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The dynamics of finance-growth-inequality nexus: Theory and evidence for India

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The dynamics of finance-growth-inequality nexus: Theory and Evidence for India[*]

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ABSTRACT

The paper critically inquires the 'finance-growth-inequality' nexus based on an econometric analysis of the IHDS Survey data for two rounds – 2005-06 and 2011-12. The study attempts to assess the co-evolution of finance-growth-inequality in an intertemporal framework. At the household level asset is still the most important determinant of bank loans inspite of several policy measures aimed at financial inclusion. However, the probability of receiving a bank loan increases if any member of the household is active participant of the local level government or caste association. 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 informal 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 observation is also confirmed for per capita income of the households. The phenomenon is explained 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. This 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 households living below poverty line are worse off in general. If the major source of borrowing is bank for the business and industry then inequality increases more for the above poverty line households than if the major source is moneylenders or the households belong to the below poverty line category. Moneylenders as the source of borrowing is not as regressive as is believed. So the whole issue of financial inclusion needs a review in the light of the findings of the paper.

Key words: Financial development, Financial Inclusion Growth, Inequality, Bank, India, IHDS, Logit Model

JEL Classification: C350, E5, G210, O11

The purpose of this research paper has been to extend our understanding of the 'finance-growth' nexus to 'finance-growth-inequality' nexus. 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 Levine and Zervos (1998) consider stock market along with banks in explaining economic growth and Rousseau and Wachtel (2000) in a subsequent study found that both stock market and banks are important in explaining economic growth. Beck and Levine (2004) further improved on the econometric methodology and found that both stock market and banks are important determinants of economic growth. Levine (2005) is a good survey of the literature.

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 erogeneity 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 an existing 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 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. 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 India and elsewhere 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, 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. Demirguc-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 erogeneity 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 poor 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 with a perfect product market and constant returns technology that does not allow surplus allotment of credit in the hands of the rich. 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, 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

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market. Our strategy is to divide the problem into two parts - in the first part we estimated the econometric model of determinants of bank loan, the second part employs another econometric model to assess the rate of growth of asset and income between the two survey periods for those 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 provide measure of inequality by source of borrowing for aggregative 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

$Y = 1$ if major source of loan in last 5 years from bank

0 otherwise.

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

$$log \frac{p}{1-p} = X'\gamma + \varepsilon \tag{1}$$

where p = probability of event Y, X is the vector of explanatory variables, γ is the vector of coefficients and ε 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

$$Asset_{t+k,i} = \beta \, Asset_{t,i} + \varphi \, Z_i + u_i \tag{2}$$

$$Income_{t+k,i} = \delta \, Income_{t,i} + \theta \, Z_i + u_i \tag{3}$$

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.[1] The study is conducted using two rounds of IHDS survey data – IHDS I, conducted in 2004-05 for more than 41,554 households in 1,503 villages and 971 urban neighourhoods and IHDS

Figure 1: Variables covered by IHDS

education, social and political participation, asset, income, sources of loans, interest rate charged, loan default etc. for both rural and urban areas. It is representative at the all India level. A graphic presentation of variables coverage in IHDS is given in Fig. 1.

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[1] 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.

Fig. 2 provides population group wise - rural, urban (non-metro) and urban (metro), source of loan for

No savings account (67.3%)

Has savings account (32.7%)

No savings account (41.3%)

Has savings account (58.7%)

Figure 2: Source of borrowing by population group with or without savings bank account

households for the two periods (first panel for the period 2005-06 and the second for the period 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 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 NGO, credit group or self help group as a whole has not changed significantly between the two periods, however, share of self help group has increased in 2011-12 and higher in urban areas (both metropolitan and

