

Repayment of Loans in the Formal Sector: The Role of Accessibility to Credit from Informal Sources

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Abstract

The purpose of this paper is to investigate the role of accessibility to credit from informal sources on repayment of loan in formal sector, which has not been adequately addressed so far. The paper addresses this issue both theoretically and empirically. Our theoretical model shows that higher interest rate in the informal sector increases probability of repayment in the formal sector. The proposition obtained from the theoretical model has also been tested empirically using unit level 59th Round *All India Debt and Investment Survey* data provided by National Sample Survey Organization. The empirical analysis supports the propositions obtained from the theoretical model.

Key Words: Repayment, formal lending Agency, Informal Lending Agency

JEL Classification O1, G0, G2

1. Introduction

One of the main constraints faced by households of developing countries is inadequate accessibility to financial resources. Majority of households in these countries suffer from fluctuating income and they also do not possess sufficient savings. This in turn compels these households to rely more on credit to finance their production and consumption expenditures. To tackle this problem, governments of most developing countries have established credit institutions targeting the poor. These institutions provide finance at reasonable terms and conditions. Unfortunately, however, most of such credit institutions have faced serious problems of repayment. Poor repayment of these institutions has often been attributed to income shocks or low rate of return from investment (Okorie, 1986). Poorer repayment has also been attributed to availability of substitutes for formal credit, which is credit from informal sources such as moneylenders, traders, landlords, and relatives and friends (see also Kochar, 1997; Karlan and Zinman, 2009).

The purpose of this paper is to explore the role of accessibility to credit from informal sources on repayment of loans in formal sector, which has not been adequately addressed in literature. Recent research papers have mostly focused on the issue of repayment of loans in institutions which performs by lending to groups such as microcredit institutions (Besley and Coate, 1995; Sharma and Zeller, 1997; Bhat and Tang, 2002). Studies which have focused on functioning of traditional formal institutions have also not addressed this issue. Our paper addresses the issue both theoretically and empirically. Using lifetime expected utility function the theoretical part of the paper brings out the conditions under which a borrower would willful default in the formal sector, in presence of accessibility to credit from informal lenders. It is observed that higher interest rate in the informal sector reduces chances of default in formal sector. The propositions

obtained from the theoretical part are also tested empirically using 59th Round All India Debt and Investment Survey data provided by National Sample Survey Organization. The empirical part supports the propositions obtained from the theoretical model. To understand the repayment problem of formal lending agency better, in the empirical part we have also looked into the factors that influence repayment of loans of informal lending agencies. In this paper, we have confined ourselves only to short-term loans (loans that are advanced for a period up to one year). Medium term (1-3 years) and long term loans (more than 3 years) has not been considered because repayment process of medium and long term loans are slow and therefore not captured adequately in the cross section data provided by NSSO. Moreover, medium and long-term loans are not availed frequently in a household's lifetime. Beside this, since credit market features differ between developed, less developed and middle performing regions, three types of representative states is considered in our analysis. Punjab and Haryana have been considered as developed states, West Bengal and Karnataka have been considered as a middle performing state whereas Chattisgarh, Madhya Pradesh, and Bihar have been considered as less developed states. The classification of these states (in terms of development) has been done based on human development index, per capita income of the states and percentage of households living below poverty line.

The rest of the paper consists of the following sections. The second section provides the theoretical model. The third section provides a conceptual framework for the empirical analysis. This is followed by section focusing on selection of variables, econometric specification and results. A concluding section is there at the end.

2. Theoretical Model

This section theoretically brings out the condition for willful repayment of loan in the formal sector when its borrowers possess accessibility to credit from informal sources. A particular case is considered where a household requires loan for income generating purpose. The result would not vary a great deal if one incorporates consumption loans. Keeping the Indian scenario in mind, the model also considers presence of loan waiver scheme. The proposition of the theoretical model is tested empirically. The model is based on the following assumptions.

