WHAT FORM OF FINANCIAL DEVELOPMENT WORKS BEST FOR POOR IN RURAL INDIA?

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Abstract

This paper examines the direct (microcredit), medium-direct (bank credit), and indirect (through economic growth) effect of financial sector development (FSD) on rural poor in India using state-wise annual data from 1999-00 to 2011-12 (for the years 1999-00, 2004-05, 2009-10, and 2011-12). A dynamic panel data analysis for a sample of 15 major Indian states using the generalized method of moments estimators provides an empirical evidence for the direct (microcredit), medium-direct (bank credit), and indirect (economic growth) effect of FSD on rural poor. The paper proposes that formal financial services by banks are primarily availed by non-poor and urban population and hence acts as a medium-direct channel whereas the semi-formal financial services by microfinance institutions specifically target the rural poor and act as a direct channel to affect the poor. It is the first ever study to use state-wise data on microcredit disbursed under Self-help Group Bank Linkage Programme to assess the direct impact of FSD on rural poor. Our findings suggest that the reduction in poverty seems to be not fully converting into reduction in income inequality between the richest and the poorest 20 percent. While bank credit disproportionately increases the income of the bottom 20 percent and reduces income inequality, microcredit with high chances of doing so, fails. The poorest seem to be the hardest hit victim of access to finance channel with both the channels increasing the income inequality among the poor. The study questions the social banking initiatives of the government in rural areas where more than 80 percent of the poor reside. There is a need for restructuring financial inclusion programmes with a shift in their focus on rural areas and an improved mechanism to target the poor.

Keywords: Financial sector development; Poverty; Inequality; Microcredit; SBLP

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1. Introduction

The relationship between financial sector development (FSD) and poverty reduction in developing countries has received much attention from academics, practitioners, and policymakers in recent times. The two key channels of financial development which are regarded to affect income inequality and poverty levels are economic growth (the indirect channel) and the access to finance channel (the direct one). The linkage between FSD and economic growth through efficient allocation of savings and enhancement of productivity has been extensively examined (e.g. Goldsmith, 1969; Jung, 1986; King and Levine, 1993; Calderon and Liu, 2003; Kar *et al.*, 2011; Nyamongo *et al.*, 2012; Menyah *et al.*, 2014). Extending the finance-growth nexus, researchers also examined the indirect link between FSD and poverty reduction through economic growth (e.g. Beck *et al.*, 2004; Honohan, 2004a; Odhiambo, 2009) and also between FSD and income inequality (e.g. Christopoulos and Tsionas, 2004; Ang, 2010; Tiwari *et al.*, 2013).

Another set of studies that examine the direct effect of FSD on poverty through improved access to finance include Honohan (2004b), Jeanneney and Kpodar (2011), McKenzie and Woodruff (2008), McKenzie *et al.* (2008), Akhter and Daly (2009), Inoue and Hamori (2012), Bruhn and Love (2014) and Sehrawat and Giri (2015a); and on income inequality include Mookherjee and Ray (2006) and Hamori and Hashiguchi (2012). Poor benefit from financial sector when they have access to financial services which strengthens their asset base and improves their productivity. However, the poor people's access to formal financial services offered by banks in developing countries is very limited forcing them to use informal sources of finance which are expensive as well as risky. Information asymmetry and high fixed costs of borrowing act as the key barriers to poor people's access to formal finance (Stiglitz, 1999). Also, financial institutions evaluate prospective clients on their entrepreneurship and lend those who have highest chances of successful repayment (Agenor, 2004) and thus primarily benefit the rich. A series of studies conducted by Allen *et al.* (2005/2012a/2012b) document the insignificant contribution of the formal financial sector compared to the informal financial sector in the economic development of developing countries such as India, China, and Kenya.

The sceptical views and evidences over the positive effect of formal finance on poverty alleviation and inequality reduction resulted in the pressing need for financial services dedicated for poor which brought the concept of microcredit in 1990s in many developing

countries. Across regions, microfinance has gained much attention of the policymakers and the sector too has witnessed tremendous growth yet there are no clear evidences of its positive impact on target clients (Armendariz de Aghion and Morduch, 2005). A review of the existing impact assessment studies of microfinance services provides mix evidence.

