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Loan Repayment Behaviour of Farmers: Analysing Indian Households*

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Abstract

This paper uses the 2004-2005 round of the India Human Development Survey (IHDS) to analyse the nature and extent of indebtedness of Indian households. It studies utilisation of loans taken from formal versus informal sector and the subsequent loan repayment behaviour of these households.By analysing repayment patterns we identify the characteristics of individuals who are defaulting. We study the source and purpose of borrowing, consumption and production patterns of households taking loan from different sources to gain insight towards the existence of moral hazard problem. We find that people who borrow from formal sources tend to have higher consumption, higher social spending and lower investment as opposed to people who borrow from informal sources. Higher spending, as opposed to investment, in turn has a negative impact on loan repayment. Our findings point towards the differential treatment of formal versus informal loans by the households. We argue that people tend to under-utilise default more on loans that are taken from sources which impose lesser punishment in the future.

Keywords: Household Finance; Debt; Formal and Informal Loan

JEL codes: G18, O13, O16, Q14

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Introduction

Debt plays an essential role in the lives of the rural households in developing countries in a number of ways. It is an important instrument for smoothing consumption, in a context where incomes typically experience large seasonal fluctuations. [Ghosh et al., 2000] However, credit markets in developing nations especially in rural households do not behave completely like competitive markets. They are dual structured, where formal and informal financial systems operate side by side. Due to the lack of availability of a properly structured debt market in the rural areas of the country, majority of the households borrow from informal sources of finance which charge high interest rates and often lead to informal agents usurping the assets of the households. To provide easier access to credit we often find governments intervening in the workings of the credit market in multiple ways. In Thailand increased participation in formal financial institutions increased economic growth between 1976 and 1990 [Townsend and Ueda, 2003].

India was also no different. Under the 1949 Banking Regulation Act, all banks required to obtain a banking licence from the Reserve Bank of India, which is the Indian Central Bank prior to opening of a new branch. In 1975, the Narsimham committee conceptualised the creation of Regional Rural Banks (RRB). According to the RRB act of 1976, their equity is partly held by the Central Bank, partly by the state bank and the remaining by the sponsoring bank. The main aim was to develop the rural economy by providing credit to small and marginal farmers, agricultural labourers, artisans and small entrepreneurs [Misra et al., 2006]. In 1977, the government of India wanted to increase access of credit in the rural areas of the country. As a means of ensuring this, they mandated that a bank can obtain a license to open a branch in an already banked location only if it opened branches in four unbanked locations [Burgess and Pande, 2004]. Rural lending rates were also kept much below the urban lending rates. Every branch was also required to maintain a credit-deposit ratio of 60 percent within its geographical area of operation [Burgess et al., 2005]. However, given the size of the Indian credit market these interventions were perhaps not significant enough to satisfy the credit needs of poor households. Although progress has been made, formal finance does not appear to

have adequately permeated vast segments of our society [Hoda and Terway, 2015].

Indian households primarily borrow from two sources, the formal and informal sources. The formal sector constitutes of all institutional credit agencies like co-operative banks, commercial banks, government lending agencies, regional rural banks, insurance etc. On the other hand the informal sector comprises of the non institutional credit agencies like landlords, agricultural moneylenders, professional money lenders, traders and commission agents, relatives and friends. Prior to the First Plan in 1951, all the financial requirements for the rural sector for agricultural purposes were met by traditional/informal sources of finance, primarily the moneylender. The share of provision of credit by commercial banks or cooperative societies was barely 4% by June 1951 [Pradhan, 2013]. With the government pushing its credit agencies to expand its credit facilities with special emphasis on providing it to the rural agricultural sector, the access and availability of formal credit has vastly increased. However, one cannot deny that both formal and informal sector still form an important aspect of the lending scenario in Indian agricultural households. Banerjee and Duflo [2007] show that a vast majority of people in Hyderabad that have a per capita income of below two dollars borrow from non institutional sources even though they have access to formal loans. Madestam [2014] developed a model in which they model how informal finance complements the banks by permitting for larger formal loans to poor borrowers. They suggest that formal banks have access to unlimited funds but lack proper monitoring of loans. Informal lenders can prevent non-diligent behaviour but often lack the needed capital.

Formal and informal sector differ vastly in their lending methodologies. The size of loans offered, the interest rates charged, the tenure of the loans, repayment schedules etc are different when a household borrows from a formal source as opposed to an informal source. Repayment of loans depends on the terms of the loan and the utilisation of the loan [Bhattacharjee, 2014]. Researchers studying household sectoral choice between formal and informal finance find that in spite of availability of formal loan, informal rural credits are still vastly popular. Part of the reason is the easy and adequate access to informal sources [Pal, 2002]. Prompt recovery of informal credit where creditors employ informal recovery techniques like reputation mechanism or third party enforcement also make it more viable. In fact, this has

been the underlying principle driving the growth of microcredit in India.

We know that formal and informal loans have different terms of the loan. Hence it is possible that the borrowing source affects the expectation of households about the associated penalty. This in turn is likely to affect the way households decide to utilise loans from different sources. To get a further insight into this and explore why this happens we need to understand how farmers utilise loans taken for agricultural purposes from formal sources. One of the main arguments for the pushing of governments to set up rural banks was to provide easier credit access to agricultural households and combat the high interest rates charged by moneylenders. But over the years several questions have been raised at the efficacy of political interventions in the credit systems.

On the one hand lower interest rates on formal sources should drive productivity. However easier availability could also increase unproductive spending which could lead towards non repayment. In order to understand this better this paper analyses the borrowing behaviour of households. It studies both investment and consumption patterns of households to analyse their relationship with loan repayment. This paper tries to study whether the source of loans has any bearing on the behaviour and decision making of the households. Specifically we ask whether borrowing from formal lending agencies as opposed to informal lending agencies alter household′s consumption and investment decision. We study if these decisions are altered how they affect the repayment capacity of these households. The next section looks at the data used to analyse these questions.

