

## Impact of Access to Multiple Source of Credit on Informal Interest Rate in Rural India

Ananda Meher<sup>1</sup> and Trupti Mayee Sahoo<sup>2</sup>

<sup>1</sup>School of Economics, University of Hyderabad, Hyderabad, Telangana, India

<sup>2</sup>Center for Studies Economic and Planning, Central University of Gujarat, Gandhinagar, Gujarat, India

Correspondence author E-mail: [aanandameher@gmail.com](mailto:aanandameher@gmail.com)

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**Abstract:** Credit is one of the most important requirements for investment and emergency expenditure in rural India. Due to rationing of formal credit, some households in rural India borrow from both (formal and informal) sources of credit. Hoff & Stiglize have explained that marginal cost of credit to a borrower who is accessing loan from multiple sources is higher than the borrower who is accessing loan from a single source in informal credit market due to enforcement problem. This study empirically verified the access to multiple sources of credit and its impact on informal interest rate. It has used 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS data on all India debt and investment survey to verify the objective. By using maximum likelihood estimate of general linear model it has observed that, those who are accessing credit from multiple sources are paying higher interest than those who are accessing credit from a single source. The reason based on the conclusion is that, multiple source borrowers less tied up with the informal lenders and consequently they have lack of credit history with those lenders. Therefore the informal lenders enforce high cost of repayment to multiple sources of borrower as compare to their regular borrowers. Therefore the marginal cost of borrowing is higher for the borrowers having access to multiple sources of credit than the borrowers having single source of credit.

**Keyword:** Informal Interest rate, multiple source of credit, Formal Informal credit linkage, Rural India

### INTRODUCTION

Credit is one of the most important requirements for rural poor for investment and emergency expenditure. Most of the debate supports formal source of credit as a better source of credit than the informal source of credit. There are so many cases where a household demands credit which is partially meets through formal sources and rest of the credit they meets through informal sources. In a competitive market economy, access to formal sources of credit leads to diminution in the demand for informal credit, consequently the interest rate also decreases. So, the households who are tied up with one money lender in informal credit under competitive market will charge less interest rate in informal credit compared to those

households who have access to multiple sources of credit. Now the question arises, whether the credit market in a developing country like India is competitive or not?

In a developing country under informal credit market where a moneylender once has screened an individual and assessed the likelihood of repayment, the money lender is an imperfect substitute for any other money lender. Therefore, the moneylending market can be appropriately modelled as monopolistically competitive (Hoff & Stiglitz, 1990); (Hoff & Stiglitz, 1997). Hoff & Siglitz further explained that the subsidized formal credit increases the entry of new moneylender into the credit market which enhances the borrower's alternative sources of credit. Therefore it affects borrowers' incentive to repay, which further deteriorate the enforcement effort that each moneylender must expend per borrower to ensure repayment. Subsequently it increases marginal cost of lending. From the above theoretical enlightenment, the study hypothesized that marginal cost of lending is relatively higher to the moneylender advancing loan to borrowers having access to multiple sources of credit than the moneylender providing loan to borrowers having access to single source of credit. Therefore, moneylender charges higher interest rate to a borrower having access to multiple source of credit than a borrower having access to single source of credit.

## **REVIEW OF LITERATURE**

There are two groups of researchers explained the impact of access to both formal and informal source of credit on informal interest rate. One group explained about Horizontal division of credit market. They clarified that due to the rationing in formal credit, households are forced to borrow from informal sources (Kochar, 1997a; Kochar, 1997b), (Bell, 1990), (Chaudhuri & Cheral, 2012). The demand for informal credit is lower for the borrowers of both the sources of credit (Formal and Informal) than the borrowers of only informal source of credit. Hence the interest rate is lower to the borrowers having access to both the sources of credit (Mukherjee, 2013). Another group of researchers explained about vertical linkage of credit market. They explained that, households use their subsidize credit of formal institution to lend in informal market. This vertical linkage increases the interest rate in informal credit market due to increase in their enforcement cost (Hoff & Stiglitz, 1990), (Hoff & Stiglitz, 1997), (Bose, 1998).

