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Threshold Effects in the Financial Development-Inequality Nexus

Focusing on different financial sector features and their varying effects

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Threshold Effects in the Financial Development-Inequality Nexus: Focusing on Different Financial Sector Features and Their Varying Effects

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Abstract

The main aim of this research is to assess whether there are any threshold effects in the relationship between financial development, poverty and inequality. However, with regards to the older literature I want to capture the multidimensional nature of the modern-day financial sector as I believe that this will give us insights into the specific channels of financial development takes in reducing poverty and inequality. The findings suggest that to reduce poverty, the financial institutional access is the channel that is most important. At low levels of financial development, increases in financial institutional access are still associated with increased levels of poverty, but once a threshold level is crossed, increased access to financial institutions reduced poverty. Financial markets as proxied by stock markets were estimated to increase income to the poorest but also increase incomes to the richest suggesting that financial market operations can benefit the poor while increasing inequality at the same time.

Keywords: Financial Development. Poverty. Inequality. Threshold Regression

1. Introduction:

A financial system can simply be described as a place where savers of funds who have a surplus in the current period can lend money to individuals or entities whose current demand for funds is greater than the amount, they have available. Financial systems facilitate the functioning of the economy by encouraging saving of funds which can lead to a supply of funds to invest in capital, possibly leading to an improvement in the productive capacity of a nation. The more efficient the financial system is, the more likely that the saved funds would be directed towards those projects that would provide the highest rate of economic growth (Viney & Phillips, 2019). The financial system needs to be both more accessible to more savers and operationally capable to use the saved funds as efficiently as possible to drive economic growth and hopefully reduce poverty and inequality. However, financial systems that do not function efficiently can end up being detrimental to the poor. Informational asymmetries and high transactions costs can lead to a large segment of the population being from the formal financial sector, worsening poverty and inequality (Kim & Lin, 2011). Empirical evidence to suggest that financial development benefits or hinders the poor is relatively thin. In a 2007 paper, Beck et.al suggest that financial development improves the lives of the poor and reduces inequality. However, in a 2009 paper Rodriguez-Pose and Tselios found evidence to suggest that financial development increases inequality (Kim & Lin, 2011).

In recent literature there has been a hypothesis to suggest that there might be a non-linear relationship between financial development, poverty and inequality. The hypothesis proposes that perhaps, at low levels of financial development, financial development might increase inequality and once a specific threshold of financial development has been crossed, financial development reduces inequality or vice-versa. One of the main routes that financial development can help reduce poverty and inequality is through an accelerated economic growth strengthened by the mitigation of financial asymmetries by financial intermediaries such as banks. At low levels of economic development, the creation of financial intermediaries is very costly leading to high costs of financial sector access. In such a situation the rich could have more access to the financial sector - hence financial development disproportionately serves the rich more than the poor, possibly increasing inequality. However, as economic development increases, the financial sector becomes more efficient and the associated cost reductions hence costs are reduced, leading to broader access to financial services for the poor (Kim & Lin, 2011). The main aim of this paper is to investigate whether there is evidence to support the non-linearity between financial development and inequality.

It has been argued that the type of proxy used to measure financial development can have an impact on the suggested relationship between financial development and inequality. The assumption behind the

argument is that certain financial development proxies capture different features of the modern financial system, leading to contrasting conclusions on the financial development-Inequality nexus. Most of the literature on the financial development-inequality nexus has used domestic credit to the private sector as a percentage of GDP to measure the impact of financial development on income inequality and poverty. This measurement captures the degree to which the financial sector contributes towards economic development and the reduction of poverty and inequality through the acceleration of economic growth by the means of increasing capital to firms. However, this measurement captures only one of the roles of the financial sector. The function of the financial sector involves not only the provision of capital to productive firms but also, monitoring of investments, pooling of savings, risk and diversification and the facilitation of trade, to name but a few (Svirydzenka, 2016). These functions can each have different effects on the functioning of the financial sector leading to varying ways that financial development can affect inequality and poverty. For example, the better a financial sector is at monitoring investments, the more efficiently, funds can be used by firms leading to the creation of more jobs and hopefully reductions in poverty and inequality. To facilitate a better understanding of the impact of financial sector development on poverty and inequality there is a need for a more comprehensive measurement that captures the many different functions of the financial system.

The modern financial sector has evolved to include more than the functions stated in the previous section to become a multi-dimensional financial structure. Financial markets have evolved to not only include banks but also pensions funds, venture capital firms etc., which all play different roles and may impact poverty and inequality in highly differentiated ways. Private sector credit to GDP is seen to encompass the depth aspect of financial development but as stated earlier this limit our analysis. It is important to also think of how efficiency of and access to the financial sector can impact poverty and inequality. Financial institutions will not do much to alleviate the social ills of poverty and inequality if most of a population do not have access to them. A wasteful and inefficient financial sector will probably hinder economic development and poverty reduction (Svirydzenka, 2016). It is crucial to find a way to incorporate all these factors in an analysis.

One of the key focuses of this paper is capture the multi-dimensional aspect of the financial sector and the assess the effect that this would have on poverty and inequality. In this regard I intend to use the Financial Development Index (FD Index), which is an International Monetary Fund (IMF) created measurement that breaks down financial development into several components that summarize the development of financial institutions and financial markets in terms of depth, access and efficiency (Svirydzenka, 2016). This FD measurement allows for a thorough analysis of the particular features of a financial system which allow for the narrowing down of the deficiencies of a financial system and to assess which areas of the

financial system have the greatest impact on macroeconomic outcomes such as poverty and income inequality (Svirydzenka, 2016).

In this paper I use similar techniques Kim and Lin (2011) to investigate non-linearity in the financial development-inequality nexus. The authors used an instrumental variable threshold regression similar to the Caner and Hansen techniques (1996, 2002). However, one of the main restrictions of the methods used by Caner and Hansen, however, is that for fixed effects estimators to be consistent, the covariates need to be exogenous. Therefore, I also adopt the methods developed by Shin and Seo (2016), where the Caner and Hansen model is extended to a dynamic panel model specification. The model allows for the possibility of an endogenous threshold variable and endogenous covariates. In this study I further add to the literature by using a multidimensional proxy for financial development and investigate threshold effects for the different features of the financial system thereby isolating the different functions of the modern-day financial sector and quantify the effects that these might have on poverty and inequality.

The rest of the paper will be structured in the following way, in section 2, I present the literature review, in Section 3, I describe the data used and going into some detail of what goes into the financial development index that I use, in section 4, I explain the econometric methodology, used in section 5, I present a preliminary data analysis, in section 6, I present and discuss the empirical estimation results and I finally conclude in section 7.