non- metropolitan) than in 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 (includes 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.
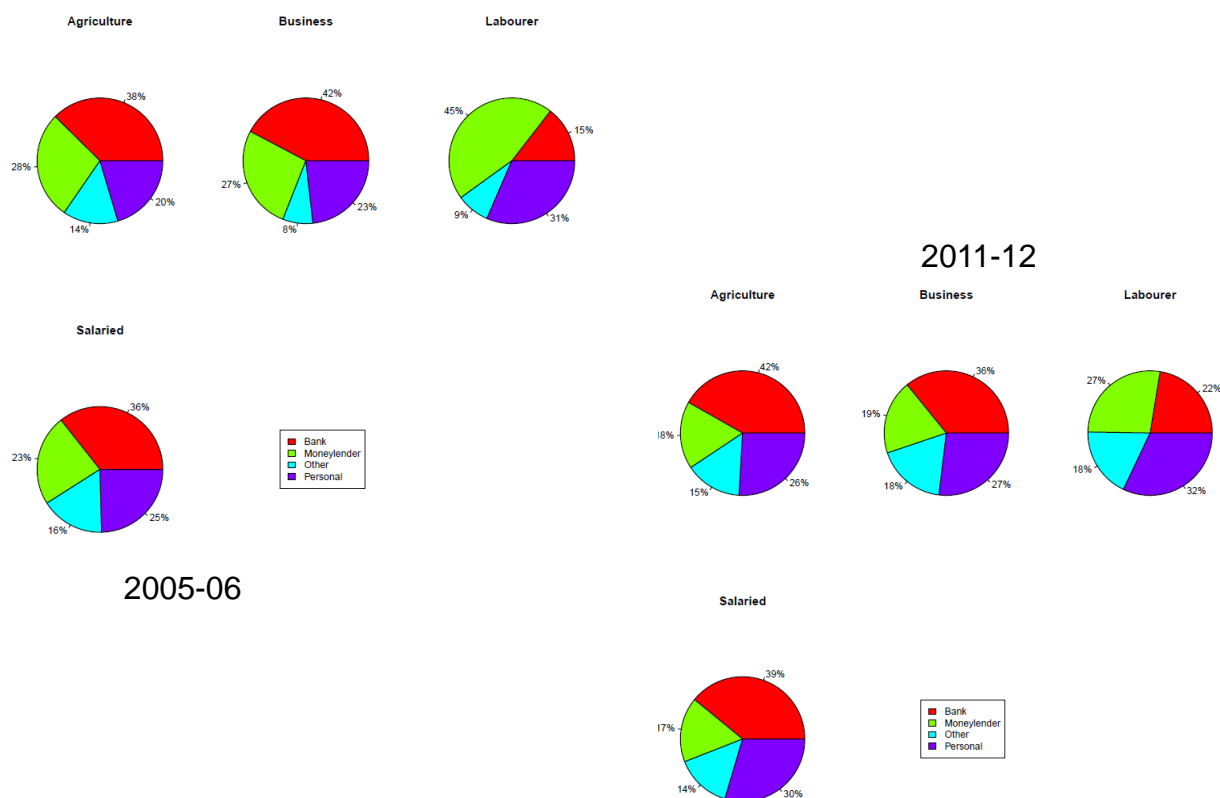

Figure 3: Sources of loans by occupation

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

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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
Bank	54	3	18	8	3	13
Moneylender	21	16	12	23	20	9
Other	49	6	19	9	5	11
Personal	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
Bank	44	8	17	11	5	15
Moneylender	15	16	11	24	22	11
Other	32	18	15	11	11	13
Personal	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
Agriculture/Business	46	21	19	15
Consumption	8	46	7	40
Home	34	25	15	26
Marriage	13	45	7	35
Medical	7	47	5	42
Other	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
Agriculture/Business	55	12	19	14
Consumption	20	25	21	33
Home	40	17	17	25
Marriage	21	29	10	39
Medical	10	30	11	48
Other	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 two sets, viz. for the first period – 2005-06 and for the two periods – 2005-06 and 2011-12 together as pooled regression. 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. For example, South India has a long history of indigenous banking system that was integrated with the modern banking system. Prior to the bank nationalisation of 1969 the banking system of South India was already developed. Among Western Indian states Gujarat also has an old tradition of indigenous banking system. On the other hand Eastern India the time of independence or bank nationalisation has a very low penetration of formal banking. Table 4 and 5 provide 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%.

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As is revealed by both sets of results that asset[2] is significant determinant of bank borrowing while household income, interest rate are not significant; when assets are interacted with North and South region dummies are slightly greater than 0.9 in reference to Central region while for Western region