Thus, the existing literature on the finance-growth-poverty nexus discusses the indirect (through economic growth) and direct channels (better access to financial services) through which the FSD affects the poor. This paper goes one step further and proposes that formal financial services provided by banks is primarily availed by non-poor and urban population and hence act as a medium-direct channel to affect the poor whereas the microfinance services provided by microfinance institutions and banks specifically target the poor households and hence act as a direct channel to affect the poor. This paper attempts to provide empirical evidence for the impact of the three channels of financial sector development viz. direct (microcredit), medium-direct (bank credit), and indirect channel (economic growth) on rural poor in Indian states. The unique feature of the paper is that it is the first ever study to make use of state level data on microcredit disbursed under Self-help Group Bank Linkage Programme (SBLP) to assess its impact on poor at meso-level. Considering the possibility of an endogeinity bias, we use the generalized method of moments (GMM) estimators and perform a dynamic panel data analysis for a sample of 15 major Indian states[3] over the period 1999-00 to 2011-12[4].

2. Literature review

2.1 FSD, Economic Growth, and Poor (Indirect Channel)

Financial development affects poor when financial development facilitates economic growth which in turn increases their income and consumption levels. Such an indirect effect of financial development on poor is observed when the growth is pro-poor in nature. There are several channels through which growth benefits poor such as creation of more jobs, reduction in wage differentials between skilled and unskilled workers at a certain phase of development

[3] The states are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odhisa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

[4] The study considers the period starting 1999-2000 because the state-wise data on microcredit from NABARD reports is available 1999-2000 onwards.

which benefits poor (Galor and Tsiddon, 1996), increased tax revenues which result in higher social spending which benefits poor and also allows them to invest in human capital (Perotti, 1993), and increased capital accumulation that facilitates availability of more funds for investment for the poor (Aghion and Bolton, 1997). A few very recent cross-country and country level studies have pointed out that FSD positively affects poor by bringing structural changes in the economy which increases employment opportunities (affects labour market) and reduces poverty and inequality (see Giné and Townsend, 2004; Beck *et al.*, 2010; Pagano and Pica, 2012; Ayyagari *et al.*, 2013).

The two conflicting theories in this regard are the Kuznets's inverted-U hypothesis postulated by Kuznets (1955/1963) and the "trickle down" theory. While the former suggests that as economy grows, income inequality increases at the early stage of development and reduces at a later stage of industrialization; the latter suggests that growth reduces inequality through creation of jobs and other economic opportunities for the poor people (Todaro, 1997). Despite conflicting theories, several researches have reached to a consensus that higher rates of economic growth result in rapid poverty/inequality reduction over a longer period of time (e.g. Datt and Ravallion, 1992; Kakwani, 2000; Fields, 2001; Dollar and Kraay, 2002; Eastwood and Lipton, 2002; Klasen, 2003).

2.2 FSD and the Poor (Medium-direct Channel)

Well functioning financial sector alleviates poverty directly by providing access to formal financial services to the poor who lack resources to fund themselves or collateral to obtain a bank loan because of information asymmetries (Banerjee and Newman, 1993; Galor and Zeira, 1993). Financial development, on one hand, improves the access to formal finance by the poor by reducing the market failures such as information asymmetry and high fixed costs of lending to small and marginal borrowers (Jalilian and Kirtpatrick, 2005) and on the other hand encourage them to make use of various credit and insurance services to acquire productive assets which improves their productivity and income and helps them to achieve sustainable livelihoods (Mundial, 2001; DFID, 2004). In addition to credit and insurance, savings too benefit the poor (Odhiambo, 2010a). Studies that support the view that FSD reduces poverty and income inequality by allowing the poor to participate and benefit from financial activities through borrowing and investing in human and physical capital include Mookherjee and Ray (2003/2010), Odhiambo (2010b) and Shahbaz and Islam (2011) . However, another view suspects the ability of developed financial sector to benefit the poor

argues that the rich and those with political influence largely benefit (Haber, 2005) especially at the early stages of FSD (Greenwood and Jovanovic, 1990). Poor who do not have enough collateral to offer are excluded by formal financial institutions due to adverse selection and moral hazard problems. This results in only rich getting access to formal financial services (Rajan and Zingales, 2004).

In India, Burgess and Pande (2005) attempted to examine the impact of large scale expansion of bank branches in rural unbanked locations during 1970s and 1980s. They found significant reduction in poverty with rural headcount ratio reduced by 17 percent. However, Kochar (2005) produced contradictory results using the instrumental variable-fixed effect (IV-FE) regression on district level bank branch data. It was found that increase in the number of bank branches had increased the consumption inequality and benefitted non-poor more significantly than the poor. Similarly, Panagariya (2006) also doubts the findings of Burgess and Pande (2005). Thus, whether the direct access to finance provided by financial institutions reaches and affects poor is still an open question.