2. Literature Review:

The notion that financial development promotes an improvement in standards of living is not a new one. One of the main areas that financial development can improve the lives of the poor is through the acceleration of economic growth. Goldsmith (1969) argued that the financial system promotes economic development by improving the efficiency of investable funds rather than their volume (Arcand, et.al., 2012). The more efficient the investable funds, the more likely that the investment would produce returns and accelerate economic growth. In such a scenario, the effect of financial development on poverty and inequality is indirect as it operates through its effects on economic growth. The link between financial development and economic growth is well researched. It is always the hope that economic growth will lead to an improvement in income distribution and a reduction in poverty, however it is also important to study the direct link between financial development and inequality.

Most empirical literature has focused on using financial depth to measure the impact of financial development on inequality. More recent studies have found that improvements in financial access, financial efficiency as well as financial depth can have positive effects on income distribution and poverty alleviation. There also appears to be a stronger relationship between financial institution development, poverty, and inequality than financial market development (Zhang & Nacuer, 2019). The study of financial development and inequality can be broken down into two main sections. One section suggests a linear relationship between the two and models a situation where financial development helps the poor accumulate human capital which under this conducive environment could lead to an improvement in income distribution and reductions in poverty. The other section suggests a non-linear inverted-U relationship. The main reason for the non-linear relationship would be that at different stages of development, the costs of accessing the financial sector would change, leading to contrasting effects on inequality. For example, at early stages of development, financial intermediation might be characterized by high cost where only the rich have access, increasing inequality in the process. However, as development matures, financial intermediation costs might be driven down, leading to greater access and lower inequality (Zhang & Nacuer, 2019).

One of the main channels through which financial development has shown to reduce inequality and poverty is through increased financial access. For example, Zhang and Nacuer (2019), find that increasing the number of bank accounts per 1000 people can reduce the poverty gap by 0.007 percentage points. However, they find that increases in financial market access do not necessarily yield a significant impact in terms of poverty reduction and in some instances the relationship even seems to suggest that an increase in financial market access leads to increases in poverty. This should not be surprising seeing that financial market access is measured in terms of the stock market, to which the poor are not likely to have access to. In terms of efficiency, a positive and highly significant relationship was found between the Gini Coefficient and the Net Interest Margin (NIM). Larger NIM suggest lower levels of efficiency. This suggests that improvements in financial institution efficiency are associated with reductions in inequality, however with regards to poverty, there appears to be no significant relationship (Zhang & Nacuer, 2019).

One of the main channels that lead to persistent inequality are capital market imperfections and lending constraints that lead to unequal access to financial services. Without access to financial services, low-income individuals find it more difficult to escape poverty through human capital accumulation or entrepreneurial activities. Through its operations and functions, the financial system can reduce poverty and inequality by ensuring equal opportunities for all (Seven & Coskun, 2016). However, it is important to consider which aspects of financial development have the greatest effect on poverty and inequality. One of the biggest contributors to the findings of the financial development -Inequality has been the proxy of financial development that has been used. It is important to take note of the proxy that is being used and what function of the financial system it represents to gain a better understanding of the impact of financial development (Seven & Coskun, 2016). It is also important to consider the financial development-Inequality nexus based on whether we are dealing with developing and developed nations. The impact that FD has on a country's income distribution might vary depending on whether the country is developed or developing.

Efficiently operating financial institutions and markets can lead to economic growth by ensuring that investable funds are directed to their most productive uses. In this way it is hoped that poverty and inequality will be reduced. However, if these markets and institutions do not operate effectively inequalities might persist (Seven & Coskun, 2016). It has been argued that a bank-based financial system is more suitable to reduce poverty and inequality in a weak institutional environment but when institutions develop, a market-based financial system would become more suitable to promote a reduction in poverty and inequality. High levels of inequality are thought to distort the institutional environment in a country, leading to unequal access to finance which acts to reinforce the high levels of inequality. In a (2008) paper, Charlton argues that in developing nations, the poor do not benefit from stock market liquidity (Seven & Coskun, 2016).

Seven and Coskun (2016), find that when using a bank aggregate as a proxy for financial development, then there is a positive relationship in the financial development-Inequality nexus.. The bank aggregate is a combination of five indicators that are widely used in the literature,

1 Net Interest Margin (NIM) - the accounting value of bank's net interest revenue as a share of its average interest interest -bearing assets (Svirydzenka, 2016).
Gini Coefficient - The Gini Coefficient is derived from the Lorenz curve, where larger values imply higher inequality (Kim & Lin, 2011).

namely logarithm of liquid liabilities to GDP, logarithm of private credit by deposit money banks and financial institutions to GDP, logarithm of bank deposits to GDP, logarithm of bank private credit to GDP and logarithm of deposit money bank assets to GDP. as a proxy for financial development, then there is a positive relationship in the financial development-Inequality nexus. The results suggest that a one percent increase in financial development is predicted to increase inequality by a value ranging between 0.056 and 0.0617 percent, for emerging economies. The reason could be that in the developing world there is a higher probability of unequal financial access. The study goes further to find that there is a negative and significant relationship between the bank aggregate and income distribution to the poorest quintiles of emerging economies. They find that a one percent increase in financial development is associated with a reduction in income to the poorest of a value between 0.083 and 0.138 percent. In terms of poverty levels as measured by the headcount ratio, no statistically significant relationship was found between financial development and poverty. When using the stock market as a proxy, no significant relationship is found between financial development and inequality. However, interestingly a positive relationship was found between income to the poorest quintile and financial development, when using the financial market as a proxy, suggesting that a one percent increase the market aggregate is associated with an increase in income to the poorest of a value between 0.027 and 0.073 percent. Interestingly, when both market and bank aggregates were combined and used as single proxy of financial development, there appeared to be no significant relationship between financial development, poverty, and inequality. Such findings lead to a suspicion that stock markets and banks probably affect poverty and inequality through very different channels depending on sector specific characteristics (Seven & Coskun, 2016).

Empirical literature has not reached a conclusive argument on whether financial development is beneficial or harmful to poverty and inequality outcomes. A non-linear relationship between economic growth and financial development is argued in the literature. In a 2012 paper, Arcand et al. found that a threshold level exists above which financial development is harmful to economic growth. Cecchetti and Kharroubi also found evidence of negative effects of financial development on economic growth. However, both papers found that the threshold level of this harmful effect was found at very high levels of financial development, in the range of 90 and 100 percent , as measured by private credit as a percent of GDP (Park & Shin, 2015). In an often-quoted paper, Greenwood and Jovanovic (1990), found that at low stages of development,

financial development would increase inequality, but once economic development increased and access was more widespread, then inequality would reduce, suggesting a nonlinear relationship between financial development and income distribution to the poor (Seven & Coskun, 2016).