Table 5: Determinants of borrowing from banks, 2005-06

Covariate	Odds Ratio	95% Lower confidence bound	95% upper confidence bound
Household Assets	1.123	1.100	1.146
Region=East	0.502	0.360	0.698
Region=North	1.761	1.315	2.361
Region=South	2.670	1.891	3.774
Region=West	0.946	0.691	1.294
Ref: Region=Central	**1.000**	--	--
OBC	0.980	0.809	1.190
SC	1.104	0.898	1.359
ST	1.213	0.937	1.571
Ref: Caste=General	**1.000**	--	--
Business	0.833	0.691	1.002
Labourer	0.430	0.387	0.478
Salaried	0.651	0.568	0.746
Ref: Agriculture	**1.000**	--	--
Owns Kisan Card	2.127	1.841	2.457
Yes/ Rural household	2.297	1.209	4.565
Yes/ Urban household	0.548	0.492	0.610
Ref: No/ Rural household	**1.000**	--	--
Prior debt	0.907	0.893	0.921
Panchayat member in family	0.951	0.854	1.057
Caste association member	0.816	0.734	0.907
Assets x East	1.065	1.036	1.095
Assets x North	0.984	0.961	1.008
Assets x South	0.975	0.952	0.998
Assets x West	1.011	0.986	1.037
Brahmin x South	2.623	1.365	5.256
OBC x South	0.750	0.613	0.919
SC x South	0.519	0.401	0.670
ST x South	0.716	0.487	1.048

Note: Regression estimate by R.

marginally higher than 1 and for Eastern region very close to 1. However, South region has much stronger effect in determining bank borrowing. 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

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[2] 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.

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 (0.83) but the latter has higher effect compared to salaried class (0.65) and labourer (0.43). *Kisan* credit card[3] for urban

Table 6: 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
S5	0.170	0.137	0.209
Ref: Caste=General			
Business	0.766	0.631	0.929
Labourer	0.432	0.397	0.469
Salaried	0.583	0.517	0.656
Ref: Agriculture	**1.000**	**-**	**-**
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
Ref: No/ Rural household	**1.000**	**-**	**-**
Prior debt	0.915	0.897	0.934
Panchayat 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 estimate by R.

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[3] Credit card issued to agricultural households for buying agricultural inputs. It eases the process of agricultural loans.

household has higher impact than rural households. This is because of 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 general category Scheduled Caste (SC) and Tribe (ST) households (traditional socially and economically backward castes, in recent times *dalits* that also includes OBC) have coefficients greater than one compared to the General Category, but Other Backward Caste (OBC) is marginally lower (0.98). This is because government policy specifically directed at SC and ST population helped 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 in the form of some family member being *Panchayat* (rural local level government) member in the family has a coefficient estimate of 0.95, while membership of Caste Association 0.816 as in 2005-06 survey data. But in the pooled regression these estimates rises significantly (to 1.336 for *Panchayat* member and by 1.280 for caste association membership). Dominance of South is probably due to a strong tradition of banking in South. We could not check the impact of bank branching at the immediate neighourhood of the resident households because of the reasons already mentioned. We used bank penetration at district level, but found to be non-significant. Possibly the impact is too thin.

Comparison of the Tables 4 and 5 reveals that qualitative nature of results do not differ much, though values of the relevant coefficients are different. Assets in 2011-12 has smaller coefficient (0.985) compared to 2005-06 (1.118). Regional effects in 2011-12 have become more important for all the regions. Caste effects have decreased significantly in 2011-12, but membership of Caste Association has a stronger effect. This is because of the stronger group effect than individual effect, probably because of the increasing caste based politics of India.

2.3 Growth of Asset and Income by Type of Borrowing and Impact on Inequality

Next we estimated equations (2) and (3) for analysis of the growth of asset and per capita income of the household respectively. From amongst several possibilities the best-fit equations are given by (2') for assets and (3') for household per capital income. The estimated equation for assets has been plotted in Fig. 4. We estimated the equation for all sources of borrowing, bank, moneylenders, employer (other), friends and relatives (personal). 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 one per cent increase in household assets

in 2005-06 raises the same in 2011-12 by 86 per cent form either source of borrowing. The significance level of the coefficients shows their role and importance.

Growth of Household Asset:

