

**The Dynamics of Finance-  
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# The Dynamics of Finance-Growth-Inequality Nexus: Theory and Evidence for India

## Abstract

The purpose of this research study has been to expand our understanding of the finance-growth 'nexus' to finance-growth-inequality 'nexus' in the presence of both the formal and the informal sources of borrowing. Using empirical evidence of IHDS Survey data for two rounds the study attempts to assess the co-evolution of finance-growth-inequality in an intertemporal framework. The most important finding of the paper pertains to the econometric result that the household asset grows at the same rate independent of the source of loans - banks or moneylenders though the level effect (intercept) is higher if the loan is obtained from banks or lower if the household lives below poverty line. The same also holds for the rate of growth of per capita income. There is virtually no significant difference for the households living below poverty line (BPL) on the rate of growth of capital asset or income whether source of borrowing is bank or money lender. This is then formalized in a theoretical model of intertemporal choice of entrepreneur-investor to show that if there are both formal and informal sources of borrowing with a constraint on the formal sector borrowing and no constraint on the latter, then growth rates of asset and income are determined by the informal sector interest rate. The result can be generalised for any number of sources of borrowing. This questions the conventional wisdom regarding the policy aimed at financial inclusion. Inequality of income increases independent of the source of borrowing, though the BPL households are worse off in general.

JEL-Codes: C350, E500, G210, O110.

Keywords: financial development, financial inclusion growth, inequality, bank, India, IHDS, logit model.

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The paper aims to inquire into the interrelationship of finance, growth and inequality when there are different sources of finance – formal, such as banks and informal, such as, local money lenders. The idea that financial structure affects growth is nothing new in economics. Starting with Schumpeter (1912), Hicks (1969) and North (1981) the more recent strand of the literature includes Bencivenga and Smith (1991), Bencivenga, Smith and Starr (1994), de Meza and Webb (1992), Greenwood and Smith (1997), King and Levine (1993), Boyd and Prescott (1986), Greenwood and Jovanovic (1990), Obstfeld (1994). Levine (1997), (1998), Levine, Loayza, and Beck (2000), confirm the role of banks in the growth process while Beck and Levine (2004), Levine and Zervos (1998) and Rousseau and Wachtel (2000) consider stock market along with banks in explaining economic growth. Levine (2005) is a good survey of the literature. The present study extends the horizon of the literature on ‘finance-growth’ nexus to ‘finance-growth-inequality’ nexus.

The literature on financial development and inequality emphasizes the role of financial development (actually lack thereof) on inequality that operates via credit market imperfection (Banerjee and Newman, 1993; Galor and Zeira, 1993; Mookherjee and Ray, 2003 and others) with an assumed ergogeneity of market imperfection. This strand of the literature puts more emphasis on the role of human capital formation. The other premise of financial development, growth and inequality is the channel through which savings behavior affects intergenerational income dynamics. At one level, this is the most obvious vehicle through which richer dynasties remain comparatively rich; richer parents give more assets to their children than do the poorer ones. This process operates via its impact on the physical capital accumulation. The impact of financial development operates via the service of financial intermediation itself and rooted in the theory of micro foundations of banking. Banks or financial intermediaries help mitigate the risk of entrepreneurial ventures (Paulson and Townsend 2004; Demirgüç-Kunt *et al* 2009; Rosenzweig and Wolpin, 1993; Rosenzweig and Binswanger, 1993; Hausman, 1979). This strand of research suggests that (i) wealthier households are more likely to start new business; (ii) the chance of survival for new entrepreneurs is higher if there is already a prior relationship with a financial institution. Thus, access to financial institutions expands the economic opportunities of individuals that are unable to tap into the dynastic wealth of their families to fund their entrepreneurial endeavors. Thus lack of access to formal financial institutions in the developing world by a large segment of the population reduces growth potential. Even a significantly large segment of the population of the emerging market economies, such as India, Brazil, South Africa etc. have to depend on the informal credit market for meeting their credit needs. However, the borrowing from informal credit market is not entirely segmented from the formal credit market. Both exist and supplement each other. Since borrowing from the formal credit market – banks, is generally governed by the amount of

collateral; absence of collateral or inadequate collateral poses a hindrance for bank borrowing by a large mass of the population. This, however, is not a hindrance for the informal sector – local moneylenders to meet the credit needs of the people who are unable to offer collateral. Because the moneylender is a local resident, hence knows the borrower well and her credit worthiness. The borrower cannot default on the loan because of various extra economic forces exerted by the local level money lenders.

Karaivanov and Kessler (2018) discuss the phenomenon of co-existence of formal and informal loans - small projects are financed by informal loans while large projects are financed by formal sector loans. The empirical evidence from rural Thailand corroborates the argument based on a theoretical model. However, the distinction of formal and informal loans adopted in the study is different from the standard distinction in the literature. While formal loan is defined as the loan from banks, same as in the literature, by informal loan they refer to loans from friends and relatives with a low rate of interest. But in general the loan from informal credit market in the usual sense of the term, meaning informal moneylenders, in the developing world as in in India has a higher rate of interest that is justified by the little or no collateral.

There is not yet enough evidence to settle the issue of finance-growth-inequality in general and in particular for India. While several studies have reported increase in efficiency and profitability in the financial sector in general and banking sector in particular in the post reform period, Das and Guha-Khasnabis (2008) reports that flow of credit has decreased in the agriculture compared to industry or services while Marjit and Das (2008) reports that aggregate growth of loan has not increased during the post-reform period compared to the pre-reform period. Banerjee and Duflo (2014) reports that small firms in India are finance constrained. Burgess and Pande (2005) finds that bank licensing policy of pre-reform era compared to the post-reform era helped reduction of poverty in rural areas in the country. However, the paper does not capture the mechanism through which bank branch expansion helps reduce poverty. In more recent times the *Jan Dhan Yojana* and other policies have also been directed towards ‘financial inclusion’. This policy shift is expected to extend the infrastructure facility for the poorer sections of the population such that they can access less costly institutional finance and thereby tap the growth potential. In the process, it is argued, reduction in the inequality in accessing finance will reduce income inequality. Demircuc-Kunt *et al* (2017) report that while it has been successful in extending the banking services by way of account ownership for the poor and the women because of reduced cost of transaction for account opening, but there are still a number of costs that put hurdle for the poor and the disadvantageous groups. Dupas *et al* (2016) in a study on the impact of policy driven extension of bank networking in Uganda, Malwai and Chile found that mere expansion of basic account has no impact on savings and welfare. However, Sayinzoga, Bulte and Lensink (2016)

reports on the basis of a field experiment in Rwanda that while training on financial literacy led to positive effect on startups, it failed to lead to an increase in income.

At a theoretical level the arguments for finance-growth-inequality nexus are based on an assumed exogeneity of the development of the financial system. But financial system is not something static, but evolves over time where policies, economic development, and financial innovation shape the functioning of the financial system. The interesting idea here is that the notions of inequality associated with the three variables are distinct and potentially contradictory. While financial development tends to equalize opportunities, it will also widen the gap even within the poorer group of households as those with skill and entrepreneurial ability will be rewarded more compared to those who do not have. Contrary to conventional wisdom Marjit and Mishra (2016) shows that a more equitable asset distribution can lead to inefficiency in the presence of product market imperfection. Financial development thus can exert opposing impacts. The existing literature does not provide a conceptual framework for explaining the endogenous evolution of finance, growth and inequality (Demirgic-Kunt and Levine 2009).

Using a large scale survey data on Indian households the present study first estimates the determinants of obtaining bank loans for two time periods and then estimates the growth equation for asset and income where source of borrowing – whether bank or local moneylenders has no impact in the slope coefficient, representing the rate of growth, though there is level effect in terms of differential intercept. The empirical finding is then ratified in a theoretical model of entrepreneur-investor with both formal and informal sector borrowing. With this introduction the paper proceeds as follows: Section 2 describes the data, econometric model and estimation results, Section 3 is devoted to a proto type theoretical model to justify the empirical results and Section 4 finally concludes.