Further research on market segmentation in credit market found that the informal finance could be complement or a substitute for bank credit

depends on banks' bargaining power. This is because borrowers' and informal lenders' joint return is maximized if both take competitive bank loans, while bank market power and subsequent credit market segmentation allows the formal monopoly to reduce agency costs (Madestam, 2014). But Tsai have explained complementarity relation between the microfinance and informal credit in Rural India and China. It has observed that the multiple dimensions of segmentation help to explain why the scale of informal finance actually increased after the introduction of the village bank: not only did the village bank deviate from its mission, but ironically, the fact that most of the bank loans went to local curb market financiers (Jains) which enabled them to expand the provision of informal financial services to other groups in the village (Tsai, 2004); (Chaudhuri & Cheral, 2012); (Sharma, 2010). Empirical study from Bangladesh explained that, expansion of microfinance program increases moneylenders' interest rates in the villages in which more loans are invested in productive activities (Mallick, 2009). Theoretical model provides some insights that two sectors such as microfinance and informal lending can easily be complementary. This complementary relation is evolved because the borrowers are typically required to repay their loans in tightly structured installments, beginning soon after loan disbursement in microfinance. This little-remarked aspect of the repayment schedule is usually explained as inculcating 'fiscal discipline' among the borrowers. This installment repayment structure allows informal lenders to survive in rural economy (Jaina & Mansuri, 2003).

### **PURPOSE OF THE STUDY**

In this backdrop, the broad objective of this paper is to empirically investigate Hoff & Siglitze argument on interlinkage of interest rate and access to credit in Rural India. It says that marginal cost of lending is relatively higher to the moneylender advancing loan to the borrowers having access to multiple sources of credit than the moneylender providing loan to borrowers having access to single source of credit. So now the question arises do the household access to multiple sources of credit pays higher interest rate in informal credit market than the household accessing credit from single source. Hence the study constructed a model to understand the determination of Interest rate in informal credit market of rural India. In this model, we tested the households those who are accessing both formal and informal source and their payment of interest rate for informal credit. Following section deals with data source and methodology of the study. Subsequently Section-3 and Section-4 deals with the result of the empirical test, with concluding remarks.

## DATA & METHODOLOGY

This study empirically investigated the interest rate determination process in Rural India. It specifically tested the impact of multiple source of credit on informal interest rate. To verify the above stated hypothesis it has used all India Debt and Investment survey 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS. The above rounds of NSS collected information from 110800, 139041 and 57031 sample households respectively. Out of total sample households, it has included rural sample of major 19 states of India which is representing 95 per cent of rural Population (With Weightage). Major 19 States of Rural India includes 54499, 79628 and 31424 numbers of sample in 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS. Out of total rural sample of major states of India, it is found that 49.6 per cent, 40.6 per cent and 45 per cent have taken credit from in 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS respectively (Table 3.1). The finally included samples are the households who have taken credit from informal sources excluding relative source of credit. Numbers of sample households finally included are 14175, 18204 and 4324 from 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS. For cross tabulation analysis, weightage has used to calculate their respective percentage. In regression analysis, borrowers who have taken credit from the relative sources are excluded from the group of informal borrowers to verify the pattern of interest rate variation. For better analysis, the study converted each source of credit into separate column and summing up the amount of borrowing and averaging the interest rate according to source of credit. Same process followed for the analysis of use of credit variable in rural India.