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

$$R^2 = 0.617, \qquad \text{Adj. } R^2 = 0.616_4 \hspace{5cm} (2')$$
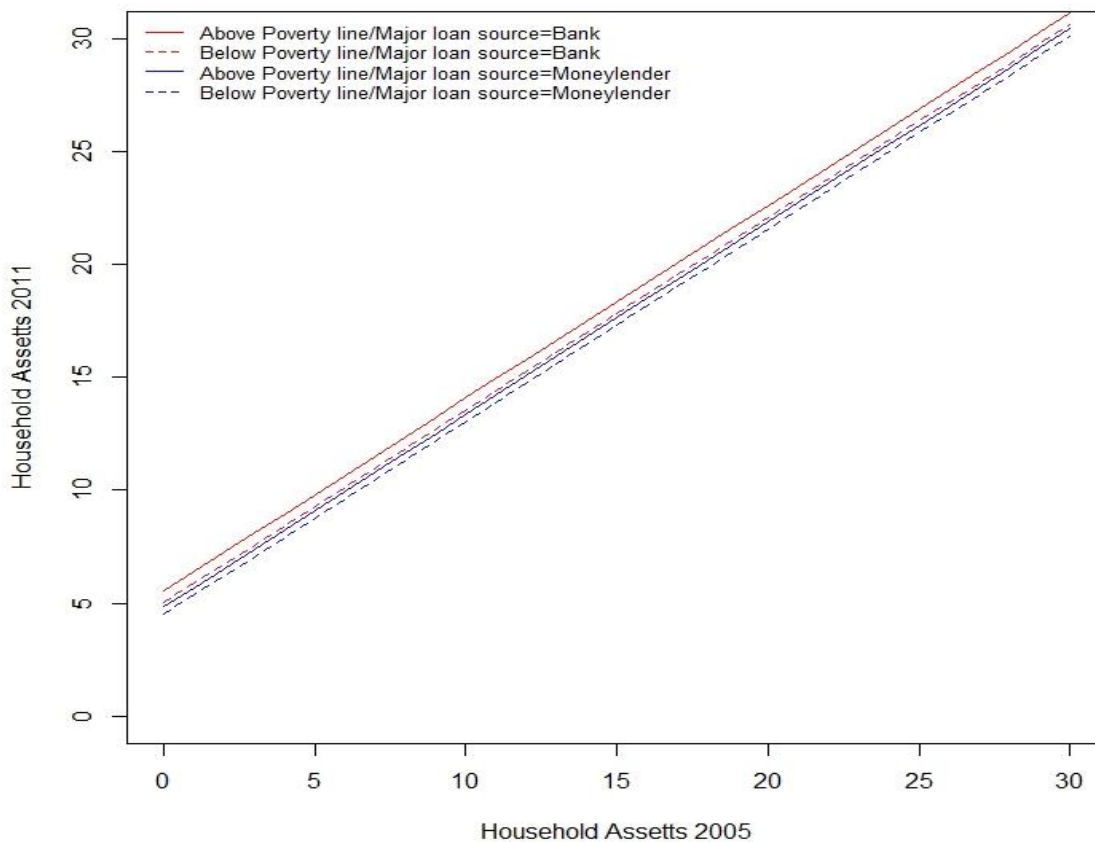
Figure 4: Growth of assets by source of borrowing

It is readily observed that the coefficient of the Assets$_{2005\text{-}06}$ is same implying same growth rate by major source of borrowing – bank, moneylenders etc. and by poverty groups - APL and BPL.

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4 ***\: Signficant at 0.1%, **: Significance level 1%, *: Significance level 5%.

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:

$$\text{Per capita income}_{2011\text{-}12} = 128500 + 0.578^{***} \text{ Per capita income}_{2005\text{-}06} - 71690 \text{ BPL}^{***}$$
$$-0.783^{***} \text{ [Loan source= Moneylender]} - 17810 \text{ [Loan source= Other]}$$
$$-58490^{****} \text{ [Loan source= Personal]} + 62690^{***} \text{ BPL x [Loan source = Moneylender]}$$
$$+25800 \text{ BPL x[Loan source = Other]} - 46980^{***} \text{ BPL x [Loan source = Personal]}$$