## **2. Empirical Analysis of the Determinants and Impact of Institutional Borrowing**

The empirical analysis taken up in this section forms the core of this paper aimed to discern the factors that determine institutional borrowing, typically bank borrowing in India and its role in the growth process of assets and income vis-à-vis non-institutional, especially borrowing from informal credit market. Our strategy is to divide the problem into two parts, in the first part we provide an estimated econometric model of determinants of bank loan, in the second part we provide another estimated econometric model that represents the rate of growth of asset and income between the two survey periods for the group who availed of bank loan and those who obtained the loan from the non-

institutional source, viz. moneylenders, employers and personal source (friends and relatives). Then we inquire into how inequality changes by source of borrowing at the aggregative levels and for households in broad occupation class, viz. agriculture and business (including industry) for poverty groups - above poverty line (APL) and below poverty line (BPL).

## 2.1 Methodology and Data

The econometric model in the first part of the empirical analysis is a discrete choice model with dependent variable defined by

$$Y = 1 \text{ if major source of loan in last 5 years from bank}$$

$$0 \text{ otherwise.}$$

This is estimated using a logistic regression by generalised linear model:

$$\text{logit } P[Y = 1|X] = X'\gamma + \varepsilon \quad (1)$$

where  $P$  = probability of the event  $Y$ ,  $X$  is the vector of explanatory variables,  $\gamma$  is the vector of coefficients and  $\varepsilon$  is the disturbance term. The estimated equation reveals the role of different variables from a set of potential variables in determining the probability of obtaining loans from banks.

For the second part of the analysis of the process of the growth of income and assets of the households after  $k$  periods ( $t+k$ ) who obtained bank loan in the initial ( $t$ ) period we estimated the following two regression equations in the second part of the empirical analysis

$$\text{Asset}_{t+k,i} = \beta \text{Asset}_{t,i} + \varphi Z_i + u_i \quad (2)$$

$$\text{Income}_{t+k,i} = \delta \text{Income}_{t,i} + \theta Z_i + u_i \quad (3)$$

where Asset and Income represent household asset and income,  $Z_i$  includes the major source of borrowing for the household along with household level characteristics and village, district or region level dummies and  $i$  is the index of household.

A central requirement for our study is unit level panel data such that we can assess the impact of institutional loan versus other source on income and assets of the units. Our unit of relevance is households. This is essential for finding the change in inequality at least between two periods. We used India Human Development Survey, IHDS henceforth, jointly organized by researchers from the University of Maryland and the National Council of Applied Economic Research (NCAER), New Delhi with funding from the National Institute of Health and the Ford Foundation (Desai et al, 2005-06,

20011-12). Unfortunately though NSSO regularly conducts household or firm level surveys these are all independent cross-sections. The advantage of the IHDS data over NSS surveys, such as All India Debt and Investment Survey is that the data of the IHDS II are mostly re-interviews (around 80% common households) of households interviewed for IHDS I, hence forms a proper panel so that one can capture the dynamics of finance-growth-inequality nexus over the years for a particular household.<sup>1</sup> The study is conducted using two rounds of IHDS survey data – IHDS I, conducted in 2004-05 for 41,554 households and IHDS II, conducted in 2011-12 for 42,152 households in 1,503 villages and 971 urban neighbourhoods which covers several aspects of households including education, social and political participation, asset, income, sources of loans, interest rate charged, loan default etc. It is representative at the all India level. A graphic presentation of variables coverage in IHDS is given in Fig. 1.

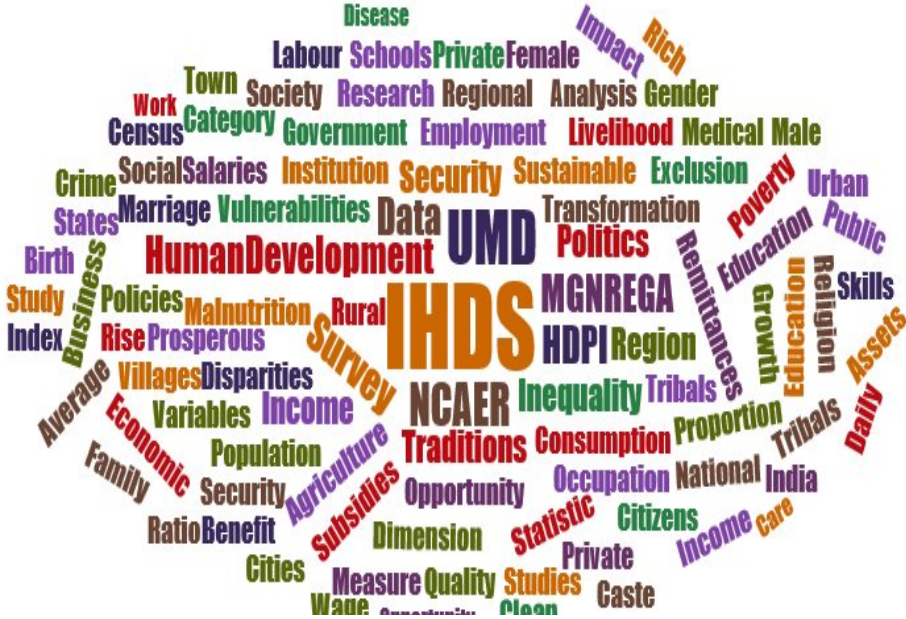


Figure 1: Variables covered by IHDS

Fig. 2 provides population group wise - rural, urban (non-metro) and urban (metro), source of loan for households for the two periods (for 2005-06 and for 2011-12). There are wide variations not only between the two periods, but also across population groups. Share of moneylenders as source of loan is much higher in the urban metropolitan area compared to rural and non-metropolitan urban area though it has significantly decreased from 2005-06 to 2011-12. Share of bank as source of loan is higher - almost same for both rural (29%) and non-metropolitan urban (28%) areas than in the metropolitan

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<sup>1</sup> The IHDS 1992-93 Survey is not very useful as its coverage is much smaller, so finding a panel leads to severe degree of sample attrition.



urban area (16%) in 2005-06. However, this has increased for all three cases though more in the metropolitan urban area in 2011-12. The share of