### Empirical Model

To analyze the impact of access to credit from multiple sources on informal interest rate, the study regressed informal interest rate on both source of credit (institutional & non-institutional) with some other socio-economic variables. General linear model of maximum likelihood estimation has used in regression analysis. Maximum likelihood estimation is useful in multivariate analysis and it calculates each category's divergence within the group variable (Fryer & Pethybridge, 1972).

$$\text{Under GLM (General linear model): } Y = X\beta + U \quad (1)$$

$$\Rightarrow U = Y - X\beta \quad \text{and } U \sim N(0, \sigma^2 I)$$

$$\text{Likelihood function in term of } U \text{ is } f(U) = (2\pi\sigma^2)^{-\frac{n}{2}} e\left(-\frac{U^T U}{2\sigma^2}\right)$$

$$\text{Put } U = Y - X\beta \Rightarrow f(Y, X | \sigma^2 \beta) = (2\pi\sigma^2)^{-\frac{n}{2}} e\left(-\frac{(Y - X\beta)^T (Y - X\beta)}{2\sigma^2}\right)$$

take log in both side

$$L(\sigma^2, \beta|Y, X) = \left(-\frac{n}{2}\right) \log(2\pi) - \left(\frac{n}{2}\right) \log \sigma^2 - \left(\frac{(Y-X\beta)^T(Y-X\beta)}{2\sigma^2}\right) \quad (2)$$

Equation 2 is a function of  $\sigma^2$  and  $\beta$ , so, it is to maximise the function with respect to  $\sigma^2$  and  $\beta$ .

$$\frac{\partial L}{\partial \sigma^2} = 0 \Rightarrow \frac{\partial L}{\partial \sigma^2} = \left(-\frac{n}{2\sigma^2}\right) + \left(\frac{(Y-X\beta)^T(Y-X\beta)}{2\sigma^4}\right) = 0$$

$$\sigma^2 = \left(\frac{(Y-X\beta)^T(Y-X\beta)}{n}\right) \quad (3)$$

$$\frac{\partial L}{\partial \beta} = 0 \Rightarrow \frac{\partial L}{\partial \beta} = \left(-\frac{1}{2\sigma^2}\right) \frac{\partial}{\partial \beta} ((Y-X\beta)^T(Y-X\beta)) = 0$$

$$\beta = (X^T X)^{-1} (X^T Y) \quad (4)$$

In the above model  $Y$  represent Vector of Interest rate,  $\sigma$  is standard error,  $X$  is the metrics of independent variable and  $\beta$  vector of regressor coefficient. Same model used to verify the interest rate determination in all three rounds of NSS data separately. In the model, source of credit variable is binary in nature, one category represents single source of credit (Informal) and other category represents multiple source of credit (formal and Informal). Other credit market variables are amount of loan borrowed and purpose of credit. Variable such as Land operated category, total value of own assets and monthly per capita consumption expenditure (MPCE) are used to explain the economic status of the households. Land operated variable is divided into five category such as land less (less than 0.01 hectares) marginal farmer (0.011 to 1.00 hectares), Small farmer (1.001 to 2.00 hectares), medium Farmer (2.001 to 4.00 hectares) and large farmer (more than 4.001 hectares). Social category or caste represent social status of the household, which is divided into four categories such as Schedule Caste (SC), Schedule tribe (ST), Other backward class (OBC), and Others. Generally Education is used as an important proxy for awareness, information or knowledge about banking and credit system. Hence, the highest education level of working members in the households is proxied for their information variable. Variables like Number of members in the household, age of the household head and sex of the household head are used as proxy for household characteristics. Amount Borrowed and Value of Assets variable are used to explain the economic status of the households. The study has used log of Amount Borrowed and Value of Assets variable in regression analysis to normalize their distribution.

### **CREDIT MARKET PATTERN IN RURAL INDIA**

History of credit market pattern is different in pre liberalization and post liberalization period. In pre liberalization period, there was a continuous

rise in formal source of credit over informal credit, and this pattern started with nationalization of bank in 1969. The dominance of formal source has crossed half of the total borrowing in 1991-92 (Ramachandran & Swaminathan, 2002), (Jodhka S. S., 1995). But in the post liberalization period, the share of households borrowing form formal sources has suddenly declined to less than 40 per cent, and again the share of formal borrowing have improved slightly in 2012-13.

