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**ENTREPRENEURIAL CHOICE OF INVESTMENT
CAPITAL FOR HOUSE-BASED INDUSTRIES:
A CASE STUDY IN WEST BENGAL**

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Abstract

The lack of access to formal credit at affordable cost (effective interest) is the most critical constraint faced by the rural entrepreneurs to get involved in productive profitable business activities. This study explores the causes behind the widespread existence of informal credits as investment capital for small house-based business. Based on a primary survey on house based industrial owners in back ward areas of West Bengal it tries to capture the binding constraints in decision process for entrepreneurs to obtain their investment capital from subsidized formal credit market. A binary probit confirms imperfect substitutability between formal and informal credit in investment decision and an ordered probit analysis claims that huge complexity in lending process of formal sector becomes major restraint to access the institutional credit and thus makes the formal credit costlier than alternative sources to use it for industrious purposes.

Keywords: *Formal Credit, Informal Credit, Entrepreneurial Decision, Ordered Probit Analysis*

JEL CODES: *C13, D22, D23, R30*

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INTRODUCTION

According to Census definition household industry is an industry carried out by the head of the household himself/ herself and /or by the members of households at home or within the village in rural areas and only within the confines of house where the household lives at urban areas¹. It is the fact that home based industries generate huge employment opportunities for landless agricultural labour, marginal workers or other workers and it can bring about a great distribution of income and wealth and alleviation of poverty through entrepreneurial development and women empowerment for rural surplus sector. According to the 2001 census, the number women working in household industries were over 8 million constituting 6 percent of all women workers, and 23 percent of women working in non-agricultural occupations. If one adds to such a picture the huge increase of 61 million marginal workers between 1991 and 2001, in comparison to a little over 27 million additions to main workers, with women accounting for 61 percent of all marginal workers, 69 percent of the women marginal workers being illiterate and 77 percent of the net accretion of women workers being in the marginal worker category, one can also gauge the conditions of their employment or rather underemployment. 43 percent of women workers are marginal workers in comparison to 13 percent among male workers (Mazumdar, 2005). Moreover, home based producers are some of the most invisible workers in the unorganized sector, (Devaraja, Wickramasinghe, 2014). However, the main problem faced by this industry is of capital scarcity in the economy as a whole though it has been using less capital per unit of output. A gradual shrinkage of formal credit flow in these industries in rural areas has caused increasing dominance of private players in the credit market, making potential producers more vulnerable. According to Handbook of

¹ <http://www.vanneman.umd.edu/districts/codebook/defhhind.html>,
<http://censusindia.gov.in/Metadata/Metada.htm>

Statistics of Indian Economy, during 1995-2009, the share of rural branches has declined at the rate of one per cent per annum. Specifically, the outstanding credit to Micro and Small Enterprises including manufacturing as well as service enterprises on March 2008 was only 9.3 percent of total Gross Bank Credit and it has increased only by 0.7 percentage point by the end of March 2009 (Mukherjee, 2013). The ground level credit flow by the Scheduled Commercial Banks has reduced from 27.36 percent in 2009-10 to 16.19 percent in 2010-11. Apart from this, number of Self Help Groups (SHGs) financed by the Commercial Banks has decreased from 572 thousand to 312 thousand in 2007-08 over previous year. Although disbursements of credit by National Bank for Agriculture and Rural Development (NABARD) has increased from Rs. 10535.29 crore in 2008-09 to Rs. 13485.87 crore in 2010-11, the credit to self-help groups (SHGs) has reduced by 6 percent point of total disbursement over the same period. Given this background of rural credit flow by the formal institutions, informal lenders remain the dominant source of credit for poor households. The coexistence of formal and informal credit markets is prevalent in rural economy in developing countries, and India is no exception. Rural credit market in India is characterised by the coexistence of both formal and informal sources of finance and the market is fragmented (Pradhan, 2013). He makes an attempt to assess the share of rural informal credit in total outstanding debt which has been decreasing over the period from 1950 to 2002 with various financial inclusion initiatives of the Reserve Bank and legislations of the various State Governments to regulate moneylenders. However, about two-fifth of the rural households' dependence on informal credit indicates further scope for financial inclusion in rural areas. This is perhaps because informal sources do not insist on regular repayment as banks or cooperative credit societies do. There is a need for regulatory policies to recognise the changing rural landscape, adapt to new realities and bring in suitable changes as many of the informal players are not included in the existing regulatory framework on money lending. The informal credit sector incessantly play dominant role in rural credit

transactions and in many cases, the interest rate of informal sector has increased (rather than reduced) due to the interest ceiling and other regulations. Informal financial institutions play a complementary role to the formal financial system by servicing the lower end of the market and informal financing typically consists of small, unsecured, short term loans restricted to rural areas, agricultural contracts, households, individuals or small entrepreneurial ventures (Ayyagari, Kunt and Maksimovic, 2011, Barslund and Tarp, 2008). Not only is the persistent segmentation of credit markets into an expensive informal sector and a cheaper formal sector puzzling, it is also worrying on equity grounds. As the poor typically rely on expensive informal credit to finance their economic activities, they may systematically earn a lower return from their investment and thereby be on a slower wealth accumulation path than the rich who borrow in formal markets. Rural borrowers prefer to use informal sources of credit despite the fact that they charge much higher interest rates. This is perhaps because informal sources do not insist on regular repayment as banks or cooperative credit societies do (Banerjee and Duflo, 2010).

