and zero for those above the poverty line. The results suggest that access to loans exert a significantly greater impact on those below the poverty line compared to those above it. Moreover, the overall evidence reveals that the effect of microcredit varies depending on who gets a loan, who graduates to bigger loan, who drops from the programme as well as the dynamism of the group. This implies that microfinance has a polarising effect on income inequality.

Furthermore, Tchouassi (2011) also examined the effect of microfinance on income inequality and vulnerability in eleven central African countries. The author used the degree of microfinance intensity to capture the effect of microfinance on inequality and employed Ordinary Least Square (OLS) and random effect. The results show that a dense network of microfinance reduces income inequality. This finding corroborates the results of Kai and Hamori (2009), who employed the same methodology for 61 developing countries, including African countries, to examine the effect of microfinance on income inequality. These two studies suggest that a denser network of microfinance institutions reduces income inequality.

The lack of access to financial services – such as a basic bank account – experienced by the rural poor has been identified as a major limitation to accumulating assets, smoothing consumption and investing in the education of their children. This has resulted in an ever-growing income inequality between the rich and the poor. Allen *et al*. (2012) used household surveys and bank penetration data at district level in 2006 and 2009 to explore the effect of Equity Bank's branch expansion in rural Kenya. Using OLS, ordered probit model and Generalised Method of Moment (GMM) to control for endogeneity, the results show that Equity Bank's branch expansion into underserved rural districts had the greatest effect on low income households with no salaried job, who had lower than secondary education and who were homeless. The study further revealed that the penetration of Equity Bank into rural areas increased the chances of having a bank account and securing a loan by 4 and 1 percentage points respectively. Dupas and Robinson (2013) also found that the use of a commitment saving account increased the average daily investment for market women in the treatment group by 38 percent to 56 percent after four to six months compared to market women without the commitment saving account. Furthermore, evidence showed that the electronic platform created by mobile phone based money transfer (M-Pesa) has a second round of indirect effects on income inequality through domestic and international remittances, job creation, risk sharing and management as well as subsidiary businesses that have developed to use the platform (Aker and Mbiti, 2010, Mbiti and Weil, 2011, Ondiege, 2013, Buku and Meredith, 2013 and Jack and Suri, 2014). This confirms that the availability of access can either have a direct or indirect effect on income inequality.

The Mzansi account implemented in South Africa's commercial banks to correct the injustice of the previous government is another suitable example of promoting access to financial services. Using the financial diaries dataset, the Bankable Frontier Associates (2010) construct a set of indictors to describe changes in saving behaviour and usage, accumulation within a month as a ratio of monthly income, and monthly balances as a ratio of total financial assets. They measure changes to these indicators for other instruments such as retirement annuities and informal instruments. Their results revealed an overall increase in income across the financial diary sample from 2004 to 2009 when the effect of inflation is taken into account. The median per capita income of households in the sample increases by 2.4 percent on average adjusted for inflation but this increase varies across sample sites. Evidence suggests this increase in per capita income raises the overall monthly saving rate in the sample from 20 percent of

income in 2004 to 23 percent of income in 2009, while the frequency of bank use increases on average from 2.9 to 5 transactions per month. In terms of bank balances, per capita income increases from 33 to 48 percent of financial assets in 2004 and 2009 respectively, whereas saving 'under the mattress' declines slightly from 19.3 to 17 percent of financial assets over the same period. However, the evidence is not strong enough to attribute the entire increase in formal financial use to the Mzansi account offering only. Also in the South African context, Karlan and Zinman (2007) confirmed that access to consumer credit for households whose applications had previously been rejected significantly improved welfare. Households in the treatment group were more likely to retain their jobs, increase income, and improve food consumption quality and quantity than the control group.

Country-specific studies outside Africa have produced similar results, particularly on the extension of financial services and physical access such as rural bank branch expansion into rural areas. For instance, the Mexican Saving Institute and Banco Aztco of Mexico's expansion into rural areas in the late 1990s and early 2000s increased average savings of low-income earners by 3 to 5 percent and informal business growth by 7 percent (Aportela, 1999 and Bruhn and Love, 2013). Burgess and Pande (2005) found similar results in India using evidence from the Indian social banking experiment. They employed regression analysis using two dependent variables: headcount poverty and rural agricultural wages, with their results showing that for every additional bank branch opened in a rural location, it lowers the headcount poverty ratio by 4.10 percentage points per 100,000 adults. The evidence suggests that easy access to loans encourages long-term investments, which in turn increases wages for rural agricultural labourers.

In a cross-country study, Honohan (2007) examined variation in households' access to financial services by constructing new access indicators using information from commercial banks and microfinance institutions. The new access indicator is then used to examine its effect on income inequality. The results from OLS estimation suggest that the access indicator is strongly correlated with income inequality as measured by the Gini coefficient, suggesting that countries with better financial access have lower income inequality. Similarly, Beck, Levine and Levkov (2007) and Bae, Han and Sohn (2012) found that liberalising the intrastate bank branching restriction in the United States reduced income inequality. More specifically, bank branch deregulation reduced income inequality by improving the incomes of lower income workers

because deregulation increased bank efficiency, which in turn enhanced the per capita income growth rate of each state. Similarly, Mookerjee and Kalipioni (2010) found in a cross-country study that a higher number of bank branches per 100,000 adults reduced income inequality.

