

DOES BANKING SECTOR DEVELOPMENT REDUCE INCOME INEQUALITY? EVIDENCE FROM A GLOBAL SAMPLE

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ABSTRACT

Financial inclusion has always been considered a necessity for balanced socio-economic development in any economy. Banking sector is the pivotal institution in financial mobilization, and in creating wider and easier access to finance to improve the socio-economic condition of people. From this developmental role view of banking sector, this paper empirically investigates the role of banking sector development in reducing income inequality from a global scale. This research uses Driscoll Kraay regression with Fixed Effect and System GMM estimation on data of 52 countries for 2004 to 2014 using several banking sector variables and 'Gini' coefficient as the measure of income inequality. Findings suggest that bank credit significantly reduce income inequality however wider banking coverage and higher real interest rate contribute to increased inequality. The impact of higher 'lending to deposit spread' is mixed. The research controls for other economic and social variables' like unemployment, female labor force etc. to ensure robustness of the results derived. Since banks are the most financial power hub in an economy, findings from this paper suggests several policy implications to enhance the role of the banking sector in minimizing income inequality within society. This study adds to the existing literature by: so far, being the first hand examination of the role of different banking sector variables on income inequality.

JEL classifications: D3, D6, G2, E5, E6, I3

Key word: banking, income inequality, gini, credit, financial development

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INTRODUCTION

Inequality means differences in standard of living, wealth, wages and income opportunities among the residents throughout an economy. Although it is closely related to poverty, inequality is a far-reaching issue as it is related to the total population rather than the population living below the poverty line (Nebebe & Rao, 2015). The rise of income inequality impedes social bonding and it has a negative effect on the economic growth and poverty reduction (Kumar, 2014). Moreover, severely high income inequality often creates political unrest and social tension as the rich try to apprehend the political and economic policy decisions into their favor (Tita & Aziakpono, 2016). Again, societies that have income disparities for a longer period, devotes less resources on human capital development like; education and health services (Kawachi et. al., 1997). Several cross country researches have shown that mortality rate and income inequality are closely related. Higher discrepancies in income distribution lead to an escalation of mortality rate in the society. Consequently, previous empirical researches suggest that continuous high level of income inequality reduces human welfare.

The influence of income inequality on economic growth has been a subject of many experiential researches. However, the findings of these studies are mixed and ambiguous. The traditional view is income inequality should foster economic growth. Supporters of the view claim that more unequal societies are destined to develop economically, faster than the societies with more balanced income distribution (Stiglitz, 1969; Bourguignon, 2004, Michael Todaro¹). Conversely, many researchers have reexamined the effect of inequality on economic growth after the development of the endogenous growth theory and availability nation's income and growth data for large volume of countries. Remarkably, the results suggest that increasing inequality reduces the rate of economic growth, a reverse to the customary view. The recent studies have concluded that equal distribution of income is

¹Michael Todaro, Economic Development (1997), pp 165-166.

pivotal to economic growth (Alesina & Rodrick, 1994; Perotti, 1992, 1993, 1996; Persoon & Tabellini, 1994; Hausmann & Gavin, 1996).

Numerous, researchers have tried to identify the causes of the discrepancy in income by using a wide range of econometric approaches. Some noticeable determinants which have been well documented in the empirical researches are rapid urbanization and industrialization, skill based technological progress, changes in organizational structure, globalization, differences in political and economic institutions, corruptions, investment in public capital, budget for a welfare state, microfinance, unavailability of credit for poor and lastly, the level of financial development². In this paper, we will focus on understanding the relationship between financial sector developments, especially, expansion of the banking sector with income inequality. While some empirical results concluded that financial sector development, better credit facility for the poor and availability of micro credit can reduce the discrepancy in income remarkably, no previous empirical study so far has attempted to find the impact of banking sector development (measured by; number of bank branches, lending and deposit spread, real interest rate and domestic credit provided by the private sector) on income inequality. The primary objective of this study is to examine whether banking sector development can reduce income inequality using the latest data for fifty-two countries of diverse geographical areas and different income levels. We contribute to the existing literature in different ways: (i) we use four different indicators of banking sector development while available studies have used only 'domestic credit provided by the banking sector' in examining variation in income inequality, (ii) we control for economic development and national income, and other social indicators to obtain robust result, and (iii) being the first using a comprehensive set of banking indicators, this study would provide insight to the policy makers in banking sector regulation and management with welfare perspective.