There are many studies that analyse non-repayment of loans taken by households (Field and Pande [2008], Rajeev and Mahesh [2010], Giné et al. [2013]). Inability to repay a loan can be due to a shock faced by the household. For instance, the household could default due to adverse shocks like natural calamities, earnings or employment shocks or health shocks. However, non-repayment could also arise due to moral hazard problems associated with easier access to loans.

Although the theoretical literature on repayment decisions of households is recent, the question has fairly been in the macro literature for quite some time. In the macroeconomics literature, the decision to default is often modelled as a function of

the cost of default, including legal costs. Further, agents need to weigh the benefits of default against the consequences of autarky. Jeffrey Sachs first introduced the concept of debt relief for countries [Sachs, 1989]. Paul Krugman formalised the actual derivation of the debt relief curve and the underlying logic behind it [Krugman, 1988]. Krugman′s paper examines the tradeoffs facing creditors of a country whose debt is large enough that the country cannot attract voluntary new lending. According to Krugman if a creditor country was trying to affect the adjustment efforts of a debtor country, the more debt relief it would give, larger would be the adjustment effort by the debtor country to service the debt. If the debt were too large then the debtor country would have no incentive to put in any effort to pay off the debt.

Background

Exclusion from the banking sector has huge welfare costs, especially for the poor. One of the major problems with informal sector lending is the high interest rate and the usurping of assets from the rural household in the event of a default. Informal finance is often thought to be anti-developmental, exploitative, and prone to consumption rather than investment behavior [Von Pischke et al., 1983] This has led to frequent interventions by the government in the banking sector of many low income countries. For instance, Mexico nationalized its banks in 1982, Nigeria and Philippines made it compulsory for its banks to lend a certain percentage to priority sectors [Besley, 1995]. This ensures that credit facilities are available to the poorer sections of the country at a cheaper rate. India has also experienced large banking programs under the flagship of the government at various times. Traditionally, majority of the population in the country borrowed from informal sources like money lenders, friends and relatives. With a view to reducing poverty, dependence on informal loans and increasing access to credit in the rural areas, the government set up 30000 bank branches between 1969-1990 in rural locations. Priority was given to locations with no prior formal credit and savings institution [Burgess and Pande, 2004]. The Indian central bank in 1977,committed to increasing bank presence in rural areas by adopting a 1:4 policy, which was establishing 4 rural branches for every urban branch. In addition to this in 1980 the central bank adopted its directed lending policy which required all banks to

lend at least 40% of the loaned amount to priority sectors, like agriculture [Burgess and Pande, 2004]. The central bank aimed to achieve this target by 1985.

These policies have resulted in increase of the overall loans issued for agriculture and allied activities from all the institutional sources from 13.89 billion in 1980-81 to 1071.62 billion in 2011-12. The overall loan amount outstanding also increased at a similar pace from 42.89 billion in 1980-81 to 2195 billion in 2011-12 [RBI, 2014].There is evidence that increase in formal banking institutions has reduced poverty and increased access to credit of farmers. Despite these improvements the reach of the formal banking sector falls short of smoothing weather shocks and price uncertainties. This is often cited as a reason behind increase in suicide rates amongst the farming community in India Mishra [2006]. On average, the decade from 1996-2006 has seen about 16,000 farmers commit suicide every year.[Nagaraj, 2008]. To combat this dramatic socio economic rural problem a number of state level and nationalised loan waiver schemes have been announced in the last two decades. In 2008, Debt-Relief scheme for small and marginal farmers, announced by the central government waived Rs 650 billion of debt held by farmers issued by commercial and cooperative banks between the years 1997-2007. In 2012, Uttar Pradesh Chief Minister announced a Rs 16.50 billion worth of debt relief for farmers in UP (Jagran Josh, 2012).As recent as 2014, the Telengana and Andhra Pradesh governments announced massive loan waiver schemes. Jumping on the loan waiver band wagon the winning party in Tamil Nadu 2016 state elections waived Rs 57.80 billion of crop loans [**?**]. While loan waivers are often the preferred instrument of governments to alleviate rural poverty and insure weather shocks, seldom choice is made on the basis of research findings about their efficacy on targeting the poor farmers. If, for instance households are indeed more likely to default on formal loans as opposed to informal, then loan waivers would only encourage households to use formal loans for unproductive purposes in the expectation of a future waiver.

With agricultural credit expanding at an increasing rate in the last couple of decades (Reserve Bank of India, 2014) and Indian government continuing to push formal sources of borrowing, it has now become increasingly important to understand the efficacy of this line of policy interventions and see how borrowers respond to the loans taken from formal sources as opposed to informal sources. Existing research

provides some evidence that loan waivers alter the borrowing behaviour of farmers. Kanz [2012] suggests in his paper analysing the 2008 national debt waiver scheme, that such economic stimulus programs may distort borrower incentives and give rise to moral hazard. To get a further insight into this and explore why this happens we need to understand how farmers utilise loans taken from various sources.

Typically there are a number of sources from where an Indian household can borrow. But loan waivers from government are primarily given to loans taken for agricultural purposes from formal sources, particularly nationalised rural banks. One of the main arguments in favour of expanding access to formal credit at low rates of return was to protect poor farmers from steep informal interest rates.Lower interest rates on formal sources should drive productivity. However easier availability could also increase unproductive spending which could lead towards non repayment. This paper analyses the borrowing behaviour of households. It studies how investment and consumption patterns of households varies with the source of loan and analyse their relationship with loan repayment.

Data & Descriptive Statistics

We use loan repayment and consumption data from the 2005 India Human Development Survey (IHDS), a nationally representative data of 41554 households, collected by the National Council of Applied Economic Research in New Delhi and the University of Maryland. Out of the 41,554 households our paper focuses on only those households which have taken a loan, thus reducing the sample size to 16,900 households. To understand loan repayment behaviour, it is important to look into the purpose of borrowing, source of borrowing, interest rates and consumption details. The IHDS is a unique survey, providing detailed information on consumption, investments, social spending and borrowing behaviour of these households.