2.3 FSD and the Poor (Direct Channel)

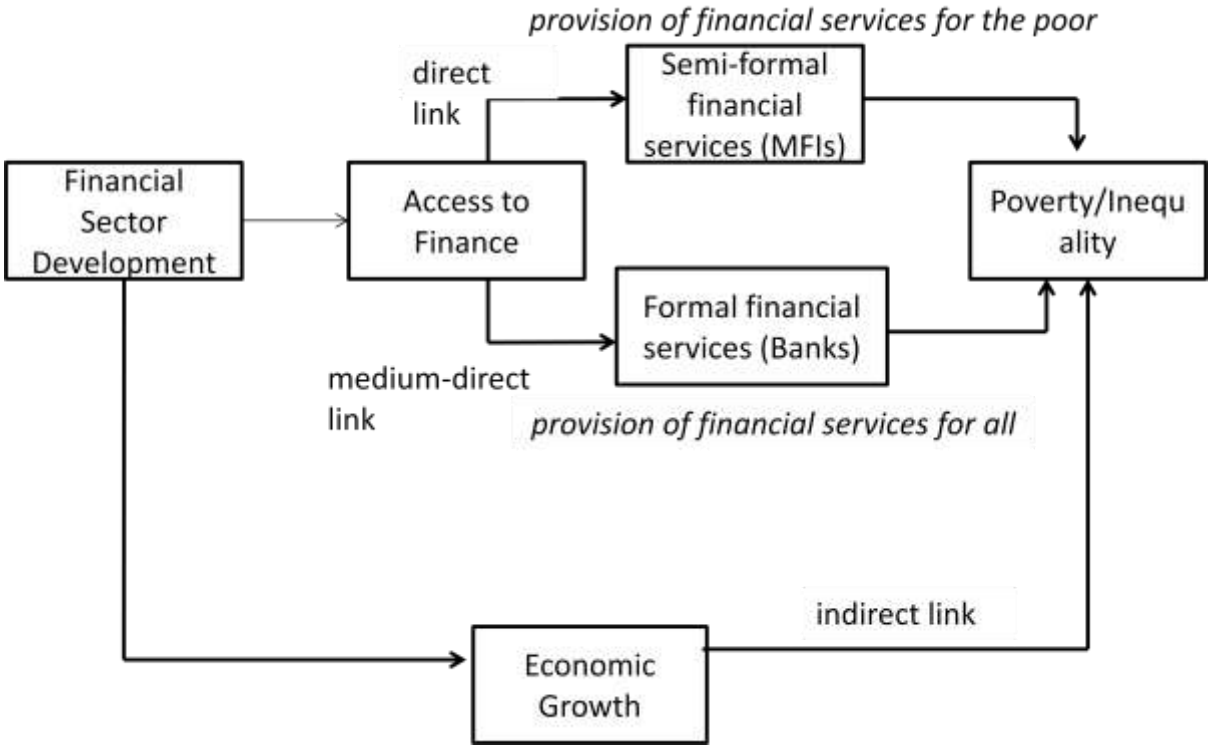
Such sceptical evidences on the accessibility of finance by the poor attracted the interest of policymakers in the potential role of financial products and services dedicated to poverty alleviation in developing countries. The introduction of microcredit by Muhammad Yunus in Bangladesh led to a significant shift in the development strategy from mere financial development to financial development with poverty reduction in developing countries. The idea of microcredit has come a long way and also includes credit-plus services such as savings, insurance, leasing, etc. The whole range of financial services is collectively termed as ‘microfinance’.

