FINANCIAL INCLUSION AND INEQUALITY: A CROSS COUNTRY ANALYSIS OF EMERGING AND DEVELOPING ECONOMIES

ABSTRACT

In the last two and a half decades to 2015, the world has experienced rapid economic development across developing and emerging economies. During this same period inequality in the developing and emerging economies have increased and remained challengingly high. This paper looks at the role that the access and the usage dimensions of financial inclusion has played or can play in reducing the high inequality. The paper use's new IMF data on financial inclusion from 2004 to 2014 for 53 developing and emerging economies in a panel econometric modelling. Our study finds that enhancing financial inclusion through expanding access has significant inequality reduction tendencies. However the effects vary by educational endowment and economic structure. The paper therefore suggest that efforts to financial inclusion must be centred on expanding financial access accompanied by less unequal educational distribution in emerging and developing economies. The work highlights the relevance of financial inclusion for economic development in the 21st century.

Key words – financial inclusion, inequality, economic development, human capital, panel data

Highlights of research

1. In this work we test for the impact of access, and usage dimensions of financial inclusion in a GMM panel data econometrics setting. Financial inclusion is shown generally to have significant inequality reducing impacts in developing and emerging economies. Our findings suggest that financial usage significantly reduce inequality, access however polarises the gap between the rich and the poor.

2. This work also tests the role that educational human capital plays in the relationship between financial inclusion and inequality. We use the proportions of population with no education, primary, secondary and tertiary education to respectively capture four different levels of human capital in an economy. We look at the implication of human capital by means of interaction terms. We find that before interaction of the human capital variable inequality reduces but after interaction with financial inclusion there is a mixture of results.

3. The economic structure of most developing and emerging economies is tilting away from agriculture and leaning towards the manufacturing and service sectors. These sectors however good for a country's development require mostly a semi-skilled and a skilled labour force. Our findings suggest that the impact of financial inclusion, given the economic structure, before interaction has strong inequality reducing effects in the agricultural and manufacturing sectors. After interaction the financial access dimension reduces inequality at all production levels.
4. The above findings raise a number of possible implications:

a. The first implication is that financial inclusion is important for reducing inequality. However usage only with significant barriers to access is less meaningful. In the effort to enhance financial inclusion care should be taken to go beyond usage to dismantling of the infrastructure and technical barriers to the access of the financial system by the relatively poor.

b. The second is that even countries that tend to be doing well in terms of financial inclusion must be mindful of their educational distribution. A country with its population polarised between very and low levels of human capital may find inequality increasing with higher levels of financial inclusion.

c. The fact the financial inclusion reduces inequality in the presence of financial usage suggest that developing and emerging countries should consider widening the accessibility of financial services to the low income earners. We believe that this would bring a better distributional outcome.

1. INTRODUCTION

Asian countries like China, Singapore, Japan, and South Korea have enjoyed rapid growth rates – above 4%[1] (Collins and Bosworth, 1996; Sachs and Warner, 1997); and, more recently, the African continent's economy has been growing at an average of 5% per annum (Ngepah, 2016). However, despite these rapid growth rates experienced in developing and emerging economies, Auerbach (2016) notes that there has been an increasing level of income inequality – even though growth was expected to reduce social ills and alleviate inequality. Amini and Dal Bianco (2016) concur with this premise and recognise that strives have been made by international bodies to fight poverty, although inequality remains a significant concern in emerging and developing economies. Addressing the issue of inequality has generated furious debates and opposing views, as researchers differ and hold alternative views as to how the issue of inequality could be resolved.

Kuznets (1955) was among pioneer researchers who examined the inequality-economic growth nexus and laid a foundation upon which many subsequent researchers based their work. He considered the distribution of income as the economy grew and described this process in what is known as the Kuznets hypothesis. He postulated an inverted U-shaped relationship between GDP per capita income and inequality. This U-shaped relationship is developed as a country goes through the various phases of economic development. After setting the foundational work, blankets of researchers have examined the various inequality relationships. The relationships examined include the financial development inequality nexus, the trade liberalisation inequality nexus, the education inequality nexus, and, more recently, the government policy inequality nexus.

The financial and economic development nexus has been widely researched and

[1] This prompted the World Bank and researchers like Page (1994), Rodrik (1994), Amsden (1994), Lall (1994), and Wade (1996) to refer to the situation as the 'Asian Miracle'.

there is a general consensus among the authors[2] that finance plays a crucial role in the development of an economy. Their hypotheses relate to the efficient allocation of capital, the mobilisation of savings through lucrative instruments, as well as the reduction of information asymmetry and costs – which are some of the key roles that financial markets play in stimulating development and reducing inequality. These authors argue that as financial markets develop, market imperfections, like asymmetric information, decrease (Ang, 2010). The reductions in information asymmetry results in lower cost and increase in access to financial products. Affordability means increased accessibility by low income earners, which could create better opportunities and help reduce inequality by financing either physical or human capital formation (Pal and Pal, 2014). In the same vein, Claessens (2006) notes that finance is essential to the survival of individuals, especially the low-income earners, as it could help in levelling their income, mitigating risks, and providing them with investment opportunities.

