

Financial decision making in rural India: poverty, financial
literacy and investment decisions

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Lukas Valentin Semmler

born in Essen

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D7

1. Name of supervisor: Prof. Dr. Meike Wollni

2. Name of co-supervisor: Prof. Dr. Stephan v. Cramon-Taubadel

3. Name of further member of the examination committee: Prof. Dr. Oliver Mußhoff

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SUMMARY

Poverty remains a pressing problem in rural areas of the developing world. This is also true for India. Expanding the rural financial system with a focus on increasing access to credit has been an important approach for poverty alleviation in India. Nevertheless, there is empirical evidence and theoretical consideration that, credit markets fail for the poor in particular. Market failures can be either driven by moral hazard or adverse selection. In the case of moral hazard, the borrower can either devote insufficient effort to enable subsequent repayment (ex ante moral hazard) or he may voluntarily default (ex post moral hazard). His actions remain hidden. In both cases, the loan would not be repaid successfully. To avoid default, lenders may demand collateral in a form that the poor cannot provide. Adverse selection describes the process of relatively more risky borrowers selecting into loan commitments. If the lender cannot observe the riskiness of potential borrowers, due to information asymmetry, he may demand a higher interest rate in an effort to compensate for loan defaults by riskier borrowers. This may in turn preclude relatively risk-averse borrowers who may not be willing to bear the risk premium, which represents the compensation for the default risk of riskier borrowers. The relatively more risky borrowers remain in the market, and consequently, the likelihood of loan default increases. In the extreme case, this can result in a totally nonexistent credit market.

To complement prior research which focused on the supply side and market failures of India's rural financial system, we focus on rural households' and individuals' financial decision making in this study. We argue that this perspective can contribute to the understanding of outcomes of rural households' financial decisions. In this study, we first shed additional light on the borrower as an individual, the means available and the limits to an individual's financial decision making. Second, we stress the decision-making process within a household. Several individuals may be involved in this process and may determine the outcomes of financial decisions at the household level.

The first objective focuses on an individual's financial literacy, as it is central to undertake informed financial decisions. However, in the context of poverty, taxes on mental capacity may disturb an individual's decision making. Mental capacity, which is limited for each individual, can be demanded by pressing financial obligations (e.g., education, health and social events) to which individuals may be exposed simultaneously. In contrast, non-poor individuals may be relatively less exposed to this

tax. They may be exposed to the same financial obligations, but are able to settle them more easily, as they are not poor. We explore whether such a tax negatively affects an individual's level of financial literacy. Experimentally, we show that for individuals, considered to be poor, such a tax negatively affects their level of financial literacy. In contrast, individuals who are not considered poor are not negatively affected by the tax. Moreover, we find that a financial incentive can act as a counter-measure. It increases the level of financial literacy. We recommend that policymakers consider measures that assist individuals in financial decision making when they have a lower level of financial literacy and to consider incorporating financial incentives in measures intended to increase financial literacy, e.g., in financial literacy training.

Our research is informative on the relevance of financial decision making for poverty in rural India. We find that a tax on mental capacity negatively influences financial literacy in the context of poverty. Thus, financial literacy, which is central for informed financial decisions, is negatively affected. When informed financial decision making is hampered, it may become more difficult to escape poverty. In essence, this suggests a vicious circle, whereby poverty promotes the likelihood of the tax on mental capacity and the tax leads to worse financial decisions due to lower financial literacy. In turn, the likelihood of escaping poverty diminishes.

For the second research objective, we focus on loan control among women who are members of a Self-help group (SHG) and have access to loans through the SHG. We analyze the influence of loan control on the likelihood that the households invest into agriculture. Agricultural investments are important for potential poverty reduction due to their productive nature. Moreover, agriculture is a traditional male domain in India. In our econometric analysis, we show that the likelihood of investing into agriculture declines with increasing loan control by women. The implication of our findings is twofold. First, this inverse relationship shows that households in which women have less loan control invest in domains over which women have no say, agriculture in our study. Thus, the women bear the obligation to repay while having no control over the loan. This may make it more difficult for SHG member women to repay their loans and to develop the reputation of being a reliable borrower. Second, although this burden contradicts the goal of empowering women through access to credit, the household as a whole may still benefit from the productive agricultural investment. This is the tradeoff found in our study in the case of SHG lending. We suggest measures intended to diminish that tradeoff. Measures to encourage women's agricultural investments are

discussed. First, we elaborate on women's access to land and markets in India. Second, we discuss the potential for diminishing the tradeoff through measures to increase loan control for women. In particular, we argue that it is worth exploring having loans that are not distributed directly to the SHG member women but are instead transferred to an agricultural investment counterpart. The women can then obtain goods or services from the investment counterpart and do not face the risk of losing control over the money when bringing it home. This research is informative for rural development because it identifies two diametrically opposed outcomes that are both important for rural development, namely potential monetary benefits at the household level through productivity-increasing investments and women's empowerment in the area of loan control.

This dissertation relies on data collected through a survey of 658 households between February and May 2014 in India. To conduct the survey, we visited the households of SHG member women. During the survey, we conducted an experiment that yielded the data for the first research objective. The second research objective relies on cross-sectional data from the survey.

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ABBREVEATIONS

GDP	Gross Domestic Product
NABARD	National Bank for Agriculture and Rural Development
NGO	Nongovernmental organization
RRB	Regional Rural Bank
Rs.	Rupees
SCB	Scheduled commercial bank
SHG	Self-help group

CHAPTER 1

GENERAL INTRODUCTION

Studying financial decision making in rural areas of the developing world is tremendously important for poverty reduction and thus welfare improvements. To what extent can “correct” financial decision making contribute to poverty reduction? This focus stresses not only the rural household’s and individual’s perspective and the means at their disposal but also the constraints they face in the context of poverty. Financial means, in theory, should enable poor households and individuals to undertake productivity-increasing investments that in turn, may raise income and thus potentially improve welfare. In particular, the poor may experience substantial productivity increases from such investments, when they are capital constrained (Karlan & Morduch, 2010). Empirical evidence e.g. from Udry and Anagol (2006) shows that investing in a new technology, pineapple cultivation, brings high returns to Ghanaian farmers. According to Wollni and Zeller (2007), farmers in Costa Rica receive higher prices when growing and selling specialty coffee. Thus, investments may be rewarding in monetary terms.

India, in particular, provides a well-suited study case, first, because poverty there remains a pressing and highly debated issue (Deaton & Kozel, 2005). Currently available statistics provided by the World Bank (2016) for the year 2011 indicate that the rural poverty head-count ratio is relatively high. It amounts to 25.7%, compared to the urban ratio of 13.7%, while the ratio for the whole country is 21.9%. Second, the promotion of rural financial markets is a major strategy employed in India to alleviate poverty (Mahajan & Navin, 2013).

The next section (1.1) introduces the institutional framework of India’s rural financial system. This description of the supply side introduces the rural financial system’s development. The subsequent section (1.2) will complement this description with theoretical and empirical considerations regarding market failures. Building on lessons learned from that focus, we will introduce our research focus on financial decision making in Section 1.3. Section 1.4 will describe the data and outline the remaining chapters of the dissertation.

1.1 The development of India's rural financial market

Financial decision making is not taking place in a vacuum; thus, before discussing financial decision making in greater detail, we will begin with a brief overview of India's rural financial system with a focus on the credit market, following Garikipati (2008), where not stated otherwise. Indian rural credit intuitions date back to 1904, during the period before independence. At that time, rural credit cooperatives were founded as the major source of capital in rural India (Robert, 1979). In the 1960s, with the advent of the green revolution, increased credit demand could not be served by the rural cooperatives alone. In 1969, the rural financial system expanded through the nationalization of commercial banks. The nationalized banks were required to open rural branches. This state intervention was grounded primarily in market failure. The drivers of market failure may be context specific, and policies to counteract it may be particularly suited to the circumstances present in a given case. The striking presence of poverty in rural India justified the state-led credit expansion. In the context of policies to combat poverty, credit expansion was preferred over politically sensitive measures such as land redistribution or tenancy laws (Garikipati, 2008). In 1975, Regional Rural Banks (RRBs) were introduced to supplement the nationalized banks in servicing the rural poor. This led to increased geographical coverage and thus increased access to credit for poor households (Chavan & Ramakumar, 2002). Table 1 provides an overview of the credit expansion in rural India. Between 1971-2 and 2007-8, the credit

Table 1. *Credit in rural India*

Year	Share in Total Credit (in %)				Total (in mil. Rs.)
	Cooperatives	State Governments	SCBs	RRBs	
1971-2	87.1	11.2	1.7	-	8,830
1981-2	57.7	3.6	34.8	3.9	42,960
1991-2	50.2	2.9	41.7	5.2	115,380
2001-2	56.4	0.8	34.4	8.4	541,950
2002-3	52.2	-	38.8	9	651,750
2003-4	48	-	43.4	8.6	834,270
2004-5	42.7	-	45.9	11.3	1,053,030
2005-6	33.4	-	56	10.6	1,440,210
2006-7	28.5	-	60.8	10.7	1,895,130
2007-8	29.6	-	58.2	12.2	1,949,530

Source: RBI (2010).

volume increased by approximately a factor of 221, from Rs. 8,830 million to Rs. 1,949,530 million. Moreover, Table 1 shows how scheduled commercial banks (SCBs), the label for nationalized commercial banks, and RRBs increased their share of credit provided over time and how the shares of cooperatives and state governments declined.

In addition to the institutional framework, state interventions included policies such as directed credit to priority sectors (e.g., agriculture), loan waivers, subsidies and bail outs of nonperforming institutions. These policies were followed by an extreme erosion of borrower discipline (Meyer & Nagarajan, 2000). A prominent example is the Integrated Rural Development Program, initiated in 1978. Although it is said to have provided loans to ca. 27 million poor households, it is criticized for incorporating a high share (59%) of overdue loans (Pulley, 1989). This clearly demonstrates that policies need to be tailored to address the mechanism that drives a market failure, even when the driver is unclear. These mechanisms will be discussed in greater detail in Section 1.2.

In 1982, India's state intervention in rural financial markets produced its apex institution, namely the National Bank for Agriculture and Rural Development (NABARD). NABARD's mandate is to refinance cooperatives, RRBs and SCBs and to manage their institutional structure (Meyer & Nagarajan, 2000). Although the centralization created by NABARD's mandate enabled measures to be coordinated throughout the whole country, at the beginning of the 1990s it was concluded that refinancing nonperforming institutions could not be continued and that measures to monitor and enforce repayment could not be sustained through NABARD (Garikipati, 2008).

In response, the so-called SHG-bank linkage program was initiated by NABARD in 1992 (Karmakar, 2008). This program created another dimension of Indian rural finance, namely Self-help groups (SHGs). The most prominent example of group lending is the Grameen Bank, founded in 1983 by Muhammad Yunus in Bangladesh (Yunus, 1999). Peer monitoring is inherent to that bank's model. Group lending and peer monitoring can prevent market failure. The responsibility for screening the group to detect bad credit risk lies with the group itself, as does the monitoring of ongoing loans and enforcement of repayment (Ghatak, 1999). SHGs typically consist of women and have between 10 and 15 members. In the SHG-bank linkage program, the SHGs are financed through banks or Non-governmental organizations (NGOs), which are financed through NABARD (Garikipati, 2008).

Table 2 provides an overview of the expansion of the SHG-bank linkage program. Between 1992-3 and 2009-10, the number of linked SHGs increased by approximately a factor of 6,224, whereas the average bank loan volume per SHG increased by approximately eight times.

The crisis in microfinance, the mass defaults of loans, that emerged in 2010 in the State of Andhra Pradesh, gave rise to critical voices against this model (Mader, 2013). According to Mahajan and Navin (2013) the mass default, which they identify as the decline in the loan recovery rate from above 95% in 2007-8 to 60%-70% in 2010-11, is an outcome of state intervention. They argue that politicians in Andhra Pradesh were in favor of the SHG- bank linkage model. The model allows politicians to garner votes, as

Table 2. *SHG-Bank Linkage Program in India: Selected Indicators*

Year	SHGs Linked (No.)	Bank Loan (in mil. Rs.)	Bank Loan per SHG (in Rs)
1992-3	255	2.9	11,372
1994-5	1,502	17.9	11,917
1996-7	3,841	57.8	15,048
1998-9	18,678	333.1	17,833
2000-1	149,050	2878.9	19,315
2002-3	255,882	10,223.30	39,953
2004-5	539,365	29,942.60	55,514
2006-7	1,105,749	65,700.00	59,416
2008-9	1,609,586	122,535.10	76,128
2009-10	1,587,000	144,433.00	91,010

Source: NABARD (2010); RBI (2010).

the promotion of SHGs can serve as a means of reaching out to the poor. However, the model of SHGs linked to banks, under public influence, was seen to face competition from microfinance institutions outside the linkage program. Thus, Mahajan and Navin (2013) argue, the competing institutions were adversely affected by policy measures such as subsidizing the interest rates of linked SHGs, passing laws that forbid competing institutions to visit their borrowers to collect recoveries and making public announcements that loans from the microfinance institutions that are not part of the linkage program, need not be repaid.

In summary, the development of India's rural financial system experienced massive interventions at several points in time, justified by the presence of credit market failures for the poor. To provide a better understanding of credit market failures, the subsequent section elaborates on relevant theoretical considerations and recent empirical evidence.

1.2 Credit supply and market failure

The textbook case typically states that credit markets can fail for the poor for two reasons (Ray, 1998). First, the poor may not take up loans. A lack of collateral in the

form required by a formal lender to insure against loan defaults may be lacking or charging excessive interest rates may prevent participation by the poor. Second, the poor may take up loans but not repay them. This may not be intuitive and will be elaborated below. These factors relate to the mechanisms underlying credit market failures.