As noted in Hoff and Stiglitz (1997), one of the most important reasons for the existence of a dual rural credit market in developing countries is related to the banking policy constraints and other rigid regulations that create an informal market indirectly which develop at uncontrolled interest rates. Jain (1999) suggested an explanation for this activity in terms of the informational differences between those sectors. In an environment in which informal lenders have better information about borrowers than formal lenders, but the opportunity cost of funds is lower for the formal sector, the formal sector can screen borrowers by providing only partial financing for projects, thereby forcing borrowers to resort to the informal sector for the remainder of the loan. Thus, the formal sector's superior ability in deposit mobilization (due to economies of scale and scope, and the security of deposit insurance) is balanced against the informational advantage that the informal sector enjoys.

Studies in the subject have pointed to limiting information asymmetry or strategy for buying information as one of the main problems in this area. Many governments have perceived the rural moneylender as usurious. In the presence of subsidized formal credit, a market for informal credit exists either because the supply of formal credit is inadequate or because formal credit is not available at the beginning of the crop cycle. In the context of developing country, Chaudhuri and Gupta (1996), Gupta and Chaudhuri (1997) and Chaudhuri (1999) Chaudhuri and Ghosh Dastidar (2009) have analyzed interaction between the two credit markets in the presence of corruption in the loan delivery system in the formal credit market. Barslund and Tarp (2008) uses a survey of 932 rural households to uncover how the rural credit market operates in four provinces of Vietnam and observed that formal loans are almost entirely for production and asset accumulation, while informal loans are used for consumption smoothening. Interest rates fell from 1997 to 2002, reflecting increased market integration. Moreover, the determinants of formal and informal credit demand are distinct. While credit rationing depends on education and credit history, in particular, regional differences in the demand for credit are striking. Datta (2009) proposes that the small business finance is characterized by the existence of formal and informal credit market and looks at the operation of formal and informal credit market in terms of a model and considers the hierarchical structure of the formal lending sector and shows emergence of delay in loan disposal as a pooling equilibrium among all types of officials. The paper then presents the loan negotiation process in the formal sector as one of bargaining and uses the results of bargaining game. It is shown that in the context of this game, the possibility of delay in the settlement of the loan negotiation can induce some of the borrowers to leave the formal credit market and go to the informal market. This explains the coexistence of both types of credit market. The paper therefore has the policy conclusion that the formal sector should look at the behavioral aspects of the loan officials and design policies that can prompt the officials to reduce the time span of loan settlement process for small

business finance. It is true that there is no dearth of comprehensive empirical work on the subject of interlinked credit market for house based industries in India. Yet much of the empirical work has been carried out in the areas of agriculture, cultivators and big land lords. The current study is a clear departure from the previous studies in respect of the subjects' canvas of livelihood. As a prior assumption the study considers that the rural credit market is expanded beyond agriculture as the primary source of livelihood for the borrowers. That is, for rural borrowers who are landless and involved in house based industrial activities as a primary source of livelihood. This study would therefore add dimensions to the existing theory and is expected to strengthen the understanding for a better policy. In order to get the underlying causes of massive use of expensive informal credit for small scale household industries in rural India the aim of this study is to examine the behavior of these entrepreneurs in preferring particular source for financing their investment capital for their business.

Theoretical Approach

Studies have taken two distinct approaches to model the coexistence of formal and informal lenders. The first assumes that only informal lenders have access to institutional credit who then relend to poorer borrowers. Hoff and Stiglitz (1997), Bose (1998), Floro and Ray (1997), and Mansuri (2007) follow this approach. The second considers formal institutions competing directly with informal lenders. In this strand, several related theoretical explanations have been offered to explain why some households decide to resort to multiple creditors. Jain (1999) and Conning (2005) postulate that if informal lenders have an informational advantage, formal lenders will screen borrowers by partially financing the project, thus forcing the borrower to resort to an informal lender. In this way, banks ensure that the project will be monitored. Gine (2011) analyzes the mechanism underlying access to credit, focusing on two important aspects of rural credit markets. First, moneylenders and other informal lenders coexist with formal lending institutions such as

government or commercial banks, and, more recently, micro-lending institutions. Second, potential borrowers presumably face sizable transaction costs in obtaining external credit. He has estimated a model based on limited enforcement and transaction costs that provide a unified view of these facts. Based on data from Thailand, the results show that the limited ability of banks to enforce contracts, more than transaction costs, is crucial in understanding the observed diversity of lenders. In order to scrutinize the role formal and informal credit markets in an entrepreneur's decision procedure separately this study attempts to develop one simple model on the basis of frame work sketched by Gine (2011).

Assumptions

Under perfect information framework let us assume that agents are income maximizers and differ in wealth w , entrepreneurial ability A , and the type of project (K, η) where K is the maximum scale at which the project can be operated and η measures the ability of lender to seize capital invested in the project.