Despite the aggressive efforts by the government to increase access to loan from formal sources, through the social banking program and various other policies the IHDS data shows that close to 70% of the households still borrow from informal sources like moneylenders, relatives and friends. Table 1 provides a summary of the

borrowing behaviour of households in urban and rural regions. 32.75% of households borrow from formal sources like banks, NGOs and employers, while 67.25% borrow from informal sources like moneylenders, relatives and friends. Almost half, 47.3% of the formal loans are agricultural or business loans, in contrast to 16.67% of informal loans. However, when we restrict the sample to just rural households the percentage of households who borrow from informal sources for the purpose of agriculture is higher.

Table 1: Summary: Household

	Formal Source		Informal Source	
No of households	5536	32.75%	11,369	67.25%
Borrowed for the purpose of agriculture	2619	47.31%	1895	16.67%
Mean Income	75367		33024	
Social Spending	4719.64		3353.43	
Monthly Consumption Per Capita	1239.55		786.31	

Source: IHDS 2004–2005, own calculations.
Notes: Summary Statistics Table giving details about the characteristics of households borrowing from Formal Sources and Informal sources like social spending, number of households borrowing for the purpose of agriculture, income and monthly consumption per capita.

In Table 1 we also notice that richer households borrow from formal sources. The average mean income of a household that borrows from a formal source is almost double the average mean income of a household that borrows from an informal source. Similarly average monthly per capital consumption, in particular social spending is higher for households borrowing from formal sources. This invokes me to question whether this high monthly per capita consumption and spending on social functions is an income effect or are households that borrow from formal sources behave differently in their consumption and investment patterns due to their source of borrowing. The next section looks into these questions through an empirical setup.

Research Questions & Empirical Analysis

Source of Borrowing and Household Consumption Behaviour.

In this paper we study the borrowing and repayment behaviour of households. Non repayment of loans could be a result of either idiosyncratic shocks to income and consumption, for instance natural calamities like drought and floods, or they could be due to unproductive expenditure. In other words, defaulting could either be due to income or due to moral hazard. To the extent that since households face different incentives for informal vs. formal loans, defaults may also vary by the source of loans. Theoretically, there have been various arguments that households might

behave differently when borrowing from a formal source like banks as opposed to an informal source like money lenders. For instance, if monitoring is stricter for loans taken from relatives and moneylenders then the defaults would be lower on informal loans [Banerjee and Duflo, 2007].

On the other hand in the absence of stricter monitoring, households misuse agricultural loans borrowed from formal institutions, leading to default. Table 2 summarises the behavioural patterns of people who have repaid their loan as opposed to those who have not. Analysing the incidence of non-repayment we see that 73% of the households who have borrowed a loan have not repaid their loan. Dissecting these households we notice that majority of them belong to the rural areas as opposed to urban. Amongst the 12,284 households who have not repaid their loans, households who have borrow for the purpose of agriculture constitute the largest group (29.66%) as opposed to marriage (16.15%) or buying a house (15.89%). This indicates that people who borrow for the purpose of agriculture are most likely to default on their loans. Does this mean that people who borrow for agricultural purposes indulge in unproductive expenditure or are there any other underlying socioeconomic characteristics within these households which contribute towards the non-repayment? To investigate these possibilities we first empirically explore whether borrowing from formal sources as opposed to informal sources has an impact on investment and consumption patterns of a household.

Table 2: Analysing Repayment Rates of Households by Purpose of Borrowing

	Frequency	Non Repayment		
			RURAL	URBAN
Total Households	16934	12284	71%	29%
HH borrowed for the purpose of agriculture	5196	3635	83%	17%
HH borrowed for the purpose of marriage	2604	1980	71%	29%
HH borrowed for the purpose of buying a house	2758	1948	59%	41%
HH borrowed for the purpose of consumption	2078	1569	67%	33%
HH borrowed for medical purposes	2393	1833	70%	30%
HH borrowed for the purpose of education	409	306	44%	56%
HH borrowed for the purpose of buying land	171	121	65%	35%

Source: IHDS 2004–2005, own calculations.
*Notes:*Repayment Rates: Table giving details about repayment rate of households and segregating them according to the purpose of borrowing.

We start by investigating whether two households with the same amount of outstanding loan and with the same overall income differ in their consumption behaviour depending on the source from which they borrowed. To do this we estimate the following model in a liner probability framework.

$$COPC_{iv} = \alpha_1 + \alpha_2 LF_i + \alpha_3 logI_{iv} + \sum_{i=4}^{k} \alpha_i X_{iv} + E_{iv} \tag{1}$$

where COPC is monthly consumption per capita of household i in village v. In IHDS data this reflects the primary sampling unit, roughly the size of an average Indian village. The IHDS survey asked a series of 47 questions about household consumption designed to estimate total household consumption expenditures. COPC is calculated as a sum total of the expenditures on these 47 consumption items. LF is an indicator reflecting whether household i took a loan from a formal source. $LogI$ is log of total household income. X_i is an additional set of covariates such as household size, caste and religion. E_i represents PSU level fixed effects capturing idiosyncratic shocks that are specific to a village. For instance it captures village specific weather shocks that might affect consumption in a village and also affect availability of formal loans

if more drought prone villages are better covered by government banks. Our primary parameter of interest is α_2 which captures any difference in consumption behaviour of households caused by the difference in their source of borrowing.

In our next section we analyse the relationship between a household′s level of social spending, which is the amount of money a household spends on social functions like festivals, birth, death etc and its source of borrowing.

Source of Borrowing and Household Social Spending.

Utilisation of loans borrowed for agricultural purposes have interested researchers for a long time. Tiwari [2012] suggests that 40% of the loan amount borrowed by farmers for agricultural purposes is used on non agricultural purposes such as marriages, education, and health etc. Similarly Banerjee and Duflo document how people spend a considerable portion of their income on festivals and other social functions despite scraping through for bare necessities like food, clothing and housing. They find that in Udaipur the extremely poor spend 14% of their budget on festival [Banerjee and Duflo, 2007].