The two mechanisms behind market failure are moral hazard and adverse selection. If market failure stems from moral hazard, we can differentiate between ex ante and ex post moral hazard (Karlan & Morduch, 2010). Ex ante moral hazard may occur if, at relatively higher interest rates, the borrower is discouraged from devoting sufficient effort, in terms of mobilizing any sources available to generate funds, to repay the principal and interest. Ex post moral hazard refers to the case of voluntary default. Here, although the borrower can afford to repay the loan plus interest, he decides not to do so. The argument behind moral hazard behavior is that the poor have a relatively lower incentive to repay. The lower incentive to repay is related to the principle of diminishing marginal utility. Each additional unit of money is of relatively more value to the poor than to the non-poor. Thus, the obligation to repay the same loan amount, in absolute terms, comes at higher opportunity cost to the poor compared to the non-poor. The utility of spending the money on alternative purposes may outweigh the utility derived from repaying the loan.

Adverse selection can occur under imperfect information. In particular, if the lender does not know the production function of the borrower, a high interest rate can attract riskier borrowers. In the event of success they can repay; otherwise, they cannot. The higher level of risk involved increases the likelihood of default (Stiglitz & Weiss, 1981). Conversely, according to de Meza and Webb (1987), advantageous selection can occur. The relationship between risk and return is modeled differently. Entrepreneurs with higher intrinsic quality have higher returns. An increase in interest rates would then lead to the selection of entrepreneurs with higher quality, and the marginal borrower who drops out would have lower intrinsic quality.

Moreover, the information asymmetries between borrower and lender may lead the lender to demand more collateral. However, this may also lead prospective borrowers who are good credit risk, and can afford the collateral, to withdraw from borrowing. The value of the collateral at stake may be too high to utilize it for borrowing (Boucher et al. 2008).

In addition to their lack of formally accepted collateral, the poor may withdraw from rural credit markets due to excessively high interest rates. Lenders may demand higher interest rates to compensate for default risk in the event that borrowers cannot provide collateral. This is exemplarily derived in Akerlof's groundbreaking theory (1970) on the market for lemons (Akerlof, 1970). According to Akerlof (1970), the fundamentally higher interest rates charged by moneylenders in rural India relative to banks in the central cities are seen as a driver of landlessness among many poor rural households in India. The moneylender only engages with clients when he can easily enforce repayment or when he has sufficient knowledge of the personal character traits of the potential client. The undersupply of formal rural financial institutions allows him to demand high interest rates¹. The high interest rates may in turn discourage adverse selection of borrowers, meaning that they may discourage the selection of potential risky borrowers. Consequently, poor rural households withdraw from borrowing from moneylenders, but high rates may also drive away households that are good credit risks.

In theory, the sheer absence of loan uptake does not prove a market failure. However, experimental interventions that increase credit supply report an increase in loan uptake. Banerjee et al. (2015a) find increased loan uptake in evaluations of microenterprises in India, and Karlan and Zinman (2010a) report such a result for the case of Manila, the Philippines. For consumer credit evaluations in South Africa, see Karlan and Zinman (2010b). Which mechanism is driving a market failure may depend on the context. It remains, e.g., a matter of debate whether adverse selection or moral hazard drives market failures.

The story of India's rural financial system is closely related to trial and error in fixing market failures. Our research enters at a moment, when a focus on the supply side and related market failures had served to substantially explaining credit market outcomes for the poor. Nevertheless, evidence from randomized control trials that remains inconclusive regarding microfinance's effects on welfare calls for further research to shed some light on how financial tools can address poverty (Banerjee et al., 2015b)². To complement the research conducted thus far on the supply side and market failures, we focus on the financial decision making of India's rural households.

¹ Note, that the article by Akerlof was published when the state-led intervention had just begun near the end of the 1960s, and thus poor rural borrowers had few alternatives to moneylenders.

² The studies described in Banerjee et al. (2015b) offer no conclusive results regarding microcredit's impact on microentrepreneurial activity, income composition, household consumption and female decision power.

1.3 Problem statement and research objectives

As outlined at the beginning, the problem of rural poverty persists in India. From a research perspective, we still do not know the extent to which a focus on financial decision making can contribute to a better understanding of poverty. We argue that this focus on financial decision making by rural households and individuals can shed light on the outcomes on the rural financial system and thus complement the research on the supply side. We first focus on the financial literacy of individuals and then on the control over financial resources within a household and elaborate on the importance of each factor for rural financial market outcomes.

Financial literacy describes the uptake and handling of financial information to undertake informed financial decisions (Cole et al., 2014; Lusardi & Mitchell, 2008; van Rooij, 2012). According to Lusardi and Mitchell (2014), financial literacy may be welfare enhancing. This is of particular importance in developing countries, where financial literacy can help to reduce a person's poverty through utilizing financial services in an informed manner.

To the best of our knowledge, the literature on financial literacy in the context of poverty remains scarce. In the presence of poverty, financial literacy may be disturbed by a tax on mental capacity. A tax on mental capacity can stem from circumstances that demand mental capacity. A household's financial obligations, e.g., education fees, health shocks or social events, may impose a tax on mental capacity (Mullainathan & Shafir, 2014).

The problem is that this tax demands relatively more mental capacity from poor than from non-poor individuals (Gennetian & Shafir, 2015). A poor person may be pressured when simultaneously exposed to several financial obligations, while a non-poor person could simply meet the obligations instantly by paying them off. This is not to say that non-poor persons are immune to the mental capacity tax. According to Mullainathan and Shafir (2014), a mental capacity tax can also stem, e.g., from time scarcity. However, when the tax stems from financial obligations, the poor are the ones affected.

The first research objective of this dissertation is to analyze the relationship between a mental capacity tax and financial literacy in the context of poverty.

Negatively affected financial literacy may have consequences for the outcomes of financial decisions and may thus hamper efforts to overcome poverty.

Second, we focus on loan control over financial resources and how it may influence the investment decisions of a household. SHGs that are exclusively available to women provide women with access to financial services. However, women who take loans through SHGs may not necessarily control the proceeds of these loans (Goetz & Gupta, 1996). Their male spouse could also control the borrowed funds. The consequences of such a development for investment decisions at the household level are unclear. Men and women invest differently (Pitt & Khandker, 1998; Menon et al., 2011). In rural India, agricultural investments may generate higher income for poor households. The likelihood of investing in agriculture, a male domain in India, may depend upon the person who controls the loan.

Moreover, analyzing loan control is important for a better understanding of the consequences for borrower women. When women lack loan control, while they nevertheless have to repay the loan, they can no longer utilize the borrowed money to generate the funds to repay the loan.

Our second research objective is to analyze a women's loan control over a loan taken in her name and its influence on a household's investment decisions.

1.4 Data and outline

The analyses of the objectives rely on a data set from India. We conducted a household survey and an experiment in India. Between February and May 2014, we surveyed 658 households in two sub-districts of Pune District in the State of Maharashtra, namely Junnar and Khed. The household questionnaire is attached in Appendix 4 of this dissertation.

Chapter 2 is titled *Implications of a tax on mental capacity and a financial incentive for financial literacy in the context of poverty: Evidence from India*. This study analyzes the extent to which a tax on mental capacity and a financial incentive can influence financial literacy using our experimental data. Our results are derived from comparisons between treatment and control groups.

In Chapter 3, titled *Women's loan control and the household's investment behavior: The case of women's Self-help group loans and agricultural investments in rural India*, we analyze the relationship between women's loan control over their SHG loans and the household's likelihood of investing the proceeds from that loan in agriculture. As Indian agriculture is a domain controlled by men, we test the relevance of women's loan

control for the household's decision on agricultural investment. We apply several econometric models to address this research objective.

Finally, in Chapter 4, we derive conclusions from our main findings and discuss policy recommendations and the limitations of our study. Moreover, suggestions for further research are outlined.

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CHAPTER 2

IMPLICATIONS OF A TAX ON MENTAL CAPACITY AND A FINANCIAL
INCENTIVE FOR FINANCIAL LITEARCY IN THE CONTEXT OF POVERTY:
EVIDENCE FROM INDIA³**Abstract**

Financial literacy is important for the ability to make informed financial decisions. However, in developing countries, poverty may correlate with discriminatory circumstances that may hamper financial literacy. In this article, we examine a factor, namely a tax on mental capacity, that plays a distinctive role for financial literacy in the context of poverty, relative to a situation in which poverty is absent. First, we provide experimental evidence showing that a tax on mental capacity will negatively affect the level of financial literacy among the poor. For the non-poor such a tax should have no effect. Second, a financial incentive will have a positive effect on the poor's (and non-poor's) level of financial literacy. The results imply that the poor's financial literacy may be reduced by a tax on mental capacity and, moreover, that inducing greater effort through a financial incentive seems to counteract this "loss" of financial literacy. Thus, policy makers in developing countries may face lower levels of financial literacy among the poor, a target group for, e.g., financial inclusion policies. However, the article further demonstrates that financial incentives can increase the level of financial literacy, what may serve to support measures, such as financial literacy trainings, intended to increase financial literacy.

Keywords: Financial literacy; mental capacity; financial incentive; poverty

³ This chapter is co-authored by Meike Wollni. The authors' contributions are as follows: In close cooperation with Meike Wollni, I conceptualized and designed the research and analyzed and interpreted the data. I conducted the survey and the experiment. I wrote a first draft and revised it in close cooperation with Meike Wollni.

2.1 Introduction

Financial literacy is described as the uptake and handling of financial information to undertake informed financial decisions (Cole et al. 2014; Lusardi & Mitchell 2008; van Rooij et al., 2012). The concept is relevant to, e.g., understanding an individual's performance in financial planning, wealth accumulation, debt management, or pensions (Lusardi & Mitchell, 2014). These are means for welfare improvement, and thus it is important to deepen the understanding of financial literacy.

For developing countries, the linkage between welfare improvements and financial literacy is of particular importance. In India, financial literacy is crucial, because policies to address poverty depend to a large extent on financial services, particularly on access to credit (Mahajan & Navin, 2013). The relationship between potential means of welfare improvements and financial literacy has received extensive scholarly attention (see, e.g., Behrman et al. 2012; Gaurav et al. 2011; Bruhn & Zia 2011; Cole et al. 2011; Drexler et al., 2014).

However in developing countries, financial literacy may be adversely affected by a tax on mental capacity. According to the scarcity theory of Mullainathan and Shafir (2014), poverty may lead to a tax on mental capacity. This article analyzes the implications of such a tax on mental capacity for financial literacy and, moreover, whether such a negative effect on financial literacy can be countered by a financial incentive that may positively affect financial literacy. Gaurav and Singh (2012) find that cognitive ability, measured using a test on mathematics and probability, is predictive of financial literacy for Indian farmers. This finding is similar to that of Agarwal and Mazumder (2013), who find that higher cognitive abilities are related to making fewer financial mistakes. Linking the literature on poverty and cognitive function, Mani et al. (2013) find that poverty impedes cognitive function. The fact of being poor acts as a tax on an individual's mental capacity. According to North (1992), individual mental capacity is limited. Thus, a tax on that mental capacity can hamper well-informed decision making. This may prevent individuals from undertaking informed financial decisions and thus make it more difficult for them to overcome poverty. Through an experiment, we test whether a tax on mental capacity negatively affects financial literacy. To the best of our knowledge, this relationship, despite its importance given its potential implications for individual welfare outcomes, remains unaddressed in the literature. Moreover, we test whether a financial incentive can counteract this negative effect on financial literacy.

Identifying ways to increase the level of financial literacy, especially in the context of poverty, can further inform our understanding of the potential incentive elements for policies intended to increase financial literacy. To test these hypotheses, we conducted a field experiment with microfinance client households in rural India.

Our sample consists only of households that have access to microfinance. The setting of our study stresses the importance of financial literacy, when access to financial services is already present. We argue that it is not sufficient for policies to merely focus on providing access to finance. Access to finance itself does not necessarily lead to improvements in welfare (Banerjee et al., 2015). Further, the potential effects of a tax on mental capacity and a financial incentive on financial literacy need to be better understood, especially when access to financial services exists.

In the following, the theoretical background and the research objectives will be outlined in Section 2.2. Section 2.3 describes the experimental design, Section 2.4 outlines the methodological approach, Section 2.5 presents the results, Section 2.6 discusses effects on mental capacity, Section 2.7 discusses potential implications of the results, and finally, Section 2.8 concludes.

2.2 Theoretical background and research objectives

The first research objective is to test whether financial literacy is negatively affected by a tax on mental capacity in the presence of poverty. We build on the scarcity theory of Mullainathan and Shafir (2014). According to their theory, scarcity in a specific domain, in our case scarcity of money, may impose a tax on mental capacity, meaning that less mental capacity is available for further well-informed decision making. In our context, the scarcity of money imposes particular concerns clustered around poverty. Meeting the obligations for, e.g., the children's education, health shocks, funerals or festivals impose a tax on the mental capacity of an individual affected by poverty. In general, exposure to concerns related to the examples above is not restricted to the poor. Such concerns may also demand mental capacity from those living in abundance. However, on average, those concerns – in the absence of emergencies – can be addressed sequentially (Gennetian & Shafir, 2015). Thus, the mental capacity needed to address the issues is not demanded at a single point in time. In contrast, those affected by a scarcity of money are simultaneously exposed to several concerns, thereby demanding mental capacity for, e.g., trading off which obligation to prioritize.