Each entrepreneur has access to a technology as,

$$\tau(A, K; k, \eta) = Ak + \delta k ; k \leq K. \delta = \check{\delta}(1 - \eta),$$

Where, k denotes total capital invested. The term δk captures the value of the fixed capital once production has taken place. A constrained household as one that invests a level of capital below its maximum capacity, so that $k \leq K$. Similarly, an unconstrained household invests the full amount, $k = K$. The term captures $\check{\delta}(1 - \eta)$ the value of the fixed capital once production has taken place. The parameter $\check{\delta}$ may be interpreted as the fraction of non-depreciated capital and η denotes the fraction of working capital relative to total capital used in production: if the ratio η is one, only working capital is used and the project has no scrap value, whereas if the ratio η is zero, all capital used is fixed and will remain after production has taken place.

Each entrepreneur decides how to finance the project by resorting to a formal or informal institution, borrowing from both sources, and simply choosing to self-finance. Entrepreneur can deposit their wealth in the formal institution or bank at no cost. A formal credit institution relies exclusively on the existing legal system to enforce contracts. Whereas, informal lenders lend out of their own wealth and may resort to a formal institution for additional funds to re-lend, while formal institutions lend out of the collected deposits.

If the entrepreneur decides to self-finance (S), she will obtain a net income of

$$Y_0(A, W, k, \eta) = \max\{Ak + \delta k + (w - k)i\};$$

$$\text{s.t } k \leq K. k \leq w \quad (1)$$

Where i denotes the interest rate on deposits.

If she goes to the formal credit market she will borrow an amount $l_f = k - w$ i.e., the difference between total capital invested and wealth. Then entrepreneur's net income can be written as:

$$Y_1(A, W, k, \eta) = \max\{Ak + \delta k - (k - w)r_f - T_f\};$$

$$\text{s.t } k \leq K \text{ and } Ak + \delta k - (k - w)r_f \geq \eta k \quad (2)$$

The optimal choice of capital for the entrepreneur depends on whether the enforcement constraint is binding. If it binds, the maximum amount of capital that she can get from formal institution is, $K^f = \frac{w r_f}{\eta - (A - r_f + \delta)}$. The interest rate r_f denotes the cost of borrowing and the parameter T_f captures the fixed transaction cost of dealing with the formal credit market. This cost parameter captures all expenses related to obtaining the loan: trips to the institution, fees, and due diligence to assess the repayment capacity of the borrower. The last constraint captures the

enforcement disadvantage that banks have in dealing with the disutility problem of the agents.

If she goes to the informal credit market she will borrow an amount $l_i = k - w$ her net income becomes

$$Y_2(A, W, k, \eta) = \max\{Ak + \delta k - (k - w)r_i - T_i\};$$

$$\text{s.t } k \leq K \tag{3}$$

Where, T_i is the fixed transaction cost of dealing with informal sector and r_i denotes the interest rate charged by that sector. It is assumed that $r_i > r_f$. The moneylender is not subject to enforcement problems and will therefore advance $l_i = k - w$ so that the entrepreneur operates the project at maximum capacity.

Finally, the entrepreneur may find it in her interest to resort to both formal and informal lenders. This case will arise if the formal lender can't provide sufficient capital due to enforcement problems or the entrepreneur may not be able to access the sector for other disunities attached to the lending process. Since the interest rate charged by the informal sector is higher than that of the formal one she borrows from the formal sector as much as it is willing to lend her, $l_f = k^f - w$ and will then turn to the informal sector to finance $l_i = k^f - w$ the remaining capital requirement. Net income can be written as total revenues from investing the maximum scale $(A + \delta)K$ minus loan repayments and fixed costs.

$$Y_3(A, W, k, \eta) = AK + \delta K - (k^f - w)r_f - (K - k^f)r_i - T_f - T_i$$

The model posits that an entrepreneur with wealth w and fraction of working to total capital η , facing interest rates r_f, r_i and transaction costs T_f, T_i will decide how to finance her project based on her maximum scale K and entrepreneurial ability A , by choosing the lender that offers the credit contract yielding the highest net income. The

costs of disadvantages in formal sector may drive the effective cost of using informal loans below the effective cost of formal loans. This cost actually rationed credit worthy borrowers in the formal sector. Therefore, they may take informal loan despite its higher rate of interest. This study assumes that a rationale producer (here owner of a house-based industry) takes decision about the credit sources, which is the only input of the production, on the basis of effective cost incurred in the process. The entrepreneurs need to raise funds to finance positive investment project, and also need to exert costly unobservable effort to make the investment profitable. Some producer applies for loans from the informal sector. In the informal sector the cost of unobservable effort for the borrower can be relatively low. The above theoretical perspective suggests an alternative explanation for why entrepreneur seeks an informal loan even when a formal credit sector is active. In order to justify the claim an evaluation of this theoretical analysis is required. After quantifying size, role and mode of interaction of the formal and informal financial sectors for the small scale house-based industries in backward areas of West Bengal a statistical analysis has been adopted to determine the factors that affect entrepreneurial decision to obtain a loan from formal or informal lender. Basically, this study attempts to investigate the factors that are actually binding for the borrower- the owner of a small scale house hold industry which is critical factor for productivity of the business and livelihood.