Some of the interesting results from a study by Park and Shin (2015), include that when using liquid liabilities to GDP as a proxy for financial development, the results show a negative linear coefficient but a positive square term, suggesting that financial development reduced inequality up to a certain threshold and then increases it. Even when private credit as a percentage of GDP is used as the proxy for financial development, there is evidence of an inverted-U shape relationship between FD and inequality. To capture the multidimensional nature of the modern-day financial sector, the authors use stock market capitalization to GDP as a proxy for financial development. The results suggest that when looking from the perspective of the stock market, financial development simply increases inequality and there is no evidence of a non-linear relationship (Park & Shin, 2015).

The specific proxy of financial development used to measure the impact on poverty and inequality is important, however Kim and Lin (2011), find that the effect depends mostly on the level of financial development that the country is in. When financial intermediation as a function is used as the proxy for financial development, an increase in financial development of one percent leads to a rise in inequality of a value between 0.020 and 0.29 percent for a less-developed financial system. For the better developed financial system, a one percent increase in financial development is associated with a reduction in inequality of between 0.70 and 1.23 percent (Kim & Lin, 2011).

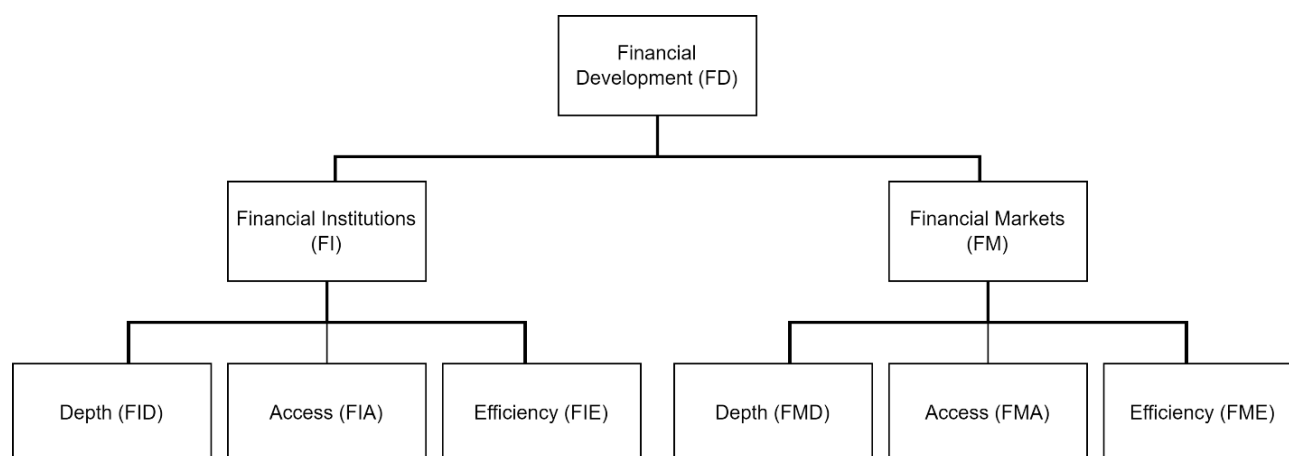
To ensure that the reduction in inequality is due to increases in income to the poor as opposed to reductions in income to the rich, the authors measure the impact of FD on the income share to the poorest quintiles. With a less- developed banking -system, the income share to the poor is reduced by an improvement in the financial development and for the better-developed banking system, the results suggest that a one percent increase in FD is associated with a rise in income to the poorest quintiles of value between 1.38 and 1.34 percent (Kim & Lin, 2011). This suggest that even for income share to the poorest, there are threshold effects in the FD-Inequality nexus. To gain a deeper understanding of the FD-Inequality relationship, the authors measured the effect of stock market functions. The result suggest that a one percent increase can increase the

Gini coefficient by a value of between 0.08 and 1.18 percent in an illiquid stock market environment. However, in a more liquid stock market environment, a one percent increase in financial development is associated with a reduction in inequality of between 0.39 and 0.91 percent (Kim & Lin, 2011). These results suggest that there is evidence of a nonlinear relationship between financial development and inequality, no matter the proxy used. It is important to account for this in a study, as failure to recognize this might lead to incorrect conclusions.

3. Methodology and data:

3.1.Data:

To capture the complexity of the entire financial system, the financial development index is constructed comprising of several different indices which provide a summary of the level of development of financial institutions (FI) and financial markets (FM) with regards to their depth, access and efficiency (Svirydzenka, 2016). The construction of the financial development index involved a three-step approach; Normalization of variables, Aggregation of normalized variables into sub-indices representing a particular functional dimension and the aggregation of sub-indices into a final index. Figure 1 below explains the composition of the index. The lowest level of the pyramid has six sub-indices that measure the depth, efficiency and access to financial institutions and financial markets. The letters I and M denote institutions and market, while the letters D, A and E stand for depth, access, and efficiency. For example, FID is a financial institution's depth. These sub-indices are collected into two higher level sub-indices FI and FM, to measure the overall level of development of financial markets and institutions. Financial institutions include banks, insurance companies, mutual funds, and pensions. Financial markets include stock and bond markets. Finally, the FI and FM are aggregated into the final FD index, which is a measure of the overall level of financial development (Svirydzenka,2016).

Figure 1.

The main aim of the index is to build on current literature by providing a measurement of financial development that captures the multidimensional nature of the modern financial system. It was crucial to include a set of key indicators to capture the different aspects of the financial system characteristics. Due to data unavailability, several potentially useful indicators could not be used. However, the database used a set of key proxy variables that may have some limitations but are available and well-established for many countries (Svirydzenka, 2016).

The process used is from the OECD Handbook on Constructing Composite Indicators (OECS, 2008). This process allows us to construct composite indices that compare and rank country performance. The data consists of 33 years of annual data between 1980 and 2013 for 183 advanced, emerging, and low-income developing countries. The data come from several different sources, The World Bank FinStats 2015, IMF's Financial Access Survey, Dealogic debt database and the Bank of International Settlements (BIS) debt securities database (Svirydzenka, 2016).

Financial institutions access (FIA) and financial institutions efficiency are the banking related information of financial development. FIA is proxied by the number of ATMs per 100 000 adults. Financial Institutions Efficiency is composed of three characteristics of bank efficiency. Efficiency in intermediating savings to investment as measured by the net interest margin, operational efficiency measures such as overhead costs to total assets and profitability measures such as return on assets and return on equity (Svirydzenka, 2016).

The financial market indicators capture the stock and debt market features of the financial system. The depth sub-index for financial markets includes the size of the stock market and how active its stocks are traded. For financial market access (FMA), the percentage of market capitalization outside the top 10 largest companies to proxy the market access to the stock market. A higher degree of stock market concentration suggests difficulties in accessing the stock market. Financial market efficiency (FME) is captured through the stock market turnover ratio - the ratio of the value of stocks traded to stock market capitalization. The higher turnover should indicate higher liquidity and greater market efficiency (Svirydzenka, 2016).