Park and Mercado (2015) and García-Herrero and Turégano (2015) recently examined whether financial inclusion contributes to reducing income inequality. The former constructed a financial inclusion index which they used to examine the relationship between poverty and income inequality in developing Asia. Their results show that financial inclusion reduces poverty and also lowers income inequality. Meanwhile, the latter measured financial inclusion from various dimensions such as adults with bank accounts, credit to SMEs as percentage of GDP as well as using Honohan's (2007) access indicator and Sarma's (2012) financial inclusion index. After controlling for a host of other factors, their results also revealed that financial inclusion reduced income inequality, whereas private sector credit to GDP did not after controlling for the effect of fiscal policy and economic development.

However, Randomised Control Trials (RCT) seems not to support these positive effects of access to finance on welfare. For example, there are allegations of increase suicide attempts in India linked to over-indebtedness of microfinance participants (Duflo *et al*. 2013). Specifically, empirical updates of the Spandana study, Hyderabad in India show no improvement in the welfare of participants. Fifteen to eighteen months after gaining access, households are less likely to be entrepreneurs but they invest more in existing businesses. Moreover, average profit increased only for businesses that had already been established before the launch of the microcredit programme, and the increases generally concentrate on bigger businesses (Duflo *et al.* 2013). This suggests widening income inequality.

From the foregoing review one can draw the following conclusions: first, there is no empirical cross-country evidence at the macro level in the African context on the relationship between financial inclusion and income inequality, although a few micro-level studies exist. Second, available country-specific and cross-country studies on access consistently show that greater access to financial services, such as saving and bank branch extension into rural areas, reduces income inequality. However, RCT studies focusing on microfinance challenged these results. Thus, there is a considerable gap at the macro level on the relationship between financial inclusion and income inequality in SSA, and this accordingly deserves attention giving the rising level of income inequality

in the face of the robust economic growth rate achieved by the region over the last two decades.

4. Methodology

4.1. Model specification

This study is based on the World Bank Global Findex (2011) database and as such employs a cross-sectional regression technique in the analysis. We adopt the specification of Clarke *et al.* (2006, pp. 584) with some modification and specify the equation as:

$$\text{LogGini}\ (y_i) = \alpha + \beta_1 \text{financial inclusion} + \beta_2 \text{controls} + \varepsilon_i \qquad (1)$$

where y_i measures income inequality, β_1 is the coefficient of financial inclusion, β_2 represents the coefficients of the control variables and ε_i is the white noise error term. We employ seven aspects of financial inclusion, namely: account ownership, account use for business, electronic payment, loans from formal financial institutions, formal loans to pay school fees, health insurance and formal savings[3]. These aspects are also disaggregated according to gender and locality (rural and urban). We expect the coefficient of β_1 to be negative suggesting greater financial inclusion reduces income inequality. However, the coefficient of β_1 can also be positive, particularly in SSA where evidence of excess liquidity has been documented (Saxegaard, 2006 and Asongu, 2014). This is reinforced by the existence of institutional factors such as interest rate caps (Maimbo and Gallegos, 2014). Interest rate caps provide incentives for banks to hold excess liquidity because lending may not be profitable enough to cover the costs and concomitant risk. Among the control variables used are governance index, derived using a principal component analysis from six governance indicators[4] to capture the effect of institutions. The inflation rate to condition for the effect of the macroeconomic environment since high inflation hurts the poor more than the rich as the latter can hedge their exposure. The gross national income (GNI) per capita and GDP per capita annual growth (GDPPKG) rate are used to control for mean income and economic growth rate respectively. We also use mean years of schooling to control for the effect of education. Finally, expenditure on health and assets to condition for the effect of public sector spending on basic health care and non-financial assets accumulation respectively. Financial

[3] See Appendix A3 for a detailed description of the variables.

[4] Control of corruption, voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality and rule of law.

inclusion data are accessed from the Global Findex (2011), mean years of school and income inequality from UNDP (2011) and the other variables from World Bank Development Indicators (2014). Simple correlation analysis is then performed to determine correlated variables and highly correlated variables are not included in the same model (see Table 1 below for details). We also control for heteroscedasticity by using robust standard error options in the estimation of all the models. We only report models that are significant with R-squared equal to or greater than 20 per cent.