Pattern of credit market over last two decades (1992 to 2012) in post liberalization period is presented in table 1. Percentage of household access to credit has declined considerably in 2002-03 as compared to 1992-93, but it again revived in 2012-13 in India. This recovery in all India level is due to increment in rural area. Percentage of households taken credit from only institutional source have continuously declined from over 50 percent in 1992-93 to less than 40 percent in 2012-13 in all India level as well as in rural and urban area separately. Percentage of households taken credit from non-institutional sources had increased from around 40 percent to over 50 percent in 2002-03 but again it has declined to 40 percent in 2012-13 in all India level as well as in rural and urban area. A clear and increasing pattern is visible in the share of households taken credit from both the sources (informal and Formal) from 7 percent in 1992-93 to more than 20 percent in 2012-13. This increment is faster in last decades (2002-03 to 2012-13) as compared to previous decades (1992-93 to 2002-03). In the latest survey,

**Table 1: Credit market structure in Rural and Urban India in latest three round of NSS survey**

<i>Credit Market Structure/ Different NSS Round</i>		<i>% of HH have taken loan</i>	<i>% of HH taken loan (OI)</i>	<i>% of HH taken loan (ONI)</i>	<i>% of HH taken loan (BS)</i>	<i>Total Borrowing HH in %</i>
48th round (1992-93)	Rural	45	53.3	39.1	7.6	100
	Urban	42.5	55.2	37.4	7	100
	All India	49.5	50.4	41.7	7.9	100
59th round (2002-03)	Rural	40.6	36.3	52.6	11.1	100
	Urban	43.8	35.6	52.6	11.8	100
	All India	31.7	38.9	52.6	8.5	100
70th round(2012-13)	Rural	44.7	37	40.4	22.6	100
	Urban	49.6	33.9	42.6	24	100
	All India	35.1	45.8	34.5	19.7	100

*Source:* Author's calculation from different rounds of NSSO (70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup>), survey on debt investment data.

*Note:* HH- Households, OI- Only Institutional, ONI- Only Non-Institutional, BS- Both Sources (Institutional & non-institutional)

the share households borrowing from both the sources (formal & informal) have doubled as compared to last survey on 2002-03. This paper mostly emphasized on these households (both formal & informal borrowers) and its impact on interest rate determination in rural India.

Both sources of borrowing in rural India spread across class groups. Table 2 shows percentage of each group access to both sources of credit across land possessed group in rural India. Percentage of household access to both sources of credit is diverse across land possessed group and same pattern of distribution is continued over the time. The rate of change is around 100 percent for Marginal, Small and Large Farmer, whereas it is 50 percent for landless and 75 percent for medium farmer from 1992-93 to 2002-03. In the last decade (2002-12), rate of change in access to both sources of credit is more than 100 percent for landless, marginal and medium farmer whereas it is around 50 percent for small and large farmer. The study also found a positive relation between access to both sources of borrowing and amount of land operated over two decades. This less access to both sources of credit among lower caste & landless, marginal and small farmer as compared to their respective counterpart is due to their lack of access to formal credit. In this regard it is very interesting to investigate these households who have taken loans from both sources and their relation with informal credit and interest rate.

**Table 2: Percentage share of Households borrowing from Both Sources out of total borrowing Household across Social Group in rural India**

<i>Land possessed group</i>	<i>48th round (1992-93)</i>	<i>59th round (2002-03)</i>	<i>70th round (2012-13)</i>
LL	5.3	7.9	18.3
MF	6.6	11.3	24.0
SF	8.4	19.6	30.0
MDF	9.4	16.6	34.1
LF	9.8	19.7	32.1
RI	7.4	11.8	23.6

*Source:* Same as Table 1

*Note:* LL- Land Less, MF- Marginal Farmer, SF- Small Farmer, MDF- Medium Farmer, LF- Large Farmer, RI- Rural India