This article builds on the lessons of the relationship among poverty, cognitive function and financial literacy. To the best of our knowledge, the experimental literature on the relationship between poverty and financial literacy in the context of developing countries is scant. Mani et al. (2013) compare the impact of a tax on mental capacity treatment on measures of overall cognitive function among poor and non-poor respondents. They find a lower cognitive function for the poor. We bring the poverty-induced tax on mental capacity into perspective of financial literacy. Is financial literacy affected by the tax on mental capacity in the presence of poverty? If we assume that poverty impedes cognitive function through a tax on mental capacity and that only the “remaining” mental capacity (which is untaxed) can be devoted to financial literacy, is there a direct relationship between exposure to that tax and the observable level of financial literacy? This leads to our first hypothesis:

1. A tax on mental capacity negatively affects the financial literacy of the poor.

For the poor, a tax on mental capacity was triggered in our experiment through exposure to a (hypothetical) financial shock. The exposure to the shock triggered thoughts on the respondent’s own financial situation. These thoughts demanded additional mental capacity from the respondent, which left less mental capacity free for other tasks. Thus, we expect to observe lower performance on our measure of financial literacy among the poor who were exposed to the tax on mental capacity. For the non-poor, we do not expect the tax on mental capacity to be triggered, and thus, among the non-poor, the level of financial literacy should not differ between respondents who were exposed to a tax on mental capacity and those who were not exposed to it.

Our second objective is to extend the scope of our first objective. In the second objective, we also consider a financial incentive. What are potential approaches to counteract the tax on mental capacity? According to Gneezy et al. (2011), a financial incentive can induce greater effort by making the incentivized behavior more attractive in monetary terms. Oswald and Backes-Gellner (2014) find, e.g., that students who are offered financial incentives for better grades have, on average, better grade point averages in the first and second year. In this article, we follow Carpena et al. (2011) and introduce a financial incentive for financial literacy test participants. This leads to our second hypothesis:

2. A financial incentive increases the level of financial literacy by inducing greater effort.

2.3 Experimental design

We conducted a field experiment between February and May 2014 throughout a household survey in the State of Maharashtra, India. In two sub-districts of Pune District (Khed and Junnar), we visited 658 households. With the help of Chaitanya, a developmental organization from Maharashtra, membership lists for Self-help groups (SHGs) were accessed and member households were randomly chosen to participate in the experiment and the subsequent survey. We obtained SHG membership lists from the sub-districts of Khed and Junnar, which were then used to constitute the pool of households with access to financial services from which we drew the sample⁴. We obtained separate lists for Khed and Junnar; thus we choose households randomly from each of the two lists which yielded our complete sample of 658 households⁵. Chaitanya oversees SHGs that are exclusively for women, where savings can be accumulated and loans can be taken contracted on individual basis. As the sampled households have at least one female SHG member, these households have access to financial services.

Each household was visited individually. At each household's residence, the respondents were offered the opportunity to participate in the experiment. The assignment of each household to either the control group or one of the three treatment groups was performed *ex ante* to the experiment, based on the selected sample households from the SHG membership lists. Each respondent was instructed accordingly in the assigned treatment and then participated in a test on financial literacy.

The financial literacy test follows Carpena et al. (2011). We asked ten questions in three categories, namely financial awareness, financial attitudes/perceptions and financial numeracy⁶. We regard including financial awareness and attitudes/perceptions in addition to numeracy questions to capture a more appropriate concept of financial literacy, compared with questions based solely on numeracy as in, e.g., in Gaurav and Singh (2012), who employ six numeracy questions and one question on risk diversification to depict financial literacy. We extend financial literacy to cover important aspects such as awareness of budgeting or rates of financial services use. The context of the questions relates to the rural environment of the study area. For each correctly answered question, the respondent earned one point, leading to a maximum of

⁴ We are especially indebted to Ketki Sheth, who enabled us to draw a sample for the region of Junnar.

⁵ For the four experimental groups, we sought to obtain at least 150 households each. However, due to time and financial constraints the sample did not exceed 658 households.

⁶ See Appendix 2.1 for the financial literacy test.

ten points. This test serves directly to test our two hypotheses, outlined above.

In addition, we conducted a second test, administered immediately following the financial literacy test. The second test was a Raven's Matrices test to control for effects on our respondent's mental capacity after they participated in the financial literacy test, where they were exposed to a treatment. This is of particular importance for our hypothesis regarding the financial incentive. Does exposure to the financial incentive come at a cost in terms of forgone mental capacity? This cost would contradict the intention of employing financial incentives in measures with the aim of promoting financial literacy.

Each respondent's scores reflect the mental capacity still available after having participated in the financial literacy test. Thus, the Raven's Matrices test provides us with a measure of mental capacity. In principal, performance on any other task could serve as a measure of the remaining level of mental capacity after being exposed to the financial literacy test. The advantage of the Raven's Matrices test is its level of abstraction. It does not require language skills, nor does it assess knowledge learned beforehand. The test captures the capacity to think logically and to solve new problems (Engle et al. 1999).

We conducted a standard Raven's Matrices test with twelve items. Each item presents a graphic with a missing part. Below the graphic, multiple choices are provided from which the respondent chooses, one of which logically completes the depicted graphic. The maximum test score is equal to the number of items, twelve points.

The experimental treatments were differentiated in the following way:

1. Tax on mental capacity treatment

The respondents were instructed that they would complete a test on financial literacy. Further, they were instructed that they would be provided with a brief text before the test began. The text was read aloud to the respondents by the enumerator. They were further informed that they would be asked about their thoughts on that text. The text was a brief hypothetical scenario, in which the respondents were asked to imagine that they would need to pay a bill for a sudden emergency⁷.

The tax on mental capacity is pronounced in financial scenarios, meaning that it is necessary to expose subjects to a cost (Mullainathan and Shafir 2014). Moreover, Mani

⁷ For details see Appendix 2.2.

et al. (2013) show that a “harder” financial scenario has an even stronger impact on a test of cognitive functions. Our treatment, hypothetically, asks the respondent to immediately cover a bill of Rs. 50,000. For our sample, SHG-member households from India’s Maharashtra State, the latest poverty line refers to Rs. 11,604 per capita, annually (Government of Maharashtra, 2014). Thus, our scenario is primarily a financial scenario, and because the hypothetical bill equals approximately five times the prevailing poverty line, we consider it to be a “financially hard” scenario.

Moreover, an emergency – a severe road accident in our case – is not uncommon in the study area⁸. This familiarity with the scenario facilitates thoughts on similar real emergencies to which the respondent may have been exposed. Considering thoughts related to personal financial problems triggers a tax on mental capacity, which leads to worse performance on the financial literacy test. This is assumed to be a subconscious process for the respondent.

2. *Financial incentive treatment*

The respondents in the second treatment group were offered a financial incentive in their instructions prior to the financial literacy test. The respondents were informed that they would receive Rs. 100 if they responded correctly to at least eight out of ten questions in the financial literacy test. We choose eight out of ten correctly answered questions as the cutoff for the cash prize to avoid totally demotivating the respondents. Further, they were informed that their answers in the second test and the subsequent survey would not influence their chances of winning the Rs. 100. This chance was not conditional on the second test, as this second test only served to control for whether the financial incentive potentially acts as another tax on mental capacity, which would then recommend against using the financial incentive in policy applications.

The effect of a financial incentive depends on its magnitude (Rydval & Ortmann 2004). In our sample, the daily wage for working on another’s farm equals approximately Rs. 150. At roughly 2/3 of the daily farm wage, we consider our incentive level to be sufficient. The respondents could earn it with relatively little cost in terms of time, compared to an entire day’s work on a farm. Finally, the respondents were instructed that the number of correct answers would be calculated immediately after the completion of the survey and that the payout would be done immediately in case of

⁸ In 2013 in the State of Maharashtra, the percentage of persons killed per road accident is 19.7% (Government of Maharashtra 2014). In Germany, for comparison, the rate in the same year is 0.1% (Statistisches Bundesamt 2015).

success.

3. *Financial incentive plus tax on mental capacity treatment (double treatment)*

In this combined treatment, the respondents were also offered a financial incentive in their instructions prior to the financial literacy test. The respondents faced the same conditions for the incentive as the respondents in the second treatment group. The difference from the second treatment group was that the respondents in the third treatment were also informed that they would be provided with a brief text, prior to the test, on which they were asked to give their thoughts. These were the same conditions faced by the respondents in the first treatment group.

4. *Control group*

The control group respondents were simply first asked to participate in the financial literacy test and directly thereafter in the Raven's Matrices test.

For the experiment to begin, first a respondent was identified in the household and asked to sit aside with the enumerator to ensure an undisturbed environment during the test phase. In 96% of the households, the respondent was the SHG member woman. The respondent was instructed according to one of the treatments and subsequently participated in the financial literacy test and the Raven's Matrices test. Neither test had a time limit. When the respondent did not know the answer to a question, the enumerator offered to skip the question and continue with the next. The respondents were then not allowed to reconsider skipped questions.

2.4 Methodological approach

To test the hypotheses, we introduce a poverty measure, which classifies each sample household as either poor or non-poor. After dividing the sample into poor and non-poor respondents, we compare the test score on the financial literacy test between the poor and non-poor groups. We apply t-test comparisons, complemented by Poisson regressions as robustness checks. We apply a Poisson regression due to the count data nature of our financial literacy test score, which is restricted to whole numbers between zero and ten. In addition to the comparison of the financial literacy test, we provide comparisons of the Raven's Matrices test to control for potential influences of the treatments on mental capacity.

To divide the sample into poor and non-poor respondents we draw on income data from

the respondent's household. The survey provides us with the total annual net per capita household income. We aggregate the income from selling agricultural and livestock produce, from wage income, from self-employment and from other income sources⁹. We adjust our income measure by applying OECD adult equivalents to account for scale effects within a household¹⁰. Then, we apply the official poverty line of Maharashtra State of Rs. 11,604 per capita per year for the years 2011 to 2012 (Government of Maharashtra, 2014). Out of the total sample, 658 observations, this division leaves us with 262 observations (39.8%) classified as poor and 396 observations (60.2%) classified as non-poor.

The sample's distribution with respect to financial literacy test performance is shown in Figure 1. Figure 1 consists of three graphs. In graph 1.1, the distribution of the financial literacy test performance is shown for the full sample, in graph 1.2, the data are restricted to the poor sub-sample, and in graph 1.3, the data are provided only for the non-poor sub-sample.

The results for the t-test comparison of the financial literacy test scores will be provided in the results section below. They will be accompanied by robustness checks in the form of Poisson regressions. The Poisson estimation relies on the Poisson distribution.

We adapt the following form, similar to Wooldridge (2003):

$$P(Y_i = j) = \frac{e^{-\lambda_i} \lambda_i^j}{j!}, \quad j = 0, 1, 2, \dots, m. \quad (1)$$

We depict $P(Y_i = j)$, the probability that the variable Y_i takes value j for respondent i . The maximum value of j is $m = 10$ for our financial literacy test. The denominator depicts $j!$, j factorial. The distribution depends on the parameter λ , which is the arithmetic mean number of incidents described by j .

⁹ Income from agricultural and livestock produce, as well as income from self-employment, is net of production cost. The category "other" includes income from government schemes, remittances and rents from land, buildings, etc.

¹⁰ For an application, see Klasen (2000): Instead of dividing the total household income by household size, each household member is counted as 0.5 if the member is aged below 17 and as 0.7 when aged 17 or older. The first adult receives an additional weight of 0.3.

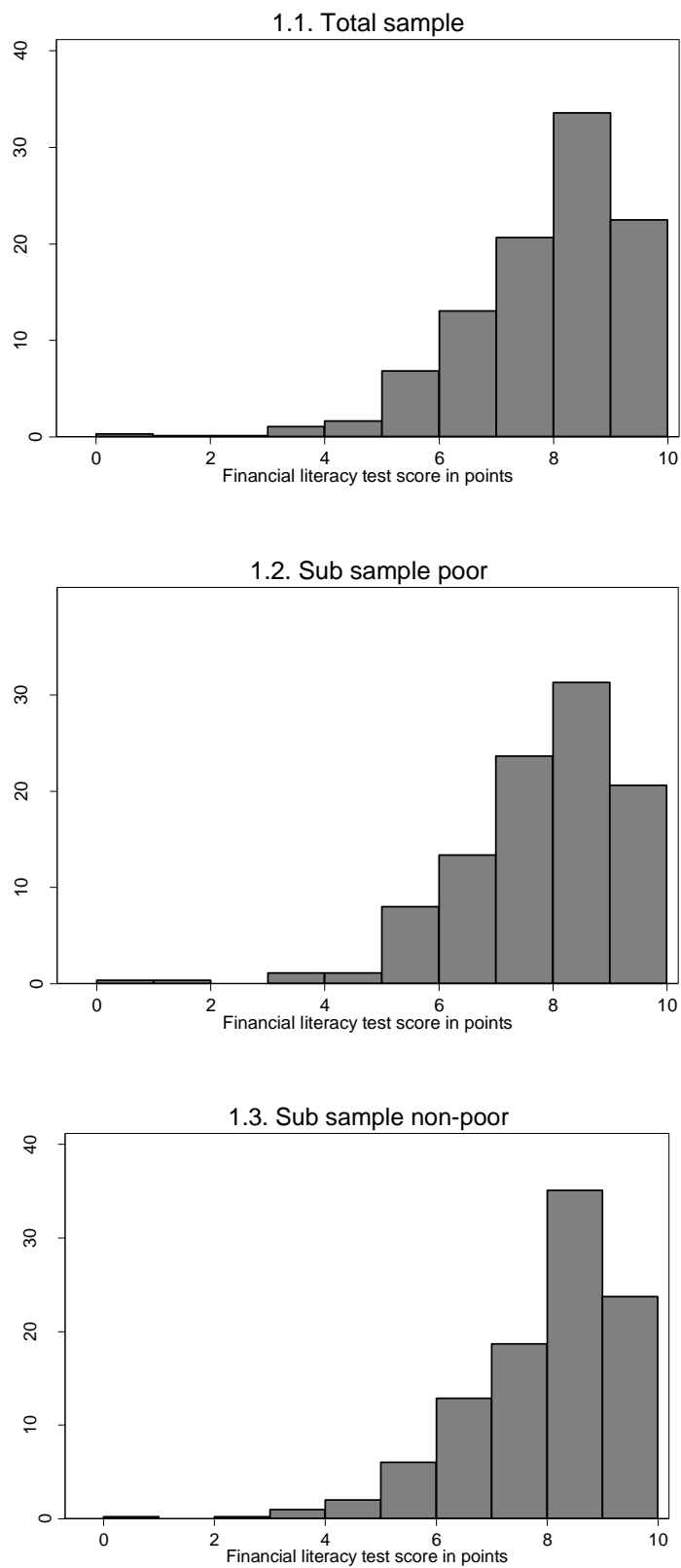


Figure 1. *Financial literacy test performance – descriptive statistics.* Source: Own household survey data.