Khamis et al. [2012] also find evidence supporting the consumption of visible goods by socially disadvantaged groups. They suggest that these consumption patterns can be partly explained as a result of the status signalling nature of the consumption items. To the extent that formal loans are less monitored, households are more likely to undertake unproductive expenditures from these formal loans. Accordingly we investigate the effect of borrowing from a formal source on social spending and the effect of social spending on loan repayment. Social spending in the IHDS, records the amount of money spent by a household on social functions like marriages, festivals, birth death etc. Table 3 shows that the average social spending of all the households in our dataset is Rs 2922. Households who have not repaid their loan have a mean social spending of Rs 4221 as opposed to the mean social spending of Rs 3045 for households who have repaid their loan. One could argue that income could be a determining factor in deciding how much a household spends on social functions. But we notice that the average income of households who have repaid their loan is higher, while their social spending is lower compared to the households who have

not repaid their loan.

Table 3: Descriptive Statistics

	Income		**Investment**		**COPC***		**Social Spending**	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean
Full Sample	41553	84293.1	14493	808.06	41554	953.64	41490	2922.18
HH who took a loan	16909	72939	7241	1323.44	16909	934.64	16905	3902.50
HH who have repaid their loan	4650	79936	2114	1473.49	4650	995.08	4650	3045.73
HH who have not repaid thei loan	12284	70313.7	5136	1259.36	12284	911.42	12280	4220.92
HH who have taken loan from a formal source	5536	109802	2621	2591.71	5536	1239.55	5534	4719.64

Source: IHDS 2004–2005.
Notes: The above table gives us the detailed descriptive statistics of the variables primarily used from the IHDS data, giving details about the characteristics of households like their Income, COPC, Social Spending and Investment Ratio. Income refers to the annual income of a household. COPC is Monthly Consumption Per Capita. Social Spending refers to the amount of money a household spends in a year on social functions like marriage etc. Investment ratio is the ratio of the number of investment equipment like tractor, hand pump etc a household owns.

To investigate this further we see whether two households with the same amount of outstanding loan and with the same overall income differ in their social spending behaviour depending on the source from which they borrowed. To do this we estimate the following model in a liner probability framework.

$$Pr(HSS)_{iv} = \beta_1 + \beta_2 LF_i + \beta_3 LogInc_{iv} + \sum_{i=4}^{k} \beta_i X_{iv} + E_{iv} \tag{2}$$

where HSS is High Social Spending and all other variables are same as previously defined. High Social Spending is a binary variable, 0 if the household′s social spending, i.e. the amount of money the household spends on festivals etc is below the mean and 1 if the social spending of the household is above the mean. A household whose HSS take the value 1, implies that it spends more than average on social functions. The β_2 variable captures this probability of this happening if the household borrows from a formal source. This helps in understanding whether the source of borrowing has any effect on the spending pattern of a household. As before, we include controls for caste and religion.

Source of Borrowing and Household Investment.

I next turn to the question whether the investment behaviour of households differs when two households with the same amount of outstanding loan and the same overall

income borrow from different sources. Investment pattern of agricultural households is analysed using the investment ratio variable which is a ratio of the number of farm equipments a household owns from the total basket of farm equipments like tractor, electric pumps etc. Empirically we investigate this effect using the following linear probability model.

$$Pr(HI)_{iv} = \delta_1 + \delta_2 LF_i + \delta_3 LogInc_{iv} + sum_{i=4}^{k} \delta_i X_{iv} + E_{iv} \tag{3}$$

Where HI is High Investment Ratio and all other variables are same as previously defined in Equation 2. High Investment is defined as a binary variable, 0 if the household′s investment ratio, (i.e. the ratio of the number of investment equipment he owns from the given list in the Appendix, Table **??**) is below the sample mean and 1 if the household′s investment ratio of farm equipment is above the sample mean. As mentioned previously, majority of the loans borrowed from formal sources are for agricultural purposes. This equation measures whether the probability of a household to have invested in farm equipment is high or low. we restrict my sample size to only those households who have borrowed for the purpose of agriculture from formal and informal sources.

Loan Repayment, Consumption and Investment.

To understand why repayment behaviour varies by the source of borrowing we explored whether consumption and investment patterns of households varies by the source of borrowing and in turn drives repayment behaviour. Table 3 shows that the average investment ratio is lower for households who have not repaid their loans as opposed to those who have repaid their loans. Not many have tried to explore the effect of low investment or high unproductive consumption on the incidence of repayment. To understand the way loans taken from various sources of borrowing are utilised by the households, we analyse how their investment and consumption patterns have an effect on their repayment behaviour.

$$Pr(LR)_{iv} = \epsilon_1 + \epsilon_2 Pr(HSS)_{iv} + \epsilon_3 Pr(HI)_{iv} \epsilon_4 logInc_{iv} + \epsilon_5 Ir_{iv} + sum_{i=6}^{k} \epsilon_i X_{iv} + E_i \tag{4}$$

where LR is Loan Repayment, HSS is High Social Spending, HI is High Investment ratio, Ir is the monthly rate of interest payable by the household on the loan borrowed, INC is log of income, X_i is a set of other covariates, such as, number of loans taken by the household, largest amount of loan taken, household size, caste and religion. Loan repayment, the dependent variable is a binary variable, 0 being if the household has repaid its largest loan and 1 being if the household has not repaid its largest loan. The ϵ_2 coefficient records the increase in probability of loan repayment with every percentage point increase in the probability to spend more on social functions than the average.The ϵ_3 coefficient records the increase in probability of loan repayment with every percentage point increase in the probability to own more investment equipment than the average.

Interest Rates

As mentioned before one of the objectives behind the introduction of formal banking institutions in the rural areas by the government was to provide easy and cheap access to credit. In the process the aim was to reduce dependence on money lenders who charge high interest rates. However, the creation of institutional alternatives has failed to drive the traditional money lender out of the market and the informal interest rates remain high [Hoff and Stiglitz, 1990]. This raises the question as to how interest rates play a role in the repayment behaviour of borrowers. Lower interest rates can have important consequences on factors such as indebtedness, utilisation of loan and repayment. The theoretical insight is that households can be induced to take loan for income generating purposes, which in turn, can scale down debt burden and enhance repayment when interest rate is low. An alternate possibility is that, a high interest rate coupled with stricter monitoring of informal loans could push the households towards defaulting less on the informal loans and as a consequence default more on formal loans. To investigate these alternative possibilities we explore how the behaviour of households differ when a high rate of interest is likely to alter household's ability to repay formal vs informal loans. we investigate this by looking at the effect interest rates have on loan repayment when households borrow from formal sources like banks as opposed to their effect on loan repayment when borrowed from informal sources like money lenders.