Many authors acknowledge the opportunities created by financial development; but, they also highlight the pre-conditions for its effectiveness. Ang (2010), as well as Rajan and Zingales (2003) are some of the authors who have taken a different stance by arguing that the positive effects of financial development could be dampened by the presence of weak institutional environments. The presence of structures like powerful political institutions could skew access to finance for a specific group of individuals. To support this premise, Mookherjee and Ray (2006), as well as Aghion and Bolton (1997) have developed models that suggest that credit market imperfections favour the rich and politically-connected, as they continue investing in human capital and other exotic financial products; thus, further perpetuating inequality. Batuo, Guidi, and Mlambo (2010) have also identified the

[2] See for example, Mayer (1990), Greenwood and Jovanovic (1997), Pagano (1993), Levine and Zervos (1996), Ake (2010), Caporale et al. (2004), Rioja and Valev (2004), Abu-Bader and Abu-Qarn (2008), Yang and Yi (2008), Akinlo and Egbetunde (2010), Pal (2011), and Kendall (2012), to name a few.

lack of collateral and political connections on the part of the poor as some of the reasons for unequal access to credit facilities. Situations like these have poured ice on the desired effects of financial development.

Despite all these contradictory arguments, the growth and development stimulating capacity of well-functioning financial markets cannot be denied (Demirgüç-Kunt, Laeven and Levine, 2003). What can be argued or questioned is the distributional income effect that financial markets have in the economy (Batuo et al., 2010). This still remains an area of paradox. Banerjee and Newman (1993), as well as Galor and Zeira (1993) argue that the presence of financial markets redistributes income to the poor by facilitating access to capital, which could be used for either human or physical capital development, or even both. However, Mookherjee and Ray (2006) disagree with the above view; they argue that developed financial systems tend to benefit only the rich because they are politically connected and can provide the collaterals demanded by banks (Batuo et al., 2010). In other words, they argue that the poor could be financially excluded from benefiting from financial development. In the light of these arguments, existing literature has not examined whether or not increased financial inclusion results in a reduction in inequality. This issue of financial inclusiveness therefore warrants more attention from researchers and policy-makers. Thus, this paper would seek to answer the question: What is the impact of financial inclusiveness on income inequality in developing and emerging economies? To answer this question, this research would make a number of contributions.

The main contribution of this paper is to: (i) empirically test the effect of financial inclusion on income inequality and providing further evidence to fill in extant literature (ii) empirically test the role that human capital development has on inequality in the presence of financial inclusion (iii) empirically test the role that economic structure has on inequality in the presence of financial inclusion. Our sample would focus on developing and emerging economies. This is very significant as inequality has been an issue in these economies despite increase economic

growth and numerous financial and economic reforms (Batuo et al., 2010) implemented by the governments of these countries.

The remainder of this paper would be structured as follows. Section 3 would look at the relationship between inequality and financial inclusion. Section 4 would look at the methodology, and empirical results respectively and Section 5 would discuss the research findings and policy recommendations.

2. Theoretical Framework

2.1 Financial inclusion and inequality framework

The role of financial inclusion in economic development has been a topic of furious debates amongst policy makers and researchers. First writing in the field of inequality development relationship was Kuznets (1955). He employed and eclectic approach to establishing that there exists an inverted U-shape between inequality and development. Building on his work, other researchers have investigated what kind of relationship exists between finance and inequality. The bulk of theoretical and empirical literature available presents contrasting views. The first view supports the Kuznets hypothesis and argues that financial development and inequality had and inverted U-shape relationship. One of such studies on finance-growth-inequality nexus concluded that there was a Kuznets curve between finance and inequality (Greenwood and Jovanovic, 1990). According to the author when the economy is still in the early stages of development, the inequality gap widens as the

financial markets develop due to a limited financial inclusion[3] Or greater exclusion of the low-income earners.

However, as the economy develops and there is greater financial inclusion inequality starts to drop as evidenced on Figure 2.1, 2.2 and 2.3 below. This would happen if development brought more investment opportunities, greater access to credit facilities and a significant reduction transaction cost. Moll (2012) also argued that the financial development inequality relationship is 'Hump-shaped' in other words it follows the Kuznets curve. His argument is based on the premise that financial development has contrasting effects on inequality. Firstly it has a 'leverage effect' which extends the inequality gap and "return equalisation effect" which reduces the gap. In a less developed economy the wealthy benefit more than poor from returns in savings and higher levels of productivity hence extending the inequality gap. As the economy develops the return on wealth equals out with the rich and the poor benefiting alike.

[3] Financial inclusion looks at the concept of both access and use of financial services product by a community. There is the thin line between access and use as one can have access to a product but it does not by default mean that the said individual is using the product.

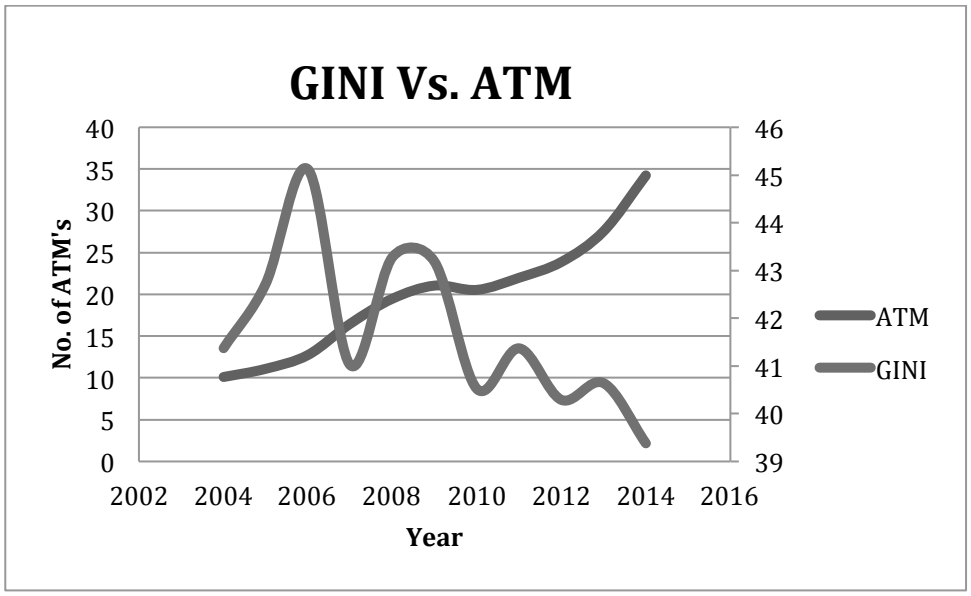

Figure 2.1: GINI Coefficients Vs. ATMs.