LITERATURE REVIEW

The empirical research on inequality is multifarious, some researches focused on cause and others on the consequences income inequality in the society. Numerous studies examined the effects of wealth and wage inequality on economic growth. The traditional view claims that reducing income inequality requires redistribution of income and wealth through tax. Hence, the incentive to accrue wealth falls which lowers the rate of economic growth. Thus, equality lowers economic progression (Okun, 1975). There is another customary theory of investment indivisibilities which advocates that large investment requires large amount of money. For an economy where the financial system is under developed wealth inequality provides adequate funds (among the rich families) to cover enormous initial investment expenditures. Similarly, in his book *Economic Development*, Michael Todaro mentioned that higher inequality can foster a sustainable economic growth as people with low income are biased towards cheap local productions. However, recent literatures have challenged the idea of inequality as being virtuous for economic growth. These researchers have identified income inequality as being detrimental to economy as well as for the society. For example, Alesina and Rodrik (1994) in their study for the period of 1960 to 1985 concluded that higher income disparity and wealth (land) discrimination can slow down economic development. Similar results were also found by Persoon and Tabellini (1994), Perotti (1996), Benabou (1996) and Deininger and Squire (1998).

From another standpoint, Kuznet (1955) concluded that income inequality increases at the early phases of economic growth due to workers movement from agriculture to industry and inequality recedes with economic development. His concept was supported by Jeong (2005) who used micro data of 82 countries and found the association between economic development and income inequality is quadratic. However, Ravallion (2004) contradicted the idea by showing that economic growth and income distribution are not significantly related. A number of contemporary studies using newly constructed large cross-sectional data have also disproved the theory of inverted-U curve of Kuznets saying that either there is no connection between inequality and growth or the relationship is country specific (see, Still and Barro, 1999; Li, Squire and Zou, 1998; Bourningon, 2004; Bruno et.al., 1996).

While attempting to understand the consequences of inequality previous scholars have categorized many aspects in their empirical works. For example, Kawachi et al. (1997) stated that high income inequality aggravates frustration, which is harmful for health and McKay (2002) said that rising income inequality is a major cause behind rising social discontent and crimes. Similar views were expressed by Fuentes-Nieva & Galasso (2014) who showed that higher income inequality disturbs social unity. Again, when in an unequal society the rich acquire political power to influence government's decisions social solidarity falls apart causing turbulence in the society. In addition, in

²Buliř & Gulde, 1995; Aghino & Howitt, 1997; Acemoglu, 2002; Alesina & Glaeser, 2005; Persson & Tabellini, 2005; Iverson, 2005; Rossi & Hansberg, 2006; Chong & Caderon, 2008; Rehman et. al., 2008; Chatterjee & Turnovsky, 2012; Schaldergger & Weder, 2014; Bergh & Bjørnsko, 2014; Acemoglu & Robinsone, 2015; Angyrids, 2016.

an unequal society more people are likely to choose governments who promise to redistribute income through tax. If the redistribution of wealth reduces incentive to invest, this will slow down economic growth and poverty reduction rates (Alesina & Rodrik, 1994; Persson & Tabellini, 1994).

Another debatable discussion regarding inequality among the academics is the relationship between financial development and discrimination in income. For instance, according to Beck, Demirgüç-Kunt and Levine (2007) financial development assists the poor to achieve a faster income growth hence reducing inequality. Again, there is another hypothesis that says income disparity escalates at the earlier periods of financial development and diminishes at the advanced phase (Greenwood & Jovanovic, 1990). They proposed that at the later stage of the financial development the financial intermediaries including banks become more efficient because of experience and economies of scale. Higher efficiency lowers the cost of bank credit and demand for credit goes up. Consequently, poor people can afford to get credit at lower cost to invest in income generating activities (IGAs) and in improving human capital. As a result more efficient and advanced financial sector should lessen inequality. Parallel views were presented by Tan & Law (2012) who pointed out three phases; firstly, a financial development reduces income inequality, then a phase of no change and lastly, the final phase of increasing income inequality with additional financial advancement. In addition, Kim & Lin (2011) in their study with instrumental variable threshold regression approach concluded that banks and stock market development can only decrease income inequality after achieving a certain level of development. Again, Beck et al (2004) found that income of the poorest twenty percent increases at a higher rate than the average per capita GDP in countries with higher level of financial development. Beck et al (2007) suggested that financial development increases social welfare while promoting economic growth and decreasing income inequality. He also stated that countries with well-developed financial system tend to reduce income discrimination faster. In another study Batou et al (2010) analyzed the relationship between financial development and income inequality in twenty-two African countries from the year 1980 to 2004. The results of the study indicate that financial development reduces income inequality.