An Introduction to Study Area

Data have been collected from two backward districts of West Bengal, namely, Jalpaiguri and Murshidabad (they have ranked respectively 10 and 15 in HDI-2004 ranking)² with different socio economic behavior. The empirical evaluation of the study is based on knowledge assimilated from a primary data source. A population of small-scale household

² West Bengal Human development report 2004. Among seventeen districts rank 10 and rank 15 respectively signifies the backwardness attributed mostly to be backwardness in health, education and income.

enterprises was identified in the study region of West Bengal, with the help of the district offices of the Ministry of Industrial Development, Government of West Bengal. Respondents were randomly selected from this population in the selected markets using a random start. In Murshidabad district, total number of household interviewed was 146. In Jalpaiguri district, total number of household interviewed was 164. The respondents are the landless rural households who are directly engaged in different types of small scale home based industries.

Empirical Model

This study proposes two specific models in the next section to analyze the social and economic factors that explain the entrepreneurs' choice of credit sources and influence her decisions to switch from informal to formal credit markets. In order to identify factors affecting her access to credit between alternative sources of credit it analyses whether credit market access and quantity borrowed are sufficient to meet her credit demand.

Model I

$$Y_i = \alpha_0 + \alpha_i X_i + \beta_i D_i + \epsilon$$

Where Y_i signifies the proportion of formal credit used for productive purposes for the i^{th} individual. It is simple multiple regression model, used to identify the productive capability of loan disbursed from formal sector.

Model II

Here, a simple Probit regression has been used. It first treats the entrepreneurs' choice regarding his available option as whether to borrow formal credit as well as their decision on which credit markets to borrow credit from as independent binary decision. In particular, we use probit model to estimate the probability of a borrowing from formal credit markets. When the dependent variable is a categorical having only two

categories, the binary regression is considered over the simple multiple regressions. In such cases, it seems preferable to fit some kind of sigmoid curve to the observed points. The model uses the logistic distribution:

$$G(z) = \frac{e^z}{1+e^z};$$

$$\text{Where, } Z_i = a + bX_i$$

'z' is the predictor variable and 'e' is the base of the natural logarithm. Suppose that z is a linear function of a set of predictor variables then we can derive the likelihood function as

$$\Pr(y_i = 1) = G(Z_i)$$

$$\Pr(y_i = 0) = 1 - G(Z_i)$$

where X_i s are predictor variables. It is an additive ordinary multiple regression.

Model III

Since the dependent variable is discrete and categorical, we employ an Ordered Probit model³ to analyze the choice of household entrepreneurs for the source of capital for their business.

As in the binary probit model, an unobserved index function Y^* is defined as: $Y^* = X\beta + \epsilon$

With

$$Y = 0 \text{ if } Y^* < K_1$$

$$Y = 1 \text{ if } K_1 \leq Y^* < K_2$$

$$Y = 2 \text{ if } K_2 \leq Y^*$$

where k_1 and k_2 are "cut points" and $k_1 < k_2$. The dependent variable Y , here, is the source of credit, takes the values 0, 1, or 2 for no credit,

³ It is the most accepted recent technique for logistic regression. It is a fairly straight-forward extension of the binary Probit model with discrete and categorical dependent variable.

credit from only formal institution, credit from only informal sources and credit from both the sources respectively. Here, the dependent variable is measured by 3 categories. X is the vector of independent variables, and β is the vector of regression coefficients which we wish to estimate. There is a disturbance term that follows a standard normal distribution. Like the models for binary data, we are concerned with how changes in the predictors translate into the probability of observing a particular ordinal outcome.

Then, the conditional probabilities $\Pr(Y=0 | X)$, $\Pr(Y=1 | X)$, and $\Pr(Y=2 | X)$ can be written as

$$\begin{aligned} \Pr(Y = 0|X) &= \Pr(X\beta + \epsilon < K_1) = \Pr(\epsilon < -X\beta + K_1) = F(-X\beta + K_1) \\ \Pr(Y = 2|X) &= \Pr(X\beta + \epsilon > K_2) = \Pr(\epsilon < -X\beta + K_2) = 1 - F(-X\beta + K_2) \\ \Pr(Y = 1|X) &= 1 - \Pr(Y = 0) - \Pr(Y = 2) = F(-X\beta + K_2) - F(-X\beta + K_1) \end{aligned}$$

Where F is the cumulative distribution function of residual ϵ . In the Ordered Probit model, it is assumed that the residual ϵ has the standard normal distribution $N(0,1)$. Thus, F is the cumulative function of $N(0,1)$. The estimator which maximizes this function will be consistent, asymptotically normal and efficient. It can be shown that this log-likelihood function is globally concave in β , and therefore standard numerical algorithms for optimization will converge rapidly to the unique maximum. Estimation is done by maximum likelihood and the estimates should have all the usual properties that maximum likelihood estimates (MLEs) have. The likelihood ratio tests are also a convenient way of testing combinations of parameters and alternative specifications etc. The independent variables are represented by the vectors and dummy variables. X_{1i} is the vector of households' characteristics, viz., gender of the respondent, age of the respondent, religion of the households, educational qualifications of the respondent, total number of earning members in the household, total number of dependents in the family,

and annual average income of the household. X_{2i} is another important vector that represents the purpose of the formal sector loan (production, consumption, sudden event, previous loan payment or interest payment). Other variables are distance to the formal lender, collateral or mortgages for the loan and other obstacles to get a loan from formal sector, advantages to get a loan from informal sector, annual interest rate in the formal sector, interest rate in the informal sector, and loan duration in the formal sector. The time taken to reach the lender proxies the distance to the lender and it have been used as the unobservable effort to obtain a loan from the formal or informal sector. There are a number of dummy variables to capture the effect of other political and sociological factors in dealing with the formal financial sector. Field experience supports the notion that the political affiliation of the household to the ruling party of the local government matters in obtaining membership in a group and eventually for getting a loan from a formal institution through group lending schemes.