$$R^2 = 0.1252, \text{ Adj. } R^2 = 0.1245 \hspace{4cm} (3')$$

As the coefficient of Per Capita Income$_{2005\text{-}06}$ 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 case of income than asset because of the particular definition of assets as already discussed earlier. However,
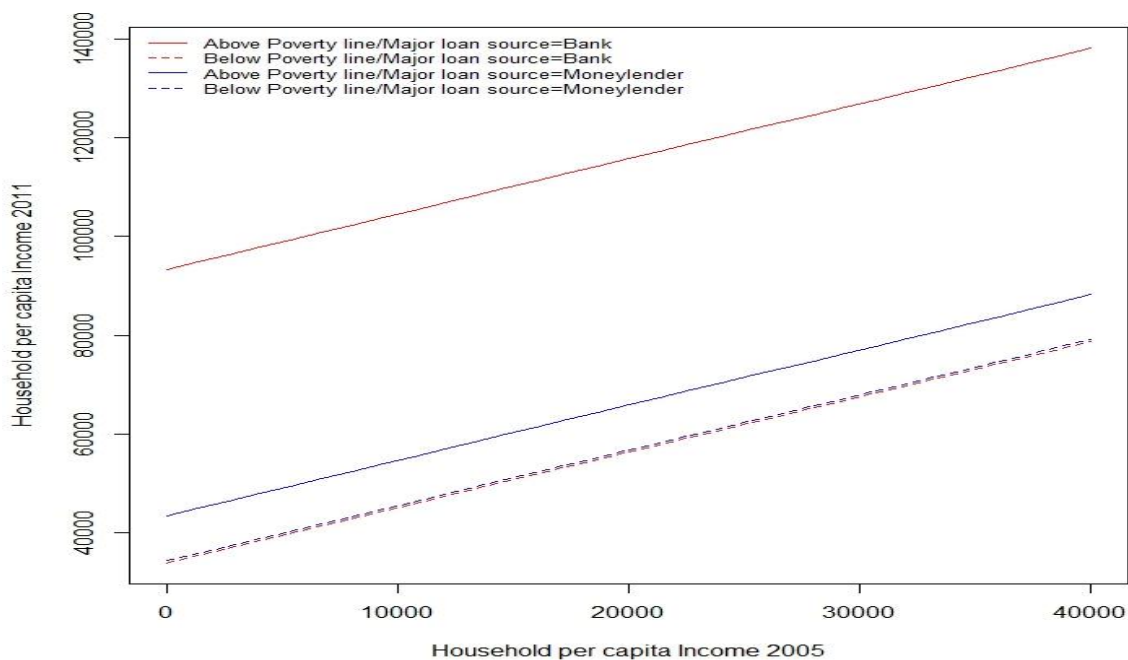

Figure 5: Growth of income by source of borrowing

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.