Source: Authors Computations

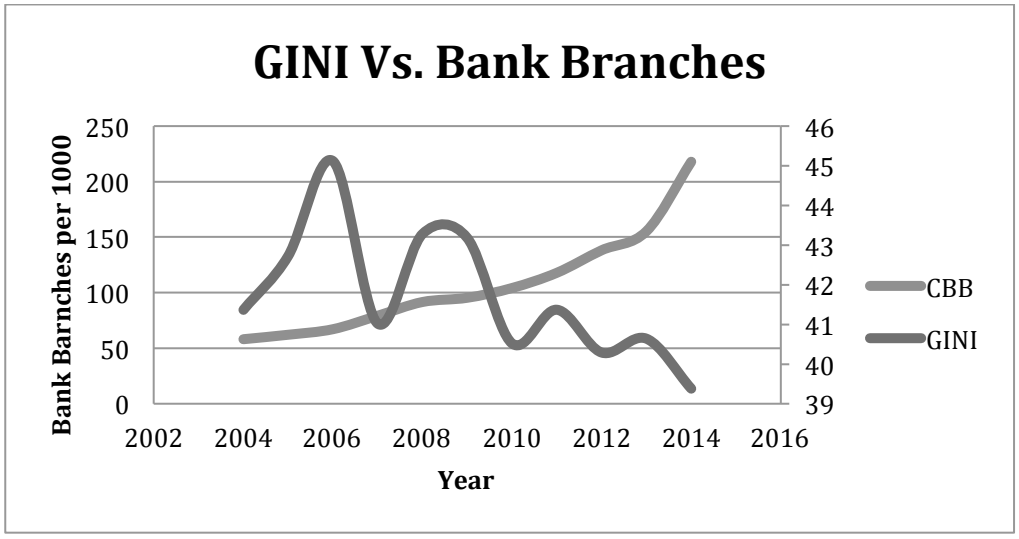

Figure 2.2: GINI Coefficient Vs. Bank Branches.

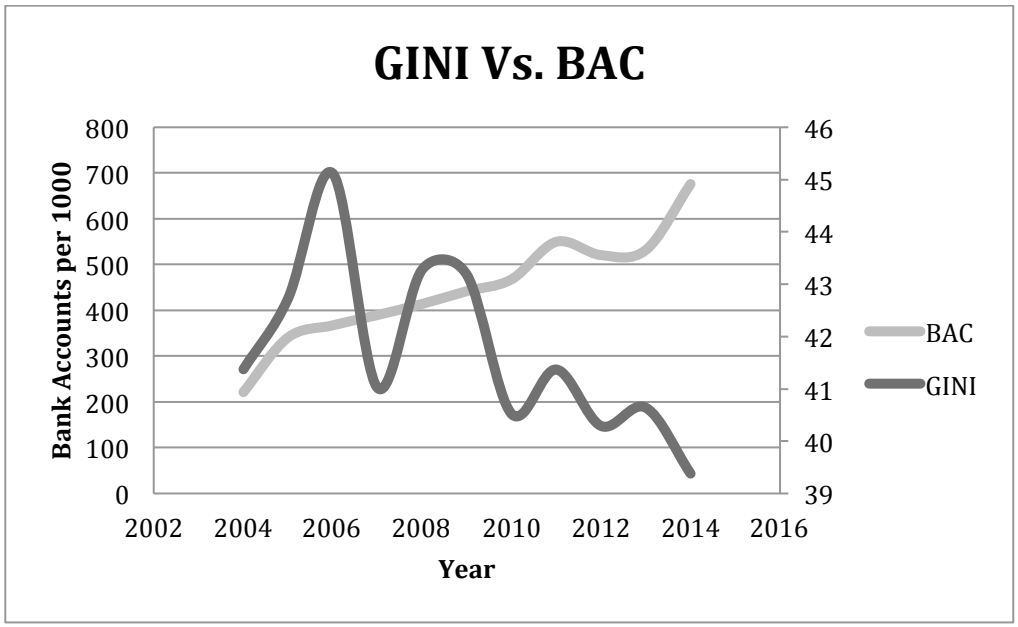

Figure 2.3: GINI Coefficient Vs. Bank Accounts.

Source: Authors Computations

The second group of authors argued that the finance-inequality nexus pointed to a linear relationship. Galor and Zeira (1993) and Banerjee and Newman (1993) point to financial market imperfections as a cause of increase financial transactions cost, which excludes and limits the poor from financial markets. They argue that as these markets develop, access to financial services becomes reduced to the poor who lack the necessary collaterals and network relationships, implying the wealthy and rich end up ripping the benefits. The poor could have ideas and "million dollar" projects, but a lack of access to these institutions due to credit rationing would distort the efficient allocation of capital (Asongu, 2013). Therefore to deal with the problem of inequality, the markets need to increase their efficiency in capital allocation amongst the poor.