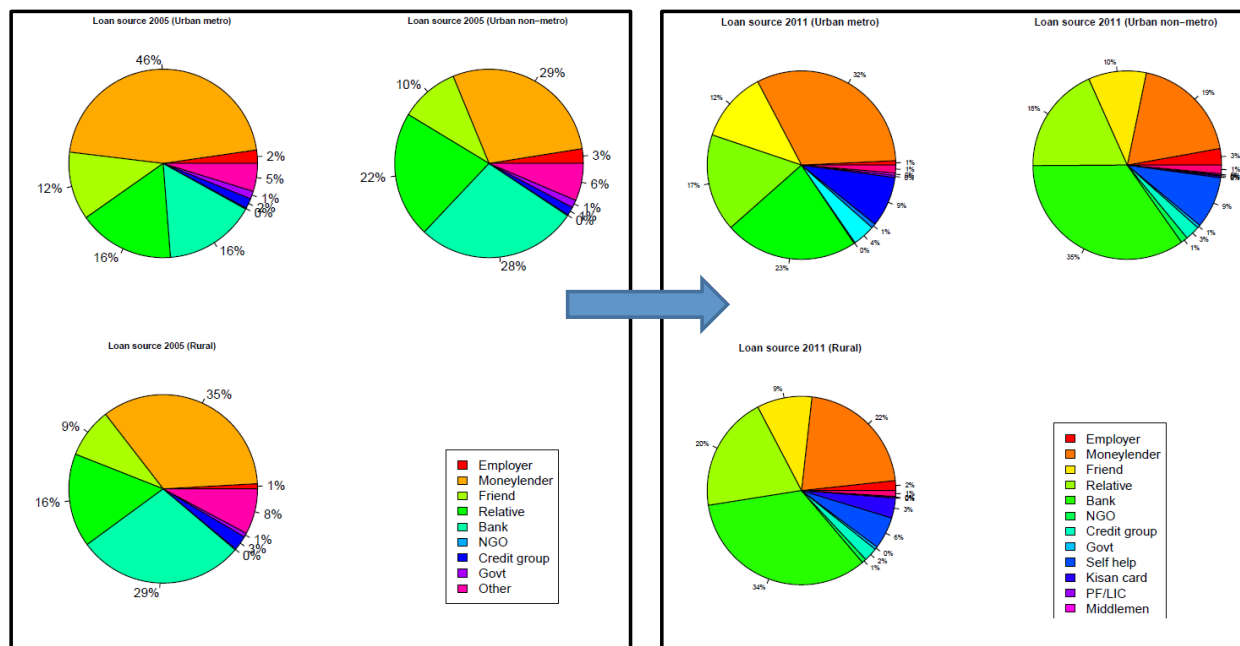


Figure 2: Source of borrowing by population groups across two periods

NGO, credit group or self help group as a whole has not changed significantly between the two periods, though, the share of self help group has increased in 2011-12 and more so in the urban area (both metropolitan and non- metropolitan) than in the rural area. Fig. 3 shows the occupation wise share of sources of loan for the two periods. We grouped occupations into four broad classes, viz. agriculture, business (including industry), salaried people and labourers (landless). Business (and industry) reports banks as the most important source of loans, though decreased from 2005-06 to 2011-12 while (landless) labourer reports moneylender as a major source of loan though not the largest in either period. Bank as the source of loan for agriculture has increased from 38% in 2005-06 to 42% in 2011-12 and that for labourer from 15% in 2005-06 to 22% in 2011-12. Loans from personal sources (friends and relatives) has very large share for all the occupation groups and is quite stable over the years. Substitution of sources takes place between banks and moneylenders. Salaried people take a significant part of their loans from banks though moneylenders are also another important source, but the importance has been falling.

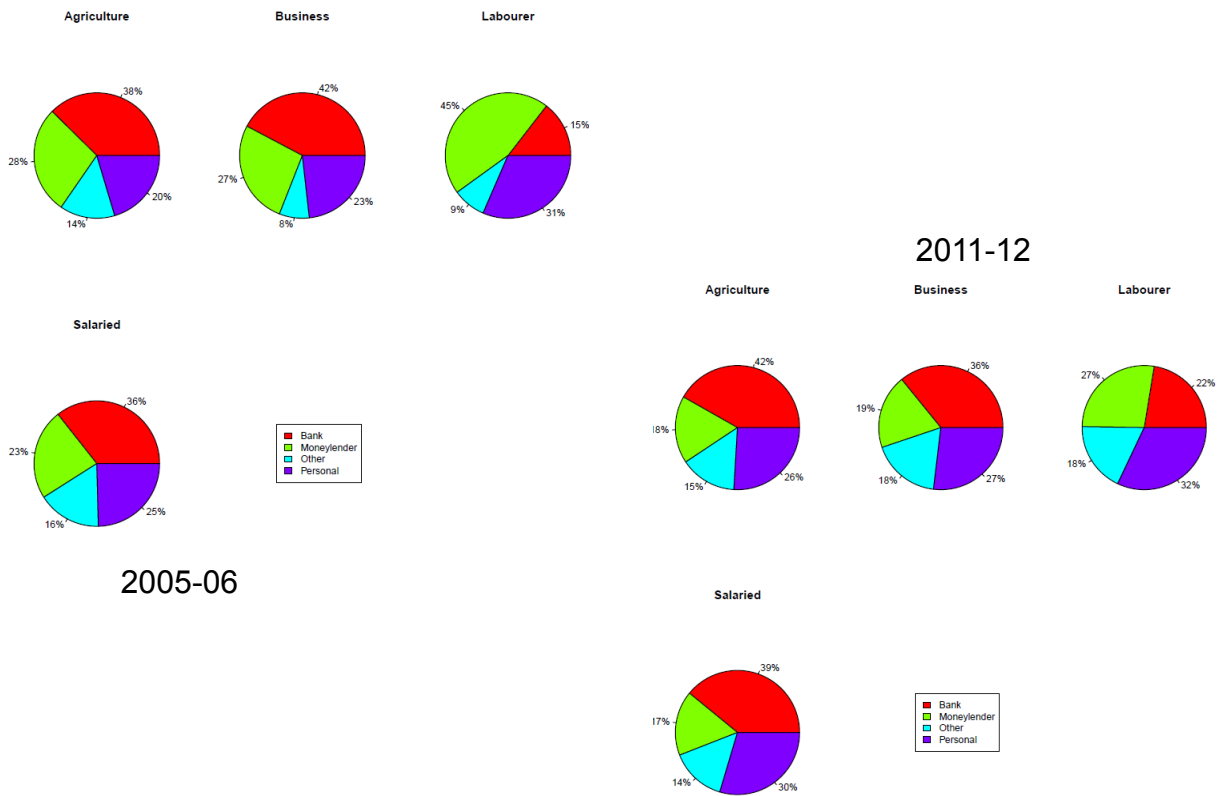


Figure 3: Sources of loans by occupation

Tables 1 through 4 provide the aggregative information on distribution of source of loan by purpose and purpose of loan by source for the two periods. Table 1 and 2 show that banks mainly lend for agriculture/ business (including industry), 54% and 44% and for home building, 18% and 17% in 2005-06 and 2011-12 respectively. Moneylenders lend for all purposes of which agriculture/ business and marriage are relatively dominant groups. However, lending for productive economic activity by banks as well as money lenders have decreased. Share of marriage and medical purposes have

Table 1: Distribution of loan type by source, 2005-06

Loan source	Purpose					
	Agriculture/ Business	Consumption	Home	Marriage	Medical	Other
<b>Bank</b>	54	3	18	8	3	13
<b>Moneylender</b>	21	16	12	23	20	9
<b>Other</b>	49	6	19	9	5	11
<b>Personal</b>	18	16	14	21	21	9

Note: Authors' calculation from IHDS data.

**Table 2: Distribution of loan type by source, 2011-12**

Loan source	Purpose					
	Agriculture/ Business	Consumption	Home	Marriage	Medical	Other
<b>Bank</b>	44	8	17	11	5	15
<b>Moneylender</b>	15	16	11	24	22	11
<b>Other</b>	32	18	15	11	11	13
<b>Personal</b>	13	15	12	24	26	10

Note: Authors' calculation from IHDS data.

**Table 3: Distribution of loan source by type, 2005-06**

Loan source	Bank	Moneylender	Others	Personal
<b>Agriculture/Business</b>	46	21	19	15
<b>Consumption</b>	8	46	7	40
<b>Home</b>	34	25	15	26
<b>Marriage</b>	13	45	7	35
<b>Medical</b>	7	47	5	42
<b>Other</b>	34	28	14	24

Note: Authors' calculation from IHDS data.

**Table 4: Distribution of loan source by type, 2011-12**

Loan source	Bank	Moneylender	Other	Personal
<b>Agriculture/Business</b>	55	12	19	14
<b>Consumption</b>	20	25	21	33
<b>Home</b>	40	17	17	25
<b>Marriage</b>	21	29	10	39
<b>Medical</b>	10	30	11	48
<b>Other</b>	40	20	17	23

Note: Authors' calculation from IHDS data.

increased between the two survey for all the source categories. It is revealed from Table 3 and 4 that for productive activities (agriculture/ business) households borrow from all sources of which bank is the most dominant source while money lender and personal (friends and family) are the primary source for consumption, marriage and medical with a decrease for all the three sources from 2005-06 to 2011-12.

## 2.2 Determinants of Bank Borrowing

The logistic regression (1) defined above is estimated for the same set of households considered at the two time points, viz. for 2005-06 and 2011-12 as pooled regression using Generalized Estimating Equations (GEE). The explanatory variables include household level economic factors, such as household income, asset, interest rate charged, debt history of the household and occupation (the last two determine credit worthiness), other social determinants, such as religion, caste, participation in the

social and political groups and financial depth determining the access of the household to formal financial system (i.e. banks in the Indian context). For the last factor the literature variously considers the bank deposits normalized by previous period's income, bank credit to private sector normalized by previous period's income, number of bank branches normalised by population. Neither measure can be calculated for the IHDS data set, because the households' identity at the village level is not disclosed by IHDS data. Hence though we collated data for bank branches at the village level combining Census and Reserve Bank of India data, it cannot be linked with households. To capture access of households to banks we estimated the regression equations by the major source of borrowing. This is consistent with the measure of financial depth in terms of bank credit to private sector. We tried with banking intensity at the district level, but it does not report any effect on household. We also include state and region dummy to capture state and region specific effects. Table 5 provides the results of the regression analysis. We have reported the coefficient estimates of the regressors along with upper and lower confidence bounds that found to be significant at 5%.