Across regions, microfinance has gained much of the attention of policymakers and the sector too has witnessed tremendous growth. Microfinance, in recent times, has gained much popularity, however, a review of the existing impact assessment studies of microfinance services provides contradictory evidences. The positive effect of microfinance in terms of increased income for the target clients is documented in UNICEF (1997), Khandker (1998/2001), and Wright (2000) and reduced vulnerability is documented in McCulloch and Baulch (2000) and Zaman (1999). At household level, the positive impact of microfinance has been observed in the form of improvement in schooling, nutritional intake, health

outcomes, and women empowerment (see Banerjee *et al.*, 2009; Abou-Ali *et al.*, 2010; Armendariz de Aghion and Morduch, 2010; Karlan and Zinman, 2010). Studies questioning the positive effects of microfinance include Adams and von Pischke (1992) and Rogaly (1996). Another set of studies that support positive contribution of microfinance reveal that the positive impact is highest for households that are closer to poverty line, rather than those at the bottom or belonging to the poorest of the poor group (Morduch and Haley, 2002). There is greater positive effect of microcredit on households that are already better-off (Remenyi and Quinones, 2000; Coleman, 2006) or belong to the upper caste group (Mukherjee, 2015). The reason being the strong inclination of MFIs towards those clients who are close to the poverty line (above or below) leaving the poorest behind resulting in a decreasing proportion of poorest clients being served over time (Navajas *et al.*, 2000). Hulme and Mosley (1996) question the ability of microfinance to reach the 'poorest of the poor' whereas Khandker (1998) and Rutherford (2000) find evidence in support of microfinance reaching to the poorest. Mukherjee (2014) argues that microfinance programmes in India have made credit accessible only for the working poor and excludes the ultra poor. Another issue is that several studies conducted to assess the impact at household level look at the immediate impact of microfinance at micro level. The evidences produced by such studies cannot be considered as sufficient proof. Also, there are chances that any positive impact at household level is a mere redistribution within different participating and non-participating households in a particular region with no significant positive impact at regional level.

Thus, the literature on financial development and poverty suggests that financial sector development affects inequality and poverty through three channels: indirect, medium-direct, and direct (Figure 1). Indirect link flows through its impact on economic growth (when the growth is pro-poor). The impact is medium direct when banks provide access to full range of financial services primarily to the lower-middle income and above group (non-poor) which provides employment opportunities to all including poor and thus helps everyone enhance their income levels. Financial services have direct impact on inequality and poverty when the microfinance services are provided directly into the hands of poor by microfinance institutions or banks and thus enable them to make productive investment resulting in increase in their income and consumption levels.

Figure 1: Channels of financial development and the poor



The present study attempts to answer whether there is any evidence of the impact of various channels of FSD on poor in rural India and tries to find out evidence of any mismatch between the nature of each channel and their actual impact on poor.

3. The Model

In order to assess the impact of FSD on poor, our paper uses panel data of 15 major Indian states over the period 1999-00 to 2011-12. The dependent variables are rural poverty ratio (POV), rural gini coefficient (GINI), and rural poverty gap index (GAP), while the explanatory variables are financial development (FD) variables which includes microcredit intensity (MC) and bank credit (BC); and control variables are rural population share (RPOP), development expenditure (DEXP), and output growth (EG) in the state. The data on POV, GINI, and GAP is available for the years 1999-00, 2004-05, 2009-10, and 2011-12. For the explanatory and control variables, we collect data for 5 years, that is the 4 years before, as well as the year for which we have data on the dependent variable. In the analysis, we use the 5-year averages of these variables. This allows for addressing causality, while at the same time it reduces the impact of (short-term) fluctuations of these variables. The econometric models that we use are as follows:

Model 1: $$DV_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it} \quad ...(1)$$

$$i = 1, 2, ..., N : t = 1, 2, .., T$$

where DV_{it} is POV_{it}, $RGINI_{it}$, and GAP_{it} in three separate equations.

Model 1 uses a limited dependent variable, i.e., it takes values from 0 to 1. The standard regression technique requires the dependent variable to take values from minus infinity to plus infinity. Therefore, in order to avoid the violation of this assumption, we use the logit transformation of DV as follows:

$$y_{it} = ln(\frac{DV_{it}}{1-DV_{it}}) \quad ...(2)$$

In equation (2), when y_{it} approaches 0, DV_{it} approaches minus infinity. If y_{it} approaches 1, DV_{it} approaches plus infinity. This allows us to use standard regression technique without violation of any of its assumption in Model 2.

Model 2: $$ln(\frac{DV_{it}}{1-DV_{it}}) = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it} \quad ...(3)$$

$$i = 1, 2, ..., N : t = 1, 2, .., T$$

We use both the models (1) and (2) to estimate the effect of the financial development variables on poor which also helps us check the robustness of our empirical results.

While analysing the finance-poor relationship, there is a need to investigate the endogeneity or reverse causality issue. In simple terms, it may be argued that provision of credit is driven by the level of povery/inequality in a particular region. In order to overcome the endogeneity problem, we use the instrumental variable method to estimate each parameter. We use a constant term and the lagged value of each explanatory variable as instrumental variable in our regression models.