Furthermore, Batuo et al (2010) assert that there exist a correlation and bi-casual relationship between inequality and financial development. This, in fact, would

mean that as the economy develops, the poor also experience growth in income due to the increased activities in the economy which would result in them demanding more financial services. For example, the growth of the economy could mean increase production and more job creation for the poor. In this situation more accounts would be opened, more people would qualify for credits and also afford to invest excess income. On the other hand, if the financial market is developing it helps eliminate transaction cost and improves financial inclusion, which could also improve the finances of the poor and intend drive growth. Studies by Liang (2006) also indicated that a negative and linear relationship existed between financial development and inequality. They concluded that there was weak evidence to support that such a relationship depicted and inverted U-shaped hypothesis.

Our research would aim to show that when there is an increasing level of financial inclusion, for example more people have bank accounts, more ATM's are available its is easy for individuals to access loans which they could use to invest and hence reduce the level of inequality. We also show that factors like education and economic structure when interacted with financial inclusion could have a significant effect on inequality.

To the best of my knowledge, there is no existing study that has specifically investigated the relationship between financial inclusion and inequality in developing and emerging economies. To fill in this gap, I intend to establish the relationship between financial access and inequality using GMM model in which we would determine if the relationship is linear or not using annual data from 2001 to

2015. We shall also examine if there exist any difference on the impact of financial access on inequality between emerging and developing economies.

3. Measuring financial inclusion

Financial inclusion has a parlance of meaning usually pinned down contextually. Different concepts have been associated to the word but Chakrabarty (2012) provided and all inclusive definition; "Financial inclusion is the process of ensuring access to appropriate financial products and services needed by all the members of the society in general and vulnerable groups in particular at an affordable cost in a fair and transparent manner by mainstream institutional players". From the definition, financial inclusion is continuous as there is no single country, which can boast a hundred per cent financial inclusion. For instance countries like the UK lead the world in financial services but still claim that until 2012 about two million adults did not have a formal account[4]. Literature has pointed out three main dimensions of financial inclusion; access, use and quality. These dimensions could be summarised in the following table.

Table 1: Dimensions of financial inclusion

Dimension	**Description**	
Access	Access to financial products and services	• Availability of formal financial products

[4] The above claim was for never wanting to open an account or looking out for alternative sources of banking. In addition to the commission reckoned that financially excluded people pay a poverty premium of about 1300 pound annually. put forward by the Commission for Financial Inclusion (CFI) in the United Kingdom. They also claimed that the banking cost had discouraged more that 50% of the unbanked

		• Knowledge of the products • Affordability
Usage	Frequency of using this products	• Regularity of using products • Frequency of using products • Duration of time using a product
Quality	Degree to which financial products meets the needs of the people and affects the lives of the people.	• Marginal utility of consuming products • Appropriate segmentation of the products • Extent of multiple products used

Source: Adapted from Triki and Faye (2013)

As illustrated on the digram above financial inclusion is countinous making its measurement difficult. International organisations like the World Bank, the IMF, IFC, the Melinda Gates Foundation have been working hard to make data available. This study would focus and two main dimensions; financial access and financial usage. This restriction is due to limitations in available data for the countries under study.

4. Data

It is expected that increased access to finance would have a positive effect on the level of inequality, but these effects would vary amongst countries because other variables like level of education, trade openness, inflation, government expenditure would create country specific effects. Furthermore to get optimal results when

testing a long run relationship it is important that all variables through which Gini coefficient could be affected are included to eliminate missing variable bias.

The data used in this study comes from different sources and then was merged into one big data set from which analysis was done. Macro economic data was gotten from the World Open Data Bank, which also compiled data from various sources. The inequality data was obtained from WIDER-WIID (World Income Inequality Data Base, 2015). Our sample comprises of 27 out 69 developing economies and 31 out 41 emerging economies[5]. The data for financial inclusion was retrieved from the latest version of Global Financial Development Database (GFDD) released in June 2016. The data set runs from 2000 to 2015 and the time frame allows us to gather reliable observations on each country[6].

4.1 Variable Discussion and measurement

The traditional approach adopted by most authors and researchers is the use of Gini-coefficient (the average coefficient) as a proxy to measure income inequality. Despite the support of the use of income in calculating inequality by pioneer economist researchers Dalton (1920)[7], and later on, as an appropriate measure of

[5] The classification of developing and emerging economies is according to the World Bank classification 2015.

[6] The data time frame was limited by the financial inclusion data, which started from 2000. The data here does not specifically differentiate financial development variables and financial inclusion. Drawing from Chakrabarty (2012) a distinction is made between access and usage.

[7] According to Dalton (1920) even though inequality is defined regarding economic welfare, income remains a better measure of inequality because it's not the distribution of income that matters but actually the effects of the distribution of income.

inequality, this approach has drawn criticism from researchers like Maio (2007). Maio points out to the inability of the Gini coefficient to differentiate various kinds of inequality. Because the Gini coefficient uses a single statistic (the average) Maio (2007) points out that inequality is most sensitive in the middle. Voitchovsky (2005) noted this weakness and suggested that calculations must look at the different spectrums of income distribution an approach adopted in this study.