As is revealed by the results reported in Table 5 that asset<sup>2</sup> is significant determinant of bank borrowing while household income, interest rate are not significant; when asset is interacted with North and South region dummies, the estimates are slightly greater than unity with respect to the Central region (reference region) while for Western region it is marginally higher and for Eastern region very close to unity in 2005-06. However, South region has much stronger effect in determining bank borrowing in 2011-12. This implies that in case of regions other than the South higher household asset matters in the determination of bank borrowing. Debt history in last 5 years has positive and significant effect. Occupation is also important determinant of bank borrowing as business occupation (that also includes industry) as opposed to agriculture has lower effect (0.766) but the former has higher effect compared to salaried class (0.583) and labourer (0.436). *Kisan* credit card<sup>3</sup> for rural households has higher impact than rural households in respect of obtaining bank loans though urban households with the card also obtain bank loans. Because the relatively rich rural households live in urban areas and with higher assets and income has higher drawing rights. Religion is not a determinant though caste is. As opposed to the general category Scheduled Caste (SC) and Tribe (ST) households (traditional socially and economically backward castes, in recent times categorized as *dalits* that also includes OBC) have coefficients less than one compared to the General Category, but the coefficients report higher values for 2011-12. This is because government policy specifically directed at SC and ST population helped

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<sup>2</sup> It may be noted that asset in IHDS data is defined as an unweighted index of assets that the households own from a set of 33 items, not in value terms. A high index value or a low index value gives an idea of high or low asset class of households, however imperfect it might be.

<sup>3</sup> Credit card issued to agricultural households for buying agricultural inputs. It eases the process of agricultural loans.

**Table 5: Determinants of borrowing from banks - 2005-06 & 2011-12 pooled regression**

Covariate	Odds Ratio	95% Lower confidence bound	95% upper confidence bound
Assets	1.118	1.106	1.129
Brahmin	0.128	0.104	0.158
OBC	0.143	0.122	0.168
SC	0.139	0.116	0.167
ST	0.170	0.137	0.209
<b>Ref: Caste=General</b>			
Business	0.766	0.631	0.929
Labourer	0.432	0.397	0.469
Salaried	0.583	0.517	0.656
<b>Ref: Agriculture</b>	<b>1.000</b>	-	-
Owns Kisan Card:			
Yes/ Rural household	2.928	2.593	3.305
Yes/ Urban household	1.606	0.951	2.715
No/ Urban household	0.603	0.551	0.661
<b>Ref: No/ Rural household</b>	<b>1.000</b>	-	-
Prior debt	0.915	0.897	0.934
<i>Panchayat</i> member in family	1.336	1.201	1.486
Caste association member	0.993	0.875	1.126
2011 x Assets	0.985	0.973	0.997
Region = East	0.930	0.776	1.113
2011 x East	1.729	1.450	2.062
Region= North	1.454	1.249	1.693
2011 x North	2.048	1.756	2.389
Region = South	1.544	1.344	1.775
2011 x South	2.716	2.343	3.149
Region = West	1.130	0.954	1.339
2011 x West	1.839	1.550	2.182
2011 x OBC	0.603	0.490	0.743
2011 x SC	0.542	0.429	0.684
2011 x ST	0.582	0.433	0.783
2011 x Other	0.644	0.503	0.824
2011 x Caste Association	1.280	1.055	1.554
2011 x Debt	1.028	1.000	1.056

**Note:** Regression equation estimated by R.

them avail of bank loans *ceteris paribus*. However, caste is particularly important in South India - Brahmin interacted with South region dummy has coefficient 2.623 while corresponding estimates for OBC is 0.75, SC 0.519 & ST 0.716. Political participation of some family member as member of *Panchayat* (rural local level government) has a coefficient estimate of 1.336, while membership of

Caste Association reports a coefficient of 1.280. Dominance of South is probably due to a strong tradition of banking in Southern India.

Comparison of the impacts of the variables across the two periods reveals that qualitative nature of results do not differ much, though values of the relevant coefficients are different. Household asset has smaller coefficient (0.985) in 2011-12 compared to that in 2005-06 (1.118). Regional effects in 2011-12 have become more important for all the regions. Membership of Caste Association reports a stronger effect in 2011-12. This is because of the stronger group effect than individual effect, probably because of the increasing caste based politics of India.

### 2.3 Source of Finance, Growth and Inequality

This section is divided into two sub-sections – growth of household assets and growth of household per capita income when households are categorized by major sources of borrowing and the impact on the inequality of the households differentiated by the major source of borrowing.

#### 2.3.a Growth of Asset and Income

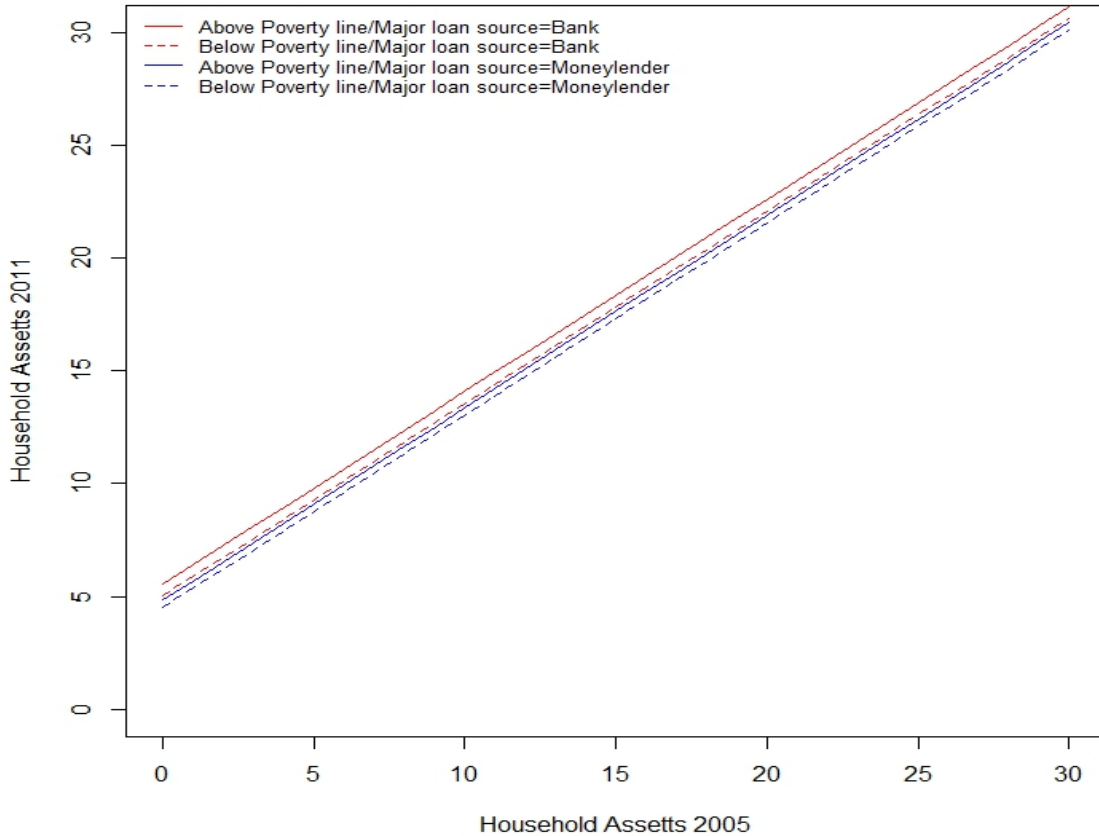
In order to inquire the role of sources of borrowing on growth of assets and per capita income of households we estimated equations (2) and (3). From amongst several possibilities the best-fit equations are only reported here given by (2') for assets and (3') for per capita household income. The estimated equation for household assets has been plotted in Fig. 4. We estimated the equation for all sources of borrowing, viz. bank, moneylenders, employer (other), friends and relatives (personal). We have reported the best fitted models only determined by the adjusted R<sup>2</sup>. However, in order to avoid cluttering of the graphs we provided the estimated equation two categories of source - bank and moneylender and for the two poverty classes – BPL and APL. As is clear from (2'), that a unit increase in household assets in 2005-06 raises the same in 2011-12