Next we consider the impact of growth on the change in inequality for the two important major source 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.
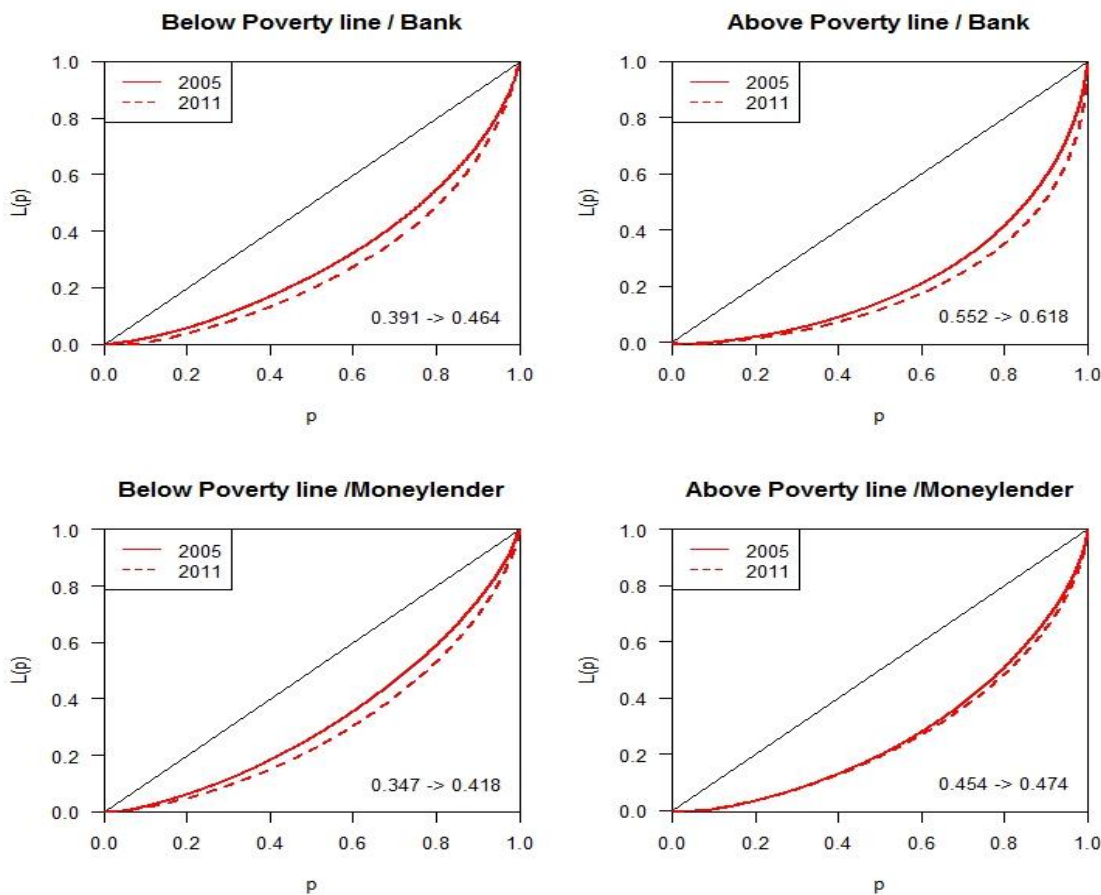
Figure 6: Change in inequality of income by source of loan & poverty line for all households
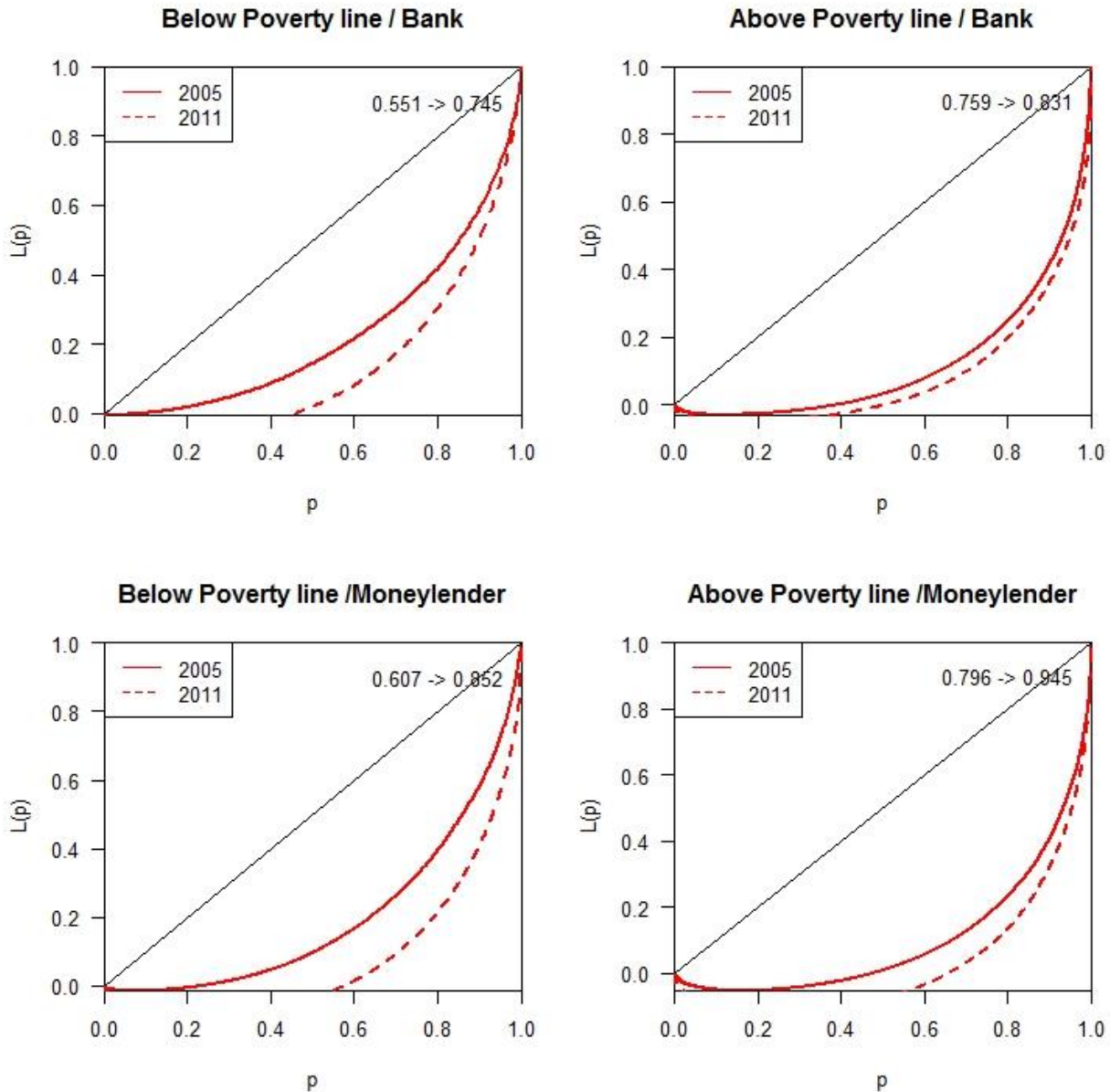
Figure 7: Change in inequality of income by major source of loan and poverty line for agriculture households