2.1 Assumptions

We assume that the earning cycle of a household is consisting of two periods. In the first period the household gives effort, which is constant temporally to obtain some output. In the second period of the cycle, the household receives the output. We assume that the borrower realize a high value output $zh\sqrt{B}$ with probability p and a low value $zl\sqrt{B}$ with probability $(1-p)$, where B is the loan amount. Loan can be availed from both the formal and the informal sector and has to be repaid in the second period. In addition to this, in both the periods, the household have a fixed income, such as income from animal husbandry, which fetches an income of y . Thus income of the borrower is composed of two components, a certain component, y , same in all periods, and a random component, z . The borrower can repay back loan only in the formal sector if the higher output is realised. In other words, we assume, rate of interest in both formal and informal sector to lie between $(zl\sqrt{B}+y-B)/B$ and $(zh\sqrt{B}+y-B)/B$. By assuming this, we avoid encouragement of willful default from the part of the formal lending agency and at the same time, we include presence of genuine default (such as due to low income) in our model. However, a borrower may

willfully default from its part¹. But this has been restricted only for the formal loans. On the event of willful default the household enjoys full value of the output, but the formal lenders stop future credit unless there is a loan waiver. The probability of loan waiver is α . Informal lenders, in our model, do not face imperfect information about the borrower and therefore no willful default. They also do not have any restriction on interest rate. In case of default, informal lenders grab the collateral of the borrower. Future credit is provided in the informal sector even in case of default as there is no loss. The income of the household is assumed to be independently and identically distributed from one borrowing period to another. The rate of discount from one period to the other is denoted by β . Utility is assumed to be additive in its components.

Given the assumptions, it is clear that expected lifetime utility of the borrower will change depending upon its borrowing and repayment decision. One can imagine three possible choices in front of the borrower. First, the borrower avail formal loan and repay back. In such case in all the subsequent periods, it can avail loan from formal sector. The expected lifetime utility is denoted by VFR and is given below.

$$\begin{aligned}
 VFR &= u(y) + \beta p \{u(y+zh\sqrt{B}) - u(B(1+i)) + \beta VFR\} + \beta (1-p) \{u(y+zl\sqrt{B}) + \beta \alpha VFR + \beta (1-\alpha) VI\} \\
 &= [u(y) + \beta p \{u(y+zh\sqrt{B}) - u(B(1+i))\} + \beta (1-p) \{u(y+zl\sqrt{B}) + \beta (1-\alpha) VI\}] / (1 - \beta^2 p + \beta^2 \alpha p - \alpha \beta^2) \dots\dots\dots (1)
 \end{aligned}$$

¹ Willful default from the part of the borrower mainly takes place due to presence of information asymmetry among lenders about the borrower.

Here i is the formal sector rate of interest. We have denoted the informal sector rate of interest by r .

The expected utility function (equation 1) shows that in the first period, the household's utility function is composed only of a certain component, y . In the second period, the household discounts its utility by β and if a higher output is realized (which occurs with probability p) it repays back the loan and in subsequent earning cycle, the household gets formal loan and therefore an expected lifetime utility of VFR . However, if a lower value of output is realized (which occurs with probability $1-p$), the household cannot repay back loan and in subsequent earning cycles, it has to borrow from informal sources, unless there is a loan waiver. Thus in case of lower output, the household gets a lifetime utility of VFR with a probability α in subsequent periods, and with probability $(1-\alpha)$ it borrows from informal sources. In the equation VI denotes the expected lifetime welfare if the household borrows from informal sources.