4. Data and Key Statistics

4.1 Data

In order to assess and compare the effect of formal and semi-formal credit on poor in rural India, our paper uses panel data of 15 major Indian states over the period 1999-00 to 2011-12

(for the years 1999-00, 2004-05, 2009-10, and 2011-12). The data for dependent variables is available with gaps for a total of four periods. The data for independent variables is adjusted by taking their 5-year averages, i.e., 4 years before as well as the year for which data on dependent variable is available. This not only helps us address the causality but it also controls for the short-term fluctuations in the variables. A few other studies that have used averaging method in their work include Deininger and Squire 1998; Forbes 2000; and Voitchovsky 2005. The paper uses three dependent variables viz. rural poverty ratio, rural gini coefficient, and rural poverty gap ratio, while the explanatory variables are microcredit intensity, bank credit, rural population share, state development expenditure, and output growth in the state. The relevance and definition of the explanatory variables used in the analysis is discussed below:

4.2 Independent variables

Microcredit Intensity: . The measure of microcredit intensity used is gross microcredit as a proportion of net state domestic product (NSDP), i.e., MFRATIO. Since microcredit is predominantly a rural phenomenon, it is expected that states with higher microcredit intensity have higher income and consumption levels in rural areas. It is because high microcredit intensity states have a greater number of people participating in microfinance programmes in rural areas suggesting a greater number of poor people having direct access to finance. This enables them to make greater use of the available economic opportunities in the region which eventually increases their income as well as consumption level. This is expected to bridge the gap between the consumption levels of rural and urban areas. Such a direct effect of financial development is captured by measuring the impact of microcredit intensity on rural-urban consumption inequality. MFRATIO assesses the usage effect of microcredit on rural-urban consumption inequality. The data on state-wise MFRATIO is taken from the annual status of microfinance in India reports published by National Bank for Agriculture and Rural Development (NABARD)

Bank credit as a proportion of NSDP: A substantial portion of bank credit goes to the urban areas and to the non-poor section of the society and hence has a medium-direct effect on poor section of the society. In order to measure this medium-direct effect of access to finance on rural-urban consumption inequality, the gross credit by commercial banks as a proportion of NSDP is used as another explanatory variable in the regression equation which is consistent

with Beck, Demirguc-Kunt, and Levine (2004), Jeanneny and Kpodar (2008) and Akhter and Daly (2009). The data is taken from Reserve Bank of India (RBI) database.

Per capita Net State Domestic Product (PCNSDP) growth: A large number of studies suggest that financial development indirectly reduces poverty through its positive effects on economic growth. Economic growth disproportionally benefits poor when the growth is pro-poor in nature. However, many contradictory studies suggest that growth has equal effect on poor as well as on non-poor (Li et al., 1998; Dollar and Kraay, 2002) or growth increases income inequality (Jeanneney & Kpodar, 2008). Thus, in order to analyse the indirect effect of growth, we use per capita NSDP growth as another explanatory variable in our model. The data is taken from RBI database.

Development Expenditure to NSDP: Several other anti-poverty programs are launched by government on which state governments spend a huge amount. In order to control for that, the ratio of total development expenditure by state government to NSDP is used as control variable. Data is obtained from RBI database.

Rural population share: Size of the population in rural areas is controlled for by including the share of size of rural population in total population of the respective state following Haughton et al. (2001) and Nguyen et al. (2007). The data on state-wise population is taken from Census India reports.

4.3 Descriptive Statistics and Correlations

Table 1 presents the summary statistics for the variables

Table 1: Summary Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Rural Poverty Ratio	60	6.350	60.800	28.618	13.4229
Rural Gini Coefficient	60	0.182	0.438	0.250	0.0400
Rural Poverty Gap Squared	60	0.126	0.470	0.231	0.051
Microcredit to NSDP	60	0.009	0.020	0.013	0.0035
Bank Credit to NSDP	60	0.072	3.164	0.680	0.6013
Rural Population Share	60	0.106	0.482	0.289	0.1048

Development Exp. to NSDP	60	0.055	0.209	0.107	0.0391
PCNSDP Growth	60	-0.310	11.220	4.988	2.3964

Before analysing the effect of formal and semi-formal credit on poverty, inequality, and squared poverty gap, it is necessary to examine the association between the dependent and independent variables considered in our models. The expansion of bank credit and micro credit in rural areas is negatively associated with rural poverty ratio (Table 2). Similarly bank credit has significant negative association with income inequality whereas micro credit has an insignificant negative association. It is interesting to note that the expansion of bank and micro credit seem to have a positive and significant association with the income inequality among the poor (rising rural poverty gap squared). The remaining independent variables viz. rural population share, development expenditure, and PCNSDP growth have a significant negative association with poverty ratio, income inequality, and income inequality among the poor.