The linear probability model below analyses how interest rates affect loan repayment behaviour in general and do interest rates play a different role when households borrow from formal sources of finance as opposed to informal sources.

$$Pr(LR)_i = \pi_1 + \pi_2 SS_i + \pi_3 Inc_i + \pi_4 Ir_i + \pi_5 Bank_i + \pi_6 Ml_i + sum_{i=7}^{k} \pi_i X_i + E_i + x_i \quad (5)$$

$$Pr(LR)_i = \Pi_1 + \Pi_2 SS_i + \Pi_3 INC_i + \Pi_4 Ir_i + \Pi_5 Bank_i + \pi_6 Bank * Ir_i + sum_{i=7}^{k} \Pi_i X_i + E_i + q_i \quad (6)$$

$$Pr(LR)_i = \rho_1 + \rho_2 SS_i + \rho_3 INC_i + \rho_4 Ir_i + \rho_5 Ml_i + \rho_6 Ml * Ir_i + sum_{i=7}^{k} \rho_i X_i + E_i + o_i \quad (7)$$

where LR is Loan Repayment, Bank is a dummy variable taking the value of 1, if a household has borrowed the loan from a bank, and 0 otherwise. Ml is a dummy for Money Lender, taking the value of 1, if a household has borrowed from a moneylender and 0 otherwise. The Π_6 coefficient in equation 7 is the interaction term of the dummy variable Bank and monthly interest rate. It records the effect of monthly interest rate on loan repayment when households borrow from Banks. Similarly ρ_6 coefficient in equation 8 is the interaction term of the dummy variable moneylender and monthly interest rate, which records the effect of monthly interest rate on loan repayment when households borrow from moneylenders.

The next section looks at the results of these equations.

Results

Consumption

I start by investigating whether households with otherwise similar characteristics, consume differently when borrowing the same amount of loan from formal vis-a-vis informal sources. Consumption is measured as the monthly consumption per capita for a household. It is calculated as a sum of total expenditures on 47 consumption items on a monthly basis. For further details on the items included refer Table **??** in the Appendix. The results from the estimation of equation 1 are reported in Table 4. Column-[1] reports the baseline estimates for α_2 after controlling only for household income. Since richer households are more likely to have greater access to formal financial sector, and at the same time have higher consumption, hence it is imperative that we control for income even in the very sparse specification. The estimate suggests that, for similar level of total household income, if a household has taken a loan from a formal source as opposed to an informal source then it is likely to have a higher monthly consumption per capita by approximately Rs. 307 on average.

Column [2] additionally controls for household size, religion and caste. Previous findings suggest that households from different socio economic background tend to indulge more in consumption goods as a signalling mechanism [Khamis et al., 2012]. Hence we include religion and caste controls. The estimation suggests that even after controlling for the additional variables there is a significant difference in consumption expenditure of households depending on the source of their borrowing. Column [3], additionally controls for village level fixed effects. It is possible that households living in more developed regions have higher consumption expenditure simply because of their access to various consumption goods. At the same time access to formal finances are also likely to be higher in more developed regions. Village level fixed effects ensures that we am comparing households with the same level of access to formal finances. More generally it accounts for any difference in behaviour due to unobserved heterogeneity across villages. Indeed, the importance of controlling for village level development is evident from the estimate in Column [3]. Compared to Column [1], the coefficient is almost halved. Households borrowing from formal

sources still have a higher level of consumption compared to households borrowing from informal sources. However the difference is now approximately Rs 148.

Other control variables also have a significant effect. Loan size has a positive effect on monthly per capita consumption. The results also suggest that Hindus have a higher consumption as compared to other religions. OBC, ST and SC have lower consumption as compared to households that belong to the General category of caste. Column [4] estimates the same specification as Column [3] but we restrict the sample to only those households who have borrowed for agricultural purposes. These households have borrowed from either a formal source or an informal source, specifically for the purpose of agricultural investment. The findings are similar in spirit for these households. Specifically households which have borrowed for agricultural investment purposes from a formal source as opposed to an informal source spend Rs. 89 more per person in the house on consumption on a monthly basis, indicating a higher monthly per capita consumption when a loan is taken from a formal source as opposed to an informal source. Overall we find a significant difference in consumption behaviour of households depending on the source from which they borrowed their loans.

Social Spending

One reason for a higher per capita consumption could be that easier terms of formal loans allow otherwise constrained households to spend on necessary and productive consumption goods like food, education or health. This might lead to higher future productivity of the households through human capital development. However, a more worrisome possibility, from a policy perspective, is a higher extent of unproductive spending that the households might indulge in when borrowing from formal sources.

To understand this further we look deeper into the composition of consumption. As discussed earlier, households in India often consume goods that signal social status even at the cost of nutrition and education. Hence in what follows we study whether households tend to finance their expenditure on certain types of consumption by taking advantage of the easier terms of formal loans. Specifically we focus here

Table 4: Effect of Borrowing Source on Monthly Consumption Per Capita

Dependent Variable - Monthly Per Capita Consumption (COPC)				
	All Loans	All Loans	All Loans	Agricultural Loans
	1	2	3	4
Loan Formal	306.395***	267.396***	147.154***	89.419***
	-17.738	-17.654	-19.562	-29.029
Income	289.327***	268.878***	160.109***	134.035***
	-8.216	-8.205	-9.334	-14.119
Brahmin		48.571	-5.819	-32.375
		-42.528	-47.27	-82.179
OBC		-280.543***	-195.806***	-145.047***
		-21.593	-26.384	-42.709
ST		-532.291***	-356.027***	-282.952***
		-35.485	-46.581	-75.844
SC		-403.117***	-352.852***	-344.349***
		-25.324	-29.478	-52.936
Hindu		119.051***	96.313***	114.116**
		-23.311	-31.209	-54.11
Constant	404.325***	594.988***	756.326***	678.375***
	-14.638	-27.313	-33.462	-57.153
PSU Fixed Effects	No	No	Yes	Yes
Observations	16,785	16,785	16,785	5,149
R-squared	0.103	0.125	0.362	0.571