To prevent large values from distorting the 0 - 1 indicators, the series needed to be winsorized. Each indicator was winsorized , with the 5th and 95th percentiles set at the cutoff levels to prevent data loss. The global distribution across time and countries is assessed to determine the cutoff levels. The next step was to ensure that the winsorized indicators were normalized between 0 and 1 using the min-max procedure (equations 1 and 2, below) to allow for the aggregation over variables expressed in different measurements. X represents the underlying raw data and l_x is the transformed continuous 0 -1 indicator.

$$l_x = \frac{x - x_{min}}{x_{max} - x_{min}} \quad (1)$$

$$l_x = 1 - \frac{x - x_{min}}{x_{max} - x_{min}} \quad (2)$$

The process normalizes indicators to have an identical range [0,1] by subtracting the minimum value and dividing by the range of the indicator values. Through this process, it is possible to relate country specific indicator performance to the global minimum and maximum across all the countries and years. Therefore, the highest(lowest)value of a given variable across time and countries is equal to one(zero) and all other values are measured relative to these maximum(minimum) values. For some variables such as net interest margin, where a higher value is suggestive of a worse equilibrium, the ratings needed to be rescaled according to the min-max formula 2 above. The Human-Development Index is a good example of using min-max normalization (Svirydzenka, 2016).

The next step is to aggregate indicators into the variables at the bottom of the pyramid (figure 1). The aggregation is a weighted linear average of the underlying series where the weights are obtained from principal component analysis, reflecting the contribution of each underlying series to the variation in the specific sub-index. All the sub-indices are then re-normalized using equation 1 to ensure that the range is between 0 and 1. Equations 3 and 4 below represent the financial institutions depth (FID), access (FIA), efficiency (FIE) and for financial markets depth (FMD), access (FMA), efficiency (FIE).

$$FI_j = \sum_{i=1}^n w_i l_i \quad (3)$$

$$FM_j = \sum_{i=1}^n w_i l_i \quad (4)$$

The process above is then repeated and aggregated again to create higher-level indices resulting at the most aggregated level in the FD index. The Financial Institutions (FI), Financial Markets (FM) and Financial Development are normalized again to ensure that the range is between 0 and 1.

In a benchmarking framework, weights can distort composite indicators and country rankings. There are a variety of weighting techniques in use, from statistical models such as factor analysis or participatory methods such as the analytical hierarchy process. No matter the method used, weights are basically value judgments. The FD index used the statistical approach - Principal Component Analysis (PCA) (Svirydzenka, 2016).

Principal component analysis (PCA) is a statistical technique that is used to analyze the variation in a set of data. It is a method for reducing the dimensionality of a data set by identifying the directions in which the data varies the most. PCA finds the "principal components" of the data, which are the directions in which the data varies the most. These principal components can then be used to represent the original data in a lower-dimensional space. The PCA groups together individual indicators that are collinear to form a composite indicator that captures information

that is as close to the individual indicators as possible. The main principle is to capture the highest amount of variation while using the smallest number of factors. The result is that the composite index depends on the statistical data dimensions instead of the dimensionality (Svirydzenka, 2016).

Sub-indices are then constructed as the weighted averages of the normalized series. The weights are squared factor loadings (sum up to 1) from the PCA of the underlying series. Factor loadings are coefficients that relate the observed variables to the principal components or factors. Squares of the factor loadings are the proportion of the total unit variance of the indicator which is explained by the factor. The result is that a higher weight is assigned to the series that contributes the most to the common variation. Simply put, the PCA involves the pooling together of all the series in a sub-index across all countries and all years (1980 - 2013) to find the linear combination in the direction of the largest variation (Svirydzenka, 2016).

3.2.Econometric Methodology:

Hansen's, threshold model has been widely used but it is a little restrictive in that it requires strict exogeneity of the covariates to produce consistent estimators. The model of Caner and Hansen, goes a step further and allows endogenous covariates but it still requires an exogenous threshold variable. Shin and Seo extended their model for dynamic panel models that allow lagged dependent variables, endogenous covariates and an endogenous threshold variable (Kim & Kim, 2019). Some work has been done to model nonlinear asymmetries for dynamic panel methods, however, the main problem is most of the work assumes that either the regressors or the threshold variable need to be exogenous to produce consistent estimates. The model created by Shin and Seo, allows us to simultaneously model nonlinear economic relationships and individual specific heterogeneity (Seo & Sin, 2016).

The regression model that I use takes the following form:

$$Y_{it} = (1, X'_{it})\alpha_1 1(q_{it} \leq \gamma) + (1, X'_{it})\alpha_2 1(q_{it} > \gamma) + e_{it}, \quad i = 1, \dots, n; t = 1, \dots, T \quad (5)$$

$$e_{it} = \alpha_i + v_{it} \quad (6)$$

The dependent variable of interest (Y_{it}) will either be the Gini coefficient, Income share to the poorest quintiles and the poverty headcount ratio. X'_{it} represent the time-varying covariates, these include the inflation, exports, domestic savings as a percent of GDP, per capita income and GDP growth. $1(\cdot)$ is the indicator function and (q_{it}) is the transition variable. The threshold variable is represented by (γ) . Once we estimate the threshold variable, then the level of our financial development proxy (q_{it}) or in other words our transition variable will determine the regime that a specific country falls into. It is also worth noting that an important characteristic of this model is that the additional control variables are specific to the regime that we are in. α_1 and α_2 are the specific slope parameters for the selected regime. Similar to all panel models, the error term is of the form $e_{it} = \alpha_i + v_{it}$, where α_i , represents the individual specific effect, or in other words it represents those factors that impact poverty and inequality that are specific to an individual country. v_{it} is just the zero mean idiosyncratic error.

The methods used by Hansen (2000), allow for a Least Squares approach to estimating the threshold parameter as well as the slope parameters under the assumption that the threshold parameter is exogenous. However, in the finance-inequality literature, it is thought that there is a feedback mechanism between financial development and inequality coming from the question, do reductions in inequality increase the need for financial services or do financial services reduce inequality? In such a situation, it is highly likely that the financial development variable will be endogenous hence different methods need to be used. However, it is also important to think of omitted variable bias problems that are normally associated with the study of inequality and poverty.

To wipe out the individual specific heterogeneity, Shin and Seo take the first difference equation 5 to get the following:

$$\Delta Y_{it} = \beta' \Delta x_{it} + \delta' X'_{it} 1_{it}(\gamma) + \Delta e_{it} \quad (7)$$

Δ = the difference operator

$$\beta = (\alpha_{12}, \dots, \alpha_{1,k1+1})', \delta = \alpha_2 - \alpha_1 \quad (8)$$

$$X_{it} = \begin{pmatrix} 1, X'_{it} \\ 1, X'_{it-1} \end{pmatrix} \text{ and } 1_{it}(\gamma) = \begin{pmatrix} 1(q_{it} > \gamma) \\ 1(q_{it-1} > \gamma) \end{pmatrix} \quad (9)$$

The model in equation 7 has four specific regimes but this is due to the lagged threshold variable, this is only included when we want to use the two stages least squares method of estimation but in this paper, I will be using the DIFF-GMM estimation method so we only have two specific regimes for my results. The need to use GMM techniques is since for equation 7 we have solved the problem of wiping out the individual specific heterogeneity, however we have created another problem in that the differenced explanatory variables are now correlated with the differenced error term (Δe_{it}).