Growth of Household Asset:

$$\text{Assets}_{2011-12} = 5.39 + 0.86^{***} \text{Assets}_{2005-06} - 0.533^{**} \text{BPL} - 0.783^{***} [\text{Loan source} = \text{Moneylender}] - 0.02 [\text{Loan source} = \text{Other}] - 0.451^* [\text{Loan source} = \text{Personal}] + 0.301 \text{BPL} \times [\text{Loan source} = \text{Moneylender}] - 0.34 \text{BPL} \times [\text{Loan source} = \text{Other}] - 0.100 \text{BPL} \times [\text{Loan source} = \text{Personal}]$$

$$R^2 = 0.617, \quad \text{Adj. } R^2 = 0.616^4 \quad (2')$$

<sup>4</sup> \*\*\* : Significant at 0.1%, \*\*: Significance level 1%, \*: Significance level 5%.



*Figure 2: Growth of assets by source of borrowing*

by 0.86 from either source of borrowing. The significance level of the coefficients shows their role and importance.

It is readily observed that the coefficient of the  $Assets_{2005-06}$  is same, implying same growth rate by major source of borrowing – bank, moneylenders etc. and by poverty groups - APL and BPL. However, there is a downward level effect if the major source of borrowing for households is other than bank. Within the same category of major borrowing source BPL households report a lower level effect than APL households. However, when BPL category is interacted with moneylender as the major source of borrowing it has positive level effect, though does not surpass the category of major source of bank for the APL households. Next we consider the growth equation of income given by (3').

Growth of Household Per Capita Income:

$$\begin{aligned} \text{Per Capita Income}_{2011-12} = & 128500 + 0.578^{***} \text{ Per Capita Income}_{2005-06} - 71690 \text{ BPL}^{***} \\ & - 0.783^{***} [\text{Loan source= Moneylender}] - 17810 [\text{Loan source= Other}] \\ & - 58490^{****} [\text{Loan source= Personal}] + 62690^{***} \text{ BPL} \times [\text{Loan source = Moneylender}] \\ & + 25800 \text{ BPL} \times [\text{Loan source = Other}] - 46980^{***} \text{ BPL} \times [\text{Loan source = Personal}] \end{aligned}$$

$$R^2 = 0.1252, \text{ Adj. } R^2 = 0.1245 \quad (3')$$

As the coefficient of  $\text{Per Capita Income}_{2005-06}$  is same for all groups of major sources of borrowing the growth rate also turns out to be same across groups. However, as in the case of growth rate of assets there is similar type of level effects in the downward direction if the source of borrowing is moneylenders. There is, however, no discernible difference within the groups of BPL households when the source of borrowing is bank or moneylenders. The level effect is, however, higher in the case of income than asset because of the particular definition of assets as already discussed earlier. However,

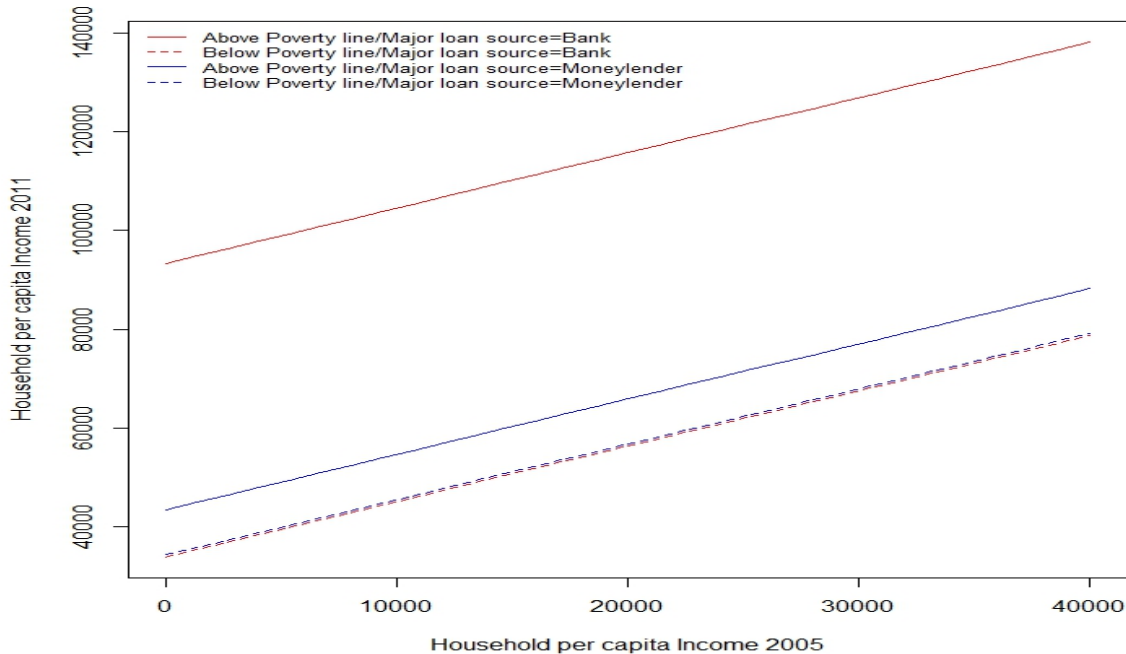


Figure 3: Growth of income by source of borrowing

when seen jointly with income growth it is confirmed that growth rate is independent of source of loan, it rather differs across poverty group or source of loan only in respect of intercept and there is no difference in slope coefficients which is essentially determines the rate of growth. It is evident from equation (3') that the  $R^2$  or Adjusted  $R^2$  is relatively lower for (3'), the majority of the coefficients are significant at 0.1% level.



### 2.3.b Impact on Inequality

Next we consider the impact of growth on the change in inequality for the two important sources of borrowing – bank and moneylender for the two poverty groups in terms of Lorenz curve and Gini coefficient for the two survey periods. We have considered only the inequality of income growth in three cases, viz. for all households, for agriculture households and for business (including industry) households. These are shown in Figs. 6 through 8. It is evident from the figures that inequality for BPL households has increased both for the set of all households as well as for the agriculture households.