Some researchers argue that banks are important financial intermediaries whose main function is to facilitate investment and consumption by reducing credit constraints. But, because of imperfections in the financial system particularly in the underdeveloped economies there is a lack of credit facilities for the underprivileged. Unavailability of capital impedes participation in human capital development and in IGAs. Their lack of skill terminates the potentiality of earning higher future incomes. In an empirical study Galor & Zeira (1993) concluded that as banks require collateral for credits, the poorest in the society cannot take benefits of banking sector development. Therefore, income inequality rises. Because of the capital market imperfections poor people will borrow only a small amount reducing their opportunity to become an entrepreneur. Thus, financial development will only create workers who work for the rich widening income inequality in the society (Clarke, Xu & Zou's, 2006). Again, Kai & Harmoi (2009) examined the impact of globalization and financial expansion on income inequality in 29 sub-Saharan Africa with data from 1980-2002. The results of the study indicate that although financial development promotes equality, but its impact diminishes with globalization since increased globalization shifts the financial assets more towards the rich widening income disparity.

Reasonably large number of research have focused on understanding the question whether financial and banking sector development can promote economic growth with mixed conclusions (see Kjosovski, 2013; Foo, 2005; Fink, Haiss & Vuksic, 2005; Watchel, 2001; Arestis et al, 2001; Levine, 1997; Demetraides & Hussain, 1996; Buffie, 1984; Patrick, 1966). However, very few researchers have examined the direct relationship between banking sector development and income inequality. Schumpeter (1912) (cited from Yu & Gan, 2010) recognized the role of banks in redistributing income for the first time. He estimated that banks can identify potential entrepreneurs of all backgrounds to rearrange resources. Similarly, Shairai (2001) and Isik & Hasan (2003) concluded that well-functioning banking sector is pivotal to allocate resources effectively and efficiently. However, no research has yet focused on finding, does banking sector development reduce income inequality or not. Advancement of the banking sector like, more bank branches and increasing private sector credit by banks can play an important role in redistributing resources efficiently while channeling funds to the poor at low-cost. The main focus of this research is to analyze whether advancement in the banking sector can decrease income inequality.

METHODOLOGY

The study estimates the link between banking sector development and income inequality using data from 2005 to 2014 for 52 countries selected based on data availability. We use 'Gini' data as a measure of income inequality. We use the following banking sector variables: (i) Number of Branches per 100 population (Nbr), (iii) Lending-Deposit Interest Rate Spread (LDs), (iv) Domestic Credit to Private Sector as percentage of GDP (DCPS), and (vi) Real Interest Rate (RIR). Based on the available literatures, we also use the following control variables: GDP per capita

(logGDPpc), Unemployment Rate (Unemp), Government Final Consumption Expenditure (GCE), and percentage of Females in Total Labor Force (FLF). All data are collected from the World Development Indicators (WDI) database of the World Bank. Therefore, we derive the following model for estimation:

$$gini_{it} = \gamma + \beta_1 \ln gdppc_{it} + \beta_2 Nbr_{it} + \beta_3 LDs_{it} + \beta_4 DCPS_{it} + \beta_5 RIR_{it} + \beta_6 Unemp_{it} + \beta_7 GCE_{it} + \beta_8 FLF_{it} + \varepsilon_{it} \dots\dots\dots(1)$$