To ensure that our data estimators are unbiased we need another moment condition which is equation 10 below.

$$E(\Delta e_{it} \setminus (\Delta z_{it})) = 0 \quad (10)$$

The z_{it} represent the instruments we would use for example, let's consider $t = 4$ for equation 7, then our differenced model will look like the following:

$$Y_{i4} - Y_{i3} = \gamma(Y_{i3} - Y_{i2}) + \beta'(x_{i4} - x_{i3}) + \delta'(x_{i4} - x_{i3})1_{it}(\gamma) + e_{i4} - e_{i3} \quad (11)$$

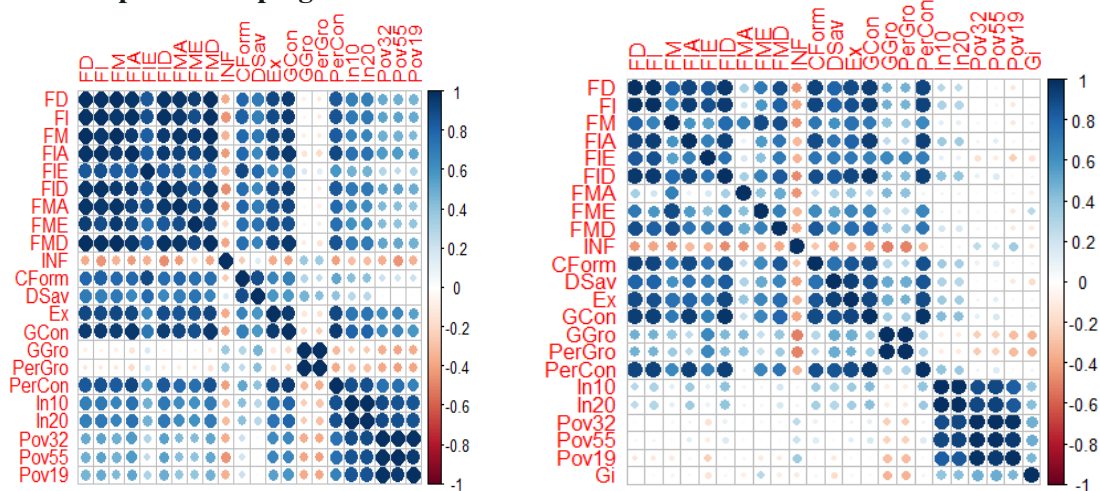
In this scenario, then both Y_{i1} and Y_{i2} can be used as instruments for $(Y_{i3} - Y_{i2})$ because they are not correlated with the differenced error ($e_{i4} - e_{i3}$). The instruments (Y_{i1} and Y_{i2}) are relevant because they are correlated with our endogenous variable and are also exogenous in that they are not correlated with the error term. For my analysis, the dependent variable will either be, Gini coefficient, Income share to the poorest ten percent and poverty headcount ratio at the \$3.20 level. The above process helps to solve the problem of estimating threshold effects while controlling for endogeneity with the dynamic panel methods. It is also important to note that the technique used, depends on the validity of the moment conditions we have assumed or in other words, whether our instruments satisfy the requirements to make them a suitable instrument. Methods used in this approach for Stata have not yet created a test for this type of estimation which is one of the main limitations for my study.

4. Preliminary Analysis:

Descriptive Statistics (1992 - 2013):

Vars	Obs	Mean	Std. Dev.	Min	Max
GI	1,218	26.09113	47.20182	1	191
P32	1,218	8.595238	21.71095	1	117
IN10	1,218	7.313629	10.75293	1	41
Ex	1,218	529.3621	347.2036	1	1135
Inf	1,218	595.9778	349.4628	1	1203
GR	1,218	596.5813	348.6691	1	1203
FD	1,218	.3329686	.2893979	0	1
FI	1,218	.4185726	.2904412	0	.9777202
FM	1,218	.2347345	.2956347	0	1
FIA	1,218	.3156447	.3538055	0	1
FIE	1,218	.5850226	.1669958	0	.9244113
FID	1,218	.312381	.3216172	0	1
FMA	1,218	.2093516	.2844873	0	1
FME	1,218	.2508557	.365042	0	1
FMD	1,218	.2387581	.3083885	0	.9907826

Developed Developing



INF = Inflation

CForm = Capital Formation

DSav = Domestic Savings

Ex = Exports

GCon = GDP (constant)

GGro = GDP growth

PerGro = Per Capita GDP growth

PerCon = Per Capita GDP (constant)

GI = Gini Coefficient

Pove19 = Poverty Headcount Ratio (\$1.90)

Pov55 = Poverty Headcount Ratio (\$5.50)

The above correlation plot shows the relationship between the variables of interest as well as the control variables. On the right axis of the correlation plot we have a number line that shows the strength of the relationship between the variables. The value positive one represents a perfectly positive correlation while the value negative one indicates a perfectly negative correlation. The correlation is also represented through different colors. The darkest shade of blue is associated with 1 (perfect positive correlation) and the lighter the shade of blue the lower the correlation in the variables. While the darkest shade of red is associated with -1 (perfect negative correlation) and the lighter the shade of red, the lower the correlation between the variables. Low color visibility suggests a very low correlation.

The first thing to take note of is that for the developed countries if we look at the relationship between all of our financial variables of interest (FD, FM, FI, FIA, FIE, FID, FMA, FME, FMD) and income share to the bottom twenty percent and bottom ten percent (In20 and In10), there is a dark shade of blue suggesting a positive relationship indicating that the financial sector increases income share to the poorest quintiles hence it reduces income inequality. I was not able to use the Gini coefficient for the developed nations as for the correlation analysis we used the means of the variables and the mean Gini for the developed nations was zero. However, when we look at the relationship between poverty levels, as measured by the poverty headcount ratio at the \$3.20, \$5.50, \$1.90 (Pov320, Pov550, Pov190), and the financial development proxy variables, we notice a lighter shade of blue. This suggests that improvements in financial development might lead to increases in poverty levels for developed countries.