The Poisson regression function follows a Poisson distribution error term structure and can be captured in the following way according to Coxe et al. (2009):

$$\ln(\lambda_i) = \alpha + \beta X_i + \varepsilon_i, \quad (2)$$

where \ln depicts the natural log and λ_i the predicted count, conditional on the given values of X_i , which is a vector of variables. The model also includes the constant α and the error term ε_i . We specify two regressions for our count data outcome, namely the score on the financial literacy test:

$$\begin{aligned} \ln(fl - score_i) = & \alpha^{poor} + mc\ tax_i \beta_1^{poor} + fin.\ inc_i \beta_2^{poor} \\ & + mc\ tax\ plus\ fin.\ inc._i \beta_3^{poor} + \varepsilon_i^{poor} \end{aligned} \quad (3)$$

$$\begin{aligned} \ln(fl - score_i) = & \alpha^{non-poor} + mc\ tax_i \beta_1^{non-poor} + fin.\ inc._i \beta_2^{non-poor} \\ & + mc\ tax\ plus\ fin.\ inc._i \beta_3^{non-poor} + \varepsilon_i^{non-poor} \end{aligned} \quad (4)$$

Equation (3) depicts the outcome variable of the financial literacy test in the poor sub-sample, $fl - score_i$, and the three treatment dummies: $mc\ tax$, $fin\ inc.$ and $mc\ tax\ plus\ fin.\ inc.$. The variables measure the tax on mental capacity, the financial incentive and the double treatment of a tax on mental capacity plus the financial incentive, respectively.

Equation (4) depicts again the outcome variable of the financial literacy test, $fl - score_i$, but for the non-poor sub-sample. The three treatment dummies, $mc\ tax$, $fin\ inc.$ and $mc\ tax\ plus\ fin.\ inc.$, are again included, as in Equation (3).

In addition to the above-presented basic regression specifications, we will include specifications, in which we control for potential differences across the four experimental groups. In these specifications, we include variables for which the t-test results in Table 3 (see the preceding page) show differences across the experimental groups.

Table 3. Pairwise t-test comparisons among experimental groups

	Control group	Treatment 1: mental capacity tax	Treatment 2: Financial incentive	Treatment 3: mental cap. tax and fin. incentive	Difference Control group and Treatment 1	Difference Control group and Treatment 2	Difference Control group and Treatment 3	Difference Treatment 1 and Treatment 2	Difference Treatment 1 and Treatment 3	Difference Treatment 2 and Treatment 3
Age in years	42.988	43.210	43.829	42.938	-0.22	-0.84	0.05	-0.62	0.27	0.89
Male Dummy	0.054	0.045	0.085	0.025	0.01	-0.03	0.03	-0.04	0.02	0.06**
Being married Dummy	0.899	0.863	0.896	0.832	0.04	0.00	0.07*	-0.03	0.03	0.06*
Completed primary school Dummy	0.704	0.719	0.689	0.735	-0.01	0.02	-0.03	0.03	-0.02	-0.05
Completed secondary school Dummy	0.491	0.556	0.476	0.525	-0.07	0.02	-0.03	0.08	0.03	-0.05
Completed highschool Dummy	0.213	0.263	0.256	0.259	-0.05	-0.04	-0.05	0.01	0.00	-0.00
Scheduled caste Dummy	0.047	0.063	0.037	0.080	-0.02	0.01	-0.03	0.03	-0.02	-0.04*
Other backward class Dummy	0.201	0.188	0.274	0.216	0.01	-0.07	-0.01	-0.09*	-0.03	0.06
Scheduled Tribes Dummy	0.178	0.131	0.122	0.117	0.05	0.06	0.06	0.01	0.01	0.00
General caste Dummy	0.533	0.600	0.518	0.574	-0.07	0.01	-0.04	0.08	0.03	-0.06
Muslim Dummy	0.036	0.037	0.073	0.093	-0.00	-0.04	-0.06**	-0.04	-0.06**	-0.02
No. of household members	4.828	4.194	4.287	4.759	0.63***	0.54**	0.07	-0.09	-0.57**	-0.47**
Farmer Dummy	0.663	0.662	0.561	0.586	0.00	0.10*	0.08	0.10*	0.08	-0.03
Crop sales Dummy	0.367	0.306	0.238	0.259	0.06	0.13**	0.11**	0.07	0.05	-0.02
Wage labor Dummy	0.675	0.644	0.652	0.716	0.03	0.02	-0.04	-0.01	-0.07	-0.06
Self-employment Dummy	0.112	0.131	0.128	0.086	-0.02	-0.02	0.03	0.00	0.04	0.04
Livestock sales Dummy	0.195	0.200	0.220	0.265	-0.00	-0.02	-0.07	-0.02	-0.07	-0.05
Income from other sources Dummy	0.041	0.044	0.085	0.068	-0.00	-0.04*	-0.03	-0.04	-0.02	0.02
Land owned in acres	2.099	1.559	1.242	1.768	0.54*	0.86***	0.33	0.32	-0.21	-0.53**
Observations	165	157	164	161						

Source: Author's estimation based on survey data.

Significance levels are as follows: *** p<0.01, ** p<0.05, * p<0.1.

2.5 Results

The mean comparisons of the financial literacy test scores are provided in the following. The results are presented in Table 4. We focus on the poor sub-sample. We find that the respondents in the *Mental capacity tax treatment* score significantly lower than the *Control group*, by approximately 0.5 points. The respondents in the *Financial incentive treatment* score significantly higher compared to the *Control group*, by approximately 0.4 points. The third treatment, the double treatment of *Mental capacity tax and financial incentive* shows no significant difference from the *Control group*. Further, for the poor, the coefficient of the third treatment, the double treatment of *Tax on mental capacity and financial incentive*, seems to be a net effect of the two single treatments, namely *Tax on mental capacity* and *Financial incentive*. The difference from the *Control group* is approximately 0.2. In this treatment, the respondents scored lower than the *Control group*, but not as much lower like the respondents in the *Mental capacity tax treatment* (0.5) do in comparison to the *Control group*. Nevertheless, the double treatment's difference from the *Control group* remains insignificant. For comparative

Table 4. *T-test comparison financial literacy test score*

	Control group	Treatment 1: Mental capacity tax	Treatment 2: Financial incentive	Treatment 3: Mental capacity tax plus financial incentive (double treatment)
	(1)	(2)	(3)	(4)
Sub-sample Poor				
Financial literacy test score	7.42 (1.06)	6.90** (1.39)	7.83** (1.30)	7.18 (1.95)
Observations	71	63	60	67
Sub-sample Non-poor				
Financial literacy test score	7.10 (1.36)	7.43* (1.29)	7.77*** (1.48)	7.74*** (1.55)
Observations	98	97	104	95

Source: Author's estimation based on survey data.

Mean values are shown with standard deviation in parentheses. Each treatment group is compared to the Control group. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

reasons, the treatment effects for the non-poor sub-sample are also provided. The *Mental capacity tax treatment* shows no negative effect here; instead respondents in the *Mental capacity tax treatment* score higher than the *Control group*, and the differences is slightly significant. The effects of the *Financial incentive treatment* and the *double treatment* are similar: The respondents in these two treatments score significantly higher than the *Control group*, by approximately 0.7 points and 0.6 points, respectively.

To control for potential bias in our estimated effects, stemming from differences across

the four experimental groups, we apply a Poisson regression. The Poisson regression output is attached in Appendix 2.3. Here, we refer to Table 5, which provides the marginal effects (at means) of the Poisson estimates. The marginal effects in Table 5 use the same scale as the differences in the t-test results from Table 4, thereby facilitating the comparison of our treatment effects.

In Table 5, we provide the marginal effects from six regression specifications. Specifications (1) and (2) include only the three treatment dummies, separately for the poor and non-poor sub-samples. In specifications (3) to (6), we add variables to control for differences across the four experimental groups. In specifications (3) and (4), we only include the sociodemographic controls, whereas in specifications (5) and (6), we also include controls related to income.

The effect of the *Tax on mental capacity treatment* confirms the results from the t-test comparison, provided in Table 4: For the poor sub-sample, the respondents in the *Tax on mental capacity treatment group* score significantly lower than those in the *Control group*, by approximately 0.5 points. This effect remains stable across all specifications for the poor sub-sample, specifications (1), (3) and (5). The effect of the *Financial incentive treatment* also remains stable for the poor sub-sample across specifications (1), (3) and (5). The effect size (ca. 0.4) is again of similar magnitude to the result from the t-test comparison.

Moreover, specifications (3) and (5) show that for the poor sub-sample, being male is associated with weaker performance on the financial literacy test. Overall, for the poor sub-sample, the regressions show similar results to the t-test comparisons. For the non-poor sub-sample – specifications (2), (4) and (6) – the regressions also confirm the results from the t-test: The *Tax on mental capacity treatment* shows no negative effect on financial literacy test performance, and both the *Financial incentive treatment* and the *double treatment* show a positive effect, of similar magnitude, on financial literacy test performance.

We cannot exclude the possibility that endogeneity in the control variables may bias our treatment effects in the regression specifications. In particular, the income-related controls might lead to biased effects. Activities, such as selling crops or receiving income from other sources may influence the level of financial literacy. However, throughout all regression specifications, the treatment effects confirm the results from the t-test comparisons. Thus, we can confirm our hypotheses, namely that for the poor, a

tax on mental capacity negatively affects the level of financial literacy and that a financial incentive positively influences the level of financial literacy, for the poor and the non-poor alike.

Table 5. *Financial literacy test scores – Marginal effects (at means) of Poisson estimates*

	Treatment effects		Randomization control – only socioeconomic variables		Randomization control – only socioeconomic and income-related variables	
	Poor (1)	Non-Poor (2)	Poor (3)	Non-Poor (4)	Poor (5)	Non-Poor (6)
Tax on mental capacity Dummy	-0.510 (2.31)**	0.407 (1.96)*	-0.504 (2.26)**	0.327 (1.62)	-0.537 (2.36)**	0.320 (1.58)
Financial incentive Dummy	0.414 (2.07)**	0.738 (3.47)***	0.421 (2.07)**	0.674 (3.30)***	0.362 (1.72)*	0.680 (3.27)***
Tax on mental capacity and financial incentive Dummy	-0.224 (0.83)	0.707 (3.18)***	-0.265 (0.94)	0.642 (3.01)***	-0.301 (1.05)	0.652 (3.08)***
Male Dummy			-0.764 (2.56)**	-0.093 (0.25)	-0.750 (2.54)**	-0.128 (0.34)
Being married Dummy			-0.358 (1.11)	0.332 (1.54)	-0.315 (0.96)	0.330 (1.52)
Muslim Dummy			0.071 (0.16)	-0.122 (0.59)	0.013 (0.03)	-0.183 (0.85)
Scheduled caste Dummy			-0.606 (1.50)	-0.378 (1.18)	-0.568 (1.35)	-0.376 (1.19)
Other backward class Dummy			0.230 (1.09)	0.184 (1.04)	0.207 (0.98)	0.184 (1.01)
No. of household members			0.016 (0.42)	0.039 (1.18)	0.034 (0.81)	0.036 (1.09)
Farmer Dummy					0.052 (0.18)	-0.032 (0.16)
Crop sales Dummy					-0.034 (0.18)	0.018 (0.08)
Income from other sources Dummy					0.170 (0.61)	-0.466 (1.21)
Land owned in acres					-0.057 (1.22)	-0.033 (0.86)
Observations	262	396	261	389	261	388

Source: Author's estimation based on survey data.

Standard errors in parentheses.

Significance levels refer to: *** p<0.01, ** p<0.05, * p<0.1.

The number of observations within the same subsample specification differs due to missings in the data.

2.6 Controlling for effects on mental capacity

In the following, we test whether the results from Section 2.5 have implications for the mental capacity of the respondents. The focus is on the *Financial incentive treatment* for the poor sub-sample. In Section 2.5, we report the result that the financial incentive positively affects the level of financial literacy among the poor. However, this finding is only worthy of consideration for policy applications if it does not negatively affect the respondent's mental capacity. If the financial incentive includes greater effort, does it require more self-control from the respondent, in turn requiring a higher share of mental capacity? According to Spears (2011), poverty can lead to diminished behavioral control. Similarly, Vohs (2013) argues that if one continuously exercises self-control, one approaches a point at which self-control can no longer be maintained. It is argued

that poverty exerts particular demands on a person's self-control, and thus a poor person is more likely to lose self-control "faster" than a non-poor person.

Table 6 provides the t-test comparison for the Raven's Matrices test score, our measure of mental capacity. It reveals no significant negative effect of the *Financial incentive treatment* for the poor sub-sample. The average respondent score in that treatment is even higher than that in the *Control group*. Thus, we find that exposure to the financial incentive does not demand further mental capacity from the poor. See Appendix 2.4 for a Poisson regression as robustness check.

Table 6. *T-test comparison Raven's Matrices test score*

	Control group	Treatment 1: Mental capacity tax	Treatment 2: Financial incentive	Treatment 3: Mental capacity tax plus financial incentive (double treatment)
	(1)	(2)	(3)	(4)
Sub-sample Poor				
Raven's Matrices test score	7.08 (2.06)	6.75 (1.90)	7.72* (2.25)	6.90 (2.13)
Observations	71	63	60	67
Sub-sample Non-poor				
Raven's Matrices test score	7.20 (2.05)	7.35 (2.32)	7.40 (2.04)	7.47 (2.13)
Observations	98	97	104	95

Source: Author's estimation based on survey data.