Notes. This table explores the impact of borrowing from formal source on monthly consumption per capita of the household.The dependent variable COPC is the per capita expenditure of a household on the list of 47 consumption items calculated for a monthly period. Column [1] controls only for source of borrowing and income. In Column [2] further control variables are added. Column[3] which is our preferred specification controls for village level fixed effects in addition to the control variables in Column [2].Column [4] explores the impact only on those households who have borrowed for the purpose of agriculture. Data on all variables is taken from the IHDS 2009-10. Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. Standard errors are in brackets. Source: IHDS 2004-05; Own Calculations.

on expenditure that are conspicuous in nature. Conspicuous consumption is easily visible to others and hence more likely to help households in signalling their social status.

The results from the estimation of equation 2 are reported in Table 5. The dependent variable High Social Spending is a binary variable which takes the value 1 when the household′s social spending is higher than the average (Rs 2922) and 0, otherwise. The reason for not using a continuous variable for social spending is that a large number of households report zero social spendings. Column [1] reports the baseline estimates for β_2, after controlling for household income. The estimate suggests that for similar levels of total household income, if a household has taken a loan from a formal source as opposed to an informal source then it is likely to have a 5% higher probability of indulging in higher social spending.

Column [2] additionally controls for household size, loan size, religion and caste. This lowers the size of the coefficient, but it still remains significant. Column [3] additionally controls for village level fixed effects. After controlling for the unobserved differences at the village level the probability of having a higher social spending when a loan is borrowed from a formal source is about 2% higher compared to when a loanis borrowed from an informal source.

Column[4] estimates the same specification as Column[3] but with a restricted sample size of only loans which have been taken for agricultural purposes. It is interesting to see that households who take loans for agricultural investments from formal sources as opposed to informal sources have a 4% higher probability of indulging in higher social spending. This is indicative of a presence of moral hazard in the utilisation of loans from formal sources and specifically those taken for agricultural use. Households may form expectations that either monitoring or enforcement of loans by formal sources is not strong and thus exercise less control in utilisation of these loans. The fact that the unproductive agricultural loans have almost double the effect of any formal loan, might further reflect the fact that loan waivers are specifically targeted towards agricultural loans which change people′s expectations about the terms of enforcement of these loans in particular.

Table 5: Effect of Borrowing Source on Social Spending

Dependent Variable: Pr(High Social Spending)				
	All Loans	All Loans	All Loans	Agricultural Loans
	1	2	3	4
Loan Formal	0.046***	0.038***	0.021***	0.043***
	-0.006	-0.006	-0.007	-0.012
Income	0.054***	0.045***	0.052***	0.048***
	-0.003	-0.003	-0.003	-0.006
HH Size		0.012***	0.010***	0.012***
		-0.001	-0.001	-0.002
Brahmin		0.054***	0.033**	-0.006
		-0.014	-0.016	-0.035
OBC		-0.033***	-0.043***	-0.076***
		-0.007	-0.009	-0.018
ST		-0.063***	-0.065***	-0.062*
		-0.012	-0.016	-0.032
SC		-0.062***	-0.074***	-0.134***
		-0.008	-0.01	-0.023
Hindu		0.017**	0.014	0.026
		-0.008	-0.011	-0.023
Constant	0.050***	0.016	0.032***	0.031
	-0.005	-0.01	-0.012	-0.026
PSU Fixed Effects	No	No	Yes	Yes
Observations	16,785	16,785	16,785	5,149
R-squared	0.033	0.046	0.284	0.456

Notes. This table explores the impact of borrowing from formal source on the social spending of the household.The dependent variable is social spending, which is a binary variable. It is 1 when a household spends more than the mean amount on social functions and 0 otherwise. Column [1] controls only for source of borrowing and income. In Column [2] further control variables are added. Column[3] which is our preferred specification controls for village level fixed effects in addition to the control variables in Column [2].Column [4] explores the impact only on those households who have borrowed for the purpose of agriculture. Data on all variables is taken from the IHDS 2009-10. Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. Standard errors are in brackets. Source: IHDS 2004–2005, own calculations.

Investment Ratio

Credit has always been looked at as a facilitator for modernising agriculture. At a basic level credit serves as a means to remove financial constraint. But the bigger role of credit in agriculture is to help farmers create assets that can help generate output by adopting modern means of technology. Thus it is very important for households to utilise the agricultural loan taken for investment purposes. By utilising loans for investment purposes whether it is in the form of buying a tractor or setting up tube wells, it helps in modernising the farm and eventually helps increase productivity. By adequately investing in production and technology farmers can achieve farm income sustainability and consumption stability. However given that the overall budget is constrained by the loan amount, an increase in consumption expenditure is likely to bring down productive expenditure. Hence in what follows we study the investment made by households who borrow from formal sources as opposed to informal sources.

The results from the estimation of equation 3 are reported in Table 2.6. High Investment Ratio is a binary variable which takes the value 1 when the household′s investment ratio (fraction of investment goods owned by the household out of 7 total investment goods) is more than the average investment ratio and 0, otherwise [1]. The primary objective of this thesis is to study loan waivers and behaviours of households in the context of agriculture. we restrict the sample size for this analysis to only agricultural loans as studying investment ratios for loans taken for other purposes is meaningless in this context. Column [1] reports the baseline estimates forβ_2, after controlling for household income. The estimate suggests that for similar level of total household income, if a household has taken a loan from a formal source as opposed to an informal source then it is likely to have a 5.2% higher probability of investing in more than the average investment.

Column [2] additionally controls for household size, loan size, religion and caste. Column [3] additionally controls for village level fixed effects. After controlling for the unobserved differences at the village level the probability of having a higher investment ratio when a loan is borrowed from a formal source goes up to .5%.