The second possible choice in front of the household is to borrow from formal sources and then willfully default. In such case whatever may be the output, in the second period the household does not repay back loan and therefore in all the subsequent periods it avails loan from informal sources with probability $(1-\alpha)$. The expected lifetime utility in this case can be written as

$$\begin{aligned} VFD &= u(y) + \beta p \{u(y + z_h \sqrt{B}) + \alpha \beta VFD + \beta (1-\alpha) VI\} + \beta (1-p) \{u(y + z_l \sqrt{B}) + \alpha \beta VFD + \beta (1-\alpha) VI\} \\ &= [u(y) + \beta p \{u(y + z_h \sqrt{B})\} + \beta (1-p) \{u(y + z_l \sqrt{B})\} + \beta^2 (1-\alpha) VI] / (1 - \alpha \beta^2) \dots (2) \end{aligned}$$

Apart from these two choices, a third choice in front of the household is to borrow from informal sources in all the periods. Here the household cannot default willfully. In case of genuine default (due to realisation of lower output), it has to transfer a collateral of value C to the moneylender.

For simplicity we have assumed $C = B(1+r)$. Since the moneylender does not face any loss, the borrower can borrow from informal sources in all the subsequent periods. The expected lifetime utility of borrowing from informal sources, denoted by VI is given below:

$$VI = u(y) + \beta p \{u(y+zh\sqrt{B}) - \beta u(B(1+r)) + \beta VI\} + \beta(1-p) \{u(y+zl\sqrt{B}) - \beta u(B(1+r)) + \beta VI\}$$

$$VI = [u(y) + \beta p \{u(y+zh\sqrt{B})\} + \beta(1-p) \{u(y+zl\sqrt{B})\} - \beta u(B(1+r))] / (1 - \beta^2) \dots (3)$$

2.2 Condition for willful default in the formal sector

It is clear that a household would find it optimal to default in the formal sector if the expected lifetime utility by defaulting is greater than expected lifetime utility by repaying back loan. Stated otherwise, a household would willfully default if the following condition prevails:

$$VFD > VFR$$

$$\text{or } [u(y) + \beta p \{u(y+zh\sqrt{B})\} + \beta(1-p) \{u(y+zl\sqrt{B})\} + \beta^2(1-\alpha)VI] / (1 - \alpha\beta^2) >$$

$$[u(y) + \beta p \{u(y+zh\sqrt{B}) - u(B(1+i))\} + \beta(1-p) \{u(y+zl\sqrt{B}) + \beta(1-\alpha)VI\}] / (1 - \beta^2 p + \beta^2 \alpha p - \alpha\beta^2) \dots 4$$

Inserting the value of VI we get the following condition for willful default

$$\beta^2 u(B(1+r)) + \alpha\beta^2 u(B(1+r)) > -p u(B(1+i)) + \alpha\beta^2 u(B(1+i)) \dots (5)$$

Equation 5 implies that a borrower would find it optimal to default in the formal sector if loss in utility from repaying back is greater than future loss from borrowing from informal sources.

Now since B is same for both formal and informal sources, differentiating both sides of (5) with respect to B give us the following condition for default:

$$-\beta^2 \{u'(B(1+r))(1+r)\} + \alpha \beta^2 \{u'(B(1+r))(1+r)\} >$$

$$-pu'(B(1+i))(1+i) + \alpha \beta^2 u'(B(1+i))(1+i)$$

$$\text{or } r > [-pu'(B(1+i))(1+i) + \alpha \beta^2 u'(B(1+i))(1+i) / -\beta^2 \{u'(B(1+r))\} + \alpha \beta^2 \{u'(B(1+r))\}] - 1 \dots (6)$$

As $u(.)$ is concave, (see condition 8) one can say that the probability of default reduces with increase in r . This leads us to the following proposition:

Proposition 1: Higher rate of interest in the informal sector increases probability of repayment in the formal sector.

Secondly rearranging 5, one can write the following condition

$$-\beta^2 u(B(1+r)) + \alpha \beta^2 u(B(r-i)) > -p u(B(1+i)) \dots \dots \dots (7)$$

The second component in the L.H.S is the net benefit in borrowing from informal sources when there is a probability of loan getting waived. Since the second component is increasing in $(r-i)$.

One can get the following proposition:

Proposition 2: : The marginal impact of loan getting waived on repayment is more if interest rate differences between formal and informal sector is more.