Table 1: Correlation Coefficients between the Control Variables

Variables	**Assets**	**GDPPKG**	**Governance Index**	**Health Expenditure**	**Human Capital**	**Inflation**	**Log GNI**
Assets	1.000	-0.436	0.287*	0.077	-0.083	-0.655***	0.025
Prob	------	0.007**	0.085	0.649	0.622	0.000	0.885
GDPPKG	-0.436**	1.00	0.113	0.174	-0.001	0.400*	-0179
Prob	0.007	-----	0.506	0.304	0.996	0.014	0.289
Governance Index	0.287*	0.113	1.00	0.477**	0.425**	-0.319*	0.478**
Prob	0.085	0.506	-----	0.003	0.009	0.055	0.003
Health Expenditure	0.077	0.174	0.477**	1.00	0.208	-0.186	0.099
Prob	0.649	0.304	0.003	----	0.217	0.271	0.562
Human capital	-0.084	-0.001	0.425**	0.208	1.00	0.179	0.669***
Prob	0.622	0.996	0.009	0.217	----	0.288	0.000
Inflation	-0.655***	0.400*	-0.319*	-0.186	0.179	1.00	-0.130
Prob	0.000	0.014	0.055	0.271	0.288	-----	0.445
Log GNI	0.025	-0.179	0.478**	0.099	0.669***	-0130	1.000
Prob	0.885	0.289	0.003	0.562	0.000	0.445	-----

Notes: ***, **, * denotes significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By authors

TABLE 2: ACCOUNT USE FOR BUSINESS AND LOG GINI COEFFICIENT AS DEPENDENT VARIABLE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Account for business	0.011[a]	0.011[b]	0.010[b]	0.010[a]	0.010[b]					
	[3.14]	[2.61]	(2.31)	[3.23]	[2.53]					
Business female						0.016[a]	0.016[a]	0.015[a]	0.014[a]	0.014[a]
						[3.33]	[2.85]	[2.81]	[3.42]	[2.72]
Log GNI	0.036		0.038	0.04		0.033		0.035	0.039	
	[1.23]		[1.19]	[1.44]		[1.24]		[1.14]	[1.51]	
GDPPKG	-0.003	-0.004	-0.001			-0.004	-0.004	-0.002		
	[-0.94]	[-1.07]	[-0.27]			[-1.19]	[-1.37]	[-0.46]		
Inflation	0.000	0.000	0.000			0.000	0.000	0.000		
	[0.74]	[0.34]	[-0.01]			[0.61]	[0.22]	[-0.15]		
Health expenditure	0.016[b]	0.014[b]		0.013[b]	0.012[b]	0.015[b]	0.014[b]		0.012[b]	0.011[c]
	[2.37]	[2.19]		[2.36]	[2.12]	[2.30]	[2.08]		[2.23]	[1.95]
Logtrade	0.015	0.013	0.055	0.020	0.017	0.020	0.019	0.056	0.026	0.023
	[0.24]	[0.22]	[0.80]	[0.31]	[0.28]	[0.32]	[0.33]	[0.81]	[0.37]	[0.37]
Education		0.006			0.008		0.005			0.007
		[1.15]			[1.38]		[0.99]			[1.27]
Governance index			0.001					0.000		
			[0.06]					[0.05]		
Log assets				-0.009	0.000				-0.005	0.004
				[-0.73]	[0.00]				[-0.35]	[0.31]
Constant	1.42[a]	1.51[a]	1.39[a]	1.42[a]	1.50[a]	1.42[a]	1.49[a]	1.39[a]	1.40[a]	1.48[a]
	[11.04]	[15.07]	[10.24]	[9.54]	[11.69]	[12.09]	[15.22]	[10.90]	[9.99]	[11.60]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.36	0.35	0.28	0.35	0.33	0.41	0.39	0.33	0.39	0.37
F-stats	4.67	4.65	3.38	10.55	12.87	6.09	5.79	4.01	11.21	14.06

Notes: t statistics are in brackets; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By authors

Table 2: Account use for business and Log Gini Coefficient as dependent variable (cont)

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Business male	0.006[a]	0.006[b]	0.005[c]	0.006[b]	0.005[b]					
	[2.65]	[2.24]	[1.73]	[2.57]	[2.08]					
Business rural						0.009[a]	0.009[b]	0.009[b]	0.008[a]	0.007[b]
						[2.82]	[2.58]	[2.03]	[2.63]	[2.31]
Log GNI	0.041		0.042	0.043		0.041		0.043	0.046	
	[1.32]		[1.24]	[1.46]		[1.33]		[1.27]	[1.54]	
GDPPKG	-0.003	-0.003	-0.001			-0.004	-0.004	-0.002		
	[-0.69]	[-0.79]	[-.13]			[-1.00]	[-1.13]	[-0.40]		
Inflation	0.001	0.000	0.000			0.000	0.000	0.000		
	[0.92]	[0.46]	[0.21]			[0.70]	[0.22]	[-0.02]		
Health expenditure	0.016[b]	0.014[b]		0.014[b]	0.012[b]	0.014[b]	0.013[c]		0.012[b]	0.011[c]
	[2.26]	[2.08]		[2.30]	[2.07]	[2.08]	[1.87]		[2.00]	[1.75]
Logtrade	0.021	0.017	0.062	0.025	0.020	0.024	0.019	0.060	0.033	0.025
	[0.32]	[0.27]	[0.90]	[0.38]	[0.30]	[-0.37]	[0.30]	[0.85]	[0.47]	[0.38]
Education		0.008			0.009		0.008			0.009[c]
		[1.48]			[1.62]		[1.54]			[1.78]
Governance index			0.001					0.000		
			[0.14]					[0.03]		
Log assets				-0.015	-0.004				-0.007	0.003
				[-1.17]	[-0.32]				[-0.53]	[0.26]
Constant	1.41[a]	1.51[a]	1.37[a]	1.43[a]	1.51[a]	1.40[a]	1.51[a]	1.37[a]	1.40[a]	1.49[a]
	[10.21]	[14.49]	[9.70]	[9.15]	[11.55]	[10.28]	[14.71]	[9.87]	[8.86]	[11.31]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.32	0.31	0.23	0.31	0.3	0.33	0.32	0.25	0.31	0.3
F-stats	3.98	4.29	2.54	10.22	12.2	4.75	5.44	3.7	9.7	12.34