[1]The average investment ratio of the entire sample if 0.0974.

This is the expected sign of investment ratio and borrowing from formal source indicating no moral hazard. However the interesting analysis comes in Column[4], which estimates the same specification as Column[3] but with a restricted sample size to only those households which have a high social spending. Here we notice that households which spend high amounts on social events and borrow from formal sources have a 13.6% lower probability of having a high investment ratio. This is indicative of a presence of moral hazard in the utilisation of loans from formal sources taken for agricultural purposes suggesting that households divert the funds borrowed for investment purposes towards unproductive purposes.

Table 6: Effect of Borrowing Source on Investment Ratio

Dependent Variable: Pr (High Investment Ratio)				
	All Loans	All Loans	All Loans	Agricultural Loans
	1	2	3	4
Loan Formal	0.052***	0.044***	0.070***	-0.132*
	-0.017	-0.017	-0.02	-0.068
Income	0.088***	0.063***	0.055***	0.03
	-0.008	-0.008	-0.01	-0.03
HH Size		0.022***	0.023***	0.015
		-0.003	-0.003	-0.009
Brahmin		-0.103**	-0.028	0.005
		-0.046	-0.062	-0.195
OBC		-0.089***	-0.038	-0.076
		-0.021	-0.031	-0.092
ST		-0.168***	-0.128**	-0.169
		-0.032	-0.05	-0.179
SC		-0.184***	-0.181***	-0.013
		-0.029	-0.039	-0.146
Hindu		0.102***	0.139***	0.079
		-0.027	-0.041	-0.165
Constant	0.415***	0.314***	0.242***	0.608***
	-0.015	-0.033	-0.045	-0.154
PSU Fixed Effects	No	No	Yes	Yes
Observations	3,429	3,429	3,429	558
R-squared	0.04	0.07	0.53	0.734

Notes. This table explores the impact of borrowing from formal source on the investment ratio of the household.The dependent variable is social spending, which is a binary variable. It is 1 when a household spends more than the mean amount on social functions and 0 otherwise. Column [1] controls only for source of borrowing and income. In Column [2] further control variables are added. Column[3] which is our preferred specification controls for village level fixed effects in addition to the control variables in Column [2]. Column [4] explores the impact only on those households who have borrowed for the purpose of agriculture. Data on all variables is taken from the IHDS 2009-10. Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. Standard errors are in brackets. Source: IHDS 2004-05

Loan Repayment

Utilisation of loans plays a very important role in the repayment of loans. If a loan is used for income generating purposes then it generates income and increases the overall sustainability of the household. On the other hand if the loan is used for unproductive purposes then the loan becomes a burden on the household as is likely to create a vicious debt trap. Hence in what follows we investigate whether low investment ratio and/or high social spending impacts loan repayment of households. The results from the estimation of equation 4 are reported in Table 2.7. Loan Repayment is a binary variable which takes the value 1 when a household has repaid its loan and 0, otherwise.

Column [1] reports the baseline estimates for ϵ_2 in equation 4, after controlling household income, monthly interest rate, loan size, household size, caste and religion dummies and the number of loans taken in the last 5 years. In addition it controls for village level fixed effects. The estimate suggests that for similar level of total household income and loan size if a household has high social spending then its probability to default will increase by 1.7%.

Column [2] uses the same specification as column [1], but the sample size is restricted to only agricultural loans. In this specification, we see a drastic increase in default rate to 5.3% when a household has a higher social spending as opposed to one having a low social spending. Column [3] reports the baseline estimates for ϵ_3, after controlling household income, monthly interest rate, loan size, household size, caste and religion dummies and the number of loans taken in the last 5 years. In this specification, after controlling for the unobserved differences at the village level, households which have a high investment ratio have a 3.2% lower probability of default although the coefficient is significant only at 16% confidence level.

Since the household is likely to be faced by a resource constraint a higher level of social spending might crowd out investment spending, instead of reducing other forms of consumption expenditure. To investigate the possibility Column [4] includes both social spending and investment spending in the same specification. The results

suggest that a higher that average expenditure on social functions reduces the probability of repaying the loan borrowed by 5%. On the other hand a higher than average expenditure on investment increases the probability of repaying the loan borrowed by 3.4%. This suggests that there is a possibility that increasing expenditure on social functions is reducing the ability of the household to repay their loan.

Interest Rate

To avoid wilful default on the part of the borrowers, lending agencies both formal and informal impose penalties in case of default. Penalties are generally in the form of seizing collateral or discontinuing future credit availability. Bhattacharjee [2014] argue that penalty could also be levied through interest rates charges on loans. Specifically they examine the impact of interest rate in the informal sector on formal sector repayment. They find that a higher unfavourable interest rate in the informal sector leads to an increase in timely repayment in the formal sector. To add to this finding, we estimate the effect that interest rates have on loan repayment, specifically in the case of agricultural loans where expected penalty might vary from actual penalty due to frequent announcement of loan waiver programs, The results from the estimation of equation 7 are reported in Table 8. Loan Repayment is a binary variable which takes the value 1 when a household has repaid its loan and 0, otherwise. In this specification we use Banks as a proxy for formal loans as they formulate majority of the formal loans and moneylenders as a proxy for informal loans.

Column [1] reports the baseline estimates for π_6, after controlling household income, monthly interest rate, loan size, household size, caste and religion dummies. The interaction term [Bank * Monthly interest) implies that when a household borrows from a bank as opposed to any other lending agency, a higher interest rate reduces the probability of loan repayment by 8%. On the other hand Column [3] shows the effect on loan repayment when a household borrows from a moneylender. In this case, a higher interest rates on moneylender loans increases the probability of repayment by approximately 3%.