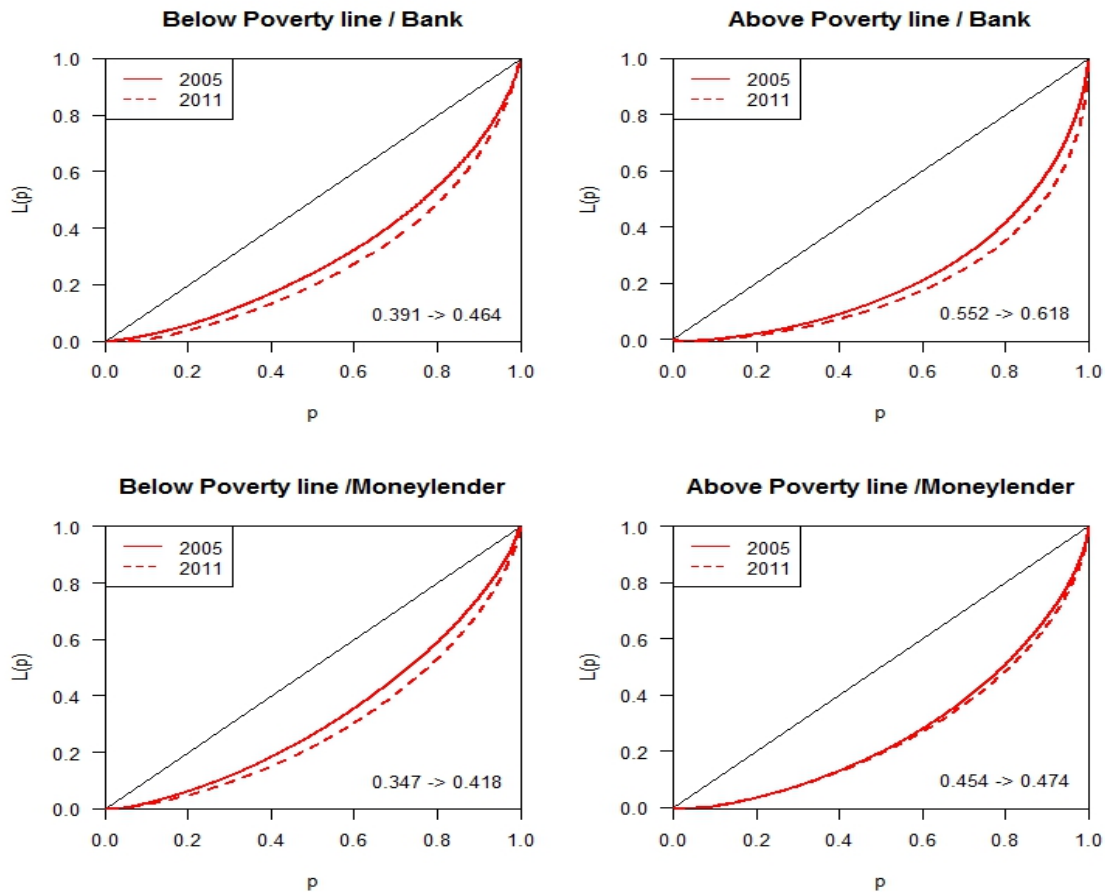


Figure 4: Change in inequality of income by source of loan & poverty line for all households

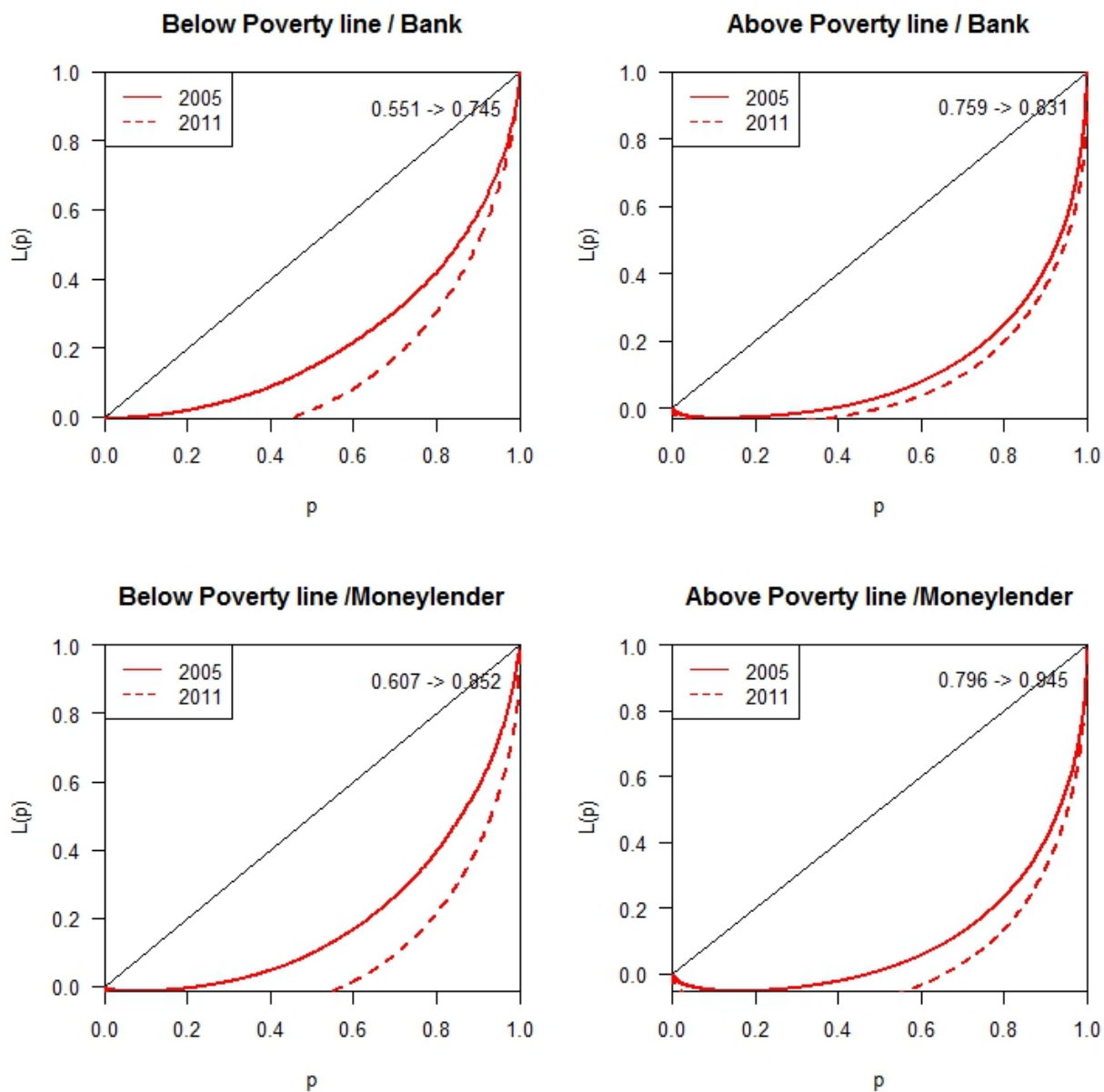


Figure 5: Change in inequality of income by major source of loan and poverty line for agriculture households

Inequality has increased for BPL households by 18.67% with bank as the major source of borrowing and 20.46% with moneylender as the major source of borrowing. For APL households inequality has increased by 4.41% if major source of borrowing is moneylender which is approximately 1/3<sup>rd</sup> if the source of borrowing is bank (11.96%). First three panels of Fig. 6 also show that for all households change in inequality is Lorenz consistent. For the agriculture households the increase in inequality is much higher for BPL category, 35.21% if major source of borrowing is bank and 40.36% if major source is moneylender. Inequality for APL households with agriculture as major occupation has increased by smaller extent (9.49%) if source of borrowing is bank and almost twice at 18.72% if

source of borrowing is moneylender. It is also revealed that extent of increase in inequality is relatively higher in the middle of the distribution. The set of business households also includes industry and these loans are expectedly more in the relatively urban areas. It is evident from Fig. 8 and also by the estimate of Gini coefficient that inequality has increased much less for business category of households for all poverty groups and for all categories of sources of borrowing except for APL with bank as the major source of borrowing, by 20.44% which is highest amongst all categories of bank borrowing.