Assuming α as zero the condition for willful repayment is represented diagrammatically as follows.

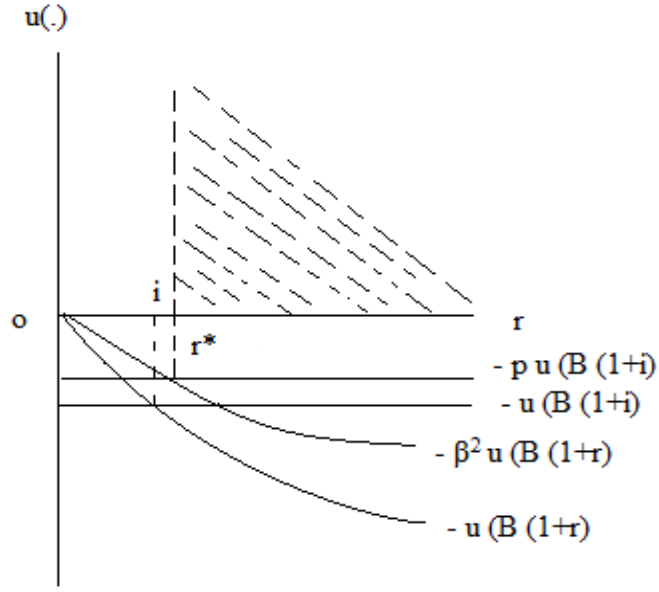


Figure 1: Condition for willful repayment

In the figure utility is measured in the vertical axis, while rate of interest of informal sector is measured in the horizontal axis. O is the origin. The formal sector rate of interest is assumed to be fixed at i . At rate of interest r^* in the informal sector, $-\beta^2 u(B(1+r)) > -p u(B(1+i))$. Thus at any interest rate above r^* , a household would not find it optimal to default. This is shown by shaded region in the diagram.

In this section, we posit theoretically how repayment is influenced by formal and informal sector rate of interest. The proposition obtained from the theoretical model is tested empirically in the next part of paper. However, other variables may influence repayment; a conceptual framework for the empirical analysis is therefore provided below.

2. Conceptual Framework

Theoretical literature on this subject argues that a household may default, if one of the following factors occurs. First, if the maximum welfare achievable by defaulting is greater than the maximum welfare attainable by not defaulting (see Srinivasan, 1989). This is generally termed in literature (see Stiglitz, 1987) as problem of incentives². Secondly, default may occur if a household does not have enough money at the time of repayment. This one can term as insolvency factor. Apart from insolvency factors and incentive factors institutions³ may play a major role in repayment by influencing the above two factors (see Udry, 1990).