Table 7: Effect of Social Spending & Investment Ratio on Loan Repayment

Dependent Variable: Pr (High Investment Ratio)				
	(1)	(2)	(3)	(4)
Pr(High Social Spending)	-0.017*	-0.054**		-0.050*
	(0.010)	(0.021)		(0.026)
Income	0.016***	0.023***	0.021**	0.023**
	(0.004)	(0.008)	(0.010)	(0.010)
Monthly Interest	-0.008***	-0.002	0.001	0.001
	(0.002)	(0.005)	(0.006)	(0.006)
Loans taken in last 5 years	0.002*	0.009***	0.010***	0.010***
	(0.001)	(0.002)	(0.003)	(0.003)
Largest Loan	-0.001	-0.002	0.005	0.005
	(0.002)	(0.004)	(0.005)	(0.005)
HH Size	-0.001	-0.005*	-0.008**	-0.007**
	(0.001)	(0.003)	(0.003)	(0.003)
Brahmin	0.034*	0.041	0.089	0.088
	(0.019)	(0.044)	(0.060)	(0.060)
OBC	-0.000	0.014	0.025	0.023
	(0.010)	(0.023)	(0.030)	(0.030)
ST	-0.011	-0.017	-0.005	-0.006
	(0.019)	(0.040)	(0.049)	(0.049)
SC	0.010	-0.023	0.028	0.024
	(0.012)	(0.029)	(0.039)	(0.039)
Hindu	0.017	0.010	-0.036	-0.034
	(0.012)	(0.029)	(0.040)	(0.040)
HH literacy	0.012	0.014	0.003	0.004
	(0.008)	(0.020)	(0.025)	(0.025)
Pr(High Investment Ratio)			0.031	0.034*
			(0.020)	(0.020)
Constant	0.241***	0.257***	0.285***	0.283***
	(0.016)	(0.038)	(0.050)	(0.050)
Observations	16,747	5,142	3,424	3,424
R-squared	0.388	0.487	0.484	0.485

Notes. This table explores the impact of interest rates charged on loans borrowed by formal and informal sources, in particular banks and money lenders on the loan repayment probability of a household. The dependent variable is loan repayment, which is a binary variable. It is 1 when a household has repaid the loan and 0, otherwise. Column [1] shows the effect of high social spending on loan repayment controlling for other variables for all loans. In Column[2],[3] and [4] the sample size is restricted to only agricultural households. Column [2] shows the effect of high social spending on loan repayment, Column [3] shows the effect of high investment ratio on loan repayment and Column [4] shows the effect of both high social spending and high investment ratio on probability of loan repayment. HH Literacy is an indicator if any member of the household is literate. All regressions control for village level fixed effects. Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. Standard errors are in brackets. Source: IHDS 2004-05, Own Calculation

In this case a higher interest rate on loans from formal institutions make household default more. This could simply be driven by a larger size of debt as a result of higher interest rate. Especially if the fear of losing credit worthiness is low people will tend to default more when debt size is large. On the other hand, the fear of losing future credit possibility in case of default is always high for the informal loans, which run precisely on the basis of reputation. Further if credit worthiness is a function of the debt size itself, so that a reputation is at a greater stake, larger the size of default, then people would be more likely to return informal debts when they are larger in size due to a higher interest rate.

Table 8: Effect of Interest Rate on Loan Repayment

Dependent Variable: Loan Repayment	(1)	(2)
Bank * Monthly Interest	-0.080***	
	(0.021)	
MoneyLender * Monthly Interest		0.030***
		(0.004)
Pr(High Social Spending)	0.024**	0.024**
	(0.010)	(0.010)
Income	0.006*	0.007*
	(0.004)	(0.004)
Monthly Interest	-0.018***	-0.031***
	(0.002)	(0.003)
Bank	0.100***	
	(0.024)	
MoneyLender		-0.114***
		(0.013)
HH Size	-0.003**	-0.003**
	(0.001)	(0.001)
Largest Loan	-0.001	-0.001
	(0.002)	(0.002)
Brahmin	-0.007	-0.008
	(0.018)	(0.018)
OBC	-0.051***	-0.048***
	(0.009)	(0.009)
ST	0.023	0.024
	(0.015)	(0.015)
SC	-0.041***	-0.038***
	(0.011)	(0.011)
Hindu	-0.034***	-0.029***
	(0.010)	(0.010)
HH literacy	0.043***	0.041***
	(0.009)	(0.009)
Constant	0.339***	0.366***
	(0.015)	(0.015)
Observations	16,743	16,743
R-squared	0.019	0.023

Notes. This table explores the impact of interest rates charged on loans borrowed by formal and informal sources, in particular banks and money lenders on the loan repayment probability of a household.The dependent variable is loan repayment. Column[1] shows us the interaction term [Bank*Monthly interest], which captures the effect of interest rates charged by the bank on probability of loan repayment. Column[2] shows us the effect of interest rates charged by moneylenders on probability of loan repayment.Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. Standard errors are in brackets. Source: ~~IHDS 2004-05; Own Calculations~~

Conclusion

Repayment of loans depends on a number of factors, such as purpose for which loan is taken, tenure of the loan, interest rate and source of borrowing. If a household borrows a loan meant for income generating purpose and uses it for that then it is likely to generate future income and make the household better off in the long run. It is also likely to enable the household to return the loan borrowed in the first place. However, if the loan is used for unproductive purposes, then repaying that loan becomes problematic for the household. The household can then get stuck in a debt trap where it borrows more to repay the previous loan and the economic status of the household does not improve. Even if households are aware of this and avoid using investment loans for consumption purposes in general, government interventions in the form of loan waivers might change the behaviour of households.

Moral hazard might arise when government intervene and announce loan waiver policies. Households which could have avoided using their loans for consumption purposes also have an incentive to default. It encourages people to be less cautious in using their loans for non productive purposes in the hope that there will be further loan waiver announcements and the punishment for default will be low.

In this chapter we explored the consumption, investment and loan repayment behaviour of households that borrow loans from formal sources as opposed to informal sources. Empirical results suggest that households that borrow from formal sources have a higher consumption and social spending. They expenditure on investment products are also lesser than the average. In addition to this we also find that households that have a higher than average expenditure on social spending have a lower probability of repaying their loans. This implies that households which borrow from formal sources spend more on social functions as compared to households that borrow from informal sources and thus have a lesser probability of repaying their loans as they have used the borrowed loan amount for unproductive expenditure.

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