The developing nations tell a slightly different story. When we look at the income share to the poorest ten and twenty percent quintiles, we notice very light shades of blue suggesting that the relationship is weak but positive. Even in the developing nations most of the financial development proxies seem to increase income to the poor. However, the poverty levels show very light shades of red suggesting a weak but negative association. The poverty headcount ratio that shows the darkest shade of red is the \$1.90, suggesting that financial development helps the poorest of the poor in developing nations. FIE (financial institution efficiency) is the strongest association with Pov190 suggesting that of the specific features of the financial sector, the efficiency of the financial institutions such as banks is the most beneficial for incomes to the poor in developing nations. I also note that FME (financial market efficiency) has a positive

association with the Gi (Gini coefficient) suggesting that the financial markets such as the stock market increase inequality in developing nations. This is in line with some of the findings from the literature review which suggested that bank-based financial systems are better suited to alleviate poverty and inequality than market-based financial systems, in a weak institution environment. I base that on the assumption that developing nations are more likely to be associated with weak institutions. It should be noted that this is a pure correlation analysis and correlation does not translate to causation, for that I will perform an in-depth analysis. It should however be highlighted that since the effects of FD are different between the developed and developing nations, this might be suggestive of some financial development-poverty threshold effect such that the developing nations have not yet crossed it while the developed nations have but this will be further investigated.

5. Results and Discussion:

The results are in the tables below. Tables 1 to 3 use the poverty headcount ratio at \$3.20 as the dependent variable. Tables 4 to 6 use the Gini-coefficient as the dependent variable. Tables 7 to 9 use the income share the lowest 10 percent of the income distribution. In each table there are 6 columns of estimates. Each set of 2 columns represent once financial development proxy. For example, column 1 and 2 of table 1 use financial development (FD) as the proxy for financial development and columns 3,4 and 5,6 represent financial markets (FM) and financial institutions (FI), respectively. Column 1 of table 2 uses financial institution access (FIA) as the proxy for financial development, while columns 2 and 3 use financial institution efficiency (FIE) and financial institution depth (FID), respectively. Finally for table 3, column 1 represents financial market access (FMA), while columns 2 and 3 use financial market efficiency (FME) and financial market depth (FMD), respectively. The same method of representation is followed through from tables 4 to 9. Estimating the effect of all the nine indices might be tedious but it was important to do it this way to gain a clearer understanding of the specific channels that financial development impact poverty and inequality through. To save space I did not include all of the control variables, but the full results can be provided upon request.

Table 1: Dynamic Panel Threshold Model 'Dependent variable: Poverty Headcount Ratio \$3.20. Financial Development Proxy: Financial Development , Financial Markets, Financial Institutions.

	FD		FM		FI	
Threshold Estimate ($\hat{\gamma}$)	- 2.242 ***		- 3.817 ***		- 2.150 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.382*** (-3.55)	-0.126 (-0.74)	-0.526*** (-3.65)	-0.0215 (0.11)	-0.743*** (-5.19)	-0.467*** (2.12)
FD/FM/FI	- 0.852 * (-1.80)	1.586 (1.55)	0.0439 (0.44)	0.608* (1.67)	-0.647 (-1.57)	-0.988 (-0.95)
INFL	0.0003** (2.52)	-0.001*** (2.83)	0.0004** (2.42)	-0.0012*** (-4.28)	0.0004*** (2.31)	-0.001*** (-3.81)
GDP	0.237* (1.7)	-0.616** (2.34)	0.274*** (3.34)	-0.071 (-0.58)	-0.077 (0.62)	-0.168 (0.54)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Dynamic Panel Threshold Model 'Dependent variable: Poverty Headcount Ratio \$3.20. Financial Development Proxy: Financial Institution Access (FIA) , Financial Institutions Efficiency (FIE), Financial Institution Depth (FID).

	FIA		FIE		FID	
Threshold Estimate ($\hat{\gamma}$)	- 5.036 ***		- 1.317 ***		- 2.778 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.382*** (-3.55)	-0.126 (-0.74)	-0.776*** (-2.99)	0.011 (0.03)	-0.402*** (-3.32)	-0.205 (-0.91)
FIA/FIE/FID	- 0.869* (-1.76)	-1.138* (-1.65)	-0.205 (-0.61)	-2.433 (-0.90)	-0.063 (-0.26)	0.715 (0.54)
INFL	0.0001 (0.94)	0.001 (2.83)	-0.00006 (-1.03)	0.00002 (0.04)	0.0004*** (2.31)	-0.001*** (-3.81)
GDP	0.237* (1.17)	-0.616** (2.34)	0.274*** (3.34)	-0.071 (-0.58)	-0.077 (0.62)	-0.168 (0.54)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Dynamic Panel Threshold Model 'Dependent variable: Poverty Headcount Ratio \$3.20. Financial Development Proxy: Financial Market Access (FMA) , Financial Market Efficiency (FME) , Financial Market Depth (FMD).

	FMA		FME		FMD	
Threshold Estimate ($\hat{\gamma}$)	- 1.885		- 1.017		- 4.932 ***	
Column	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.0132 (-0.05)	-0.538* (-1.82)	-0.754*** (-7.41)	-0.266 (-1.11)	-0.322* (-1.89)	-0.144 (0.62)
FMA/FME/FMD	0.0654 (0.16)	0.671 (0.65)	-0.133 (-0.91)	-0.451 (-1.40)	0.105** (2.46)	0.300 (1.36)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In most financial development - inequality/poverty literature, the focus of the studies has been on the effect of financial intermediation on poverty and inequality, however the modern financial system encompasses more functions than that. It is important to try identifying the specific parts of the financial system that help reduce poverty and inequality to know the particular channels that financial development takes to reduce poverty and or inequality (Seven & Coksun, 2016). For example, between financial markets such as the stock market and financial institutions such as banks which plays a bigger role in poverty reduction? We also need to consider what is more important in poverty reduction, increasing access to the financial system or improving the efficiency of a financial system. One of the ways that the financial system can help reduce poverty is through boosting economic growth, leading to higher per capita incomes for the population, this is the indirect channel that FD takes in poverty reduction. In this paper I have specifically used per capita income and GDP growth as control variables to try isolate the direct effect that the financial system has on poverty.

The findings seem to suggest a non-linear relationship between economic growth as measured by GDP growth and poverty. At the lower level of GDP region, estimates for GDP growth, suggest a one percent increase in GDP growth is predicted to increase poverty by 0.237 percent and the effect is significant. However, in the above threshold region economic growth is predicted to reduce the poverty headcount ratio at the \$3.20 level by 0.62 percent and this result is highly significant. This finding could be suggestive of some findings that at low levels of economic development, economic growth serves the rich more than the poor because the rich have more access to economic resources that ensure that the returns to economic growth go to them but as more individuals gain more access to economic resources such as access into the financial services then, economic growth works to reduce poverty (Kim & Lin, 2011).