For the all households set inequality has increased for BPL households by 18.67% with bank and 20.46% with moneylender respectively 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 $1/3^{rd}$ 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 agriculture households have increased

lesser amount of 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 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.
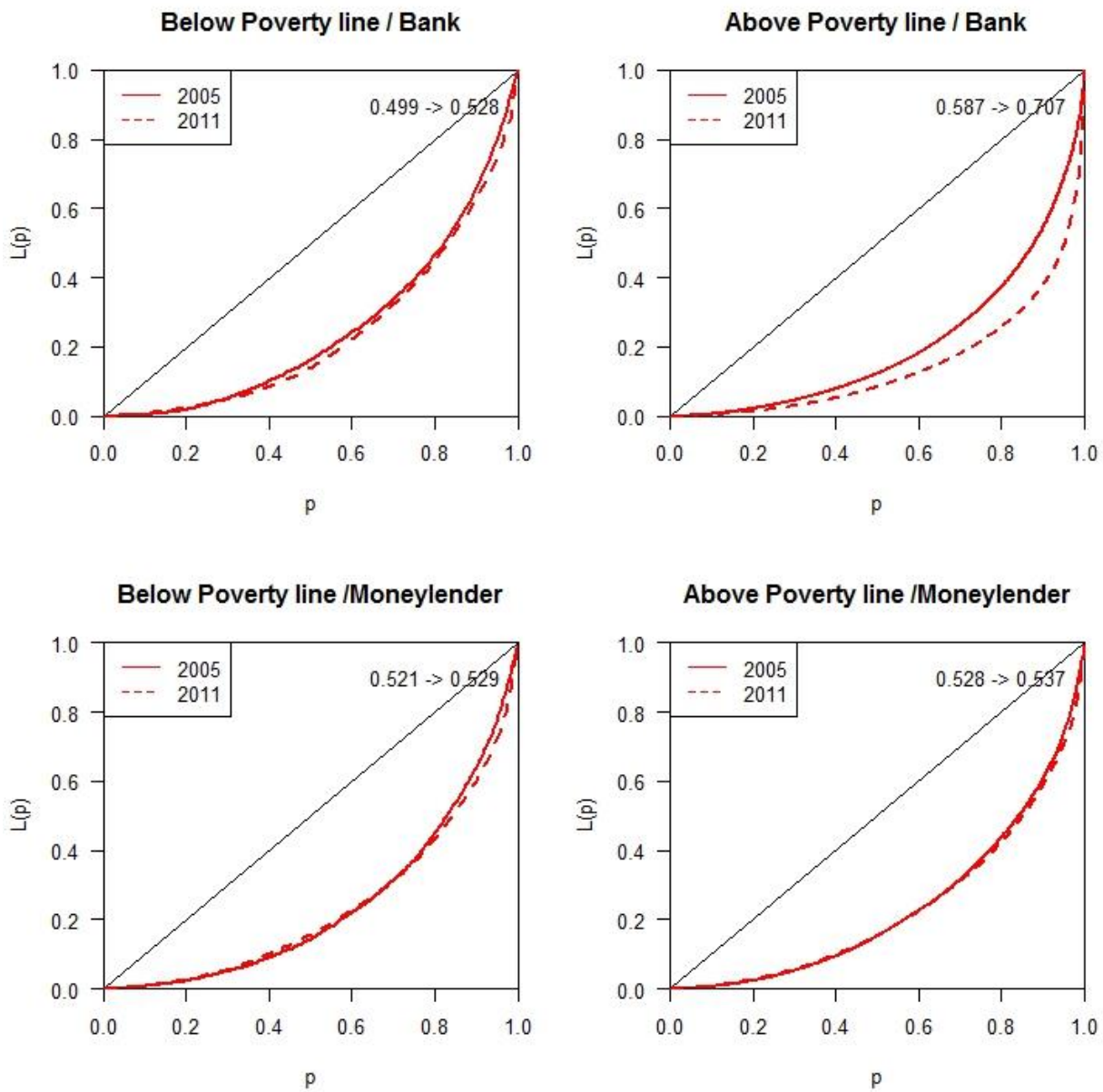
Figure 8: Change in inequality of income by source of loan and poverty line for business and industry