Mean values are shown with standard deviation in parentheses. Each treatment group is compared to the Control group. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.7 Discussion and policy implications

The contribution of this article is twofold. First, we find evidence of a causal link between a tax on mental capacity and financial literacy. We find that, in the context of poverty, financial literacy is negatively affected by a tax on mental capacity. Second, we provide evidence for a positive influence of a financial incentive on the level of financial literacy. The effect holds for the poor and non-poor alike. The results imply that although the poor's financial literacy seems to be negatively affected by a tax on mental capacity, it can also be positively affected by a financial incentive. The financial incentive thus has the potential to compensate for the forgone financial literacy imposed by the tax on mental capacity. Furthermore, we are able to confirm that the financial incentive does not negatively affect overall mental capacity and thus does not translate into a further tax on mental capacity.

The policy implications of our findings are twofold. First, in line with the World Bank (2015), we agree that policies might have a greater impact if one acknowledges that poverty can act as a tax on mental capacity and that, consequently, the target population is assisted in making financial decisions. Assistance can, e.g., be provided in decisions regarding the timing of taking a loan, the loan volume, the number of parallel loans, the source of the loan, and so forth. Financial decisions may promote poverty reduction when competent assistance is made available to individuals with relatively lower financial literacy in poor regions. An example of a problem for individuals with low financial literacy is provided by Beck et al. (2005), who show that bank paperwork can pose an obstacle to clients. If a tax on mental capacity prevents the target population from properly completing a required enrolment form, a person who assists in completing the form can significantly improve the proper use of financial services.

Second, in addition to acknowledging taxes on mental capacity and the resulting need to assist those who are affected, we suggest that it is worth exploring going beyond assistance and to increase the level of financial literacy of those affected by such mental burdens. We do not suggest that the only thing poor people require is a financial incentive to obtain the financial literacy necessary to undertake decisions that shape their path out of poverty. We do find, however, that one means of counteracting the tax on mental capacity, namely a financial incentive, can be beneficial for poor individuals affected by the tax. One possible field of application is financial literacy training. Here, Cole et al. (2011), among others, show that subsidizing bank accounts can increase demand for such accounts and that financial literacy training is unable to increase bank account demand. Doi et al. (2014) find that the effect of financial literacy training on financial knowledge, behavior and savings varies according to the composition of the participant group. Their experiment grouped migrants and their family members in different ways. Drexler et al. (2014) find that simplified rule-of-thumb training is superior to standard accounting training. The rule-of-thumb training improved a firm's financial practices, objective reporting quality, and revenues. The standard accounting training did not affect these outcomes. Bruhn et al. (2014) test the effect of financial incentives, offered to potential participants beforehand, on the uptake of a financial literacy education program. We suggest exploring whether such trainings are more successful in increasing financial literacy when incorporating financial incentives for, e.g., achieving certain learning goals during the trainings.

Moreover, conditional cash-transfer systems can potentially lead to increases in financial literacy. In such systems, conditional on fulfilling a target, a person receives cash¹¹. The money can be used to meet financial obligations. Poor persons in particular may experience relief if some of their pressing financial obligations are met. Thus, their mental capacity may be less taxed and their financial literacy less affected. In turn, they would be better able to undertake financial decisions to overcome poverty. Hence, we argue for conditional cash-transfer systems as a potential means to promote financial literacy among the poor.

2.8 Conclusion

This article provides experimental evidence that a tax on mental capacity and a financial incentive have effects on financial literacy. We suggest that outcomes of financial decisions can be better understood if the tax on mental capacity, stemming from poverty, and the potential for financial incentives are taken into account. Our findings only allow limited generalization, as we only report results from a particular sample at one point in time. Further research is necessary to test the robustness of our findings over time and in other regions.

Moreover, the responsiveness of respondents with respect to the treatment design needs to be elicited in further studies. For example, does the treatment effect of the financial incentive vary when the financial incentive is lowered or increased? Similarly, variation in the treatment of the tax on mental capacity needs to be studied further to elucidate lower and upper bounds of our effect.

Nevertheless, this article contributes to explaining the importance of two particular factors that influence financial literacy, an important means of welfare development, particularly in the developing world.

¹¹ See, e.g., Barrera-Osorio et al. (2011) for a study on conditional cash transfer systems.

2.9 References

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Appendix 2.1: Financial literacy test

Our financial literacy test closely follows the questions from Carpena et al. (2011). We use the following questions:

I. Basic Financial Awareness

1. Shantiben is preparing a budget for her household. Which of the following needs to be included in the budget?
 - A. Income only
 - B. Expenses only
 - C. Both
 - D. Don't know

2. Do you think you can open a savings account in a bank with amount as low as Rs. 500?
 - A. Yes
 - B. No
 - C. Don't know

3. Sukhiben's expenses are more than her income. Her friend Najmabanu tells her that writing a budget can help bring down her unnecessary expenses. Do you agree with Najmabanu or not?
 - A. Yes
 - B. No
 - C. Don't know

4. Iqbalbhai is 20 years old and Ashokbhai is 30 years old. If they were to buy life insurance for 20 years, who between the two to your mind will have to pay higher premium?
 - A. 20 year old Iqbalbhai will have to pay a higher premium
 - B. 30 year old Ashokbhai will have to pay a higher premium
 - C. Don't know

II. Financial Attitudes and Perceptions

1. Rameshbhai does plastering on tall buildings. It is a dangerous job and he is worried that if he gets injured his family's income will become inadequate to meet their needs. If Rameshbhai comes to you for advice what would you suggest?

- A. Quit job
- B. Purchase health/life/ accident insurance
- C. Increase savings
- D. Don't know

2. Nareshbhai currently drives a rented auto rickshaw. Driving the auto rickshaw will definitely be a profitable business in the coming years in Nareshbhai's city. He wants to purchase his own auto rickshaw but does not have the money and is considering taking out a loan for the same. If Nareshbhai comes to you for advice what will you suggest – should he take out a loan or should he not?

- A. Yes
- B. No
- C. Don't know

3. Sajidbhai recently got married. He and his wife are considering buying a TV. They do not have enough savings and will need to take out a loan. Sajidbhai has two options: (1) He can take a loan from the moneylender and a relative and get a bigger amount in loan to buy a big TV, or (2) He can take a loan only from a relative and buy a smaller TV.

What would you advise Sajidbhai and his wife?

- A. Take loans from the moneylender and a relative and buy a big TV
- B. Take a loan only from the relative and buy a smaller TV
- C. Don't know

III. Financial Numeracy Skills

1. Suppose you had Rs. 50 to save. You could either save this for 1 month in an account which earns 2 percent interest per month, or save it for 1 month in an account that earns 0.75 percent interest per week.

Which would you choose?

- A. 2 percent per month
- B. 0.75 percent per week
- C. Don't know

2. Assume you have purchased a medical insurance policy and suffer an accident which results in Rs. 3,500 of hospital fees. Would you be better off if you had purchased an insurance policy with

- A. Rs. 3,000 cover and Rs. 950 premium
- B. Rs. 2,800 cover and Rs. 900 premium
- C. Don't know

3. We would like to tell you a short story about the income and expenditures of a tailor. We would then like you to use this sheet on the next page to determine if in a month, this tailor is saving money or if his monthly expenditures exceed his monthly income.

Jerembhai is a tailor in Vasna. Each week he makes Rs. 1,500 from his work. He also sells the scraps from his work, for this he earns Rs. 200 each week. Each month Jerembhai must pay Rs. 1,000 for the rent of his shop. He also spends Rs. 200 per week on his food and household goods. In addition to this he spends about Rs. 50 per week on tea and snacks. He must pay Rs. 500 each month for the education expenses of his children. Some time ago, Jerembhai took a loan to purchase his sewing machine. He pays an installment of Rs. 250 each week for this loan. He also pays Rs. 150 per month for a life insurance policy.

- A. Expenditures exceed income
- B. Income exceeds expenditures
- C. Don't know

Appendix 2.2: Treatment instructions for the tax on mental capacity treatment

Test Instructions

For enumerator: Sit directly next to the respondent and read the following

1. This is a 10-question test on financial literacy
2. I will sit next to you and read every question to you
3. If you have clarification questions please ask me
4. I will not give you any help in answering the questions
5. When you have fully understood the question, tell me the answer [mark the answer on the sheet]
6. After you have answered the question, we will proceed to the next question
7. Once we proceed, we can't return back
8. If you don't know the answer and want to go to the next question tell me
9. Do you have any questions before we start?
10. For the duration of the test, nobody will interrupt us; please ensure a undisturbed condition now
11. Before we proceed to the test questions, I will read to you a short text and ask you to give your considerations on that
12. Now we start the test

Financial Considerations

I will now read the following text to you, please take your time understanding it carefully. I can also repeat.

1. Imagine that through a road accident your aunt is hit hard.
2. She is immediately brought to the closest hospital.
3. The treatment requires your household an immediate expense of Rs. 50,000.
4. Are there ways in which you may be able to come up with that amount of money on a very short notice?
5. How would you go about it?
6. Would it cause you long lasting financial hardship?
7. Would it require you to make sacrifices that have long term consequences?
8. If so, what kind of sacrifices?
9. Please now note down your considerations here! Tell me when you are ready, latest after 10 minutes we continue.

Appendix 2.3: Financial literacy test score – Poisson estimates

VARIABLES	Treatment effects		Randomization control – only socioeconomic variables		Randomization control – only socioeconomic and income-related variables	
	Poor (1)	Non-poor (2)	Poor (3)	Non-poor (4)	Poor (5)	Non-poor (6)
Tax on mental capacity Dummy	-0.0696** (0.0303)	0.0543* (0.0278)	-0.0688** (0.0306)	0.0435 (0.0268)	-0.0733** (0.0312)	0.0426 (0.0270)
Financial incentive Dummy	0.0565** (0.0273)	0.0986*** (0.0285)	0.0575** (0.0277)	0.0898*** (0.0272)	0.0494* (0.0286)	0.0905*** (0.0277)
Tax on mental capacity and financial incentive Dummy	-0.0307 (0.0370)	0.0944*** (0.0297)	-0.0362 (0.0386)	0.0854*** (0.0283)	-0.0411 (0.0392)	0.0869*** (0.0282)
Male Dummy			-0.104** (0.0407)	-0.10123 (0.0503)	-0.102** (0.0403)	-0.10171 (0.0501)
Being married Dummy			-0.0488 (0.0440)	0.0442 (0.0287)	-0.0430 (0.0451)	0.0439 (0.0288)
Muslim Dummy			0.00975 (0.0607)	-0.0162 (0.0275)	0.00175 (0.0619)	-0.0244 (0.0285)
Scheduled caste Dummy			-0.0828 (0.0554)	-0.0503 (0.0425)	-0.0775 (0.0576)	-0.0500 (0.0420)
Other backward class Dummy			0.0315 (0.0289)	0.0245 (0.0237)	0.0283 (0.0288)	0.0245 (0.0242)
No. of household members			0.00220 (0.00526)	0.00518 (0.00442)	0.00464 (0.00572)	0.00485 (0.00445)
Farmer Dummy					0.00708 (0.0389)	-0.00429 (0.0277)
Crop sales Dummy					-0.00468 (0.0266)	0.00245 (0.0303)
Income from other sources Dummy					0.0232 (0.0383)	-0.0620 (0.0512)
Land owned in acres					-0.00774 (0.00634)	-0.00437 (0.00508)
Constant	2.002*** (0.0170)	1.952*** (0.0216)	2.042*** (0.0474)	1.900*** (0.0373)	2.039*** (0.0514)	1.914*** (0.0355)
Observations	262	396	261	389	261	388
LR Chi2	15.51	14.77	28.47	21.87	31.86	24.85
Prob < Chi2	0.0014	0.0020	0.0008	0.0093	0.0025	0.0241
Pseudo R-squared	0.0035	0.0028	0.0058	0.0034	0.0062	0.0040

Source: Author's estimation based on survey data; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; The number of observations within the same sub-sample specification differs due to missings in the data.

Appendix 2.4: Raven's Matrices test score – Poisson estimates

VARIABLES	Treatment effects		Randomization control – only socioeconomic variables		Randomization control – only socioeconomic and income-related variables	
	Poor (1)	Non-poor (2)	Poor (3)	Non-poor (4)	Poor (5)	Non-poor (6)
Tax on mental capacity Dummy	-0.0468 (0.0490)	0.0305 (0.0438)	-0.0411 (0.0492)	0.0179 (0.0440)	-0.0510 (0.0482)	0.0183 (0.0439)
Financial incentive Dummy	0.0876* (0.0505)	0.0377 (0.0403)	0.0715 (0.0496)	0.0274 (0.0398)	0.0547 (0.0482)	0.0319 (0.0401)
Tax on mental capacity and financial incentive Dummy	-0.0249 (0.0507)	0.0471 (0.0419)	-0.0215 (0.0514)	0.0407 (0.0415)	-0.0327 (0.0506)	0.0426 (0.0417)
Male Dummy			0.0487 (0.0682)	0.0636 (0.0880)	0.0430 (0.0645)	0.0600 (0.0882)
Being married Dummy			-0.0177 (0.0682)	0.00188 (0.0441)	-0.00206 (0.0702)	-0.00512 (0.0443)
Muslim Dummy			0.0125 (0.0762)	-0.0585 (0.0470)	0.0212 (0.0804)	-0.0465 (0.0491)
Scheduled caste Dummy			-0.163* (0.0934)	0.0408 (0.0705)	-0.139 (0.0989)	0.0432 (0.0726)
Other backward class Dummy			0.0801* (0.0416)	-0.0162 (0.0395)	0.0781* (0.0404)	-0.0133 (0.0397)
No. of household members			-0.00202 (0.00800)	-0.00217 (0.00873)	0.00241 (0.00796)	-0.00455 (0.00938)
Farmer Dummy					0.0478 (0.0627)	0.00525 (0.0401)
Crop sales Dummy					-0.0190 (0.0393)	0.0199 (0.0488)
Income from other sources Dummy					0.105 (0.0839)	-0.0192 (0.0605)
Land owned in acres					-0.0124 (0.0120)	0.00408 (0.00588)
Constant	1.956*** (0.0340)	1.964*** (0.0300)	1.971*** (0.0787)	1.985*** (0.0573)	1.929*** (0.100)	1.985*** (0.0593)
Observations	262	396	261	389	261	388
LR Chi2	7.68	1.42	16.80	3.42	20.36	6.05
Prob < Chi2	0.0531	0.7005	0.0519	0.9452	0.0867	0.9443
Pseudo R-squared	0.0040	0.0005	0.0094	0.0012	0.0111	0.0017

Source: Author's estimation based on survey data; Robust standard errors in parentheses; ***, ** p<0.01, * p<0.05, * p<0.1; The number of observations within the same sub-sample specification differs due to missings in the data.