Financial inclusion looks at the extent to which society has access to financial products. In other words, the presence of financial institutions (like banks and insurance companies) and financial markets (like stock, bond, and derivative markets) does not imply that the society at large has access or benefits from such products. The development of the financial sector is described by four main variables according to Čihák, Demirgüč-Kunt, Feyen, and Levine (2013). However, the focus of this research is on financial inclusion which could be measured by financial access, financial usage and quality. This data[8] could be measured by (i) bank accounts per thousand adults (ii) number of bank branches per 100,000 adults (iii) number of ATMs per 1000 adults. The expectation is a negative correlation between these financial access variables and the Gini coefficient.

In our econometric estimation, we include some control variables. The first of such control variable is the per capita GDP in the country. We use this as a proxy for the

[8] The variables that describe financial development were summarised in what is known as the "4x2 Framework for Benchmarking Financial Systems." This model captures the key elements of the financial sectors of more than 205 economies across the world. These elements are (i) financial depth (ii) financial access (iii) financial efficiency (iv) financial stability.

level of a country's development. The expected relationship between GDP per capita and inequality would be an inverted U-pattern because inequality rises at earlier stages of production and drops as the economy develops further (Kuznets, 1955).

To proxy human capital development we use the average years of schooling with dataset retrieved from Barro-Lee education data set . The level of education has a significant impact on an individual's level of income in future. Increasing levels of education could mean increasing level of skilled labour and vice versa. According to David (2014), a significant rise in the income of employees could be associated to rising level of education. Putting it in perspective Cruces, Domenech, and Gasparini, (2014) indicated that educati5on provides wide access to economic and social opportunities in an economy. This relationship however has been distorted with rapid technological changes in which labour is replaced with technology (Jaumotte, Lall, and Papageorgiou, 2013[9]). The literacy level according to Chakrabartky (2012) helps stimulate demand for financial products by creating awareness. However, because our study is based on developing and emerging economies where the level of literacy is low it is empirical that we have such a variable in our study.

Included in the estimation equation are other control variables that could have a distributive effect on inequality. We include the rate of inflation as a proxy of Macroeconomic policies inequality and the added value of manufacture and services sectors as share of GDP to proxy the level of development in the economy (Kuznets,

[9] Jaumotte et al. (2013) argue that despite the fact that technological progress has led to a significant increase of incomes in developing and emerging economies the problem lies in the distribution of income.

1955)[10]. Countries battle to keep the inflation rate low because increasing levels of prices means that purchasing power drops as real income falls. This has a greater negative impact on the low-income earners[11] compared to the high-income earners as the latter they can hedge their exposure to monetary instability (Easterly and Fisher, 2001). These drive low-income earners further into poverty hence a positive correlation is expected between inequality and inflation.

Government expenditure could help distribute income if it's targeted at a specific group of individuals. Ngepah (2011) citing the case of South Africa, points out that government expenditure may reduce between group inequality and also within-group inequality in the long run. The relationship of government expenditure would, therefore, depend on how the government spends its budget and those who directly and indirectly benefit form the budget. Like government expenditure trade openness (export + import as a share of GDP) might have both a negative and positive correlation. This could be described in what is known as the Leontief paradox (Shahbaz and Islam, 2010).

5. Empirical strategy

[10] Kuznets in his paper argued that income inequality would depend on the sectoral structure of an economy.

[11] When inflation goes up but wages remain the same the knock on effect is harder on the low-income earners whose real income drops. In most developing countries either trade unions are absent or their influence is low (Majeed, 2013) meaning that chances of negotiating wages relative to increase in inflation is also limited.

The first part of this section would borrow from inequality-development function as initially estimated by Ahluwalia (1976) and later by Anand and Kanbur (1992); the second part would build on the works of Anand and Kanbur (1992) by augmenting it to an inequality- financial inclusion framework. Drawing insights from the Kuznets hypothesis and the works of Anand and Kanbur (1993) they suggest non-linearity between inequality and growth. For the sake of this study a similar argument could be made in establishing the relationship between inequality and finance as seen in the works of Greenwood and Jovanovic (1990). Literature has made reference to human capital development (Motonishi, 2006; Ngepah; 2016), and other control variables like trade openness, government expenditure and inflation (Barro, 2000; Li and Zou, 2002) as important determinants of inequality.

This study adopts the works of Anand and Kanbur (1993)[12] due to the fact that it suites the estimation equations to be used in this study and also facilitates the interpretation of results. Our work moves away from the log-quadratic equation as originally specified by Ahluwalia (1976). Anand and Kanbur (1993) justify this shift on the premise that there could be other functional forms that lead to a U-shape and also makes a finding that the Kuznets process might not lead to a quadratic relationship in all cases.

The ordinary least square model and the instrumental variable regression are bypassed in our analysis because it does not take into account heterogeneity and endogeneity respectively. There could also be problems of dual causality between

[12] Anand & Kanbur (1993) adopted the estimation equation from the original work of Ahluwalia (1976).

my dependent variable (Gini) and my main explanatory variable. To address these issues a system GMM is introduced to estimate the linear simultaneous equations. The model was first developed by Arellano and Bond (1991) and Arellano and Bover (1995) and is known as the generalized method of momentum (GMM) for dynamic panel models. This approach has been previously used by a number of authors[13].