Data Distribution

Out of the total 146 reported households in Murshidabad district, over 36 per cent availed credit from informal sources only. Formal sources alone contributed only around 13 per cent of total loans. Rest occurs from both the sources simultaneously. On the other side, total number of household surveyed at Jalpaiguri district is 164. Among them only 14 percent and above 16 percent are the respective contributions by the formal and informal credit markets. But, jointly the informal lenders had made a payment near about 70 percent of the total number of loans disbursed to the sample households. The coexistence of formal and informal credit market in rural backward areas in West Bengal is well observed from the above findings.

Table 1: Number of Borrowers by Sources of Loan

Sources of Loan	Number of Borrowers	
	Murshidabad	Jalpaiguri
Formal Credit	18	21
Informal Credit	48	25
Both	64	103
Total	130	149

Note: 'Formal' lenders include Scheduled Commercial Banks (SCBs) and Khetriya Grameen Banks (KGBs) and other formal institutions. Formal lenders are not directly involved in such type of transaction. People accessed formal sector through 'Group Lending Programs'.

The distribution of the collected data also gives an insight of the households' demographic characteristics like, gender, religion, education of the respondent, family size, number of earning member in the family, number of dependents income, occupation, household industrial category, and other related factors like loan size, distance to the lenders, membership of a group like self-help group (SHG), obstacles to get loan from the formal sector, advantages to get loan from informal sector, below poverty line (BPL) card membership.

Table 2 presents the summary statistics of the exogenous variables based on general information of the household industry, like age of the entrepreneur, gender, educational qualification, religion, number of earning member of the family, number of dependents, monthly average income of the households, category of various household industries based on the nature of activities associated with it and the alternative occupation category. The monthly average income is used as a proxy for entrepreneurial viability or ability of self-finance. Education of the borrower is measured by the years of schooling. Since higher level of education provides better knowledge and more information about the credit market. Age is used as a proxy of maturity and the potential for careful handling of the loans and repayment capability of the borrower. Religion is important social meter and behaves as a key indicator to

access formal credit in local area. Total earning member of the household and total dependent member of that family are the basic indicators of actual status of the household. Here, the respondents are the main owner of the household industries. Since these household industries and alternative source of income moves smoothly or earns money continuously throughout the year, the average monthly income has been calculated on the basis of their assessment. There are other selected characteristics that may affect the entrepreneur's decision of borrowing. Such characteristics include average annual interest rates in formal as well as informal sector, transaction costs occur in the loan application from both the sectors (measured by the time taken to cover the distance from residence to the lenders) and other important qualitative dimensions of the study using some categorical and dummy variables, like duration of loan in terms of total pay-back period, value of collateral for formal loan as felt by the borrowers, purpose of borrowing for formal loan and informal loan, obstacles to get loan from formal sector, advantages of borrowing from informal sector, political affiliation to the ruling party at local Panchayat, membership of a group (SHG), holder of BPL card.

Table 2: Summary Statistics of the Exogenous Variables

Exogenous Variables	Description	Mean (Std)	Min/ Max
Entrepreneur's gender	Dummy , Female = 1	0.652 (0.477)	0/1
Age of the Respondent	Continuous		19/65
Years of Schooling of the Respondent	Continuous	3.629 (3.077)	0/10
Religion	Dummy, Hindu = 1; Otherwise = 0	0.413 (0.493)	0/1
Number of Earning Members	Continuous	2.567 (0.840)	1/6
Number of Dependents in the Household	Continuous	2.458 (1.057)	0/6
Monthly Average Income of the Household (Rs.)	Continuous	2516.935 (603.827)	1100/4000
Alternative Occupation of The Household	Household Labour = 0 Tea Garden Labour = 1 Self-employed =2 Marginal farmer = 3 Marginal labour= 4	1.929032 (1.185728)	0/4
Various House Based Industries	Bamboo Cane Crafts = 0 Packet making = 1 Piggery = 2 Pottery = 3 Poultry Firm = 4 Puffed Rice = 5 Sewing = 6 Vermi-pit = 7 Weaving = 8	3.316129 (2.347635)	0/8
Duration of loan Or Total payback period	Category = 0, if no loan taken = 1, if period is < 1 month, = 2, if 1- 6 months, = 3, if 7 months - 1 year, = 4, if >1year – 1.5 year, = 5 , if >1.5 year– 2 years, = 6 , if > 2 years – 2.5years, = 7 , if > 2.5 years – 3 years , = 8 , if > 3 years	1.635 (1.527)	0/7
Collateral for formal loan	Categorical, High = 3, Moderate=2, Low =1, Nil=0	0.413 (0.739)	0/3
Political affiliation of the Entrepreneur	Dummy, affiliation to the ruling party in local government = 1, Otherwise = 0	0.655 (0.476)	0/1
Distance to the formal lender	Continuous	37.490 (37.689)	0/150km.