CHAPTER 3

WOMEN'S LOAN CONTROL AND THE HOUSEHOLD'S INVESTMENT
BEHAVIOR: THE CASE OF WOMEN'S SELF-HELP GROUP LOANS AND
AGRICULTURAL INVESTMENTS IN RURAL INDIA¹²**Abstract**

Self-help groups (SHGs) have substantially increased access to credit. In particular, rural India has witnessed a tremendous increase in access to credit for women through SHGs. However, access to and control over credit are not synonymous, and it is not necessarily the case that SHG member women enjoy both. We explore the relevance of SHG member women's level of loan control for their household's investment decisions. We study the case of agricultural investments, a male domain in India. Due to its productive nature, agricultural investment promises welfare improvements for the investing households. We find that the likelihood of investing the funds from an SHG loan in agriculture decreases with increasing loan control by women over their SHG loans. The implications of that inverse relationship are twofold. First, with a decreasing level of women's loan control, the households are more likely to invest in a domain over which the women have no say. The women bear the responsibility for repaying the loan but can no longer control the borrowed sum anymore to generate the funds for repayment. This may impede their ability to repay the loan to the SHG. Second, the lent funds nevertheless flow into a productive domain that promises welfare improvements from which the whole household can potentially benefit. The inverse relationship we observe is interpreted as a tradeoff between women's loan control and potential benefits for the whole household. Suggestions to resolve the tradeoff are discussed.

Keywords: financial decision making; credit; agricultural investment; women empowerment; Self-help groups; microfinance

¹² This chapter is co-authored by Meike Wollni and Ketki Sheth. The authors' contributions are as follows: In close cooperation with Meike Wollni I conceptualized and designed the research and analyzed and interpreted the data. I conducted the survey. I wrote a first draft and revised it in close cooperation with Meike Wollni and Ketki Sheth.

3.1. Introduction

In the developing world, women are seen to be relatively more credit constrained than are men (Agier & Szafarz, 2013; Fletschner, 2009). Further, women are a better credit risk than men (Boehe & Cruz, 2013; D'Espallier et al., 2011). The formation of Self-help groups (SHGs) exclusively for women to obtain credit is thus potentially beneficial for the women, their families and the institutions that exclusively target such women. According to Galab and Rao (2003), participation in SHGs has improved women's access to credit and helped to reduce their dependence on moneylenders. In 2009, the share of women among all microfinance clients worldwide amounted to approximately 73% (Reed, 2011).

Nevertheless, the impact of microcredit on women's empowerment remains inconclusive (see, e.g., Kabeer, 2001; Mayoux, 2001; Holvoet, 2005; Weber & Ahmad, 2014; Pitt et al., 2006; Garikipati, 2012; Banerjee et al., 2015). Women's empowerment is important as an end in itself, and moreover, it may function as a means for economic development (Duflo, 2012). However, a common view in the literature on women's empowerment argues that women may not control their SHG loans personally, despite that, in general, the women benefit in terms of improved access to credit (Goetz & Gupta, 1996; Rahman, 1999). Similar to Garikipati (2008) and Garikipati (2013), we argue that it is crucial to distinguish between pure access to and control over credit. It remains unclear how a loan is utilized when taken in the name of an SHG member women but controlled by, e.g., her male spouse.

As an illustrative case we will restrict our attention to loan utilization for agricultural investments. Similar to Zeller (2006), we stress the role of rural finance for agricultural development. We argue that agricultural investments matter for development, as they have the potential to increase productivity, which may lead to income increases. The literature shows that household investments in agriculture can benefit households in monetary terms and are hence welfare promoting. According to Udry and Anagol (2006), investment in pineapple cultivation in Ghana generates high returns. Wollni and Zeller (2007) show that farmers in Costa Rica receive higher prices when growing and selling specialty coffee. According to Kleemann et al. (2014) and Asfaw et al. (2009) farmer's investment into standards in Kenya can boost income, respectively can bring a positive return on investment in Ghana. According to Khandker and Koolwal (2015), microcredit in Bangladesh has enabled households with low landholdings, to increase

their income from livestock rearing and promotes income diversification. Furthermore, they find that (credit) supply-side constraints reduce crop income. In India, it remains crucial to increase the incomes of poor rural households. The poverty indicators are worse in rural than in urban areas in India. Recent statistics, for the year 2011, provided by the World Bank (2016) indicate that the rural poverty head-count ratio amounts to 25.7%, compared to the urban ratio of 13.7%, while for the whole country, the ratio is 21.9%.

Investigating women's level of loan control is important for two reasons. First, women's level of loan control may have consequences for their ability to repay the loan. If women do control the borrowed funds, they cannot use the loan to generate the funds necessary for loan repayment. This may impair their credit risk reputation and thus can reduce the likelihood of obtaining further loans. Second, when the investment activity is productive in nature, the whole household and thus, at least indirectly, the SHG women can potentially benefit from the returns on the investment.

To the best of our knowledge, the literature on agricultural investments has not yet rigorously addressed SHG member women's loan control as a potential influential factor¹³. The econometric study most similar to ours, conducted by Garikipati (2008), reports mixed results. An increase in women's SHG loan control decreases the household's likelihood of using the loan for working capital for the family's farm or enterprise and does not significantly affect the likelihood of investing in family land. Moreover, the effect on family land investments is also negative. The investment category of working capital for the family's farm or enterprise employed by Garikipati (2008) does not restrict the loan's purpose to be solely related to agriculture. Enterprise investments and farm investments may be differentially affected by women's level of loan control. The business in which the family enterprises engage is not further defined. In contrast, we will define the investment purpose to be solely related to agriculture in our analysis and will test the extent to which it is influenced by SHG member women's level of loan control. Moreover, the results from Garikipati (2008) may be biased by endogeneity, what we do consider in our study.

¹³ Agricultural investments have been analyzed from a range of different perspectives (see, e.g., Binswanger & Siller, 1983 and Feder et al., 1992 for a focus on farm size; see Karlan et al., 2014; Takeshima & Yamauchi, 2012; Weber & Musshoff, 2012; and Weber & Musshoff, 2013 for a focus on risk; see Ihli et al., 2014 and Maart-Noelck & Musshoff, 2013 for a focus on investment timing; see Hertz, 2009 for the relationship between non-farm income and investment; and see de Brauw & Rozelle, 2008 and Böhme, 2014 for a focus on migration and investment). Nevertheless, a gap in the literature remains regarding women's level of loan control.

In the following, we will introduce our conceptual discussion (Section 3.2), the SHG model and our data (Section 3.3), and the methods used (Section 3.4). These topics are followed by descriptive statistics (Section 3.5) and our econometric results (Section 3.6). In Section 3.7, we elaborate on our suggested policy measures, and we conclude with our findings in Section 3.8.

3.2 Conceptual discussion

The literature shows that women and men invest differently. Khandker and Koolwal (2015) find that in Bangladesh, nonfarm income growth for marginal farmers increased through borrowing by both men and women, whereas for larger farms, only men's borrowing lead to income increases. Pitt and Khandker (1998) show that poor households increased their consumption expenditure by participating in a credit program to a greater extent when women participated in the program, relative to the case of men's program participation. Similarly, Menon et al. (2011) find that the impact of access to credit differs between men and women: Access to credit encouraged women's own account self-employment activities and discouraged men's unpaid family activities.

Investment in agriculture is rather regarded as investment in a domain controlled by men in India. Land, a major factor for agricultural production, is typically controlled by men, as access to land rights remains difficult for women in India (Agarwal, 2003; Agarwal, 1995; Agarwal, 1988). However, according to Upadhyay (2005), with regard to labor input, women spend more hours on agricultural activities than men do. Nevertheless, women face categorical exclusion from equal shares in the benefits from agricultural production. Upadhyay (2005) relates this to male control over marketing activities such as finding a buyer, negotiating the price or transporting the produce to market, which are activities traditionally dominated by men in India.

Thus, we would expect women not to invest in agriculture, as their level of control in that domain may be relatively more limited than men's. Nevertheless, in our sample of SHG member households, we find agricultural investments to be the most prominent category¹⁴. Out of 317 SHG loan purposes, 132 (41.6%) are devoted to agriculture.

As mentioned above, Goetz and Gupta (1996) find that women's degree of loan control varies by the nature of the investment activity. This relationship is the focus of our

¹⁴ See Section 3.5 for details.

study: The link between a woman's control over her SHG loan and the likelihood that this loan is invested in agriculture. In an SHG that exclusively admits female membership, formally, a woman receives the loan from the SHG. We hypothesize the following: The higher the SHG women's level of loan control, the less likely a household is to invest that loan in agriculture. As an increasing level of women's control entails that men's degree of control diminishes, we also expect the relevant investment outcome, male-dominated agriculture, to become less likely with increasing loan control by women.

3.3 The SHG model and the data

The model of SHGs became prominent thanks to the efforts of Muhammad Yunus, who founded Grameen Bank in Bangladesh 1983 (Yunus, 1999). Inherent to that model are group lending and peer monitoring. Thus, relative to formal banking, this model could more effectively address adverse selection of bad credit risks and moral hazard because the responsibility for screening and monitoring the members lies with the group itself (Ghatak, 1999).

The governmental organization Chaitanya operates throughout Maharashtra, India and supports the formation of SHGs, which it governs through a hierarchical model that is outlined below (Chaitanya, 2015). The groups meet monthly and consist of ten to 20 women. Above the groups, clusters supervise between 15 and 20 SHGs. The top level of governance is exercised through federations that than act as institutions to provide financial services to the lower levels. A given federation has responsibility for governing 200 to 400 SHGs. The federations are linked to formal banks for refinancing. In India, the most prominent model of linking SHGs to formal sources of refinance is the SHG-bank linkage program initiated by the National Bank for Agriculture and Rural Development (NABARD) in 1992 (Karmakar, 2008). Under this program, NABARD serves as the apex institution for rural financial institutions and refinances them.

In Chaithanya's SHGs, the member women can take loans on an individual basis and accumulate savings. As of March 2015, Chaitanya and partner NGOs govern 112,870 women in 8,772 SHGs and administer Rs. 273,696,371 in outstanding loans (Chaitanya, 2015). Between February and May 2014, we conducted a household survey in two sub-districts of Pune District, namely Khed and Junnar. Pune District belongs to the Indian State of Maharashtra. Through Chaitanya, we accessed the membership lists of

women's SHGs for these two sub-districts¹⁵. We obtained separate lists for Khed and Junnar; thus we chose households randomly from each of the two lists, which amounted to our complete sample of 658 households¹⁶. We applied a structured questionnaire.

In approximately 96% of our sample households, the SHG member served as the respondent. Thus, we expect that our data reflect the women's view, despite that in 4% of the cases, the respondent was not the SHG women. The respondent was asked whether the household had taken a loan (from any source) within the last twelve months. Moreover, in the event that the household had taken a loan, we further asked after the purpose of the loan and the gender of the person who controls the borrowed funds. Such control could be exercised by the borrower alone, by another household member, or jointly by the borrower and the spouse. Section 3.5 will describe credit activities in detail.

3.4 Method

To test our hypothesis, we will estimate the likelihood of investing credit in agriculture. We draw on econometric techniques to identify causality and to control for potential endogeneity bias. We begin with a univariate probit model in Section 3.4.1. In Section 3.4.2, we address the potential selection bias. In Section 3.4.3, we apply an IV probit model to account for the potential endogeneity of our main explanatory variable, a SHG member women's level of loan control. The last model specification in Section 3.4.4 includes two binary measures of women's loan control. This provides an alternative specification to that one in Section 3.4.1, where we rely on an ordinally scaled measure for SHG member women's level of loan control. All model specifications will be elaborated below.

3.4.1 Univariate probit model

We estimate the likelihood of investing SHG credit in agriculture using a probit model. Similar to Mishra and Morehart (2001), we model the binary outcome:

$$Y_i^* = \alpha + \beta_1 C_i + \beta_2 \mathbf{X}_i + \varepsilon_i \quad (5)$$

As we model the likelihood of investing the proceeds from SHG loans, the sample is restricted to those households that had taken a SHG loan and excludes households that

¹⁵ We are especially indebted to thank Ketki Sheth for enabling us to draw a sample for the Junnar region.

¹⁶ Time and budget constraints limited our sample size to 658 households. In Junnar, we drew 408 households, and in Khed we drew 250 households from the respective lists.

took no SHG loans. For each household (i), we observe the binary outcome variable *SHG credit investment in agriculture*, referred to as Y_i . The latent variable Y_i^* remains unobserved. We model $Y_i = 1$ if $Y_i^* > 0$ and $Y_i = 0$ if $Y_i^* \leq 0$. When $Y_i = 1$, this refers to the case in which the household currently has devoted an ongoing SHG loan to agriculture in one or more of the following categories: Agricultural land, farm equipment, animals, fertilizer, seeds, farm buildings, product/process certification or land title/certification; otherwise, $Y_i = 0$. In the model, β_1 represents the coefficient for the main control variable C_i (an SHG woman's level of control over her SHG loan), β_2 refers to the parameter vector of further explanatory variables \mathbf{X}_i , α describes the constant, and ε_i is the error term.