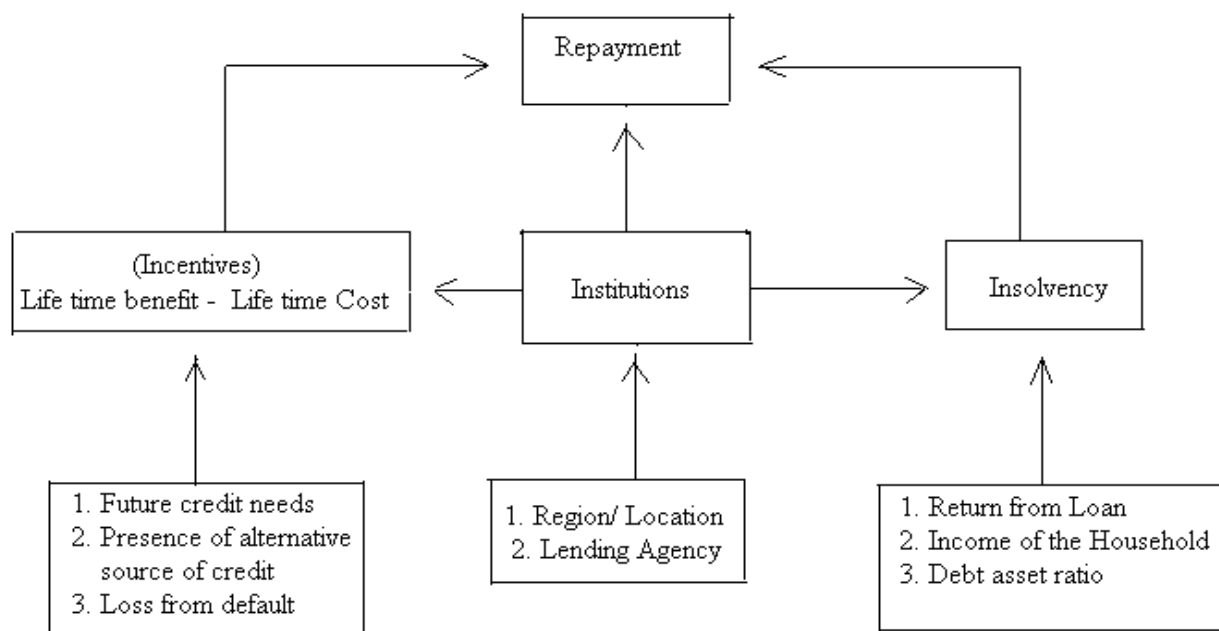


Figure 2: Factors influencing repayment of loans (Source: Done by authors)

² In this context, one should note that economic aspects might not necessarily influence the welfare function of the borrower. Indeed, the welfare function of the borrower may also consist of non-economic social components such as relationship with the lender.

³ 'Institutions are social rules, conventions, and other elements of the structural framework of social interaction' (Bardhan, 1989).

The diagram given above (figure 2) shows the factors that influence repayment along with the components that makes it.

Generally, intensity with which a household credit in future, presence of alternative source of cheap credit and loss of collateral on the event of default influences the incentives to repay back loan. On contrary, return from loan, size of the loan along with income and asset of the household determines insolvency. Institutional factors are expected to change with region and lending agencies. Each one of these aspects is discussed in detail in the next section.

4. Variables selected for the analysis

4. a. Dependent variable

The dependent variable is the ratio of repayment done and the amount of loan⁴. The amount of loan is obtained by adding amount repaid and amount due on the date of survey. Only short term loans, which were availed during the year July 2002- June 2003 has been considered in our analysis.

4. b. Explanatory variables

As mentioned in the conceptual framework part, there are three factors that influence repayment, namely incentives to repay back loan, insolvency and institutional factors. Given below are the variables that capture each one of the above-mentioned effects.

4. b.1 Factors influencing incentive effects

⁴ Amount of loan is considered since it considers both amount borrowed and interest paid. Thus, households who are perpetually indebted by paying only rate of interest would get captured in the analysis as having lower repayment rates.

Households who require loans on a frequently basis are expected to have higher incentives to repay back the loan (see Coate, 1993; Haugen, 2005; Rajeev et al.,2006; Shivappa, 2005; Hatai et al.,2005). Therefore, in any region self-employed households, who require loan on a regular basis, are expected to repay better compared to that of any other households. To capture this in our analysis, a dummy variable is formed, where the self-employed households are assigned the value 1.

Economic condition of the household may well influence repayment incentive. For instance, household having higher income are expected to have less incentive to repay back loan. This is because on the event of a default from one lender, these households can avail loan from some other sources by providing collateral. On the contrary, poorer households for having fewer sources of credit would have higher incentives to repay back loan (see Dev and Rajeev, 2007). In our analysis, monthly per capita consumption expenditure (MPCE) of the household is considered as a proxy of economic status of the household. Since there are three kinds of region (which differs in terms of features), we have considered three interactive variables with MPCE and type of region instead of a single MPCE variable.