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 sector 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 with borrowing the household as entrepreneur-investor undertake projects that 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 moneylender they execute it efficiently to generate adequate surplus. In fact our growth equation 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 the village and knows the borrower in terms of credit worthiness. So moneylender as a source of borrowing though attracts a high interest rate, a lower transactions cost balances the interest cost of borrowing. Moreover, since the moneylender can exercise various extra economic forces to make sure repayment of debt there is no credit constraint. 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 problem of the entrepreneur-investor is given by

$$\max_{C_t, K_{t+1}} \sum_{0}^{\infty} \beta^t U(C_t)$$

s.t. $[AK_t^\alpha + B_t - C_t - (K_{t+1} - K_t)](1 + \widetilde{R}) - B_t(1 + \bar{R}) = 0$

where $U(.)$ is the tth period utility that depends on consumption at t, C_t, K_t is the capital stock at t given from previous period investment, A is the technology or other factors in the production function, $\widetilde{R}$ is the interest rate in the informal credit market, $\bar{R}$ is the bank interest rate and B_t is the volume f bank borrowing. After exhausting B_t determined by the collateral the entrepreneur-investor borrows the rest from the informal credit market given by the first term under the parenthesis in the constraint function above. The second term represents the repayment for the bank borrowing including the principal and interest components. 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 θ 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 determined by the following relation

$$AK_t^\alpha - (1 + \bar{R})B_t \geq AK_t^\alpha - q(B_t + K_t)$$

$$\Rightarrow B_t \leq \frac{q}{(1 + \bar{R}) - q} K_t$$

$$\Rightarrow B_t \leq \theta K_t$$

where $\theta = \frac{q}{(1+\bar{R})-q}$ and q is the probability of default. Substituting for B_t in the constraint function and solving the dynamic programming problem by Bellman's Method we have,

$$U'(C_t) = \lambda_t(1 + \widetilde{R}) \tag{4}$$

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

Using Benveniste-Scheinkman Formula we have

$$\beta \lambda_{t+1}(1 + \tilde{R})\left[\alpha AK_{t+1}^{\alpha-1} + 1 + \theta - \frac{1+\tilde{R}}{1+\bar{R}}\theta\right] = \lambda_t(1 + \tilde{R}) \tag{6}$$

In steady state capital accumulation is governed by the following equation

$$K = \left[\frac{\alpha A(1+\tilde{R})}{\rho(1+\tilde{R})-\theta(\tilde{R}-\bar{R})}\right]^{\frac{1}{1-\alpha}} \tag{7}$$

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The output is readily given by

$$y = \left[\frac{\alpha A(1+\tilde{R})}{\rho(1+\tilde{R}) - \theta(\tilde{R} - \overline{\overline{R}})}\right]^{\frac{\alpha}{1-\alpha}} \qquad (8)$$

Equations (7) and (8) shows that is the entrepreneur-investor borrows from bank determined by quantum of collateral and the rest from the informal credit market with no constraint then it is the interest rate of the informal credit market that determines the accumulation of capital or in general assets and income. However, individual characteristic, such as BPL, member of caste association or other factors determining influence to avail of bank loans can be captured by A in the theoretical model and determines the level effects as in (2') or (3'). As a matter of fact one can show that if there are n number of sources of borrowing where $(n\text{-}1)$ are obtained at a fixed interest rate with an upper limit while the nth without any upper limit then the path of capital or income are determined by the interest rate of the nth source independent of the major source of borrowing. If, however, the major source of borrowing is bank then $\tilde{R}$ disappears from both (7) and (8) and the accumulation and income equations modifies to

$$K = \left[\frac{\alpha A}{\rho + \theta \bar{R}}\right]^{\frac{1}{1-\alpha}} \qquad (7')$$

$$y = \left[\frac{\alpha A}{\rho + \theta \bar{R}}\right]^{\frac{\alpha}{1-\alpha}} \qquad (8')$$

In the other case of moneylender as the only source of borrowing the accumulation and income equations are given by

$$K = \left[\frac{\alpha A(1+\tilde{R})}{\rho(1+\tilde{R}) - \theta\tilde{R}}\right]^{\frac{1}{1-\alpha}} \qquad (7'')$$

$$y = \left[\frac{\alpha A(1+\tilde{R})}{\rho(1+\tilde{R}) - \theta\tilde{R}}\right]^{\frac{\alpha}{1-\alpha}} \qquad (8'')$$

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 weak traditional banking networks. It is further observed that growth rates of assets and income are not sensitive to major source 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. This phenomenon is then modeled in an intertemporal framework to provide a theoretical justification. The result can be generalized for n number of sources of borrowing when (n-1) sectors ration credit and the nth sector can supply the rest of the credit needs of the entrepreneur-investor.

The issue of inequality also 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 experience has significantly higher change in inequality as well. This is inspite of 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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