To deal with endogeneity problem and also examine the lag effect of variables, we estimate the same equations using lag of all variables:

$$gini_{it} = \gamma + \beta_1 \ln GDPpc_{it} + \beta_2 Nbr_{it} + \beta_3 LDs_{it} + \beta_4 DCPS_{it} + \beta_5 RIR_{it} + \beta_6 Unemp_{it} + \beta_7 GCE_{it} + \beta_8 FLF_{it} + \beta_9 L1gini_{it} + \beta_{10} L1 \ln GDPpc_{it} + \beta_{11} L1 Nbr_{it} + \beta_{12} L1 LDs_{it} + \beta_{13} L1 DCPS_{it} + \beta_{14} L1 RIR_{it} + \beta_{15} L1 Unemp_{it} + \beta_{16} L1 GCE_{it} + \beta_{17} L1 FLF_{it} + \varepsilon_{it} \dots\dots\dots(2)$$

Using several diagnostic tests as reported in Table-1, we find that both equation (1) and (2) suffer from cross section dependence, moving average (MA) serial correlation in addition to AR1 and heteroskedasticity problem. To deal with all these issues, we chose Fixed Effect estimation with Driscoll-Kraay Standard Errors (DKSE) which is adjusted with appropriate lag orders.

TABLE 1. DIAGNOSTIC TEST RESULTS

All Countries	Test	Equation (1)	Equation (2)
Serial Correlation (AR1)	Woolridge	0.0003	0.0000
Serial Correlation (MA)	Cumby-Huizinga (Arellano-Bond)	0.0030 at lag 9	0.0356 at lag 6
Heteroskedasticity	Modified Wald	0.0000	0.0000
Cross Section Dependence	Pesaran CD	0.0004	0.0035
Final Estimation Method		Driscoll-Kraay standard errors (lag 9)	Driscoll-Kraay standard errors (lag 6)

Source: Author constructed

Since GMM estimations are more efficient and superior than Fixed Effect estimates, we also utilize dynamic panel data estimation technique using System GMM. Arellano–Bond (Arellano and Bond 1991) first developed the ‘differenced GMM’ and later was augmented as System GMM by Arellano–Bover/Blundell–Bond (Arel-lano and Bover 1995; Blundell and Bond 1998). We first look at the difference GMM. The model is as follows:

$$gini_{it} = \gamma_t + (\delta + 1)gini_{it-1} + \beta X_{it} + u_{it} \dots\dots\dots(3)$$

$$\Delta gini_{it} = \gamma_t + (\delta + 1)\Delta gini_{it-1} + \beta \Delta X_{it} + \Delta u_{it} \dots\dots\dots(4)$$

Where, X_{it} denotes the vector of all explanatory variables γ_t stands for period specific intercept terms to capture the common changes to all countries and u_{it} is the time variant idiosyncratic error term. This difference GMM estimator was augmented by incorporating additional assumption that first differences of the instrument variables are uncorrelated with the fixed effects. This allows the introduction of more instruments and thus, can improve efficiency highly (Roodman, 2009). Hence, the System GMM estimates a system of two equations—the original equation and the transformed one. We do not provide the details of the extension from difference to System GMM as it has been explained widely by many literatures most methodically and popularly by Roodman (2009). In addition, System GMM is useful for ‘Small T’ and ‘Large N’ which matches our case as we have T=10, N=52. Alike the DKSE estimation of equations (1) and (2), we estimate System GMM for two models: with and without lagged variables. Here, we use System GMM instead of the difference GMM as the later sometimes shows downside

bias. Although methodologically, GMM estimation is more efficient than Fixed Effect estimation, we present both results to compare and draw meaningful conclusions. However, when results are inconclusive, we put more emphasis on the results obtained by System GMM over FE estimations.

We present below the correlation matrix Table-2 and we find no significant multicollinearity problem which is also supported by the VIF test result (mean VIF 1.61).