As can be seen from tables 1 to 3, the threshold estimate is highly significant, suggesting two separate regimes, one with a better level of financial development and one with a poor level of financial development. To make things easier to understand, the poorly developed level of financial development is the column falling under $(q_i \leq \hat{y})$ and better developed level of financial development is represented by $(q_i > \hat{y})$. The specific threshold estimate is the initial value of the specific proxy of financial development we are dealing with. So, for example, for

FIA, the initial value of FIA is the threshold estimate that is computed. In table 1 we see that in column 1, financial development (FD) has a negative sign and is statistically significant suggesting that for the less developed level of financial development a one percent increase in financial development is predicted to reduce the poverty headcount ratio by 0.85 percent, *ceteris paribus*. However, the better developed level of financial development is associated with an increase in the poverty headcount ratio, but the result is non-significant. One explanation of this is that the financial development measurement encompasses the financial institutions and the financial markets as a whole and we can see from column 3 that financial markets increase poverty in both less developed and better developed financial markets, with a significant relationship in the better developed region. One of the arguments on why financial markets would not help the poor is that stock markets tend to benefit big corporations due the high associated costs of debt issuance, which excludes the poorest who would not even have the money available to start a company let alone compete with large corporations. It has also been argued that the level of economic development dictates the type of financial structure for a country and that developing countries' financial needs would be best met by a bank based financial system (Seven & Coksun, 2016). In my sample I have included more developing countries than developed ones which might be what the findings on financial markets seem to suggest.

To further support this argument, if we look at column 5 and 6 of table 3, which captures the effect of financial market depth (FMD), for both less developed and well-developed regions, there is a positive and statistically significant relationship (in the less developed region), suggesting that financial markets operations such as the trading of stocks increase poverty levels. A one percent increase in the financial market operations as captured by FMD, is associated with an increase in poverty levels of about 0.11 percent.

Finally, the results suggest that in terms of financial development-poverty nexus, financial institutional access(FIA) has the greatest impact on poverty. In columns 1 and 2, the results suggest that in both developed and less developed regions, a percent increase in financial institution access is associated with a reduction in poverty levels of between 0.869 to 1.138 percent, holding all else constant.

Table 4: Dynamic Panel Threshold Model 'Dependent variable: Gini Coefficient. Financial Development Proxy: Financial Development (FD) , Financial Markets (FM), Financial Institutions (FI).

	FD		FM		FI	
Threshold Estimate ($\hat{\gamma}$)	- 2.077 ***		- 3.482 ***		- 1.642 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.778*** (-5.20)	1.178*** (-0.74)	-0.234 (-1.34)	0.506** (2.35)	-0.665*** (-3.70)	0.726*** (2.79)
FD/FM/FI	-0.611 (-0.88)	-0.843 (-0.45)	0.101 (1.55)	1.488*** (2.76)	1.106 (1.44)	-0.474 (-0.18)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Dynamic Panel Threshold Model 'Dependent variable: Gini Coefficient. Financial Development Proxy: Financial Institution Access (FIA) , Financial Institution Efficiency (FIE), Financial Institution Depth (FID).

	FIA		FIE		FID	
Threshold Estimate ($\hat{\gamma}$)	- 4.997 ***		- 1.306 ***		- 2.315***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.142 (-0.42)	0.240 (0.65)	-0.278* (-1.69)	0.569*** (3.07)	-0.821*** (-4.66)	1.113*** (4.19)
FIA/FIE/FID	2.461** (2.55)	-2.913** (2.54)	1.826*** (2.72)	0.569 (0.22)	-0.385 (-1.02)	4.265** (2.21)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Dynamic Panel Threshold Model 'Dependent variable: Gini Coefficient. Financial Development Proxy: Financial Market Access (FMA) , Financial Market Efficiency (FME), Financial Market Depth (FMD).

	FMA		FME		FMD	
Threshold Estimate ($\hat{\gamma}$)	- 1.053		- 1.125		- 4.376 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	0.492* (1.85)	-0.770*** (-2.82)	-0.0247 (-0.23)	0.223 (0.96)	-0.379 (-0.23)	0.391 (1.24)
FMA/FME/FMD	-0.778 (-0.92)	0.976 (0.39)	-0.278 (-1.12)	-0.640 (-0.70)	-0.337 (-1.41)	0.861 (1.43)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In terms of inequality as measured by the Gini coefficient, the results were surprising as well. Financial development as a whole does not seem to have a significant relationship with inequality. Financial markets do not seem to have a relationship with inequality in the less developed region, however once the threshold is crossed then a one percent increase in financial market development is associated with an increase in inequality of 1.49 percent. This finding is consistent with the argument that it is mostly the rich who have access to stock market operations hence the increase in inequality from financial market operations is due to increases in income to the rich from the stock market than a reduction in income to the poorest. In the table 7, column 3, the results suggested that financial market operations increased income to the lowest ten percent of the income distribution. However, this is not necessarily conflicting to the results we have seen for the Gini. Large firms are most likely to use the stock market to raise capital to invest in large scale operations which hopefully leads to a reduction in poverty and inequality through job creation (Seven & Coksun, 2016). In this way the poor can receive jobs which leads to increased income. However, this job-led increase in income to the poor would be very low compared to the increase in income that large firms receive as return to their large-scale investments hence overall inequality might increase. The data suggest that perhaps financial market operations increase income to the poorest while increasing overall inequality. Access to financial institutions has a highly significant relationship with overall inequality. Column 1 and 2 of table 5 suggests that, in the less developed financial sector development region, an increase in financial development is associated with a 2.5 percent increase in overall inequality but once the threshold is crossed and the financial sector is more developed then, an increase in financial institution access reduces inequality by 2.9 percent. One of the arguments to explain this finding was in the paper by (Kim & Lin, 2011), where it was argued that at low levels of economic and financial development, then only those with unequal access to political connections will benefit from financial development access due to the regulations that seek to protect the rents of the well-connected. However, as the economy develops and the financial sector and financial access with it, corruption and rent-seeking are too costly and credit constraints are less binding hence the benefits of financial sector inclusion improve the lives of the poor.

Table 7: Dynamic Panel Threshold Model 'Dependent variable: Income Share to Bottom 10 Percent. Financial Development Proxy: Financial Development (FD) , Financial Markets (FM), Financial Institutions (FI).

	FD		FM		FI	
Threshold Estimate ($\hat{\gamma}$)	- 2.015 ***		- 2.334*		- 1.324 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	-0.707*** (-4.17)	1.296*** (-0.74)	-0.495*** (-2.52)	0.790** (2.54)	-0.450*** (-2.76)	1.373*** (4.57)
FD/FM/FI	-0.882* (-1.72)	0.862 (0.65)	0.116* (1.90)	0.688 (1.53)	0.874 (1.04)	- 4.760 (-0.92)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Dynamic Panel Threshold Model 'Dependent variable: Income Share to Bottom 10 Percent. Financial Development Proxy: Financial Institution Access (FIA) , Financial Institutions Efficiency (FIE), Financial Institution Depth (FID).