Table 2: Correlations between the dependent and independent variables

	Poverty Ratio	Gini Coefficient	Poverty Gap	Microcredit	Bank Credit	Rural Population Share	Development Exp.	PCNSDP Growth
Poverty Ratio	1							
Gini Coefficient	-0.253*	1						
Poverty Gap	0.303*	0.384*	1					
Microcredit	-0.264**	-0.098	0.107*	1				
Bank Credit	-0.300**	-0.076*	0.218*	0.487	1			
Rural Population Share	0.536***	0.415***	0.279*	0.012	0.092	1		
Development Exp.	-0.258**	-0.101*	-0.064*	-0.071	0.044	0.006	1	
PCNSDP Growth	-0.322**	-0.220*	-0.095	-0.219*	0.207**	0.277***	0.326***	1

*. Correlation is significant at the 0.1 level (2-tailed)
**. Correlation is significant at the 0.05 level (2-tailed)
***. Correlation is significant at the 0.01 level (2-tailed)

5. Empirical Results

We notice from Table 2 that the two forms of credit – bank credit and micro credit are highly correlated with each other. Therefore if we include them both together as independent variables in the same regression equation, we may run into the problems of multicollinearity.

To avoid this problem, we include each variable in a separate regression equation. This approach enables us to obtain more precise estimates of the impact of each form of credit. We, thus, have a total of twelve regression equations with four equations for each of the three dependent variables viz. poverty ratio, income inequality, and income inequality among the poor. The first four equations use rural poverty ratio and its log transformation as the dependent variable and each of the two forms of credit as independent and so on for the other two dependent variables.

In order to adjust for the endogeneity problem, we use generalized method of moments (GMM) estimators (Hansen, 1982) developed by Arellano and Bond (1991). The instruments we use in our model are a constant term and the lagged value of each explanatory variable. The results of the empirical investigation are shown in Table 3, 4 and 5. The coefficient value of the estimates along with the SEs in parentheses is given in all the three tables. The endogeneity of the explanatory variables is checked by Durbin-Wu-Hausman test (Durbin, 1954; Wu, 1973, 1974; Hausman, 1978), the p-value of which is reported in both the tables. The null hypothesis for the test is that all the explanatory variables in the equation are endogenous and exogeneity of the explanatory variables being the alternative hypothesis. The p-values associated with Durbin-Wu-Hausman test provided in the tables suggest that the null hypothesis of endogenous explanatory variables for all the cases is not rejected and thus supports the use of GMM.

The results in Table 3 confirm the poverty reducing effect of formal and semi-formal credit across Indian states. The formal form of credit, i.e., bank credit, has a statistically significant negative coefficient (-0.441 and -0.617). Thus, an increase in the bank lending reduces the number of rural poor in a state. Similar results are obtained for the semi-formal form of credit, i.e., micro credit (-0.107 and -0.213). Both the forms of credit have a significant negative coefficient confirming a positive impact on rural poverty with bank credit having a greater impact. Even the growth process across states, which is an indirect channel of FSD to affect poor, has been pro-poor which is confirmed by the statistically significant and negative coefficient of per capita NSDP (-0.415 and -0.531 for poverty ratio; -0.502 and -0.783 for its log transformation). Similarly, development expenditure by the states produces pro-poor effects (-0.374 and -0.539 for poverty ratio; -0.608 and -0.635 for its log transformation). The positive significant coefficient of rural population share suggests that an increase in the share of rural population increases the number of rural poor in a state.