Notes: t statistics are in brackets; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By author

TABLE 3: ELECTRONIC PAYMENT AND LOG GINI COEFFICIENT AS DEPENDENT VARIABLE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Electronic payment	0.005[b]	0.006[a]	0.006[b]	0.005[b]	0.006[a]					
	[2.03]	[2.83]	[2.23]	[2.08]	[2.80]					
Female						0.006[b]	0.007[a]	0.006[b]	0.006[b]	0.007[a]
						[2.32]	[3.51]	[2.40]	[2.37]	[3.42]
Log GNI	0.029		0.027	0.029		0.033		0.028	0.032	
	[0.93]		[0.79]	[0.97]		[1.11]		[0.85]	[1.15]	
GDPPKG	-0.001	-0.001	0.000			-0.001	-0.001	0.000		
	[-0.33]	[-0.27]	[0.08]			[-0.27]	[-0.20]	[0.08]		
Inflation	0.001	0.000	0.000			0.001	0.000	0.000		
	[0.82]	[0.29]	[0.18]			[0.84]	[0.24]	[0.26]		
Health expenditure	0.013[c]	0.011		0.012[c]	0.010[c]	0.013[c]	0.010		0.012[b]	0.010[c]
	[1.78]	[1.47]		[1.93]	[1.64]	[1.81]	[1.47]		[1.98]	[1.65]
Logtrade	0.031	0.008	0.060	0.030	0.006	0.031	0.007	0.060	0.030	0.004
	[0.45]	[0.13]	(0.91)	[0.45]	[0.10]	[0.46]	[0.11]	[0.92]	[0.45]	[0.07]
Education		0.009[b]			0.009[b]		0.010[b]			0.010[b]
		[2.00]			[2.00]		[2.25]			[2.20]
Governance index			0.001					0.002		
			[0.14]					[0.26]		
Log assets				-0.018	-0.008				-0.019	-0.008
				[-1.43]	[-0.59]				[-1.59]	[-0.65]
Constant	1.44[a]	1.54[a]	1.43[a]	1.49[a]	1.56[a]	1.43[a]	1.54[a]	1.43[a]	1.48[a]	1.56[a]
	[10.09]	[14.74]	[9.93]	[9.57]	[12.16]	[10.54]	[15.12]	[10.16]	[9.92]	[12.52]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.32	0.36	0.26	0.32	0.36	0.34	0.38	0.29	0.34	0.38
F-stats	3.84	4.74	2.60	9.56	12.66	4.37	5.73	3.33	9.40	12.46

Notes: t statistics in parentheses; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By authors

Table 3: Electronic payment and Log Gini Coefficient as dependent variable (cont)

	(11)	(12)	(13)	(14)	(15)
Rural area	0.005[c]	0.006[b]	0.005[c]	0.005[c]	0.006[b]
	[1.79]	[2.57]	[1.84]	[1.83]	[2.52]
Log GNI	0.035		0.031	0.035	
	[1.12]		[0.93]	[1.19]	
GDPPKG	-0.001	-0.001	0.000		
	[-0.37]	[-0.33]	[0.00]		
Inflation	0.001	0.000	0.000		
	[0.80]	[0.18]	[0.23]		
Health expenditure	0.014[c]	0.011		0.013[b]	0.011[c]
	[1.84]	[1.53]		[1.99]	[1.70]
Logtrade	0.031	0.005	0.063	0.032	0.004
	[0.43]	[0.08]	[0.92]	[0.46]	[0.07]
Education		0.010[b]			0.011[b]
		[2.19]			[2.19]
Governance index			0.002		
			[0.25]		
Log assets				-0.016	-0.003
				[-1.20]	[-0.24]
Constant	1.42[a]	1.54[a]	1.41[a]	1.46[a]	1.55[a]
	[9.77]	[14.31]	[9.82]	[9.31]	[11.80]
N	37	37	37	37	37
R-square	0.312	0.35	0.25	0.31	0.35
F-stats	3.75	4.64	2.19	9.15	12.29

Notes: t statistics are inparenthesis; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By author