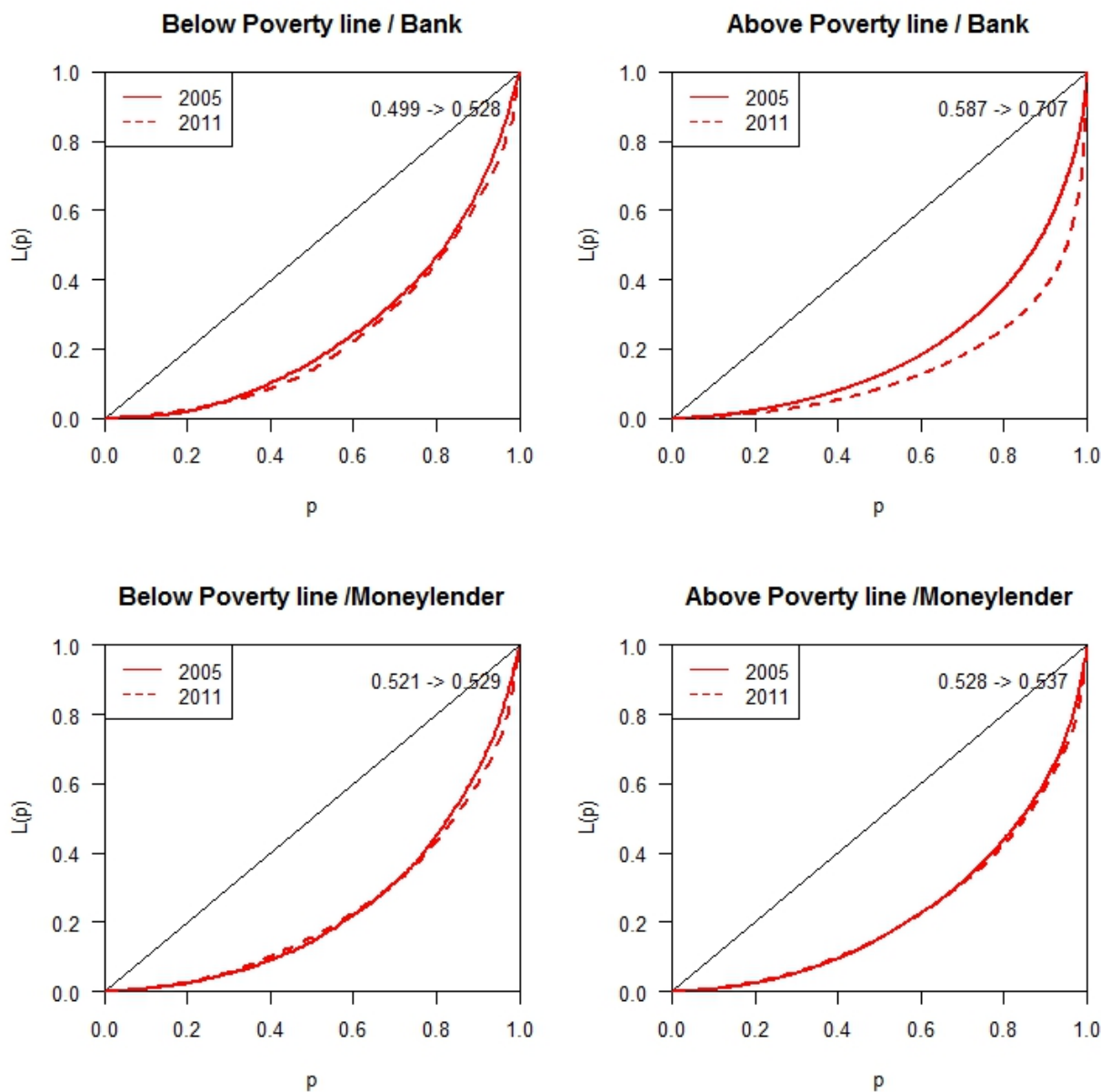


Figure 6: Change in inequality of income by source of loan and poverty line for business and industry

The above analysis shows that inequality has increased amongst the APL households even when the major source of borrowing is bank. In fact for the business and industry that enjoy a better banking

networks in India, inequality has risen the most. From a theoretical perspective it is not unexpected in view of the fact that if households as entrepreneur-investor undertakes projects with access to borrowed finance, then it leads to higher asset and income (as revealed by equations (2') and (3')). But all households will not be equally successful, those who are more successful will enjoy a higher level of income and assets and vice versa. This raises inequality even within the same category of borrowing. Households in the BPL category has an inherent disadvantage, hence this group suffers most. To take another view from the other side, informal credit market is not necessarily as regressive as it is thought to be. Entrepreneur-investor when borrows from the moneylenders, they execute it efficiently to generate adequate surplus. In fact our growth equations shows that it is as efficient as institutional source of borrowing.

### 3. Towards a Theoretical Model

Based on the empirical findings in the previous section we attempt to build up a theoretical model of entrepreneur-investor as in below. It is observed from the data that the source of borrowing is not watertight in the sense that a typical borrower has multiple sources to meet her credit needs. In that sense bank is the cheapest source in terms of interest cost, but it has several transactions cost both in terms of access to bank as well as timely disbursal of credit. In addition bank loan is almost always constrained by the appropriate collateral that a borrower can offer. On the other hand, informal source is easily accessible as the moneylender lives in close proximity and has adequate knowledge of credit worthiness of the borrower. So moneylender as a source of borrowing though attracts a high interest rate, is balanced by a lower transactions cost. Moreover, since the moneylender can exercise various extra economic forces to make sure full repayment of loan with a probability almost surely one, she does not require any collateral and hence, there is no credit constraint on loans from money lender. To justify the assumption of multiple sources of borrowing for any borrower it may be noted that as per the IHDS data more than 10% on an average of loans are from moneylenders when the major source of borrowing is bank and vice versa. Horvath (2018) also recognizes the importance of a large presence of an informal credit market and its impact on the economy.

The production function of the entrepreneur-investor is assumed to be Cobb-Douglas with constant returns to scale:

$$y_t = AK_t^\alpha L_t^{1-\alpha} \text{ where } A \text{ is the exogenously given technology parameter.}$$

Capital has one period gestation lag so that investment has to be made one period in advance which is then combined with labour. For the sake of simplicity we have assumed away depreciation of capital.

Labour is employed at a constant wage rate,  $w$ . The single output good is the numeraire in this model. Given  $K_t$  at  $t$  the profit maximizing choice of labour input decision of the entrepreneur-investor is given by

$$\max_{L_t} AK_t^\alpha L_t^{1-\alpha} - wL_t$$

Solving for the optimal choice of labour in terms of (given) capital stock and plugging it in the profit function we have,

$$\pi_t = A \left[ 1 - (1 - \alpha)^{1/\alpha} A^{\frac{1-\alpha}{\alpha}} w^{\frac{\alpha-1}{\alpha}} \right] K_t = \tilde{A} K_t.$$

The above profit function is conditional on optimal choice of labour in the next period at the constant (real) wage rate. The cost of labour is paid after the sales proceeds are realized. So long as real wage rate is constant the optimal profit function resembles A-K production in the single factor capital which is employed to decide about optimal capital stock. The dynamic choice problem of the entrepreneur-investor boils down to choice of capital only.

Given the fact that a typical entrepreneur-investor has two sources of loans, she will first borrow from bank (with a lower interest cost) and then the rest from the local money lender. Thus the cash flow constraint of the entrepreneur is given by

$$\tilde{A} K_t - C_t - (K_{t+1} - K_t - B_t)(1 + \tilde{R}) - B_t(1 + \bar{R}) = 0$$

or alternatively as,  $\tilde{A} K_t - C_t - (K_{t+1} - K_t)(1 + \tilde{R}) = B_t(\bar{R} - \tilde{R})$

$C_t$  is current period consumption,  $K_t$  is the capital stock at  $t$  given at the beginning of the period,  $\tilde{R}$  is the interest rate in the informal credit market,  $\bar{R}$  is the bank interest rate and  $B_t$  is the volume of bank borrowing. After exhausting  $B_t$  determined by the collateral the entrepreneur-investor borrows the rest from the informal credit market given by the third term under parenthesis in the first expression above. Thus  $\tilde{R}$  is the marginal cost of borrowing. The term on the right in the second expression is the premium enjoyed by the entrepreneur due to a lower interest cost of bank borrowing.

The volume of bank borrowing is determined by the availability of collateral, which in this model consists of capital stock of the entrepreneur at the beginning of the period,  $K_t$ . A fraction, say  $\theta$  of the capital stock is deemed fit for collateral, not the whole of the capital stock, because there are costs of recovery by way of litigation and other administrative costs in the event of default. This is determined by the following relation

$$\tilde{A} K_t - (1 + \bar{R})B_t \geq \tilde{A} K_t - q(B_t + K_t)$$

$$\begin{aligned}\Rightarrow B_t &\leq \frac{q}{(1 + \bar{R}) - q} K_t \\ \Rightarrow B_t &\leq \theta K_t\end{aligned}$$

where  $\theta = \frac{q}{(1 + \bar{R}) - q}$  and  $q$  is the probability of default.

The problem of the entrepreneur-investor is given by

$$\max_{C_t, K_{t+1}} \sum_0^{\infty} \beta^t U(C_t)$$

$$\text{s.t.} \quad \tilde{A} K_t - C_t - (K_{t+1} - K_t)(1 + \tilde{R}) = B_t(\bar{R} - \tilde{R})$$

where  $\beta (= \frac{1}{1 + \rho})$  is the discount factor.  $U(\cdot)$  is the  $t^{\text{th}}$  period utility that depends on consumption at  $t$ .