Table 3: Empirical results

Model 1: $\boldsymbol{POV_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}}$, $i = 1, 2, ..., N$: $t = 1, 2, .., T$

Model 2: $ln(\frac{POV_{it}}{1-POV_{it}}) = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}$, $i = 1, 2, ...,N$: $t = 1, 2, ., T$

	Model 1[a] (FD = MC)		Model 1[b] (FD = BC)		Model 2[c] (FD = MC)		Model 2[d] (FD = BC)	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Constant	1.073	(0.418)***	1.186	(0.636)***	2.119	(2.339)**	2.725	(2.402)**
MC	-0.107	(0.625)**			-0.213	(3.273)*		
BC			-0.441	(0.795)***			-0.617	(2.962)***
EG	-0.415	(0.215)***	-0.531	(0.328)***	-0.502	(0.491)**	-0.783	(0.527)***
RPOP	0.221	(0.176)**	0.308	(0.115)**	-0.519	(0.576)*	-0.556	(0.478)**
DEXP	-0.374	(0.116)**	-0.539	(0.203)***	-0.608	(0.311)***	-0.635	(0.403)***
Durbin-Wu-Hausman test	0.035		0.043		0.009		0.025	
J-statistic	0.311		0.357		0.315		0.369	
Adjusted *R*-squared	0.213		0.237		0.250		0.263	
Number of observations	60		60		60		60	

Notes: Numbers in parentheses represent the standard error (SE). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Durbin-Wu-Hausman statistic indicates the probability value of the test. '*J-statistic*' indicates the probability value of the Hansen's *J*-statistic.

[a] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[b] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[c] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[d] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

The results with respect to the effect of formal and semi-formal credit on the distribution of income between the bottom and top 20 percent are presented in Table 4. The insignificant effect of micro credit on income inequality across states confirms that the semi-formal form of credit, which is meant for the poor, has not been pro-poor in nature. On the other hand, bank credit significantly increases the income of the bottom 20 percent compared to the top 20 percent resulting in reduced income inequality across states (-0.243 and -0.097). Similar results are obtained for the effect of economic growth (-0.237 and -0.531 for income inequality; -0.191 and -0.142 for its log transformation) and development expenditure (-0.274 and -0.322 for income inequality; -0.088 and -0.094 for its log transformation). This suggests that the average income of the poor increases at a faster rate with an increase in the average income of entire population and with increasing development expenditure by the government. The results also suggest that the increasing rural population share deteriorates the distribution of income between the poorest and the richest resulting in increasing income inequality.

Table 4: Empirical results

Model 1: $\boldsymbol{GINI_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}}$, i = 1, 2, ..., N: t = 1, 2, .., T

Model 2: $ln(\frac{GINI_{it}}{1-GINI_{it}}) = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}$, i = 1, 2, ...,N: t = 1, 2, ., T

	Model 1[a] (FD = MC)		Model 1[b] (FD = BC)		Model 2[c] (FD = MC)		Model 2[d] (FD = BC)	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Constant	1.413	(0.418)***	1.561	(0.636)***	3.446	(2.339)**	3.975	(2.402)**
MC	-0.092	(0.625)			-0.029	(3.273)		
BC			-0.243	(0.795)*			-0.097	(2.962)**
EG	-0.237	(0.215)**	-0.531	(0.328)***	-0.191	(0.491)***	-0.142	(0.527)***
RPOP	0.322	(0.176)**	0.308	(0.115)***	0.162	(0.576)***	-0.204	(0.478)***
DEXP	-0.274	(0.217)**	-0.322	(0.286)*	-0.088	(0.401)*	-0.094	(0.443)*
Durbin-Wu-Hausman test	0.019		0.026		0.011		0.017	
J-statistic	0.224		0.316		0.298		0.347	
Adjusted *R*-squared	0.302		0.343		0.367		0.362	
Number of observations	60		60		60		60	

Notes: Numbers in parentheses represent the standard error (SE). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Durbin-Wu-Hausman statistic indicates the probability value of the test. '*J-statistic*' indicates the probability value of the Hansen's *J*-statistic.

[a] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[b] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[c] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[d] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

The results showing the effect of the two forms of credit on the poorest are given in Table 5. The expansion of bank as well as micro credit leads to increase in the income inequality among the poor leaving poorest at the greatest disadvantage. A comparison between the two forms of credit suggests that bank credit (0.516) hits the poorest harder than micro credit does (0.204 and 0.074). The evidence with respect to the effect of economic growth, in terms of per capita income, seems to be insufficient to help the poorest (as indicated by an insignificant coefficient). The development expenditure incurred by the states does have a significant positive effect on income inequality among the poor (-0.154, -0.079, and -0.091) increasing the income of the poorest by a greater proportion. Increasing rural population share in total population continues to deteriorate the income distribution among the poor and widens gap between the poor and the poorest (0.115, 0.196, 0.084, and 0.139).