However, for formal sector (which provides credit mainly to households, who are economically better off), MPCE may not be the correct variable to capture the repayment incentives. This is because all households availing formal loans are expected to have accessibility to informal credit. In such case, only households who can avail loan at low rate of interest (below formal lending agencies) is likely to have less incentive to repay back. Since we do not have information about the informal sector rate of interest for all households, a separate variable is formed, which provides information about percentage of households (belonging to the same MPCE group) in the district is availing loan above the highest formal sector rate of interest. A higher value is

expected to increase repayment to repay back formal loan. This variable would help us to test the proposition, obtained from the theoretical model.

Type of moneylender may also influence repayment of loans. Moneylenders having better information are more likely to put higher social cost on the borrower (see Jodhka, 1995). Presence of security may act as an incentive for repaying loan. In case of a default, it may lead to loss of asset (see Barro, 1976; Bester, 1987).

4. b.2 Factors influencing insolvency of loan

In addition to incentive effects, a household may default if the household does not have enough liquid at the time of repayment. Several factors may lead to such a problem. For instance, if the debt asset ratio is very high, a household may face difficulty in repaying. Monthly per capita consumption expenditure of the household may be considered a good proxy of repayment capability. Households having higher MPCE are expected to save more at any point of time; therefore, they possess less chance of facing insolvency.

Return from investment in a region can also play a central role in repayment. If return from investment is less in a region, more households are expected to default. In our analysis we have considered average MPCE of the households in a district as a proxy of return from investment. A higher value of average MPCE is expected to have a positive relation with repayment.

Utilization of loan is another crucial variable that may influence repayment. If loan is utilized for income generating purpose, where return is certain (for example working capital needs), a household would find it easier to repay back loan, compared to loan used for some other purpose.

Presence of security as well may give an indication about riskiness of the borrower. Generally, a lender may ask for security if he perceives the borrower to be risky. Therefore presence of security to some extent implies that there is more chance of project failure.

Rate of interest is another crucial variable that may influence repayment. If rate of interest is very high, a borrower may find difficulty in repaying back loan, leading to default and loss of collateral (see Bhaduri, 1977). In the regression rate of interest is considered as a variable both for formal and informal loans. This is because in the formal sector, interest rate tend to differ scheme wise and lending agency wise (such as between cooperatives and commercial banks).

Table 1: Expected impact of different explanatory variables on repayment of loans via various channels

Explanatory Variables	Incentive to repay	Insolvency effect	Institutional effect
MPCE	Negative	Positive	Nil
Self employed Households	Positive	Nil	Nil
Presence of Security	Positive	Negative	Nil
Use of loan for working capital needs	Nil	Positive	Nil
Debt Asset Ratio	Nil	Positive	Nil
Region	Positive/ Negative	Nil	Positive/ Negative
Education	Nil	Positive	Nil
Age	Nil	Positive	Nil
Rate of Interest	Nil	Negative	Negative
Percentage of loans availed above formal sector rate of interest	Positive	Nil	Nil

4. b.c Institutional factors

In the analysis to follow, to capture the institutional differences between different regions, region-specific dummy variables are incorporated. Some interactive variables are also considered.

In addition, rate of interest, regarded as a variable under insolvency factors can be an instrument in the hand of the bank in influencing riskiness of projects and in keeping away bad borrowers. Keeping interest rate below the market rate is often practiced by lending agencies to remove away bad borrowers (see Stiglitz and Weiss, 1981).

Table 1 summarizes the likely impact of the explanatory variables on the dependent variable.

5. Econometric Specification

The dependent variable is a ratio, assuming two censored points, namely 0 and 1⁵. In censored data, running ordinary least square (OLS) models leads to biased estimates. Therefore we have considered a two-limit Tobit model that uses a maximum likelihood procedure to correct biasedness.

The Tobit model assumes that the actual dependent variable (Y_i^*) possesses a linear relation with the explanatory variables.

$$Y_i^* = \beta x_i + u_i \dots\dots (1)$$

⁵ In the present analysis, the observations are naturally censored at the point zero. This is because the zero value may not be actually zero. It may happen that the repayment process has not started, for some households. However, there is no natural censoring at the point 1. For methodological purpose, we have assumed it (see also Clark and Stanley, 1999; 2003).