Substituting for  $B_t$  in the constraint function and solving the dynamic programming problem by Bellman's Method we have,

$$U'(C_t) = \lambda_t \quad (4)$$

$$\beta V'(K_{t+1}) = \lambda_t(1 + \tilde{R}) \quad (5)$$

Using Benveniste-Scheinkman Formula we have

$$\beta \lambda_{t+1} [\tilde{A} + (1 + \tilde{R}) - \theta(\bar{R} - \tilde{R})] = \lambda_t(1 + \tilde{R})$$

$$\frac{\lambda_t}{\lambda_{t+1}} = \frac{\tilde{A} + (1 + \tilde{R}) - \theta(\bar{R} - \tilde{R})}{(1 + \rho)(1 + \tilde{R})}$$

$$\frac{U'(C_t)}{U'(C_{t+1})} = \frac{\tilde{A} + (1 + \tilde{R}) - \theta(\bar{R} - \tilde{R})}{(1 + \rho)(1 + \tilde{R})}.$$

Assuming a logarithmic utility function the above expression approximately reduces to

$$\frac{C_{t+1}}{C_t} - 1 = \frac{\tilde{A} - (1 + \tilde{R})\rho - \theta(\bar{R} - \tilde{R})}{(1 + \rho)(1 + \tilde{R})} \approx g_t \quad (6)$$

The left hand side is the growth rate of consumption. This is approximately same as the rate of growth in an endogenous growth model. ( **citations required**). It is evident from equation (6) that rate of growth of capital and income are constant determined by technology (given a constant wage rate), both formal and informal sector interest rates, the factor for determining collateral requirement for borrowing from formal sector and rate of discount. Equation (6) asserts that an increase in productivity parameter  $A$ , resulting into an increase  $\tilde{A}$  raises growth rate. However, for a the effect of an increase in the informal sector interest rate on growth rate, given by

$$\begin{aligned}\frac{\partial g_t}{\partial \tilde{R}} &= \frac{\theta - \rho}{(1 + \rho)(1 + \tilde{R})} - \left[ \frac{\tilde{A} - (1 + \tilde{R})\rho - \theta(\bar{R} - \tilde{R})}{(1 + \rho)(1 + \tilde{R})^2} \right] \\ &= \frac{1}{1 + \tilde{R}} \left[ \frac{\theta - \rho}{1 + \rho} - g_t \right]\end{aligned}$$

is unequivocally negative if  $\theta < \rho$  for a growing economy. If, however,  $\theta > \rho$ , then an increase in  $\tilde{R}$  also raises the premium on the bank loan and if it is sufficiently higher than the rate of time preference then the higher premium works as an incentive for higher capital formation and a higher collateral so that a higher volume of bank loan can be availed in the next period. If, however the growth rate is high enough then even the positive component can be dominated resulting into a overall negative effect. The impact of an increase in interest rate on bank loan is unequivocally negative:  $\frac{\partial g_t}{\partial \tilde{R}} = -\frac{\theta}{(1+\rho)(1+\tilde{R})} < 0$ .

It may be noted that productivity of different groups of entrepreneur-investors, such as APL, BPL and/or with sources of borrowing being mainly bank (generally for the richer class with higher assets) or money lender (for the poor with less assets) may vary as reported in Table 5. Similarly collateral requirement,  $\theta$  can also vary across different groups of people depending upon the probability of successful repayment. It can as well be the case that interest rates on bank loans and loans from money lenders are different for different groups of borrowers. However, these parameters can vary across different groups so that the growth rate can be same, though the intercept of the growth equation can vary. This is in tune with the empirical results given by equation (2') and (3') reported in Section 2.3a.

Equations (6) shows that the level of capital accumulation undertaken by the entrepreneur-investor is determined by the interest rate on the informal credit market without any constraint on the informal market loan and the premium due to lower interest rate on bank borrowing. Interest rate on informal credit market,  $\tilde{R}$  is the marginal cost of borrowing that determines capital accumulation when a typical entrepreneur-investor borrows from both banks and informal loan market. As a matter of fact one can show that if there are  $n$  number of sources of borrowing where  $(n-1)$  are obtained at a fixed interest rate with an upper limit on borrowing while the  $n^{th}$  has no credit limit then the path of capital or income are determined by the interest rate of the  $n^{th}$  source independent of the major source of borrowing. Capital accumulation or household per capita income in steady state is determined by (6) which are consistent with the estimated equation (2') and (3'). The difference in the intercept for (2') or (3') can be explained in terms of differences in initial assets across households and other individual characteristics, such as BPL status of household, member of caste association or other factors that determine the availability of bank loans operating via a different  $\theta$  for different categories of households and differential

productivity reflected in differences in  $A$ . These determine the level effect only for different categories of borrowers.

If, however, bank is the only source of borrowing, then the constraint function changes to

$$\tilde{A} K_t + B_t - C_t - (K_{t+1} - K_t) - B_t(1 + \bar{R}) = 0$$

and the rate of growth is given by

$$g_t = \frac{\tilde{A} - \rho - \theta \bar{R}}{(1 + \rho)(1 + \bar{R})}$$

which is higher than the rate of growth given by (6).

This paper is one of the rare contributions to highlight the significance of informal credit market in a world where formal lending cannot reach in adequate amount to a vast majority of entrepreneurs. The relationship between financial development and growth must factor in the role of informal credit market. We have shown how informal credit market is linked to economic growth. Borrowers can be quite constrained to shift a dollar worth of loan from the informal to formal source. In a world where there is no informal source, growth may not take place beyond the limits of available finance from formal source. But when informal market loans are available and even in the absence of formal sector loan constraints, it is easier to access at a higher rate of interest which determine the marginal cost of borrowing. Thus our paper is also a contribution to the literature on financial development and growth. We demonstrate that when agents use both formal and informal sources of finance, the informal interest rate determines the rate of accumulation beyond the availability of formal sector loan. The present paper differs from Karaivanov and Kessler (2018) in respect of a number of factors. First, they considers informal source as the borrowings from friends and relatives at an interest rate much lower than even the bank interest rate and without collateral. Threat of severing of social relations acts as collateral in the model. The present paper considers informal loans as a separate market outside the formal banking sector with a higher interest rate and borrowing takes place even without collateral. The relative attractiveness of borrowings by source in this paper is exact opposite to that of Karaivanov and Kessler (2018).

#### 4. Conclusion

We provided an empirical analysis of ‘finance-growth-inequality’ nexus where inequality is also treated as an endogenous outcome of the process. The study is based on a large scale survey for India which in its own right is an important case to address this issue, because several policies have been implemented



in the country in recent times aimed at financial inclusion of the general population under the ambit of formal sector. The econometric results show that there are still many social rather than economic factors, such as caste, political participation etc. that are important in determining bank borrowing. However, asset and successful repayment of debt are important determinants among the economic factors. History matters in the sense that South and parts of West India with traditional banking system have better performance than other parts of the country with weaker traditional banking networks. It is further observed that growth rates of assets and income are not sensitive to major sources of borrowing. However, there is level effect with respect to source of borrowing where bank borrowing has a higher intercept than any other source. This questions the conventional wisdom about the policy of financial inclusion when there are multiple sources of borrowing. Expansion of formal sector banking networks does not by itself is adequate when investor-entrepreneurs are forced to borrow from the informal credit market – moneylenders or employers and relatives because the bank borrowing is constrained by the availability of collateral.

The issue of inequality shows a perceptible departure from the conventional wisdom on the basis of empirical evidence. It is found that inequality has increased whether major source of borrowing is bank or moneylenders though BPL and rural households suffer more in general. However, the business sector households above poverty line with major source of borrowing from banks are found to show significantly higher change in inequality. This is despite the fact that urban areas where business and industry are located have better banking networks. In general it can be stated on the basis of change in inequality between two periods that it is not necessarily the case that inequality will get reduced by mere expansion of formal sector banking. The study helps us understand inadequacy of the existing policy on financial inclusion of the unbanked households within the formal financial sector of the credit market.

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