Table 5: Empirical results

Model 1: $\boldsymbol{PGAP_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}}$, $i = 1, 2, ..., N$: $t = 1, 2, .., T$

Model 2: $ln(\frac{PGAP_{it}}{1-PGAP_{it}}) = \beta_0 + \beta_1 FD_{it} + \beta_2 EG_{it} + \beta_3 RPOP_{it} + \beta_4 DEXP_{it} + \mu_{it}$, $i = 1, 2, ...,N$: $t = 1, 2, ., T$

	Model 1[a] (FD = MC)		Model 1[b] (FD = BC)		Model 2[c] (FD = MC)		Model 2[d] (FD = BC)	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Constant	1.163	(0.418)***	1.423	(0.636)***	4.024	(2.339)**	5.105	(2.402)**
MC	0.204	(0.625)**			0.074	(3.273)**		
BC			0.516	(0.795)***			0.194	(2.962)
EG	-0.085	(0.215)	-0.112	(0.328)	-0.037	(0.491)	-0.075	(0.527)
RPOP	0.115	(0.176)**	0.196	(0.115)**	0.084	(0.576)*	0.139	(0.478)**
DEXP	-0.120	(0.264)	-0.154	(0.311)*	-0.079	(0.233)*	-0.091	(0.388)*
Durbin-Wu-Hausman test	0.014		0.020		0.010		0.012	
J-statistic	0.197		0.222		0.214		0.245	
Adjusted *R*-squared	0.191		0.209		0.232		0.260	
Number of observations	60		60		60		60	

Notes: Numbers in parentheses represent the standard error (SE). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Durbin-Wu-Hausman statistic indicates the probability value of the test. '*J-statistic*' indicates the probability value of the Hansen's *J*-statistic.

[a] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[b] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[c] Instrumental variables used: Constant, $MC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

[d] Instrumental variables used: Constant, $BC_{i,t-1}$, $EG_{i,t-1}$, $RPOP_{i,t-1}$, $DEXP_{i,t-1}$

6. Conclusions and Policy Implications

The existing studies on finance and the poor focus on the direct (access to finance link) and the indirect (economic growth link) channels of financial sector development (FSD) affecting the poor. The various proxies used to measure the direct link include bank credit, deposits, money supply, etc. However, a big chunk of formal financial services by banks are availed by non-poor and urban population whereas semi-formal financial services by microfinance institutions (MFIs)/banks are meant to be availed by the poor in rural areas. This paper thus divides this access to finance link into two parts: one is medium-direct link through provision of formal financial services (credit, deposit, payments, etc.) by banks and another is the direct link through provision of semi-formal financial services (microcredit, microsavings, etc) by MFIs/banks for the poor households. It thus looks at the direct, medium-direct, and indirect effect of FSD on rural poor and finds that the effect of FSD through different channels is partially effective for poor and completely ineffective for the poorest. The results with respect

to the medium-direct and indirect link support the findings of few recent works by Tiwari *et al.*, (2013) who conclude that bank credit and economic growth widen the rural-urban income inequality in the long run in India and contradicts the findings by Sehrawat and Giri (2015b) who conclude that bank credit along with economic growth has increased the income inequality in India. Our findings suggest that the reduction in poverty seems to be not fully converting into reduction in income inequality between the richest and the poorest 20 percent. While bank credit disproportionately increases the income of the bottom 20 percent and reduces income inequality, microcredit with high chances of doing so, fails. The poorest seem to be the hardest hit victim of access to finance channel with both the channels increasing the income inequality among the poor.

From policy perspective, the results suggest that the efforts being put in by the Government of India to make finance work for the poor have not been effective yet. The pro-urban nature of the finance (whether through growth or bank credit or microcredit) questions the social banking schemes and programmes being launched by the government specifically in rural areas where more than 80 percent of the poor reside. The huge expenditure being incurred by the government on Self-help Group Bank Linkage Programme, the largest financial inclusion programme in India, with an objective of making financial services accessible by the poor in rural areas has failed to deliver the desired results. Microfinance, which is a bunch of financial services meant for rural poor, actually seems to be widening the rural-urban gap. The possible reason for such a failure could be mis-targeting by the financial service providers, self-exclusion by the poor in rural areas, and the negative impact of microcredit on its users due to the debt trap because of lack of economic opportunities.

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