## RESULTS & DISCUSSION

This section investigates the inter-linkage and impact of multiple sources of credit on informal interest rate which has explored by a very few studies in case of developing country (Jaina & Mansuri, 2003; Mallick, 2009). This

study shows the degree of relation between access to both sources of credit and interest rate on informal credit through regression analysis. The characteristics of independent variables and their expected sign in regression model have given in Table 3. Column 3, 5 and 7 of table 3 stated the average figure of independent variables and the dependent variable for the period 1992-93, 2002-03 and 2012-13. Average credit amount borrowed by each household increased three times in every decade. And the average value of own assets has doubled from 1992-93 to 2002-03 and it has again increased three times in last decade of 2002-03 to 2012-13. The average interest rate of informal credit followed an increasing pattern over the period and it is stagnant at 36 percent in the last decades (2002 to 2012). Along with that other characteristics of the variable such as age of the household's head and household's size are mostly same over the period.

**Table 3: Basic Statistics of continues variable**

Variable Name	Exp. Sign	48th round (N= 4324)		59th round (N=18204)		70th round (N=14175)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Interstate rate		28.75	21.76	35.49	23.80	35.91	22.73
Credit amount	(-)	6735	12459	17608	34969	57075	120409
HH size	(-)	5.72	2.87	5.18	2.46	5	2
Age of HH Head	(+)	44.24	13.32	44.25	13.12	46	13
Assets value	(-)	41587	60789	84066	144333	316379	459704
MPCE	(-)	223.88	409.50	478.32	260.31		

Source: Author calculated from 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS.

Note: MPCE- Monthly Per capita Consumption Expenditure.

Result of general linear model of maximum likelihood estimate is presented in table 4 where most signs of the regression coefficients are as expected.  $\beta$  value in regression model explains the percentage change in interest rate with correspondence to the change in continuous independent variable. In categorical variable case,  $\beta$  represent percentage of interest rate change if we move from base category to any other category. In regression analysis, the study found SC households pay higher interest rate than the OC households by 2.87 per cent in 70<sup>th</sup> round (2012-13) and it is 3.84 per cent in 59<sup>th</sup> round (2002-03). The predicted mean explains the expected Interest rate of each category. SC households in rural area pays 36.51 and 37.4 per cent interest rate as compared to 33.60 and 33.56 percent interest



rate by other category households in 70<sup>th</sup> and 59<sup>th</sup> round of survey respectively. Other variables such as social group, highest education of working member of the households and land possessed group are statistically insignificant in 48<sup>th</sup> (1992-93) round of NSS survey, so the study can't reject the null hypothesis of no difference in interest rate across the respective variables.

In 1992-93, dispersion of interest rate on informal credit is negatively related with household's assets and MPCE, which describes economically well up households pays less interest rate as compared to poor households. The same pattern is also found during 2002-03 and 2012-13 in debt investment survey data. The credit amount is also negatively related to amount of borrowing which is opposite as per expectation. This opposite sign may be due to lender who gives higher amount of credit only to their regular or interlock borrower in which risk of the credit is low, so they charged lower interest rate. Household size has positive sign as per expectation, as most of the credit are used for consumption purpose.

Across, households having different size of land possessed, marginal farmers are significantly paying higher rate of interest to informal lender followed by landless and small farmers & large farmers in both 2002-03 and 2012-13 survey. Expected average interest rate paid by marginal farmer is around 37 percent in 2002-03 and 39 per cent in 2012-13 as compared to 32 percent of interest rate paid by large farmers. The landless household pays averagely 4 percent higher interest rate than large farmer, but 2 percent less than marginal farmer. It may be due to their less requirement of credit for investment purpose and secondly in agricultural season they are able to generate income from labour services which are partly difficult for marginal farmer and at the same time marginal farmer have invested money in agriculture which squeeze their availability of fund. The purpose of credit reflects that lender charges less interest rate to productive purpose of credit than non-productive uses. The productive purpose of credit is highly related with land holding groups. So, the high land holding household takes credit for productive purpose with less interest rate but the land less, small & marginal farm household takes credit for non-productive use with high interest rate.