TABLE 2. CORRELATION MATRIX

	Gini	logGDPpc	Nbr	LDs	DCPS	Unemp	RIR	GCE	FLF
Gini	1								
logGDPpc	-0.469	1							
Nbr	-0.106	0.3626	1						
LDs	0.4553	-0.4406	-0.1264	1					
DCPS	-0.111	0.0806	0.0509	-0.0471	1				
Unemp	-0.002	-0.3194	0.0274	0.0073	-0.044	1			
RIR	0.3463	-0.2521	0.0143	0.722	-0.0247	0.1223	1		
GCE	-0.577	0.431	0.1353	-0.2496	0.0396	-0.014	-0.0614	1	
FLF	-0.503	0.1832	-0.0335	-0.2106	0.0438	-0.0361	-0.2115	0.2681	1

We can see from the table above that all explanatory variables show expected correlation sign with gini. GDP per capita (GDPpc) as an indicator of economic development and national income, Number of branches (Nbr) reflecting the coverage of banking services and Domestic Credit to Private Sector (DCPS) have negative correlation signifying increase in these variables is correlated with reduction in income inequality (Gini). Such negative correlation is theoretically expected. The same is true for Government expenditure (GCE) and Female participation in Labor Force (FLF). Increase in Lending Deposit spread (LDs) (as an indicator of welfare reduction of both borrower and savers) and Real interest rate (causing reducing value of assets, reduction in credit flow) show positively correlated with Gini which is also theoretically supported.

ANALYSIS, RESULTS AND DISCUSSION

We report the results of both System GMM and FE DKSE in Table-3. The estimation results suggest that banking sector indicators significantly influence income inequality with some contradictory outcomes. For example, the variable number of branches shows conflicting results between DKSE and one step System GMM estimation. But private sector credit projects significant negative impact across three estimations except for DKSE estimator without lag. This is intuitively eloquent because banking credit can help to eradicate income inequality by enhancing access to capital for the poor. Banks provide credit to people who need it and also develop investment and employment opportunities. As the banks become more efficient in providing services they can provide low cost loans to the people. Low cost funds increase the profitability of the businesses. Again, as the number of bank branches goes up there is an opportunity to achieve economies of scale to reduce the fees of banking services. Thus, it has the potential to significantly contribute in narrowing down the income disparity in an economy.

The FE DKSE estimate suggests that increase in number of branches significantly reduces income inequality. However, it changes sign when estimated with System GMM. The FE result seems meaningful in the first place since higher number of branches implies higher regional and population coverage. The more the poor people are covered under banking services network, the more access to finance and credit can be ensured. Access to low-cost and stress-free fund enables the underprivileged people to start with self-employment income generating activities that create greater income opportunities reducing income vulnerability. As GMM estimation is superior to FE estimation, it is interesting to find that System GMM suggests that higher number of branches contributes to increase in income inequality. The System GMM may be critically important as it may suggest that banks are increasing their network and coverage however not reaching out the people who need them most. Noticeably, banks are usually profit generating entities and do not intend to provide financial services to them who do not pass a minimum of financial status. Therefore, often banks aim to catch up the middle-income to higher-income segment of

population and compete in the high-end market. In such situation, often the poor or low-income households cannot access banking services either banks coverage has left them out or they do not meet the minimum financial or social criteria required to avail banking products and services. Consequently, banks often are more biased towards covering high-income market and providing them financial services. This creates further investment and income generating opportunities for the already higher income or rich pool of population leaving the poor or lower income pool out of reach. Lastly, the final outcome of such scenario would essentially be increasing disparity and divergence of income between the rich and the poor. Based on the methodological superiority, we prefer to rely more on System GMM results and thus we comment that increase banking sector coverage through increased number of branches is perhaps highly biased towards high-income market which inherently is helping inequality to rise.

Lending to deposit interest rate spread shows significant negative impact on income inequality when estimated by both approaches with lagged variables. However, System GMM without lag shows no significant impact of the lending deposit spread on inequality. The negative coefficient is somewhat interesting since higher spread is supposed to be positively impacting income inequality. Because, higher interest rate spread means increasing differences between lending interest rate and deposit interest rate. So, increasing lending rate essentially contracts credit flows, limiting access to credit and finance and thus constricting investment and employment for the poor thereafter. Such difference may go up because of increase in lending rate (while deposit rate stays same) or decrease in deposit rate (while lending rate stays same) or divergence of both at the same time. Moreover, increased lending rate would make many lower-income or poor household incapable to borrow anymore. This would create significant reduction in access to finance for them and reduce their income generating activities. On the other hand, decreasing deposit rate would necessarily cause higher consumption expenditure, reduction in national savings and investment intermediation and finally loss in interest income for the savers. Such reduction of interest income is significant for poor or low-income households. Alternatively, lower interest rate would discourage small savers or poor or low-income group population to save and thus would indirectly entice their consumption expenditure. The low-income population generally has a high propensity to consume. Therefore, higher LD spread is expected to be positively contributing to income inequality. Our results for System GMM show the opposite. One reason could be that the lending deposit of a particular year does not affect the income inequality of that year. It takes some time for the high spreads have a significant influence on the borrowings of the poor. For lag lending deposit spread, the FE result has significant and positive sign and the System GMM demonstrate positive but insignificant relationship with inequality. Although, we prefer System GMM, the FE estimation result of course supports the theoretical expectation.