Similar to Garikipati (2013), we model women's loan control independently of a loan's purpose. We apply an ordinal scale with three levels. For the lowest level, $C_i = 0$, the women exhibits no control at all over her loan. In this case, another, male household member fully controls the loan. At the intermediate level, $C_i = 1$, the women exhibits partial control over the loan. Her male spouse also exhibits partial control, but we cannot further differentiate the degree of each spouse's influence here. For the highest level, $C_i = 2$, the SHG woman fully controls the loan with no male influence. The further explanatory variables, captured by the vector \mathbf{X}_i , will be discussed below. Summary statistics will be provided below after all model specifications are introduced. To cover potential sociodemographic influences on our outcome, we include *Male head (dummy)*, *Age of head (in years)*, *Education of head (in years)*, *Education of SHG woman (in years)*, *Age of SHG woman (in years)*, *Hindu household (dummy)*, *General caste (dummy)* and *Household size (in members)*. According to the literature, which regards agriculture as a male domain, we expect the *Male head (dummy)* variable to increase the likelihood of investing loan proceeds in agriculture (see, e.g., Agarwal, 2003 on the topic of land rights and gender in India). Further, we expect that *Age of head (in years)* may negatively influence our outcome measure, as older farmers may be less inclined to invest (Feder, 1992). Moreover, we expect *Education of head (in years)* to positively influence the likelihood of agricultural investments. To control for the bargaining power in loan control for the SHG women, we include *Education of SHG woman (in years)* and *Age of SHG woman (in years)*. To capture exposure to information, we include *Respondent never reads newspaper (dummy)*. Here, we expect that households that are less exposed to information according to our measure to be less informed about agricultural investment opportunities and thus less likely to invest credit

in agriculture. We also include *Respondent is risky (dummy)*. This binary measure is derived from a hypothetical risk game in which the respondent was offered two options. Option 1 was to take Rs. 100 without any risk. Option 2 was to take a 50% chance of winning Rs. 300 or losing Rs. 100. In the case of Option 2, a coin was flipped to determine the outcome. The risk variable is coded 1 if the respondent chose Option 2, 0 otherwise. We expect our risk measure to positively influence the likelihood of investing credit in agriculture, as agricultural investments can entail risk (Karlan et al., 2014; Weber & Musshoff, 2012; Weber & Musshoff, 2013; Takeshima & Yamauchi, 2012). To control for differences with respect to religion, *Hindu household (dummy)* is included. Moreover, *General caste (dummy)* is added as a control. This category is the remainder after the identification of other caste categories that are eligible for governmental support (see, e.g., GOI, 2014 for the categorizations). Thus, the *General caste (dummy)* variable taking value 1 may represent the better-off households, which might lead to differentials in the likelihood of investing credit in agriculture. Finally, at the household level, we control for household size.

Moreover, we include two distance variables to capture the level of infrastructure in our sample region. We include *Next market for agric. produce (in km)* and *Taluka main city (in km)*. For *Next market for agric. produce (in km)*, we expect a positive relationship with our outcome measure. Due to lower agricultural productivity in more remote areas, the likelihood of investing credit in agriculture may be positively related with the degree of remoteness (Stifel & Minten, 2008). Because of diminishing marginal gains in the productivity of investments, we expect that the likelihood of investing in agriculture is higher where the agricultural productivity is lower. Households with a relatively higher potential productivity increase would benefit more from an investment than households with relatively lower potential productivity increases. Thus, we expect investments to be made where the benefits are relatively higher. In our sample, all households have access to credit; thus all households, independent of the degree of remoteness, have the chance to invest. The second distance variable, *Taluka main city (in km)*, controls for the influence of main city infrastructure that offers, e.g., a variety of off-farm employment opportunities, health infrastructure and general consumption opportunities.

Finally, we include a proxy for the agricultural activity of a household as a potential predictor of agricultural investments. We include *Land owned by the household five years ago (in acres)*.

The model in equation (5) may suffer from endogeneity bias, stemming from two sources. First, those households that take an SHG loan may systematically differ from those that do not. The error term ε_i , included in equation (5), captures unobserved characteristics. These may include the ability and motivation of household members, which may make those households more likely to take an SHG loan and may, simultaneously, also positively affect our outcome, the likelihood of investing credit into agriculture. Thus, selection bias may lead to an overestimation of our effects. Second, the effect of the main explanatory variable, an SHG woman's level of control, may also be biased due to endogeneity. Unobserved household characteristics such as traditional gender roles may influence our outcome measure. Moreover, in addition to this endogeneity bias stemming from unobserved factors, the effect of the SHG woman's level of control may be biased by endogeneity stemming from reverse causality. The dependent variable, *SHG credit investment in agriculture*, is one purpose for which an SHG loan may be used. There are also other purposes; see Section 3.5 for an overview. We cannot exclude the possibility that the purpose to which the household puts the loan may also influence our main explanatory variable, women's level of SHG loan control. The male spouse may be more inclined to increase his level of loan control if the loan is to be invested in agriculture, a male domain. Similar to Lambrecht et al. (2016), we separately address the potential sources of endogeneity bias. First, to reduce the selection bias, we apply a bivariate probit model that takes sample selection into account, and second, to reduce the bias stemming from the potentially endogenous regressor C_i , we employ an IV probit model that instruments our main explanatory variable C_i , the level of control an SHG woman has over her loan.

3.4.2 Bivariate probit model with sample selection

The household's decision-making process for SHG loans is modeled to consist of two decisions. The first decision concerns whether to take a loan with the SHG, and the second decision regards choosing the purpose of the loan. Those households that opt to take an SHG loan may differ from those that do not due to unobserved characteristics, as discussed above. To account for potential selection bias in our estimates, we estimate the likelihood of using credit for agriculture with bivariate probit models with sample selection (van de Ven & van Praag, 1981; Lambrecht et al. 2014). Similar to Kersting and Wollni (2012), we apply the following model specification:

Outcome equation:

$$Y_{i2}^* = \alpha_2 + \beta_1 C_i + \beta_2 \mathbf{X}_{i2} + \varepsilon_{i2}, Y_{i2} = 1 \text{ if } Y_{i2}^* > 0, Y_{i2} = 0 \text{ if } Y_{i2}^* \leq 0 \quad (6)$$

Selection equation:

$$Y_{i1}^* = \alpha_1 + \mu_1 \mathbf{X}_{i1} + \mu_2 M_i + \varepsilon_{i1}, Y_{i1} = 1 \text{ if } Y_{i1}^* > 0, Y_{i1} = 0 \text{ if } Y_{i1}^* \leq 0 \quad (7)$$

$$\varepsilon_{i1}, \varepsilon_{i2} \sim \text{BVN}(0,0,1,1,\rho), \text{Var}[\varepsilon_{i1}] = \text{Var}[\varepsilon_{i2}] = 1,$$

$$\text{Cov}[\varepsilon_{i1}, \varepsilon_{i2}] = \rho,$$

$$(Y_{i2}, \mathbf{X}_{i2}, C_i \text{ is observed only when } Y_{i1} = 1),$$

where Y_{i1}^* and Y_{i2}^* remain unobserved or latent. In the outcome equation, β_1 describes the coefficient for the main explanatory loan control variable, C_i . This is similar to equation (5). The vector of control variables is modeled as \mathbf{X}_{i2} , and the corresponding parameter vector is denoted β_2 . In equation (7), μ_1 refers to the parameter vector of the control variable vector \mathbf{X}_{i1} , which comprises the same variables as \mathbf{X}_{i2} . In addition, the variable M_i and its corresponding coefficient μ_2 are included in equation (7) as an exclusion restriction, which will be elaborated on below. In both equations (6) and (7), α_1 and α_2 refer to the constants and ε_{i1} and ε_{i2} to the error terms. The error terms, $\varepsilon_{i1}, \varepsilon_{i2}$, are distributed bivariate normal with zero mean, unit variance and correlation ρ .

Similar to equation (5), Y_{i2} is a binary outcome variable in equation (6), the outcome equation. In the model of utilizing credit for agriculture, $Y_{i2} = 1$ if household i decides to devote an SHG loan to an agricultural purposes, 0 otherwise. In the selection equation, equation (7), $Y_{i1} = 1$ if household i is taking a loan at the SHG, 0 otherwise.

The bivariate probit model with sample selection provides more robust estimations if an exclusion restriction is imposed, as the exclusion restriction may reduce the collinearity of covariates (Cameron & Trivedi, 2009). Accordingly, the selection equation requires an additional variable that is excluded from the outcome equation. This variable should have a significant influence on the probability of selection and no direct influence on the outcome of the outcome equation.

We include an additional regressor, M_i , in the selection equation that captures the likelihood of taking a SHG loan. The regressor M_i describes the *SHG membership (in years)* of the SHG member women in the selection equations. After the formation of an SHG, it is unknown how long the group will exist. According to Giné and Karlan (2014), it is a common concern among microfinance institutions that groups may be

dissolved after two to five years. Holvoet (2005) states that it is common for women to take their loans near the beginning of their membership.

Thus, we expect a negative influence of a women's membership duration on the likelihood of taking an SHG loan. Moreover, we expect that membership duration will not be predictive of the likelihood of investing credit in agriculture relative to other investment purposes. Loans can be devoted to productive or consumption purposes in our sample. We expect that the choice of the loan purpose may depend on individual preferences and constraints, not on the duration of membership.

Similar to Di Falco et al. (2011), we provide a simple falsification test for the conditions of the exclusion restriction described above. We test whether *SHG membership (in years)* influences the likelihood that a household will take an SHG loan (selection equation) and conditional on taking a loan in the first stage, whether it influences the likelihood, that a household will invest the SHG loan in agriculture (outcome equation). For the latter, we estimate a univariate probit model similar to equation (5), but in addition we include *SHG membership (in years)* as a regressor. For the former, we estimate a univariate model similar to equation (6). The results are provided in Appendix 3.1. We find our exclusion restriction to fulfill both conditions: *SHG membership (in years)* significantly influences the likelihood of taking a SHG loan while it does not influence the likelihood of investing the SHG loan in agriculture.

3.4.3 IV probit model

In the IV probit model, the outcome equation (8) is similar to equation (5). However, in this case, the potentially endogenous regressor, C_i , women's level of loan control, will be instrumented with equation (9):

$$Y_{i3}^* = \alpha + \beta_1 C_i + \beta_2 \mathbf{X}_i + \varepsilon_i \quad (8)$$

$$C_i = \gamma + \pi Z_i + \tau \mathbf{X}_i + v_i \quad (9)$$

Similar to Sections 3.4.1 and 3.4.2, the variable Y_{i3}^* is unobserved or latent. Instead, we observe Y_{i3} with $Y_{i3} = 1$ if $Y_{i3}^* > 0$, and $Y_{i3} = 0$ if $Y_{i3}^* \leq 0$. The corresponding coefficient of the potentially endogenous regressor, C_i , is denoted β_1 . Similar to Sections 3.4.1 and 3.4.2, the vector of control variables, \mathbf{X}_i , is included in equations (8) and (9) with the corresponding parameter vectors, β_2 and τ , respectively. In the two equations, the constants and the error terms are α and γ , respectively ε_i and v_i .

In equation (9), there must be at least as many instrumental variables as there are potentially endogenous regressors (Cameron & Trivedi, 2009). The instrument should not directly affect Y_{i3}^* in equation (8) but should have a substantial influence on the potentially endogenous variable. The variable Z_i will serve as our single instrument for the potentially endogenous variable, C_i . The instrument, Z_i , refers to the respondent's trust in moneylenders (measured as a binary)¹⁷. The corresponding coefficient is denoted π .

We expect trust in moneylenders and women's level of loan control to be positively related for our respondents. Women who are indebted to the SHG may have difficulty in repaying their loans on time because usually the obligation to repay begins soon after taking the loan and continues on a monthly base in our sampled SHGs. According to Jain and Mansuri (2003), this is a business case for moneylenders. They can assist the women by offering them another loan. However, what are the women's options if they mistrust moneylenders, e.g., due to the negative image of moneylenders stemming from charging usurious interest rates¹⁸? According to Fernando (2006), women may be forced into dependence on their husbands for assistance in repaying the loan when they cannot do so on their own. We argue that the husbands may in turn claim greater loan control. In contrast, women who trust in moneylenders may not need to rely on their husbands and thus may not need to abandon loan control.

We find a positive correlation (0.410), which is highly significant ($p=0.000$), between a respondent's trust in moneylenders and our potentially endogenous regressor, women's loan control, for our sub-sample of households that took an SHG loan. Moreover, we expect that the respondent's trust in moneylenders is not a significant exogenous regressor in equation (8), as we expect that trust in moneylenders does not affect the likelihood of investing the proceeds of an SHG loan in agriculture. We do not expect the borrower's level of trust in another potential source of borrowing, the moneylender, to influence the investment activity with the SHG loan.

3.4.4 Univariate probit model with binary loan control variables

The three different models, which were presented in the preceding subsections, allow us to compare the estimates from the univariate probit, in which we do not control for any potential bias from endogeneity, with models in which we address selection bias and the

¹⁷ Recall that in 96% of our households, the SHG member woman served as the survey respondent.