TABLE 4: FORMAL SAVING AND LOG GINI COEFFICIENT AS DEPENDENT VARIABLE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Saving formal	0.004[b]	0.005[c]	0.005[c]	0.004[c]	0.004					
	[2.31]	[1.95]	[1.94]	[1.84]	[1.57]					
Saving female						0.004[b]	0.005[c]	0.005[c]	0.004[c]	0.004
						[2.31]	[1.95]	[1.94]	[1.84]	[1.57]
Log GNI	0.018		0.025	0.027		0.018		0.025	0.027	
	[0.64]		[0.86]	[1.03]		[0.64]		[0.86]	[1.03]	
GDPPKG	-0.004	-0.005	-0.002			-0.005	-0.005	-0.002		
	[-1.22]	[-1.33]	[-0.49]			[-1.22]	[-1.33]	[-0.49]		
Inflation	0.001	0.000	0.000			0.001	0.000	0.000		
	[0.95]	[0.74]	[-0.10]			[0.95]	[0.74]	[-0.10]		
Health expenditure	0.014[c]	0.013[c]		0.011[c]	0.011[c]	0.014[c]	0.013[c]		0.011[c]	0.011[c]
	[1.94]	[1.85]		(1.87)	[1.69]	[1.94]	[1.85]		[1.87]	[1.69]
Logtrade	0.029	0.026	0.059	0.034	0.029	0.029	0.026	0.059	0.034	0.029
	[0.50]	[0.45]	[0.92]	[0.55]	(0.46)	[0.50]	[0.45]	[0.92]	[0.55]	[0.46]
Education		0.004			0.006		0.004			0.007
		[0.66]			[1.01]		[0.66]			[1.01]
Governance index			-0.004					-0.004		
			[-0.39]					[-0.39]		
Log assets				-0.015	-0.008				-0.015	-0.008
				[-1.05]	[-0.52]				[-1.05]	[-0.52]
Constant	1.46[a]	1.50[a]	1.42[a]	1.46[a]	1.52[a]	1.46[a]	1.50[a]	1.42[a]	1.46[a]	1.52[a]
	[10.78]	[15.08]	[10.27]	[9.29]	[11.34]	[10.76]	[15.08]	[10.27]	[9.29]	[11.34]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.36	0.35	0.29	0.33	0.33	0.36	0.35	0.29	0.33	0.33
F-stats	4.09	4.19	2.53	11.42	12.74	4.09	4.19	2.53	11.42	12.74

Notes: t statistics in parentheses; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By authors

Table 4: Formal saving and Log Gini Coefficient as dependent variable (cont)

	(11)	(12)	(13)	(14)	(15)
Saving rural area	0.004[b]	0.004[b]	0.005[b]	0.003[c]	0.003[c]
	[2.37]	[2.09]	[2.11]	[1.88]	[1.70]
Log GNI	0.026		0.033	0.033	
	[0.96]		[1.14]	[1.25]	
GDPPKG	-0.004	-0.004	-0.002		
	[-1.16]	[-1.27]	[-0.45]		
Inflation	0.001	0.000	0.000		
	[0.93]	[0.62]	[-0.07]		
Health expenditure	0.013[c]	0.012[c]		0.011[c]	0.01[c]
	[1.91]	[1.78]		[1.85]	[1.65]
Logtrade	0.035	0.029	0.064	0.038	0.03
	[0.59]	[0.50]	[1.00]	[0.61]	[0.49]
Education		0.005			0.007
		[1.11]			[1.36]
Governance index			-0.004		
			[-0.38]		
Log assets				-0.016	-0.007
				[-1.16]	[-0.49]
Constant	1.43[a]	1.50[a]	1.39[a]	1.44[a]	1.51[a]
	[10.80]	[14.89]	[10.55]	[9.12]	[11.31]
N	37	37	37	37	37
R-square	0.35	0.35	0.29	0.33	0.33
F-stats	3.79	3.89	2.64	11.47	12.57

Notes: t statistics are inparenthesis; a, b and c indicate significance at the 1 percent, 5 percent and 10 percent levels respectively

Source: By author

5. Discussion of results

We examine the relationship between various aspects of financial inclusion and income inequality and report only significant results due to length constraints. However, we discuss results from aspects of financial inclusion that seem to reduce income inequality but which are not statistically significant. These aspects are health insurance and formal loans to pay school fees. The empirical analysis from these aspects shows a negative but insignificant relationship with income inequality. The negative relationship is also more pronounced in the rural areas, suggesting that scaling up financial inclusion in these dimensions could reduce income inequality in these areas.

As stated in the theoretical proposition, financial inclusion is likely to increase income inequality in the short run if only a few people gain access to financial services, and even in the long run the effect may take longer than expected to become apparent. Our analysis suggests that three out of the seven aspects of financial inclusion analysed have a positive relationship with income inequality. These are account use for business purposes, electronic payment and formal saving (see Tables 2, 3 and 4). Overall, the relationship between account use for business and income inequality was positive and statistically significant at least at the 10 percent level for all five models estimated. When financial inclusion is disaggregated into gender and locality, the relationship remains positive and significant (see Table 2). Electronic payment also exhibits a positive and statistically significant relationship with income inequality and even when the analysis is disaggregated, the positive relationships still hold particularly in rural areas when females have access to financial services (Table 3). These results confirmed the *a priori* that income inequality is likely to increase if only a few people gained access to financial services. For example, account ownership and formal saving in SSA respectively increased from 24 percent and 14.3 percent in 2011 to 34 percent and 16 percent in 2014, but access to credit only increased from 4.8 to 6 percent over the same period (Demirgüç-Kunt and Klapper, 2012 and Demirgüç-Kunt *et al*. 2015). Though overall account penetration increased by 20 percent, some countries such as Guinea and Niger have account penetration of only 7 percent and in the Central Africa Republic just 3 percent of adults have access to a formal bank account (Global Findex, 2014).