Real interest rate appears to be positively affecting income inequality. It implies that the higher the real interest rate the higher the income inequality, which makes sense. Because, any increase in real interest rate would contract investment activities that ultimately slows down economic activities. Therefore, reduction in unemployment may result in increasing income inequality. Moreover, higher interest rate would cause many potential borrowers especially the poor or lower income households to go out of capacity. Hence, they would refrain from borrowing. This in turn would affect their economic activities creating loss in income opportunities.

The estimation results indicate that GDP per capita significantly reduces income inequality (suggested by the FE results). The impact is also negative with System GMM though not significant. But we can generally comment on the results that the higher the national income of countries or the higher economically developed countries are the lower is the income inequality. This is quite expected since the more economy grows and develop it generally has an upward shifting effect on general income level. Of course, the inequality or disparity of income would remain same if such development impact is not more biased to the poor or low-income households. Hence, FE estimations shows significant negative impact of GDP per capita but its insignificance in System GMM may suggest that GDP per capital growth or economic development is perhaps not biased to the poor or low-income group.

Conversely, although unemployment rate is surprisingly not significant under System GMM, it is found to be significant in the FE estimation without lag. This significance is also important since increase in unemployment essentially increase more people with income loss and vulnerability. One probable explanation for the insignificant relationship in the System GMM results is the unfair low level of salary for the poor. Often, because of low wages employment does not improve the economic condition of the poor people. Again, Government final consumption expenditure shows significant negative impact on inequality in FE results however not significant in System GMM. May be due to the inefficiency and ineffectiveness of the government expenditure it fails lessen income inequality. Although we prefer System GMM, the FE result is also seems consequential here implying that increased government expenditure would make more disposable income for all and thus would help poor or low-income households to improve their livelihood. Female labor force has strong negative impact income inequality as shown

by FE estimation and System GMM result without lag also supports this result. This is also meaningful because in low-income households, accessibility and availability of job for women has strong role in their empowerment and often, women takes the responsibility of family management. In addition, in such households, working women alongside their male counterparts improves the income, savings, investment, health and overall sustainability of the families contributing to reduction of income inequality.

TABLE 3. ESTIMATION RESULTS FOR ALL COUNTRIES

	FE Estimation DKSE (9)	FE Estimation with Lag DKSE (6)	System GMM	System GMM with Lag
GDP per capita (log)	-6.015 * (.308)	-2.632 ** (1.182)	-.116 (.091)	-1.163 (1.567)
Private Sector Credit	0.0001*** (.000)	-.0001 ** (.00004)	-.0001 * (.00004)	-.0002 * (.00001)
No. of Branches	-0.007*** (.004)	-.0196 (.0150)	.005 ** (.002)	.006 (.012)
LD Spread	0.019 (.024)	-.0247 *** (.0129)	-.005 (.029)	-.084 *** (.049)
Real Interest Rate	-0.007 (.014)	.020 *** (.010)	.032 *** (.016)	.027 *** (.015)
Unemployment Rate	0.093* (.030)	.0266 (.0171)	-.011 (.020)	.047 (.060)
Govt. Expenditure	-0.186* (.033)	-.070 * (.025)	-.046 (.038)	-.090 (.072)
Female Labor Force	-0.081*** (.045)	-.426 ** (.177)	-.096 ** (.039)	-.346 (.276)
L1.Gini	-	.512 * (.065)	.897 * (.033)	.965 * (.011)
L1.GDP per capita (log)	-	-.732 (.878)	-	1.157 (1.556)
L1. No. of Branches	-	.024 (.019)	-	-.003 (.012)
L1.LD Spread	-	.073 ** (.036)	-	.058 (.043)
L1.Private Sector Credit	-	-.0001 * (.00001)	-	-.0001 ** (.00002)
L1. Unemployment Rate	-	-.036 *** (.018)	-	-.049 (.055)
L1. Real Interest Rate	-	.010 (.010)	-	.001 (.013)
L1. Govt. Expenditure	-	-.018 (.033)	-	.094 (.064)