Our study would estimate a battery of equations starting from the basic inequality-development relationship as estimated by Anand and Kanbur (1993). We use three different specifications, however we adopted the equation with the square of gross domestic product. As seen on table 4.1 the coefficients of Y^2 are significantly zero across all the models hence to retain some degree of freedom Y^2 is dropped from the maim model. To verify the impact that improved financial inclusion would have on inequality the model is augmented to include financial inclusion variables as indicated on the equation below.

$$G_{it} = \alpha_0 + \beta_1 FI_{i,t} + \beta_2 Y_{i,t} + \beta_3 Y^2 + \varepsilon_{i,t} \quad (1)$$

With the assumption of the linearity of Y^2, the new equation takes the form:

$$G_{it} = \alpha_0 + \beta_1 FI_{i,t} + \beta_2 Y_{i,t} + \varepsilon_{i,t} \quad (2)$$

Equation (1) is augmented to include human capital variables interacted with financial inclusion thus:

$$G_{it} = \alpha_0 + \beta_1 G_{i,t-1} + \beta_2 FI_{i,t} + \beta_3 Y_{i,t} + \varepsilon_{i,t} \quad (2)$$

Equation (1) is augmented to include human capital variables interacted with financial inclusion thus:

[13] Beck, Demirgü.-Kunt, and Levine (2007), Batuo et al. (2010), Hamori and Hashiguchi (2012), Inoue and Hamori (2013), and Majeed and Tariq (2013).

$$G_{it} = \alpha_0 + \beta_1 G_{i,t-1} + \beta_2 FI_{i,t} + \beta_3 Y_{i,t} + \beta_4 HK_{i,t} + \beta_5 FI.HK_{i,t} + \varepsilon_{i,t} \quad (3)$$

The role played by the economic structure is also verified by interacting three main economic structure variables with financial inclusion gives:

$$G_{it} = \alpha_0 + \beta_0 G_{i,t-1} + \beta_1 FI_{i,t} + \beta_2 Y_{i,t} + \beta_3 HK_{i,t} + \beta_4 FI.HK_{i,t} + \beta_5 ES_{i,t} + \beta_6 FI.ES_{i,t} + \varepsilon_{i,t} \quad (4)$$

Finally, the study conducts a sensitivity analysis by adding other control variables to the estimation equation, as shown below:

$$G_{it} = \alpha_0 + \beta_0 G_{i,t-1} + \beta_1 FI_{i,t} + \beta_2 Y_{i,t} + \beta_3 HK_{i,t} + \beta_4 FI.HK_{i,t} + \beta_5 ES_{i,t} + \beta_6 FI.ES_{i,t} + \beta_5 X_{i,t} + \varepsilon_{i,t} \quad (5)$$

In the equations above G represents the income inequality variable, FI the financial inclusion, y is for GDP per capita, HK for human capital development, ES for the economic structure of the country, t is for the time periods, $X_{i,tk}$ for other control variables while $\varepsilon_{i,t}$ is a composite term for unobserved country specific effects. The series of equations would permit a better appreciation of the impact of financial inclusion variables on inequality. It gives an opportunity to access the impact that other variables have and how the effectiveness of the financial inclusion variable could be enhanced.

5.1 Estimation techniques

To estimate the impact of financial inclusiveness on inequality and the role that transmission channels play, we use the GMM approach. In our model estimation we start by the classic OLS estimator and then modify it step by step to address all concerns, before applying the GMM estimator. In applying the OLS there is an empirical problem, because $G_{i,t-1}$ is endogenous to the fixed effects in the error term and

leads to a dynamic panel bias (Roodman; 2006). This correlation between a regressor and the error term violates one of the assumptions necessary for the consistency in the OLS. To deal with this problem of endogeneity we can either use difference or system GMM estimators.

The first method takes the first difference of all the variables in the model and then uses the lag values of the right hand side to control for endogeneity as put by Arrellano and Bond (1991). Even though this approach deals with the problems of omitted variable and endogeneity bias it takes away a lot of information from the data because of cross sectional variations.

The second method adopted in our study is the system GMM proposed by Arrellano and Bover (1995). It instruments $G_{i,t-1}$ and any other similarly endogenous variables with variables thought uncorrelated with the fixed effects, bringing back the missing information lost after first differencing. A number of authors amongst others Ngepah (2016), Cingano (2014) and Halter et al (2014) all used the system GMM in similar studies thus justifying why we adopt this method to examine the effects of financial inclusion on inequality.

6. RESULTS

This section describes the results of three basic specifications. The key coefficients are the financial inclusion variables. Table 2, 3, 4, and five report the estimates of equations 2,3, and 4 respectively.

Table 2: Preliminary Model

	Financial Access	**Financial Usage**	
	BAC	**CBB**	**ATM**
FI	-0.0013	-0.0193***	-0.0496***
	(0.000)	(0.000)	(0.000)
Y	-0.0009***	-0.0007***	-0.0003***
	(0.000)	(0.000)	(0.000)
Constant	44.4959***	43.7992***	44.1649***
	(0.000)	(0.000)	(0.000)
Sargan	1.000	1.000	1.000

*Note: The symbols of ***; ** and * depicts 1%; 5% and 10% level of significance for the coefficient*

The results of the basic model with financial inclusion proxied by the number of BAC, the number of CBB, and the number ATMs are consistent with the linear hypothesis of Galor and Zeira (1993), as well as Clark (2003) – which points to a negative relationship with inequality. The coefficients of both GDP per capita and financial inclusion variables are all negative and significant at 1% for all the different regressions. Irrespective of the financial inclusion proxy used in this study, the level of inequality drops with any increase in financial inclusion; hence, confirming Batuo, Guidi and Mlambo's (2010) claim of a negative linear relationship between inequality and finance. We can conclude that both financial access and financial usage are important in reducing inequality. The next model includes human capital and human capital variable interacted with financial inclusion.