Highest education of the working member which represents education level in the analysis explains about access to information and computational skill of household is negatively related to the interest rate. In the regression analysis, we found that illiterate households pay 6 percent higher rate of interest and households completed only primary level of education pay 4 percent higher interest rate as compare to graduated households. Sex of

**Table 4: Result of general linear model of maximum likelihood**

Variable	Sub Category	48th round (N= 4324)		59th round (N=18204)		70 <sup>th</sup> round (N=14175)	
		$\beta$	$\mu$	$\beta$	$\mu$	$\beta$	$\mu$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(Intercept)	59.32* (0.00)		75.18* (0.00)		73.32* (0.00)	
Social Group	ST	1.51 (0.27)	31.98	-2.22* (0.01)	31.34	-1.07 (0.19)	32.56
	SC	1.04 (0.27)	31.51	3.84* (0.00)	37.40	2.87* (0.00)	36.51
	OBC	-	-	2.1* (0.00)	35.66	1.63* (0.00)	35.27
Land possess group	OTHER	a	30.47	a	33.56	a	33.64
	LL	0.75 (0.59)	31.14	3.13* (0.00)	34.99	4.07* (0.00)	35.87
	MF	1.86 (0.10)	32.25	4.99* (0.00)	36.84	7.05* (0.00)	38.85
	SF	1.71 (0.14)	32.10	2.37* (0.00)	34.22	1.3*** (0.06)	33.10
	MDF	0.32 (0.77)	30.71	2.71* (0.00)	34.56	1.07 (0.13)	32.87
Education	LF	a	30.39	a	31.85	a	31.80
	Illiterate	1.39 (0.41)	31.31	2.29* (0.00)	35.81	6.17* (0.00)	37.81
	Primary	2.48 (0.12)	32.40	1.51** (0.04)	35.03	3.55* (0.00)	35.19
	higher Secondary	1.72 (0.30)	31.64	0.09 (0.90)	33.61	1.71* (0.00)	33.35
Sex of HH Head	Graduate & above	a	29.92	a	33.52	a	31.64
	Male	-2.98** (0.05)	29.83	-0.54 (0.40)	34.22	-1.88* (0.01)	33.56
Both Source Access	Female	a	32.81	a	34.76	a	35.44
	Both source	2.42* (0.00)	32.53	3.15* (0.00)	36.07	1.55* (0.00)	35.27
Purpose of Credit	Only non-Ins	a	30.11	a	32.91	a	33.72
	Productive	-1.79 (0.00)	30.94	-2.78* (0.00)	32.97	-3.22* (0.00)	32.99
	Non-Prod	-2.44*** (0.07)	30.29	-1.00 (0.23)	34.75	-1.93** (0.04)	34.28
	Both Use	a	32.72	a	35.75	a	36.21

contd. table 4

Variable	Sub Category	48th round (N= 4324)		59th round (N=18204)		70 <sup>th</sup> round (N=14175)	
		$\beta$	$\mu$	$\beta$	$\mu$	$\beta$	$\mu$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of assets value		-1.44*		-1.99*		-1.87*	
		(0.00)		(0.00)		(0.00)	
HH size		0.20		0.4*		1.03*	
		(0.14)		(0.00)		(0.00)	
Age of the HH Head		-0.01		-0.03*		-0.03**	
		(0.71)		(0.01)		(0.002)	
Log of credit amount		-0.09		-0.64*		-2.38*	
		(0.79)		(0.00)		(0.00)	
LOG of MPCE		-2.89*		-3.11*		—	
		(0.00)		(0.00)			
Maximum likelihood estimate		464.49		543.96		478.87	
Omnibus Test (Likelihood Ratio Chi-Square)		84.06		734*		1070*	
		(0.00)		(0.00)		(0.00)	

Note: \*, \*\*, \*\*\* represents 1%, 5%, and 10% level of significance, "a" represent the base category in respective categorical variable. Value in parentheses "()" explains the level of significance or (p value).  $\beta$  is coefficient of independent variable.  $\mu$  is predicted average interest rate of respective category.