Empirical Findings

Factors related to the participation of entrepreneurs in different credit markets were therefore investigated. This estimation also hits upon the incidence of formal sector rationing to be considerably high what has been conventionally assumed in literature. Here, the availability of credit, or access to credit by borrowers, has been explained in terms of the credit rationing behaviour of lending institutions. In this analysis, as a whole, the 279 respondents out of 310 (i.e., 90 percent) who had borrowed can therefore be considered as having had a demand for credit. In this sample, 10 percent of the respondents revealed that they did not apply for any such credit, formal or informal, because they had no need for credit and are therefore classified as 'not constrained'. Empirical findings present the results from the estimation of various models of entrepreneur's sectoral choice. Factors related to the participation of entrepreneurs in different credit markets were therefore investigated. The size of loan borrowed from formal sector as a proportion of total loan is considered as rationed credit. Model I estimates the most basic regression effect focusing on the amount of loan borrowed from formal sector with respect to total loan borrowed by the entrepreneur with three different specifications as shown in different columns in the Table 3.

The specifications or different set of exogenous variables have been selected on the basis of the values of R^2 and results of multicollinearity by iteration method. In this context, it should be mentioned that every specification fits the data well with R^2 of at least 0.22. The model, specified in column I, indicates that the variables, like gender, age and educational qualification, 'household industrial category' are insignificant.

Table 3: Results for Model- I with 3 specifications

Formal Capital	Loan/Invested	Coefficient	Coefficient	Coefficient
		(Std. Err.)	(Std. Err.)	(Std. Err.)
		Column I	Column II	Column III
Gender		0.0091 (0.029)		
Age of the Respondent		0.000 (0.04)		
Years of Schooling of the Respondent		0.009 (0.004)		
Number of Dependents in the Household		-0.007 (0.011)		
Monthly Average Income of the Household		0.023* (0.000)		
Household Category	Industrial			0.007 (0.005)
Interest rate of formal sector		0.019*** (0.003)	0.024*** (.003)	0.0244*** (0.003)
Interest rate of Informal sector		-0.00061 (0.00)	-0.00105 (0.008)	-0.008 (0.0008)
Duration Category		-0.012** (0.008)		-0.047*** (0.11)
Poverty Dummy (BPL)		0.037 (0.027)		0.42 (0.253)
Political Affiliation Dummy		-0.036** (0.016)	-0.048*** (0.158)	-0.435*** (0.014)
Purpose of Formal sector Loan				0.0602*** (0.0187)
Loan Size		0.05077*** (0.0005)	0.063*** (0.191)	-0.0519*** (0.006)
SHG Dummy		-0.0712 (0.005)	0.045** (0.005)	
Distance to formal lender			-0.02*** (0.007)	
_cons		0.34464*** (0.1094)	0.296*** (0.437)	0.3919*** (0.056)
R-square		0.3484	0.224	0.229

Note: *** means significant at 1 percent; ** means significant at 5 percent and * means significant at 10 percent level.

Column II provides an interesting assessment about the interest rates in formal credit market as well as informal credit sector. The interest rate in formal sector is significant at 1 percent level with negative coefficient. It is very obvious that higher the value of interest rate lower is the demand for credit from formal sector. The coefficient for informal interest rate is the positive and significant. This implies an interesting implicit horizontal linkage between informal interest rate and formal sector credit demand. The interest rates in both formal and informal sector directly and/ or indirectly determines the demand for credit in formal sector. On the other hand, the distance to the formal lender and that of informal sector which proxy the transaction costs associated with the loan application from respective sources are significant at 1 percent and 10 percent level respectively with negative and positive signs with coefficients. Therefore, it can be said that these three variables are imperative determinants of credit rationing in formal sector. It may be expressed, here, that the insignificant results of households' characteristics like, sex, age, educational qualification, religion number of dependents in the family suggest that, once other factors controlled for, these factors do not have any role in credit rationing in formal sector. Column III adds the political affiliation factor as a major driver of credit availability in formal sector. SHG dummy includes membership in a group as a significant determinant in this case.

Model II estimates the determinants of maximum likelihood of major proportion of the loan going to productive purposes separately for formal sector using binomial logistic regressions as shown in Table 4. Here, the analysis is little different as compared to with earlier models. It explains the determinants of likelihood that major portion (above 60 percent) of the money borrowed from formal sector would be used for productive purposes.

Table 4: Results for Model II: Binary Probit Model

Probability that Formal Loan goes for Productive Purpose	Coefficient (Std. Err.)	Marginal Effects
Gender	-0.1559 (0.409)	-0.0165* (0.068)
Age	-0.0167 (0.018)	-0.004 (0.003)
Years of Schooling	0.0549 (0.057)	0.008 (0.102)
Dependency Ratio	0.363 (0.356)	0.0639 (0.063)
Income class	3.33** (1.461)	0.532 (0.128)
Formal Loan /Total Loan	5.885*** (1.405)	0.608 (0.259)
Loan Duration	-0.128*** (0.206)	0.037 (0.021)
District Dummy	-0.104* (0.394)	-0.0432* (0.086)
BPL Card Holder; Yes=1.	0.185 (0.352)	0.022* (0.063)
Interest rate in formal sector	-0.151** (0.071)	-0.001 (0.018)
Interest rate in Informal sector	0.078*** (0.025)	0.0084 (0.0041)
Distance of the formal Lender	-5.623 (1.52)	0.603 (0.248)
Distance of the informal Lender	-0.0089 (0.007)	-0.0022 (0.0017)
Advantage of the informal	-0.1054 (0.171)	-0.0137 (0.031)
SHG Dummy	0.106 (0.13)	0.013* (0.068)
Political Affiliation	5.719*** (1.696)	0.282* (0.115)
Obstacles to get loan from Formal Sector	-0.799*** (0.099)	0.012 (.023)
_cons	-5.265** 1.815	

Note: *** means significant at 1 percent; ** means significant at 5 percent and * means significant at 10 percent level.