Anchoring this result within the '*Africa on the rise*' narrative, confirm that SSA's growth has benefited only a few elite. Leaving aside the data quality intensively discussed in Jerven (2014), we advance some likely reasons driving our results. Firstly, most African government continued to operate on inherited

colonial institutions that focus more on top-down approach to urban governance and practices thus, failing to account for the complexities of African economies that are informally based. This creates a scenario where cities are the centre of growth as oppose to national economies (see Obeng-Odoom, 2016). Thus, if Africa is actually rising, growth should be inclusive, ecologically sustainable and generating jobs that will lead to improve well-being, however, only Mauritius and Botswana so far have experienced rising growth trend, falling poverty, income inequality and unemployment trends (Obeng-Odoom, 2015).

Secondly, the colonial institutional architecture also defines financial sector development and shape economic opportunities with British common law conducive for financial development (banks and stock exchanges) relative to French civil law (see Gwama, 2014). This constraint on financial sector development especially equity and bond markets reduces banks' lending option, coupled with interest caps in some SSA countries increased banks' desire to hold excess non-remunerated liquidity (Saxegaard, 2006, Asongu, 2014 and Maimbo and Gallegos, 2014). This translates into our argument that though account ownership has improved, it does not necessarily imply an increase in credit accessibility. This is possibly because some of the account holders may be first time users of financial services as such, have no transaction history, hence the problems of information asymmetry, uncertainty and risk of default continue to hold. These reasons are likely to drive the positive relationship between financial inclusion and income inequality observed in the analysis.

Our results contradict the negative relationship between financial inclusion and income inequality documented by some of the earlier studies in Asia, the developed and developing regions (Park and Mercado, 2015 and García-Herrero and Turégano, 2015). The emerging evidence suggests that SSA is yet to experience inclusive and sustainable growth as the 'Africa rising' currently has narrow focus on the formal sector while neglecting the informal sector that support livelihood for millions of Africans. Furthermore, the results support the apriori that financial inclusion is likely to increase income inequality in the short run particularly when fewer people gain access to financial service. However, using the bottom up approach through financial inclusion of the previously excluded, economic opportunities will be spread across a wider spectrum of the population. Consequently, as more people gain access to financial services and depending on labour productivity, income inequality will reduce in the long run as entrepreneurs create jobs through business expansion and higher wages to employees (World Bank, 2008).

6. Conclusion

This study analyses the relationship between various aspects of financial inclusion and income inequality with the intention to determine which aspect has the greatest potential to reduce income inequality in SSA. Of the seven aspects of financial inclusion, the empirical evidence from health insurance and formal loans to pay school fees show a negative but insignificant relationship with income inequality (Appendices A1 and A2). The negative relationship is more pronounced in the rural areas. This suggests that income inequality can be reduced in both the short and long run by scaling up access to formal loans to pay school fees and providing health income (micro-insurance) in the rural areas.

Other aspects of financial inclusion such as account use for business purposes, electronic payment and formal saving were found to have a positive relationship with income inequality, contradicting earlier studies from developing Asia. This deviation can possibly be explained by the recent findings of Obeng-Odoom (2015 & 2016) that urban governance in Africa suffers from internal and externally imposed and colonial inherited problems. This is likely the reason why the welfare in sub-Saharan Africa particularly income inequality keep rising despite rising GDP per capita growth. Hence, the top-down approach to development that focuses on the formal sector at the expense of the vast majority of workers in the informal sector required a rethink.

The finding has implications for development policy makers in sub-Saharan Africa and Africa in general. Literature has established that the operation of the financial system can determine who starts a business and who cannot as well as who can and cannot pay for education. Thus, finance influences the gap between the rich and the poor and the extent of persistent across generations. Consequently, by influencing capital allocation, the financial system can change both the rate of economic growth and the demand for labour, with serious implications on poverty and income distribution (Demirguc-Kunt and Levine, 2009, p. 2). Given the established link between colonial institutions and financial development highlighted earlier, policy makers in sub-Saharan Africa are strongly encouraged to engage in genuine democratic governance to improve the quality and functioning of institutions to support financial sector development. Furthermore, both top-down and bottom-up approaches to development is strongly recommended in order to promote interaction and dialogue across all sectors of the economy. Bottom-up approach encourages local community participation in development initiatives, ensure community ownership of

development projects, and enhance commitment and accountability to the development project (see Kaiser, 2012). This will stimulate viable economic activities in the formal and informal sectors of the economy and encourage financial service providers to take advantage of these opportunities and expand outreach. Finally, telecommunication technology and innovation in financial services delivery is encouraged to overcome the infrastructure deficiency. The successful models of M-Pesa and Equity Bank in Kenya demonstrate that banking the poor is a viable business and this model is therefore worthy of emulation. Hence, for development to have a trickle-down effect, the poor should be the centre of concern of development efforts.