Table 3:

	Financial Access	**Financial Usage**	
	BAC	**CBB**	**ATM**
FI	-0.0286***	-1.2730	-0.1335
	(0.001)	(0.134)	(0.356)
Y	-0.0012***	-0.0013***	-0.0007***
	(0.000)	(0.000)	(0.001)
FI.N	0.0010 ***	0.0647**	0.0143***
	(0.006)	(0.021)	(0.007)
FI.P	-0.0002	-0.0026	0.0019
	(0.264)	(0.752)	(0.400)
FI.S	0.0004*	0.0230**	0.0009
	(0.179)	(0.068)	(0.609)
FI.T	0.0004**	0.0225**	-0.0009
	(0.030)	(0.003)	(0.859)
NS	-0.5334***	-0.6094***	-0.3321***
	(0.000)	(0.000)	(0.000)
PPC	0.5025***	0.3430***	0.1016*
	(0.000)	(0.000)	(0.160)
PSC	-0.4383***	-0.4310***	-0.2909***
	(0.000)	(0.000)	(0.000)
PTC	0.0094**	-0.6043***	-0.0957
	(0.020)	(0.000)	(0.509)
Constant	63.4263***	64.5596***	55.8382***
	(0.000)	(0.000)	(0.000)
Sargan	0.1174	0.3689	0.4326

*Note: The symbols of ***; ** and * depicts 1%; 5% and 10% level of significance for the coefficient*

Table 2 in the appendix presents the results of the estimation – when the human capital variable is interacted with financial inclusion. From our regression table we observe that the coefficients of financial usage enters with the expected sign and significant at 1% level of significance while the coefficient of financial access also enters with the right sign but insignificant. According to our regression results the coefficients of GDP and financial inclusion terms remain negative as expected. The human capital variables show a mixture of results. Before interaction of the human capital variable, no schooling and secondary schooling reduce inequality but after financial interaction they tend to increase inequality. We observe that the coefficient of primary education is positive and significant but the signs of the coefficient become negative and insignificant when interacted with financial inclusion. For tertiary education financial access is positive and significant at 1% level but financial usage presents two different results; bank branches is negative and significant at 1% and ATM is negative but insignificant.

We can deduce from the results that all levels of education except for primary education reduce inequality but when interacted with financial inclusion the inequality gap reduces. According to Ngepah (2016), in situations where compensation is based on skills, those who are educated would tend to earn higher rewards; thus, leading to increased inequality. Unger, Rauch and Rosenbusch (2011) support these results of the analysis. They reckon that human capital is positively related to success, because educated individuals with financial access and usage have the ability to get utilitarian resources like financial and physical capital that will help increase their income levels and widen the inequality gap.

We can deduce from table 3 in the appendix that in an economy void of financial inclusion, the more developed these sectors are, the higher the level of inequality. This could be because higher skills are needed in this area and only few people possess them those skills; hence, their level of income would rise faster than those of people lacking those skills. The agricultural and manufacturing sectors, shows a negative relationship with inequality. This is because the sectors accommodate both unskilled and semi-skilled labourers, which make up a huge percentage of the population in developing and emerging economies. The service sector increases inequality because of its requirement of high skilled labour and low labour absorption rates. These results are in line with Eicher's (2001) argument that inequality has increased because of the disparity between labour demand and labour supply. Indeed, technological innovation has led to a greater demand for high-skilled labour, while the market is flooded with unskilled and semi skilled labourers, causing those with the required skills to charge a wage premium. Katz and Kearney (2004) link this disparity to changes in the composition of labour, as the economy moves from the agricultural through the manufacturing to the services sector. After interacting economic structure with financial inclusion, financial access plays a significant role in reducing inequality across the various sectors while financial usage increases inequality.

7. CONCLUSION

In this work we test for the impact of access, and usage dimensions of financial inclusion in a GMM panel data econometrics setting. Financial inclusion is shown generally to have significant inequality reducing impacts in developing and emerging economies. Our findings suggest that while both the access and the usage

significantly reduce inequality, access has a stronger effect than usage as measured by ownership of bank accounts, bank branches and, ATM's respectively.

This work also tests the role that educational human capital plays in the relationship between financial inclusion and inequality. We use the proportions of population with no education, primary, secondary and tertiary education to respectively capture four different levels of human capital in an economy. We look at the implication of human capital by means of interaction terms. We find that financial inclusion in countries at the extremes of human capital distribution (more of no education and tertiary education) tend to lead to higher inequality.

The economic structure of most developing and emerging economies is tilting away from agriculture and leaning towards the manufacturing and service sectors. These sectors however good for a country's development require mostly a semi-skilled and a skilled labour force. Our findings suggest that the impact of financial inclusion, given the economic structure, only matters when we consider financial access. The interaction term, between the number of bank accounts and agricultural value added, manufacturing value added and services value added shows significant negative effects on inequality. In the presence of financial usage, inequality tends to widen.