Source: All India Debt & Investment survey of 70<sup>th</sup>, 59<sup>th</sup> and 48<sup>th</sup> round of NSS.

the household head also negatively related with interest rate significantly. So male headed households pay around 2 percent less interest rate than female headed household, because of gender bias in rural institutional set up.

The multiple source of credit and its impact on Interest rate of informal credit explains in access to both sources of credit variable. Access to both sources of credit is positive in sign and highly significant in all three regression analysis. It explains that households who have access to both the sources of credit are paying higher interest rate on informal credit than the households who borrowed only from informal sector. The difference in interest rate is 1.55 percent, 3.15 percent, 2.42 percent in 2012-13, 2002-03 and 1992-93 respectively across Rural India. Same result is also found in case of Bangladesh relating micro finance credit and informal interest rate (Jaina & Mansuri, 2003) (Mallick, 2009). It has observed that difference in interest rate for households accesses to both the sources of credit and households accesses to only informal source of credit have been declining.

This result strongly supports Hoff & Stiglitz, argument that "if the borrower accessing multiple source of credit, he pays higher interest rate

on informal credit". This is due to enforcement problem, the lender has less control over the households who have taken loan from multiple sources than the households who have accessed loan from single source. So, the lender required more effort to enforce repayment of credit for the households who have taken loan from multiple sources, which increases his marginal cost of credit and so on the interest rate as compared to households accessing single source of credit.

### **Model Specification test / Robustness Test**

The study examined model specification biases through likelihood ratio test and Wald test. The likelihood ratio test compares fitted model against intercept model. The result of the likelihood ratio test is highly significant in all three regression analysis which rejects the model specification biases (Table 4). The Wald test verifies the importance of each independent variable in the model. Regression model for the year 2012-13, the Wald test result shows all the variables of the model are having significant impact on the dependent variable. Regression model for the year 2002-03, the Wald test is significant for all variables except sex of the household's head. So we have excluded the variable (sex of the household head) in 2002-03 regression model. In case of 1993-94 debt data more number of variables are insignificant in Wald test but the important variables such as both the sources of credit, log of asset value, age of household head, log of amount borrowed and log of MPCE are significant in Wald Test.

### **CONCLUSION**

There are two types of debate on credit market linkage i.e. horizontal linkage which explains the interest rate is lower on informal credit for multiple source of borrower than the single informal source borrower due to less demand of credit among multiple source of borrower and the vertical linkage explains that the rate of interest is higher on informal credit for multiple source of borrower than the single informal source borrower due to increasing marginal cost of credit (Aleem, 1990; Hoff & Stiglitz, 1997; Bose, 1998).

However, the systems of labour services, transactions in the informal sector of credit have become more commercialized in recent period: a lender lends primarily to earn an income or property through loans, not to be able to extract unpaid labour or to reinforce traditional patron-client relations between himself and the borrower. This changing scenario in rural credit increased the rate of interest. The empirical investigation found that the marginal cost of credit has positive impact on informal interest rate

determination. Secondly, a rise in new entry may raise the marginal transaction costs (via economies of scale), increase the marginal enforcement cost of moneylenders due to reduced borrowers' incentives to repay (via enforcement externalities), and reduce the flows of information about each borrowers' credit history. The regression results clearly explains the positive impact of enforcement cost on interest rate under imperfect credit market. Due to rationing in formal credit, some borrower depends on informal source to meet otherpart of their of credit. These borrowers are less tied up and lack of credit history under informal lenders, which increase the enforcement cost of repayment for informal lender and hence the marginal cost of credit. So, the informal lender charges disting and higher interest rate to such borrowers than their regular tied up borrowers.

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