However, it is latent for a large number of observations. For instance, in the present context, the latent variable is observable when Y_i^* lies between zero and 1. Zero value is observed when $(Y_i^* \leq 0)$ or $\beta x_i + u_i \leq 0$. The value of 1 is observed when, $(Y_i^* \geq 1)$ or $\beta x_i + u_i \geq 1$.

Thus we have three sets of observations: $Y_i^* \leq 0$, $1 > Y_i^* > 0$ and $Y_i^* \geq 1$. The probability of Y_i^* assuming a zero value can be written as $F(-\beta x_i/\sigma)$. On the other hand, the probability of Y_i^* assuming the value 1 can be written as $F(1-\beta x_i/\sigma)$. For observations lying between zero and one, we can write down the normal density function.

The maximum likelihood maximizes the joint probability density functions of all the observations. Since we have three sets of observations the likelihood function is given as follows:

$$L = \prod_{y_i=0} F(-\beta'x_i/\sigma) \prod_{1 > y_i > 0} \frac{1}{\sigma} f(y_i - \beta'x_i/\sigma) \prod_{y_i=1} F(1 - \beta'x_i/\sigma)$$

Maximizing the likelihood function with respect to β and σ yields the estimates.

6. Results:

Two separate regressions have been carried out for formal and informal lending agencies on the assumption that they have separate way of operation. While for the formal lending agency, loan amount is the choice variable (as there are ceilings on interest rate), the informal lender considers both loan size and rate of interest as its choice variable to maximize profit. Moreover, the informal lender is supposed to have informational advantage over the formal lending agency. The results are given in table 3.

Our analysis show some common features of repayment between formal and informal lending agencies. It is observed that both formal and informal lenders face a lower repayment rate in rural areas compared to that of urban areas. It is further observed that repayment rate increases with increase with time. Moreover the average MPCE possesses a positive relation with repayment, implying that repayment is low due to low return.

As expected, for formal lenders, it is observed that repayment is positively related to the extent of development of a state. For instance, the regression result shows that repayment is more in developed state compared to that of middle performing state, which again is ahead of less developed state in this respect. Thus our result is similar with that of earlier studies (Ghatak, 1977, Iqbal, 1988). However, in case of the regression carried out for informal lenders, middle performing regions have better repayment than developed states. It is possible that due to informational advantage, moneylenders in middle performing regions are able to extract their dues effectively. On the contrary in less developed states, households default due to insolvency factor (see also Shah and Sah, 2004).

Next we move onto the variable (see the variable ‘percentage above formal’ in table 3) which helps us in testing the proposition obtained from the theoretical model. This variable is included only in case of formal sector. It is observed that districts where a larger percentage of households avail loan above formal sector rate of interest have higher repayment. Thus the empirical analysis also provides us a support for the theoretical result obtained in section 2.

Apart from these, we obtain some major differences in repayment pattern between formal and informal lending agencies.

While rate of interest holds a positive sign with repayment in case of informal moneylenders, the relation between rate of interest and repayment is negative for formal lending agencies. The result obtained in case of informal lending agencies contradicts the credit rationing theory (Stiglitz and Weiss, 1981), which states that due to presence of asymmetry of information, lending institutions does not raise interest rate. The difference between formal and informal lending agencies in this regard, may be due to the informational advantage of the informal lending institutions. It is possible that informal lenders charge interest rate based on the degree of information and control they possess on the borrower. In other words, borrowers on whom the informal lender possesses better control are charged higher interest rate.

Another difference between formal and informal lending institution is regarding loan availed for working capital needs. In general, working capital loans are expected to have better repayments. However, in the regression carried out for formal lending agencies, repayment is observed to be low for loans availed for working capital needs. This may be due to the moral hazard problem created by the loan waiver scheme introduced by the government from time to time (such as during 1990). Moreover households in India have tendencies to default on scheme based loans. But in case of informal lender a default may totally stop future credit.