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Table 1: Preliminary Model

	Financial Access	Financial Usage	
	BAC	**CBB**	**ATM**
FI	-0.0013	-0.0193***	-0.0496***
	(0.000)	(0.000)	(0.000)
Y	-0.0009***	-0.0007***	-0.0003***
	(0.000)	(0.000)	(0.000)
Constant	44.4959***	43.7992***	44.1649***
	(0.000)	(0.000)	(0.000)
Sargan	1.000	1.000	1.000

*Note: The symbols of ***; ** and * depicts 1%; 5% and 10% level of significance for the coefficient*

Table 2: Model 2

	Financial Access	Financial Usage	
	BAC	**CBB**	**ATM**
FI	-0.0286***	-1.2730	-0.1335
	(0.001)	(0.134)	(0.356)
Y	-0.0012***	-0.0013***	-0.0007***
	(0.000)	(0.000)	(0.001)
FI.N	0.0010 ***	0.0647**	0.0143***
	(0.006)	(0.021)	(0.007)
FI.P	-0.0002	-0.0026	0.0019
	(0.264)	(0.752)	(0.400)
FI.S	0.0004*	0.0230**	0.0009
	(0.179)	(0.068)	(0.609)
FI.T	0.0004**	0.0225**	-0.0009
	(0.030)	(0.003)	(0.859)
NS	-0.5334***	-0.6094***	-0.3321***
	(0.000)	(0.000)	(0.000)
PPC	0.5025***	0.3430***	0.1016*
	(0.000)	(0.000)	(0.160)
PSC	-0.4383***	-0.4310***	-0.2909***
	(0.000)	(0.000)	(0.000)
PTC	0.0094**	-0.6043***	-0.0957
	(0.020)	(0.000)	(0.509)
Constant	63.4263***	64.5596***	55.8382***
	(0.000)	(0.000)	(0.000)
Sargan	0.1174	0.3689	0.4326

*Note: The symbols of ***; ** and * depicts 1%; 5% and 10% level of significance for the coefficient*

Table 3: Model 3

	Financial Access	Financial Usage	
	BAC	**CBB**	**ATM**
FI	0.0083	-1.5874*	-1.2316**
	(0.688)	(0.152)	(0.003)
Y	-0.0015***	-0.0014***	-0.0007**
	(0.000)	(0.000)	(0.016)
FI.N	0.0004***	0.0710**	0.0318***
	(0.420)	(0.026)	(0.002)
FI.P	0.0000	0.0029	0.0036
	(0.891)	(0.751)	(0.260)
FI.S	0.0005***	0.0236**	0.0054**
	(0.005)	(0.095)	(0.054)
FI.T	0.0001	0.0303***	0.0069
	(0.775)	(0.001)	(0.368)
Fl.AV	-0.0009***	0.0293**	0.0161***
	(0.005)	(0.068)	(0.003)
FI.MV	-0.0004**	0.0120	0.0093*
	(0.041)	(0.576)	(0.075)
FI.SV	-0.0004**	-0.0069	0.0070*
	(0.046)	(0.208)	(0.105)
NS	-0.4339***	-0.4923***	-0.3651***
	(0.000)	(0.002)	(0.000)
PPC	0.3083**	0.2800***	0.0542
	(0.042)	(0.002)	(0.624)
PSC	-0.5537***	-0.4238***	-0.3372***
	(0.000)	(0.000)	(0.000)
PTC	0.0008	-0.8116***	-0.2406
	(0.997)	(0.000)	(0.263)
AVAG	-0.1766*	-0.6216***	-0.4581***
	(0.136)	(0.000)	(0.000)
MVAG	0.1966	-0.2552*	-0.4727***
	(0.174)	(0.235)	(0.000)
SVAG	0.3385***	0.1213	0.1819*
	(0.008)	(0.142)	(0.013)
Constant	51.5671***	70.7524***	83.1846***
	(0.000)	(0.000)	(0.000)
Sargan	0.3005	0.2887	0.7765

*Note: The symbols of ***; ** and * depicts 1%; 5% and 10% level of significance for the coefficient*

Table 4: Model 4

	Financial Access	Financial Usage	
	BAC	**CBB**	**ATM**
FI	0.0235	-3.8606***	-1.0276**
	(0.335)	(0.001)	(0.044)
Y	-0.0014***	-0.0012***	-0.0008**
	(0.000)	(0.000)	(0.049)
FI.N	0.0005	0.1263	0.0403***
	(0.472)	(0.000)	(0.001)
FI.P	0.0002	0.0188**	0.0104***
	(0.548)	(0.064)	(0.006)
FI.S	0.0005**	0.0495***	0.0055*
	(0.042)	(0.001)	(0.143)
FI.T	0.0002	0.0378	0.0086
	(0.582)	(0.000)	(0.383)
Fl.AV	-0.0008**	-0.0040	0.0192***
	(0.066)	(0.810)	(0.006)
FI.MV	-0.0002	0.0231	0.0036
	(0.362)	(0.339)	(0.569)
FI.SV	-0.0007***	0.0058	0.0012
	(0.001)	(0.327)	(0.825)
NS	-0.4820***	-0.8835***	-0.4297***
	(0.000)	(0.000)	(0.000)
PPC	0.0995	-0.0405	-0.2936***
	(0.518)	(0.653)	(0.009)
PSC	-0.5494***	-0.6498***	-0.3982***
	(0.000)	(0.000)	(0.000)
PTC	-0.2276	-0.7593***	-0.2019
	(0.218)	(0.000)	(0.477)
AVAG	-0.1510	-0.3667***	-0.4608***
	(0.331)	(0.001)	(0.000)
MVAG	0.0485	-0.3428*	-0.4544***
	(0.799)	(0.155)	(0.001)
SVAG	0.4244***	-0.0855	-0.0020
	(0.007)	(0.224)	(0.985)
INF	-0.1325**	-0.0743**	-0.0517**
	(0.023)	(0.017)	(0.151)
GEX	0.3737***	0.1294***	-0.1367
	(0.000)	(0.143)	(0.328)
TRD	-0.0626***	-0.0749***	-0.0631***
	(0.008)	(0.000)	(0.003)
Constant	53.8352***	102.3321***	88.9466***
	(0.000)	(0.000)	(0.000)
Sargan	0.1023	0.0053	0.8321