L1. Female Labor Force	-	.422 * (.141)	-	298 (.266)
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* 1%, ** 5%, *** 10% significance. Figures in parenthesis are standard errors.

TABLE – 3. ESTIMATION RESULTS FOR ALL COUNTRIES (CONTD.)

	FE Estimation DKSE (9)	FE Estimation with Lag DKSE (6)	System GMM	System GMM with Lag
R- Squared	0.2853	0.5002	-	-
Prob>F	0.0000	0.0000	0.0000	0.0000
N	52	52	52	52
Observation	520	468	468	468
Arellano-Bond test for AR(1) in first differences:			Pr> z = 0.000	Pr> z = 0.000
Arellano-Bond test for AR(2) in first differences:			Pr> z = 0.328	Pr> z = 0.327
Sargan test of overid restrictions: chi2(43) = 72.25			Prob > chi2 = 0.003	Prob > chi2 = 1.000
Hansen test of overid. restrictions: chi2(43) = 44.41			Prob > chi2 = 0.412	Prob > chi2 = 1.000
Difference-in-Hansen tests of exogeneity for GMM instruments for levels				
Hansen test excluding group: chi2(35) = 37.20			Prob > chi2 = 0.368	Prob > chi2 = 1.000
Difference (null H = exogenous): chi2(8) = 7.21			Prob > chi2 = 0.514	Prob > chi2 = 1.000
Difference-in-Hansen tests of exogeneity for IV				
Hansen test excluding group: chi2(35) = 38.78			Prob > chi2 = 0.303	Prob > chi2 = 1.000
Difference (null H = exogenous): chi2(8) = 5.63			Prob > chi2 = 0.688	Prob > chi2 = 1.000

We find that one-year lag of Gini can significantly cause an increase in following year's Gini supported by both FE and System GMM results. The expectation of positive impact of LD spread is somewhat observable with one-year lag LD spread. However, it is only supported by FE estimation with lagged variables and System GMM has support for this. We can see the strong negative impact of one-year lag of private sector credit which supports the findings and arguments we provided for current year credit. This means that any credit provided in previous year has strong income inequality reduction impact in this year. Again, one year lag of unemployment rate and female labor force show significant impact however we discount them as they seem to be inconsistent with theory and not supported by System GMM which we prefer to accept.

As we can see from our results, our System GMM estimations well pass the Arellano-Bond test for autocorrelation (AR2), Sargan test and Hansen Test for over-identification of instruments and Hansen Test of exogeneity.

CONCLUSION

In this empirical study we estimate the impact of banking sector development on income inequality using both FE and GMM estimations. Although methodologically, GMM estimation is more efficient than FE, we present both results to compare and draw meaningful conclusions. However, when results are inconclusive, we prefer the results obtained by System GMM over FE estimations. Here, we find that private sector credit and its one-year lag shows significant negative impact on income inequality. Nevertheless, although bank credit is reducing inequality, we find that growth in coverage through greater number of branches is increasing inequality. It implies that the positive impact of banking sector credit growth is channeled through economic activities (e.g. investment) however not through creating wider access to finance or financial inclusion. That means only higher number of branches does not guarantee credit and better income opportunity for the poor. Appropriate policies need to be devised and implemented so that banks are encouraged to distribute low cost credit to the population with lack of financial resources. Our results also suggest that the increased coverage of banking network is perhaps highly biased towards high-income market which inherently is helping inequality to rise. As expected, we find that real interest rate is also

contributing in increased income inequality through limiting access to credit or finance and reduced income opportunities. Again, employment of the female population can significantly reduce income inequality. Interestingly, although higher LD spread is expected to increase income inequality, the results are contradictory. System GMM rejects the hypothesis but the FE estimation supports it somehow.

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