	FIA		FIE		FID	
Threshold Estimate ($\hat{\gamma}$)	- 4.723 ***		- 1.290 ***		- 2.836 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (5)
Lag_Y	-1.116*** (-2.77)	1.076*** (2.92)	-0.520** (-2.36)	1.432*** (3.44)	0.431* (-1.89)	0.788*** (3.82)
FIA/FIE/FID	0.730 (1.41)	- 0.209 (-0.21)	1.486** (2.07)	1.275 (0.32)	-0.246 (-0.67)	3.144** (2.11)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Dynamic Panel Threshold Model 'Dependent variable: Income Share to Bottom 10 Percent. Financial Development Proxy: Financial Market Access (FMA) , Financial Market Efficiency (FME), Financial Market Depth (FMD).

	FMA		FME		FMD	
Threshold Estimate ($\hat{\gamma}$)	- 2.495 ***		- 1.125		- 2.495 ***	
Columns	$q_i \leq \hat{\gamma}$ (1)	$q_i > \hat{\gamma}$ (2)	$q_i \leq \hat{\gamma}$ (3)	$q_i > \hat{\gamma}$ (4)	$q_i \leq \hat{\gamma}$ (5)	$q_i > \hat{\gamma}$ (6)
Lag_Y	0.447 (1.27)	0.716* (1.72)	0.383 (1.33)	-0.391 (-1.09)	-0.468*** (-2.67)	0.427 (1.38)
FMA/FME/FMD	1.098** (-2.06)	3.457*** (3.40)	-0.263 (-1.36)	-0.748 (-1.56)	-0.0837 (1.23)	1.286** (1.96)
R-Squared						
N	58	58	58	58	58	58

Standard error in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

One of the main problems when measuring inequality is that due to how the Gini Coefficient is constructed, a drop in the Gini could come from an increase of income to the poor or a reduction of income to the rich. To ensure that we are measuring the effects of financial development on the incomes to the poor specifically, we need to specifically look at the relationship between financial development and income to the poorest quintiles. Tables 7 to 9, use the income share to the lowest 10 percent of the income distribution. Some interesting findings from the estimation was that of inflation, in the below threshold region, it is predicted that an increase in inflation will increase income to the poorest but once the threshold has been crossed, then inflation is detrimental to the poor. An economic explanation of such a finding could be that at low levels of inflation, perhaps government spending in the form of redistributive measures helps the poor but if the government starts to print more money to give to the poor, then inflation rises which reduces spending power of the currency, which hurts the poor the most as they can buy less with their money. It is also argued that high levels of inflation reduce the effectiveness of financial intermediation because it makes money worthless leading to policies that interfere with the operations of a financial system. In this way inflation distorts the financial systems way of allocating resources efficiently (Kim & Lin, 2011). Compared to the findings on absolute poverty, financial institution access does not seem to have a significant relationship with income to the poorest in society. However, in column 3 of table 8, the results suggest that in the less developed region, a one percent increase in the efficiency of financial institutions is associated with an increase of income to the poorest 10 percent of 1.47 percent. However, once the threshold is crossed, then the relationship is insignificant, but the relationship is still positive. One of the main functions of a financial system is to take in funds from savers and then give out money to borrowers to use in investable projects. The more efficient the financial system is then the more likely that the projects it decides to invest in will be successful ensuring higher return to the institution. The more successful the projects, then the more likely it is that there will be economic growth and more jobs created in a country, in this way more income might be transferred to the poorest in society (Seven & Coksun, 2016). In the less developed region, financial institutional depth is insignificant, however once the threshold is crossed, then the estimates suggest that a one percent increase in FID as seen from column 5, is associated with an increase of income to the poor of 3.14 percent. One of the arguments to explain this finding is that at low levels of financial and economic development, which could be represented by the less developed region, capital might be scarce, then we might have a situation where the rich and politically connected are able to prevent small firms and the poor from accessing the financial system and terms of receiving credit. However, as a country becomes more developed hence more capital and the financial system also become more sophisticated than it is more likely that society will require institutions that reduce the corruption often associated with low economic development leading to more credit availability for the poor and an increase of income to the

poor (Kim & Lin, 2011). The most interesting and significant finding was for financial market access in column 1 and 2 of table 9. The findings suggest that at the less developed region, an increase in the financial market access is associated with a 1.1 percent reduction in income to the poorest but once the threshold is crossed then an increase in financial market access is associated with an increase in income to the poorest of 3.6 percent. This finding was highly surprising in that most of the literature suggests that financial markets operations as proxied by the stock market would be detrimental to the poor. It is important to note that in our preliminary analysis, the results showed that there was a strong and positive relationship between FMA, and income share to the poorest for the developed countries but for the developing countries, there was a slightly negative relationship. In a 2011 paper, Kpodar and Singh suggest that in a weak-institution environment, a bank-based financial system is better for the poor but with an improved institutional development, financial markets are better for the poor (Seven & Coksun, 2016). In the less developed region, perhaps most of the countries would be the developing ones based on the assumption that the developed nations have better developed financial systems. If we also allow for the assumption that institutions are less developed in developing nations than in the developed ones, then the reduction in income to the poor from improved financial markets access would make sense in the less developed region. However, once we are above the threshold then perhaps more developed nations fall into this category with an assumed better institutional capacity hence increases in financial market access are associated with an increase in income to the poorest.

6. Conclusion:

There has been a considerable amount of work that has been done to estimate the relationship between financial development, inequality and poverty. However, most of the work has focused on the depth of the financial sector as measured by the private credit as a percentage of GDP. The literature has also assumed a linear relationship between financial development and inequality. In this paper the aim was to capture the multidimensional features of the financial sector and the effects they have on poverty and inequality but also to look for any non-linear effects. In most of the relationships we did find evidence of a non-linear effect between financial development, poverty and inequality. This suggest that previous studies that assumed linear relationship might have been imprecise. Institutional access seems to have the strongest relationship with poverty reduction. However, this relationship was surprising in that at low levels of financial development, increased financial institution access increases the poverty levels but after a specific threshold then poverty is reduced. This seems to suggest that developing countries that have high poverty levels should focus on a bank-based financial system to ensure that poverty levels are reduced but also more importantly that the financial system develops fast enough to ensure that it crosses the threshold where it reduces poverty. I think one of the most interesting findings in this article is that

even though financial market operations as measured by the stock market operations can increase income to the poorest in society, overall inequality can still rise since large firms who are the most likely users of the stock market would receive a larger return on their investments than the poorest would receive from the job-led income increase. Jobs which are a result of the investments that firms make from sourcing capital from the stock market. However, whether this increase in job-led income increase can lead to an overall reduction in poverty levels for emerging economies specifically, should be a topic of future research.

For future areas of investigation, it would be good to separate the effects of the different financial development proxies depending on whether the countries are developed or developing. In this study I was not able to separate the sample into developing and developed because there was too much missing data for the developing countries and the results were highly suspicious. Another major limitation of my study is that I was not able to use the Stata commands to verify the validity of my instruments.

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