On the basis of entrepreneur's estimation about the expenditure of the loan borrowed in the year 2007-08, the dependent variable, 'probability of formal loan goes for productive purpose' has been generated. Concerning the nature of the dependent variables, here, the monthly average income has been classified into 5 categories according to the distribution named as 'income class'. Another variable viz., 'dependency ratio' (estimated as the total number of the dependent in the family divided by total earning member of the family) is included in this analysis. In order to get the effect of loan size, loan from formal sector with respect to total loan borrowed has been considered as a new exogenous variable. First column specifies original probit results and last column is the corresponding marginal effects of the probabilities. The specification of the model has been decided by the trial and error method on the basis of pseudo R^2 (greater than 0.21) and probability greater than χ^2 . The results specify the predicted probability that formal credit can be considered as a productive input. It depends on formal sector interest rate, time taken to avail loan, purpose specified at the time of loan application, loan size, distance (transportation costs to get loan) from formal sector institution, political affiliation of the borrower. Probability of majority portion of availed loan used as investment capital for business generally get determined by loan size, loan duration, membership in self-help group, interest rate charged by formal and as well as by informal sector and disutility or obstacles faced to avail formal loan.

The results shows, as a whole, that income class of the household, loan borrowed from formal sector as a proportion of total loan borrowed by the entrepreneur, interest rates in both formal and informal sector, distance of the formal lender, political affiliation to the ruling party of the local Panchayat, along with other obstacles to get loan from formal sector are the major determinants (highly significant) of the fact that, the loan from formal sector is highly probable to get invested in productive purposes. While, the significant determinants for availing credit from

informal sector are -income class, amount of loan from formal source with respect to total loan, loan duration, interest rates in both formal and informal sectors, advantages associated in borrowing process in informal sector, membership in SHG. The respective signs of the coefficients signify the respective relation with the dependent variable. The positive sign in coefficient of 'income class' variable ('0' is considered as lowest income, 5 used for highest class) that higher the income class higher is the probability of formal loan being used as working capital. Transaction cost and interest rates both plays a major role in these cases. Formal sector interest rate comes as significant determinant with negative sign. This leads to an important observation that if formal sector interest rate increases, then the probability of loan borrowed from formal sector can not be used more for business purpose. The magnitude of loan amount from informal sector used in business purpose will increase if informal interest rate remains same. Otherwise, it may happen that whenever interest rate in formal sector increases the informal lenders can also deliberately raise their interest rates as well. Eventually, it follows the same dimension that loan amount will be less as a whole and thus less investment for business. The other interesting observation reveals that the membership in self-help group does not have significant result for availing formal credit, but, it has significant negative impact in informal credit.

Model III analyses the sectoral choice of sources of credit for household entrepreneurs for their business using ordered probit model. It considers three specifications of different combinations of exogenous variables which are shown in three columns in Table 5.1. The statistical model is used to calculate the lower tercile ($Y=0$), the middle tercile ($Y=1$), and the upper tercile ($Y=2$) probabilities. Table 5.2 specifies the predicted marginal effects only with respect to ($y=1$) credit from informal sector).

Table 5.1: Results of model III: Ordered Probit Model

	Coefficient (Std. Err.) Specification 1	Coefficient (Std. Err.) Specification 2	Coefficient (Std.Err.) Specification 3
Gender of the Respondent	-0.112 (0.253)		-0.005 (0.012)
Age of the Respondent	-0.005 (0.012)		0.000 (0.000)
Years of Schooling of the Respondent	0.051 (0.037)		(0.048)** -0.076
Number of Dependents in the Household	0.145 (0.096)		-0.590 (0.428)
Wealth	0.00 (0.00)		0.146* (0.096)
Monthly Average Income of the Household	0.0003*** (0.001)	0.116 (0.211)	-0.112 (0.254)
Household Industrial Category	-0.09 (0.0456)	0.170 (0.232)	0.051 (0.038)
Interest rate of formal sector	0.205*** (0.030)	0.193*** (0.023)	0.206*** (0.030)
Interest rate of Informal sector	0.162*** (0.015)	0.153*** (0.013)	0.162*** (0.014)
Duration Category	0.113 (0.248)	-0.047 (0.070)	-0.098 (0.231)
Poverty Dummy (BPL)	-0.099 (0.230)	-0.516 (0.128)	-0.023*** (0.000)
Political Affiliation Dummy	-0.5197*** (0.007)	-0.351*** (0.386)	0.113** (0.248)
Purpose of Formal sector Loan	-0.117 (0.162)		-0.118 (0.162)
Loan Size	-0.67*** (0.005)		
SHG Dummy	-0.59 (0.428)	(0.043) -0.047	-0.520 (0.137)
Distance to formal lender	0.0028** (0.004)	0.000*** (0.003)	0.003** (0.004)
/cut1	-0.387	-0.949	-0.387
/cut2	3.623	2.860	3.623
/cut3	5.237	4.410	5.237
S. R-square	0.65	0.47	0.65

Note: *** means significant at 1 percent; ** means significant at 5 percent and * means significant at 10 percent level.