This study is based on cross-sectional data and as such the results are interpreted as associations and not causal effects. However, this does not invalidate the findings of the study. Furthermore, the study did not empirically model the relationship between financial inclusion and excess liquidity as well as institutional influence, and this is accordingly identified as a potential area for further research.

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Appendix A1: Description of variables

Abbreviation	Indicator	Description of indicator	Source	Year	No of SSA countries
		Financial inclusion measures			
ACC	Account at a formal financial institution (% age 15+)	Percentage of adults with an account (self or joint) at a bank, credit union, another financial institution (e.g. cooperative, MFI), or the post office (if applicable) including respondents who reported having a debit card	GFD	2011	38
ACC_Bus	Accounts used for business purposes (% age 15 +)	Percentage of adults who report using their accounts for business purposes only or for both business and personal transaction	GFD	2011	38
EP	Electronic payments used to make payments (% age 15+)	Percentage of adults who used electronic payments in the past 12 months to settle bills or to buy things using money from their accounts	GFD	2011	38
LoanF	Loan from a financial institution in the past year (% age 15+)	Percentage of adults who reported borrowing any money from a bank, credit union, MFIs or other financial institutions in the past 12 months	GFD	2011	38
Eduloan	Outstanding loan to pay for school fees (% age 15+)	Percentage of adults who reported having an outstanding loan to pay for school fees	GFD	2011	38
Insur	Personally paid for health insurance (% age 15+	Percentage of adults who currently have health or medical insurance (in addition to national health insurance) and who personally purchased this insurance	GFD	2011	38
Save	Saved any money in the past year (% age 15+	Percentage of adults who reported saving or setting aside any money in the past 12 months	GFD	2011	38

Notes: GFD is Global Findex Database and MFI is Micro Finance Institutions

Table A2: Health insurance and Log GINI as dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Insurance	-0.0021	-0.0006	-0.0003	-0.0010	-0.0004					
	[-0.51]	[-0.15]	[-0.06]	[-0.25]	[-0.12]					
Insurance male						-0.0024	-0.0011	-0.0012	-0.0015	-0.0010
						[-0.58]	[-0.32]	[-0.26]	[-0.38]	[-0.31]
Log GNI	0.060[c]		0.048	0.055[c]		0.063[c]		0.051	0.058[c]	
	[1.72]		[1.25]	[1.67]		[1.72]		[1.31]	(1.70)	
GDPPKG	-0.001	-0.002	0.000			-0.001	-0.002	0.000		
	[-0.34]	[-0.41]	[-0.01]			[-0.31]	[-0.40]	[-0.02]		
Inflation	0.0012	0.0005	0.001			0.001	0.001	0.001		
	[1.41]	[0.66]	[0.59]			[1.39]	[0.76]	[0.69]		
Health expenditure	0.015[b]	0.012		0.013[b]	0.011[c]	0.015[b]	0.012[c]		0.014[b]	0.011[c]
	[2.05]	[1.62]		[2.01]	[1.68]	[2.08]	[1.67]		[2.04]	[1.74]
Logtrade	0.047	0.037	0.084	0.052	0.038	0.049	0.038	0.085	0.053	0.037
	[0.66]	[0.56]	[1.23]	[0.74]	[0.56]	[0.68]	[0.57]	[1.25]	[0.76]	[0.56]
Education		0.0115[b]			0.0118[b]		0.012[b]			0.012[b]
		[1.98]			[2.05]		[2.00]			[2.07]
Governance index			0.00311					0.004		
			[0.36]					[0.45]		
Log assets				-0.032	-0.014				-0.036	-0.018
				[-1.26]	[-0.67]				[-1.28]	[-0.86]
Constant	1.32[a]	1.49[a]	1.34[a]	1.41[a]	1.52[a]	1.32[a]	1.48[a]	1.33[a]	1.41[a]	1.52[a]
	[8.82]	[13.45]	[8.75]	[8.91]	[10.87]	[8.71]	[13.51]	[8.73]	[9.12]	[11.27]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.26	0.353	0.189	0.248	0.25	0.265	0.255	0.191	0.251	0.252
F-stats	3.766	4.149	1.556	10.04	13.99	3.794	4.164	1.504	9.945	14.21

Table A2: Health insurance and Log GINI as dependent variable (cont.)