Apart from this, in our analysis, education is having a positive relationship with repayment of formal loans. However, for informal lending agencies the variable is insignificant. It seems that educated borrowers avoids informal lending agencies, therefore to avail formal loans in future they make proper repayments of formal loans. Table 4 given below shows the education level of borrower availing formal and informal loans. The table shows that households' having higher education generally avoids availing informal loans.

Table 4: Loans by highest education of the household

Highest Education of the	Formal	Informal
Not Literate	4.5	14.8
literate without formal	0.8	0.9
Below Primary	6.0	13.3
Middle	17.1	23.1
Secondary	19.2	20.2
higher secondary	20.1	13.6
diploma/certificate course	16.4	7.7
graduate	2.3	0.5
Post Graduate	10.0	4.5
Above Post Graduate	3.7	1.3
Total	100	100

Computed using 59th round All India debt and Investment Survey unit level data (NSSO, 2002-03)

Note: In the table only short loans of July 2002-2003 is considered

Some contradictory results are also observed. While we anticipated a negative relationship between repayment and loan by asset ratio, we found a positive relation in the regression carried out for both formal and informal lenders. It may happen that borrowers who are good in repaying are given are larger loans.

7. Conclusions

The objective of the paper was to bring out the factors that explain non repayment of loans in the formal and informal lending agencies. The following results were obtained for the formal sector repayment. We found higher interest rate in the informal sector encourages repayment in the formal sector. This result is observed both from the theoretical and empirical analysis part. Secondly, we observed that educated borrowers make timely repayment of formal loans to avoid availing loans from informal market in future.

As far as informal sector is concerned, we found the following results. We observed that repayment is better for loans on which interest rate is high. It seems that informal lenders charge interest rate based on the degree of information they possess about the borrower. Borrowers on whom the informal lender possesses better information are charged higher interest rate.

Appendix

Table 2 List of variables with notation used

<i>Explanatory Variables</i>	Notations
Time (measured on a quarterly basis)	Time
Developed region dummy (Developed Region =1, others = 0)	Developed
Less developed region dummy (Less Developed Region =1, others = 0)	Less Developed
Middle Performing Region dummy (Middle= 1, others = 0)	Middle
Loans availed for working capital (Working capital =1, others =0)	Working Capital
Rate of interest	Interest Rate
Presence of security (security = 1, others = 0)	Security
Non Professional money lender (Professional =1, others =0)	Non Professional
Self employed household (Self Employed =1)	Self Employed
Monthly per capita consumption expenditure	MPCE
Rural area	Rural
Loan by asset ratio of household	Loan by Asset
Profit per acre	Profit
<i>Interactive dummies</i>	
Developed region * MPCE	Developed MPCE
Less developed region * MPCE	Less developed MPCE
Middle Performing * MPCE	Middle MPCE
Percentage of households availed loan in a district above formal sector rate of interest	Percent above formal

Table 3: Regression results

Regression	Informal	Formal
Number of observations	3541	1717
F value	24.64	19.73
Prob > F	0.0000	0.0000
Pseudo R sq.	0.065	0.09
Rural	-0.152***	-0.223***
Time	.0179882 ***	0.0209***
Average MPCE per district	.0002***	0.003***
Less Developed	-.319951***	-0.0720*
Developed	-.1207254*	0.03 *
Interest Rate	.0022843***	-0.005**
Working Capital	.0432238 ***	-0.121***
Education	.008084	0.020***
Loan by asset ratio	.03268 **	0.054**
Developed MPCE	-.0001127	0.0005
Middle MPCE	-.00003	0.0007
Less developed MPCE	.0001514	0.00018*
Professional	.0305	-
Security	-.049296	0.015
Self Employed	.0537405**	-0.0048
Percent above formal	-	0.00076**
Constant	-.5223746**	-0.4818021***

Notes: *, ** and *** implies significance at the 10 %, 5 % and 1 % levels, respectively.

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