Table 5.2: Results of model III: Marginal Effects of Ordered Probit Model

Marginal Effects Predicted outcome(1) dy/dx	Coefficient (Std. Err.) Specification 1	Coefficient (Std. Err.) Specification 2	Coefficient (Std.Err.) Specification 3
Gender of the Respondent	0.007 (0.016)		0.002 (0.004)
Age of the Respondent	0.000 (0.001)		0.035 (0.081)
Years of Schooling of the Respondent	0.051 (0.037)		-0.036 (0.079)
Number of Dependents in the Household	-0.008 (0.017)		-0.046 (0.031)
Wealth	0.005 (0.005)		0.00** (0.00)
Monthly Average Income of the Household	-0.003 (0.003)	-0.016 (0.005)	0.024** (0.024)
Household Industrial Category	0.145 (0.096)	0.009** (0.005)	-0.016 (0.012)
Interest rate of formal sector	-0.014 (0.005)	-0.016*** (0.005)	-0.065*** (0.012)
Interest rate of Informal sector	-0.011 (0.004)	-0.012*** (0.004)	-0.051*** (0.007)
Duration Category	0.007 (0.015)	-0.010** (0.018)	0.029 (0.016)
Poverty Dummy (BPL)	0.035 (0.016)	0.004 (0.006)	0.031 (0.073)
Political Affiliation Dummy	0.004** (0.000)	0.042*** (0.017)	0.165** (0.047)
Purpose of Formal sector Loan	0.008 (0.011)		0.037 (0.051)
Loan Size	0.083*** (0.005)		
SHG Dummy	0.064 (0.068)	0.037 (0.052)	0.169 (0.102)
Distance to formal lender	0.023*** (0.0070)	0.000 (0.000)	-0.001** (0.001)

The ordered probit analysis estimated the predicted probabilities to get the credit from different sources. This can be considered as credit demand for different available sources. It yielded a number of highly consistent results across different estimation methods. The credit demand is significantly affected by household's production capacity as supported by the fact that interest rate in formal as well as informal sector, distance to the lender, credit amount, credit duration, monthly average income, political affiliation and purpose of loan specified by the borrower are significantly determining entrepreneur's probability to borrow. Purpose of the loan can be considered as most important decision variable in this context. The distribution claims that formal lenders may be 'rationing' their lending by limiting it to 'productive' purposes, rather than for consumption. It has been observed in the data distribution that for low amount loan, formal sector contributes less than informal sector. It was observed in results also that higher the loan sizes higher are the formal sector involvement. People who have demanded for credit at lower amount are rationed from formal sector and they take loans from informal sector. The variable 'purpose of loan' highlights the fact that the probability of getting credit is more for production purposes. This tentatively suggests that formal sector acts as an imperfect substitute with respect to 'purpose of loan'. As observed during the field survey and also quite obvious for the large section of the illiterate rural mass, calculating the net cost of borrowing by taking into account the transaction costs including greater 'convenience' and 'flexibility' instantly at the time of interview was a difficult task and mostly impossible. For the same, the study considered 'distance to the lender from the household's habitation' as a proxy of transaction cost. The bulk of informal lending appears to occur with lenders who are in ten minutes to half an hour away, in terms of physical distance. Rest of the informal loans has been taken from the lenders who are in 30-60 minutes away. By contrast, the huge proportions of loans from formal lenders are taken from lenders who are in a distance of less than an hour. The observation says that transaction cost (obviously, depending on distance) is a most

important determining factor for choosing sources of credit. A very similar observation has been noted in terms of political affiliation as well. Borrowers who have taken loan even from the informal sectors have the political affiliation of the then ruling party of the local Panchayat. This eventually signifies that credit worthiness is, to a great extent, dependent on the political loan from the informal sector.

CONCLUSION

A few interesting findings emerged from our study. Formal and informal credits coexist in rural industrial sector without clear evidence of one superseding the other. The entrepreneur makes an effort to get a loan from the formal sector if the financial margin of the project seems positive. Self-dependent entrepreneurs' decisions avail credit and thereby to choose the relevant market for credit are mainly determined by interest rate, political affiliation to local Panchayat, time taken to avail the loan, purpose of loan, transaction costs. Increasing the accessibility of formal credits by reducing the transaction costs is an essential step to improve formal credit sector, especially for the rural mass. The producer seldom uses formal credit if the effective price of the same exceeds the price of informal credit. Further, informal sector is more accessible and efficient to a great extent for productivity and eventually accommodates potential borrowers rationed from formal sector. Therefore an improvement in the policy environment can, by providing an incentive for savings and investment through strategic interaction between informal and formal sector, further enhance its ability to generate growth in rural finance. Observing the findings this study suggests the need to explicitly recognize the role of the informal sector in the development plans. The formal financial institutions should also be encouraged to diversify their loan portfolios so as to be able to cater for the different financial needs of industries.

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