	(11)	(12)	(13)	(14)	(15)
Insurance urban	-0.0006	-0.0011	-0.0004	-0.0002	-0.001
	[-0.24]	[-0.52]	[-0.18]	[-0.10]	[-0.51]
Log GNI	0.055[c]		0.049	0.053[c]	
	[1.68]		[1.34]	[1.67]	
GDPPKG	-0.001	-0.001	0.000		
	[-0.32]	[-0.38]	[-0.01]		
Inflation	0.001	0.001	0.001		
	[1.46]	[0.88]	[0.86]		
Health expenditure	0.014[c]	0.012[c]		0.013[b]	0.011[c]
	[1.94]	[1.65]		[1.98]	[1.71]
Logtrade	0.049	0.035	0.084	0.053	0.035
	[0.68]	[0.53]	[1.23]	[0.75]	[0.53]
Education		0.013[b]			0.013[b]
		[2.22]			[2.28]
Governance index			0.003		
			[0.39]		
Log assets				-0.028[c]	-0.015
				[-1.82]	[-1.14]
Constant	1.34[a]	1.49[a]	1.34[a]	1.41[a]	1.52[a]
	[9.09]	[13.83]	[9.25]	[8.82]	[11.55]
N	37	37	37	37	37
R-square	0.257	0.257	0.189	0.247	0.253
F-stats	3.743	4.246	1.562	10.1	15.11

Table A3: Formal loans to pay school fees and Log GINI as dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Eduloan	-0.0001	0.0010	0.0006	0.0003	0.0012					
	[-0.02]	[0.35]	[0.21]	[0.11]	[0.46]					
Eduloan male						-0.0012	-0.0002	-0.0008	-0.0008	0.0001
						[-0.47]	[-0.06]	[-0.32]	[-0.33]	[0.04]
Log GNI	0.0523[c]		0.048	0.055[c]		0.063[c]		0.051	0.058[c]	
	[1.70]		[1.25]	[1.67]		[1.72]		[1.31]	(1.70)	
GDPPKG	-0.001	-0.002	0.000			-0.001	-0.002	0.000		
	[-0.34]	[-0.41]	[-0.01]			[-0.31]	[-0.40]	[-0.02]		
Inflation	0.0012	0.0005	0.001			0.001	0.001	0.001		
	[1.41]	[0.66]	[0.59]			[1.39]	[0.76]	[0.69]		
Health expenditure	0.015[b]	0.012		0.013[b]	0.011[c]	0.015[b]	0.012[c]		0.014[b]	0.011[c]
	[2.05]	[1.62]		[2.01]	[1.68]	[2.08]	[1.67]		[2.04]	[1.74]
Logtrade	0.047	0.037	0.084	0.052	0.038	0.049	0.038	0.085	0.053	0.037
	[0.66]	[0.56]	[1.23]	[0.74]	[0.56]	[0.68]	[0.57]	[1.25]	[0.76]	[0.56]
Education		0.0115[b]			0.0118[b]		0.012[b]			0.012[b]
		[1.98]			[2.05]		[2.00]			[2.07]
Governance index			0.00311					0.004		
			[0.36]					[0.45]		
Log assets				-0.032	-0.014				-0.036	-0.018
				[-1.26]	[-0.67]				[-1.28]	[-0.86]
Constant	1.32[a]	1.49[a]	1.34[a]	1.41[a]	1.52[a]	1.32[a]	1.48[a]	1.33[a]	1.41[a]	1.52[a]
	[8.82]	[13.45]	[8.75]	[8.91]	[10.87]	[8.71]	[13.51]	[8.73]	[9.12]	[11.27]
N	37	37	37	37	37	37	37	37	37	37
R-square	0.26	0.253	0.189	0.248	0.25	0.265	0.255	0.191	0.251	0.252
F-stats	3.766	4.149	1.556	10.04	13.99	3.794	4.164	1.504	9.945	14.21

Table A3: Formal loans to pay school fees and Log GINI as dependent variable (cont.)

	(11)	(12)	(13)	(14)	(15)
Eduloan rural	-0.0013	-0.0005	-0.0008	-0.0010	-0.0003
	[-0.54]	[-0.20]	[-0.35]	[-0.45]	[-0.15]
Log GNI	0.0511[c]		0.048	0.050[c]	
	[1.67]		[1.37]	[1.69]	
GDPPKG	-0.001	-0.002	0.0002		
	[-0.35]	[-0.41]	[0.03]		
Inflation	0.001	0.0005	0.0006		
	[1.52]	[0.75]	[0.76]		
Health expenditure	0.0141[b]	0.0118		0.0128[b]	0.0107[c]
	[1.97]	(1.62)		[2.03]	[1.69]
Logtrade	0.047	0.038	0.082	0.0515	0.0383
	[0.70]	[0.58]	[1.24]	[0.77]	[0.58]
Education		0.011[b]			0.011[b]
		[2.11]			[2.15]
Governance index			0.002		
			[0.25]		
Log assets				-0.028[b]	-0.013
				[-2.28]	[-0.90]
Constant	1.37[a]	1.49[a]	1.3[5a]	1.43[a]	1.52[a]
	[9.79]	[12.99]	[9.42]	[8.83]	[10.49]
N	37	37	37	37	37
R-square	0.263	0.254	0.191	0.252	0.250
F-stats	4.059	4.363	1.577	11.84	15.70