¹⁸ See, e.g., Sharma and Chamala (2003) for a discussion of the perception of moneylenders.

potentially endogeneity of our main explanatory variable, *Level of SHG woman's loan control*, separately¹⁹. However, even if the estimates from all three models are very similar, suggesting that we can rely on the estimates from the univariate probit, the models above are prone to another caveat. That is the interpretation of the magnitude of the main explanatory variable's effect, the effect of the ordinally measured *Level of SHG woman's loan control*. Like mentioned above, the variable can take only one of three values, zero, one, or two, corresponding to no loan control, partial loan control or full loan control, respectively. Thus, one-unit increase on average would not inform us of whether this average increase by one unit is driven by the change from no control to partial control or by the change from partial control to full control.

To trace out the effects of the different levels of loan control, we specify a model that includes binary regressors for loan control:

$$Y_{i4}^* = \alpha + \delta_1 F_i + \delta_2 P_i + \beta_2 X_i + \varepsilon_i \quad (10)$$

Similar to the preceding sections, the variable Y_{i4}^* is latent and thus unobserved. Instead, we observe Y_{i4} with $Y_{i4} = 1$ if $Y_{i4}^* > 0$, and $Y_{i4} = 0$ if $Y_{i4}^* \leq 0$. Instead of the variable C_i from equation (5), here we include two binary measures for SHG women's level of loan control, F_i and P_i . For the first measure, F_i takes $F_i = 1$ if the SHG member woman exhibits full control over her SHG loan, $F_i = 0$ otherwise. For the second measure, P_i holds, $P_i = 1$ if the SHG member woman exhibits partial control upon the loan, $P_i = 0$, otherwise. The remainder of the model is similar to the univariate probit model in equation (5). Note that $F_i = 1$ if $C_i = 2$ and that $P_i = 1$ if $C_i = 1$. As a reference category, not included in the model we specify N_i , representing the level of no loan control by the SHG woman over her loan, where $N_i = 1$ if $C_i = 0$. Finally, we provide summary statistics in Table 7 for the sub-sample of SHG borrower households and for the complete sample, which also includes households that did not take a SHG loan. The loan control variables and the outcome measure, *Credit for agriculture (dummy)*, are only provided for the SHG borrower households.

¹⁹ Note that if we had had two instrumental variables for two binary measures of women's loan control, we would have relied only on models in which we apply the binary loan control measures. However, as two instruments could not be identified in our data, we first modeled our main explanatory variable by applying the ordinal scale with three levels, which allowed us to control for the above-mentioned potential sources of endogeneity bias. In particular, the IV probit is satisfied with one instrumental variable, which we provide and discuss in Section 3.4.4. Second, we then introduce the univariate probit model with binary measures for women's loan control.

Table 7. *Summary statistics*

Variable	Mean (sub-sample SHG borrower households)	Standard deviation	Mean (total sample)	Standard deviation
Credit for agriculture (dummy)	0.4567	0.499		
Level of SHG woman's loan control (ordinal scale)	1.3218	0.6746		
SHG woman has full loan control (dummy)	0.4394	0.4972		
SHG woman has partial loan control (dummy)	0.4429	0.4976		
Male head (dummy)	0.8616	0.3459	0.8439	0.3632
Education of head (in years)	7.0138	3.9974	7.1685	4.2318
Age of head (in years)	49.227	12.492	49.5362	12.5156
Head is married (dummy)	0.9031	0.2963	0.9026	0.2967
Age of SHG member (in years)	43.1792	12.9025	43.0335	12.8833
Education of SHG member (in years)	5.7093	3.9754	6.2025	4.198
Hindu household (dummy)	0.9204	0.2711	0.9351	0.2466
General caste (dummy)	0.5363	0.4995	0.558	0.497
Household size (in members)	4.7197	2.0483	4.5425	2.1153
Land owned five years ago (in acres)	1.6846	2.1883	1.6996	2.4184
Taluka main city (in km)	16.3598	8.5777	17.0347	8.881
Next market for agric. produce (in km)	10.814	7.102	10.3361	7.2294
Respondent never read newspaper (dummy)	0.5606	0.4972	0.5595	0.4968
Respondent is risky (dummy)	0.6552	0.4745	0.6636	0.4721
Observations	289		647	

Source: Based on own household survey data.

Due to missing values in the data the number of observations for the mean sample is lower than the total sample size of 658 households.

3.5 Descriptive results

This section provides an overview of the loan purposes chosen by the households. Table 8 shows how many SHG loans the households currently devote to which agricultural purposes. A total of 143 agricultural loan purposes are reported by the households, whereas the three categories chosen most often are *Agricultural land* (37.1%), and loans for *Farm equipment* (28.7%) and *Animals* (12.6%). Table 9 reports how often the households reported each loan purpose. Credit for agriculture is the aggregate of all agricultural purposes from Table 8. Thus, the total of 143 agricultural loans from

Table 8. *SHG loan investments by agricultural purpose*

Loan purpose	No. of loan purposes	(in %)
Agricultural land	53	37.1%
Farm equipment	41	28.7%
Animals	18	12.6%
Farm fertilizer	13	9.1%
Farm seeds	10	7.0%
Farm building	7	4.9%
Product/process certification	1	0.7%
Land title/certification	0	0.0%
Total	143	100.0%

Source: Based on own household survey data.

Table 8 are attributable to 132 households that reported at least one, but possibly more, agricultural loan purposes. Here, households chose *Credit for agriculture* (41.6%) most often, followed by *Home improvement* (24.3%) and *General/regular expenses* (10.1%). In total the households reported 317 credit items in the survey.

Table 9. *SHG loan investment by all purposes*

Loan purpose	No. of loan purposes	(in %)
Credit for agriculture	132	41.6%
Home improvement	77	24.3%
General/regular expenses	32	10.1%
Education	28	8.8%
Non-agricultural business	14	4.4%
Vehicle	12	3.8%
Social event	11	3.5%
Health	10	3.2%
Other	1	0.3%
Legal court matter	0	0.0%
Total	317	100.0%

Source: Based on own household survey data.

In Figure 2, we show how the status of loan control by the SHG member woman is distributed across loan purposes. Recall that this ordinal scaled variable can only take the values of zero, one and two. We find that, in our key category *Credit for agriculture*, the dominant category is $C_i = 1$, where the SHG member woman and her

male spouse both exhibit partial control. Of our 132 SHG borrower households that reported agricultural loan purposes, 78 (59.1%) fall into that category. In 35 households (26.5%), the SHG member woman exhibits full loan control, and in 19 households (14.4%), she exhibits no loan control. Similar to Goetz and Gupta (1996), we find variation in SHG loan control across the different loan purposes, although we employ different categories of loan purposes.

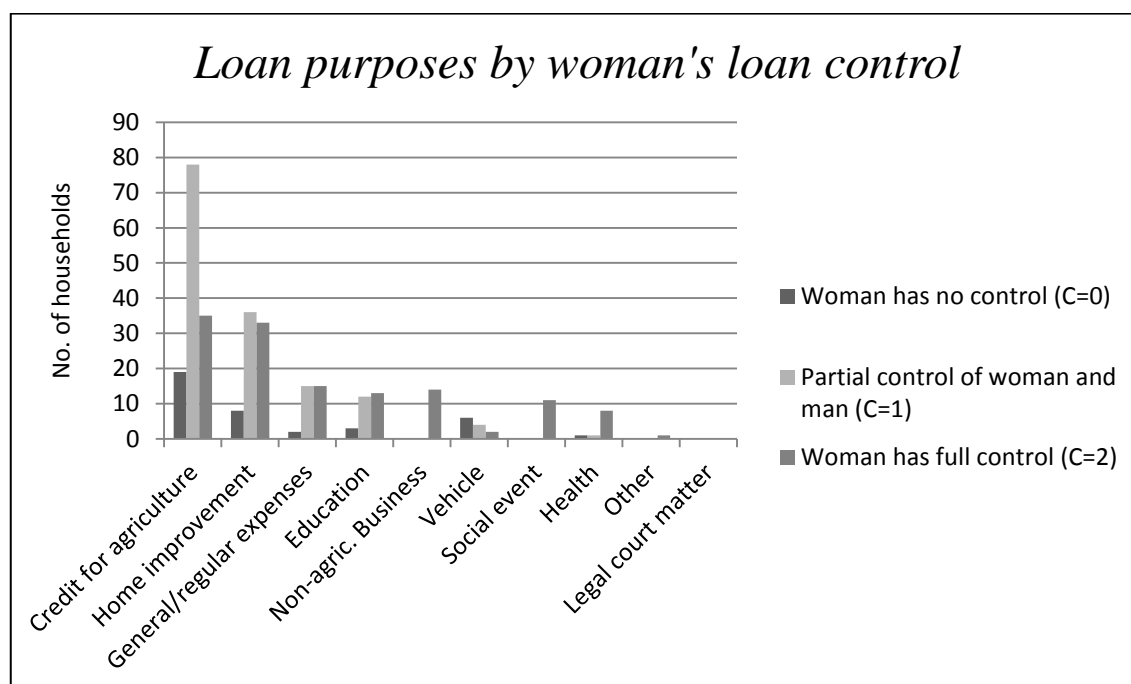


Figure 2. *Loan purpose by woman's loan control.* Source: Based on own household survey data.

3.6. Results

The outcome of interest in our analysis, the likelihood of investing credit in agriculture, is first estimated by applying a univariate probit model that is restricted to the sample of SHG borrower households. The bivariate probit model, which corrects for sample selection, provides very similar parameter estimates and does not indicate endogeneity bias, as will be outlined below. In Table 10, the results of both models are displayed. Moreover, the IV probit model, which is also restricted to the SHG borrower households, yields very similar results and further indicates that the instrumented variable, *Level of SHG woman's control*, is not endogenous. The regression output is attached in Appendix 3.2. Thus, the potential endogeneity bias does not seem to alter our estimates, and we can rely on the estimates from the univariate probit model. The

univariate probit model, in which we model women's loan control through binary measures, is therefore expected to also provide estimates unaffected by potential endogeneity bias. It relies on the same specification, except that the main explanatory variable is measured differently. The regression output is also attached at the end of this chapter in Appendix 3.3. As discussed in Section 3.4.4, the estimates of our binary measures of women's loan control are superior to the ordinally scaled continuous measure because the effect's magnitude at the different levels of women's loan control can be identified. Below, we continue with the discussion of the point estimates (Section 3.6.1), which is followed by Section 3.6.2 that discusses the marginal effects of our estimates.

3.6.1 Discussion of point estimates

The point estimate of *Level of SHG woman's control* is negative and highly significant (see Table 10, Column (1)). Thus, the more control the SHG woman exhibits over her loan, the less likely her household is to invest the SHG loan in agriculture. As men and women generally exhibit a different investment behavior and because agriculture is a male-controlled domain in India, this indicates confirmation of our hypothesis. As mentioned in the introduction, Garikipati (2008) examines two similar outcomes, namely utilizing the loan for the working capital needs of the family farm/business and family land investments. In both cases, she also finds the women's SHG loan control variable to reduce the likelihood of the outcome to occur. However, the effect on family land investments is insignificant. In contrast to the insignificant effect on family land investments, we find a significant effect on agricultural investments, as described above. Thus, in terms of significance, our result is similar to that of Garikipati (2008), where the investment category is the working capital needs of the family farm/business. However, the significant finding in Garikipati (2008) also includes enterprise activity that is not restricted to agriculture. The effect of women's level of loan control may be different on investments in the family farm or a family business. Hence, in contrast to Garikipati (2008), we show that a measure fully related to agriculture is significantly affected by women's level of loan control. Among the control variables, we find that *Education of head* positively influences the likelihood of investing the loan in agriculture. Thus, better-educated households undertake productive and potentially risky investments. Moreover, the variable *General caste* positively influences the likelihood of investing the loan in agriculture. As this caste category includes the better-off house-

Table 10. *Likelihood of investing credit in agriculture (Univariate probit and heckprobit models)*

VARIABLES	Probit	Probit	Heckprobit	Heckprobit
	Outcome	Selection	Outcome	Selection
	(1)	(2)	(3)	(4)
Level of SHG woman's loan control (ordinal scale)	-0.449*** (0.125)		-0.441*** (0.140)	
Male head (dummy)	0.383 (0.544)	0.272 (0.229)	0.418 (0.549)	0.271 (0.229)
Education of head (in years)	0.0590* (0.0355)	0.00139 (0.0185)	0.0582* (0.0352)	0.00129 (0.0184)
Age of head (in years)	-0.0157 (0.0147)	-0.00832 (0.00744)	-0.0169 (0.0149)	-0.00827 (0.00748)
Head is married (dummy)	-0.239 (0.568)	-0.292 (0.260)	-0.280 (0.580)	-0.290 (0.261)
Age of SHG member (in years)	0.0137 (0.0156)	0.00398 (0.00773)	0.0140 (0.0153)	0.00393 (0.00777)
Education of SHG member (in years)	-0.0458 (0.0328)	-0.0397** (0.0185)	-0.0508 (0.0378)	-0.0396** (0.0184)
Hindu household (dummy)	0.457 (0.397)	-0.246 (0.225)	0.425 (0.449)	-0.242 (0.223)
General caste (dummy)	0.367** (0.169)	-0.0926 (0.106)	0.350* (0.188)	-0.0940 (0.107)
Household size (in members)	0.0386 (0.0439)	0.0415 (0.0265)	0.0447 (0.0471)	0.0408 (0.0267)
Land owned five years ago (in acres)	0.195*** (0.0508)	-0.00388 (0.0220)	0.191*** (0.0575)	-0.00360 (0.0220)
Taluka main city (in km)	-0.00496 (0.0105)	-0.0105 (0.00651)	-0.00683 (0.0119)	-0.0105 (0.00650)
Next market for agric. produce (in km)	0.0454*** (0.0128)	0.0120 (0.00778)	0.0467*** (0.0127)	0.0120 (0.00779)
Respondent never read newspaper (dummy)	0.00377 (0.170)	-0.112 (0.108)	-0.0119 (0.177)	-0.111 (0.108)
Respondent is risky (dummy)	0.166 (0.187)	-0.0715 (0.108)	0.155 (0.197)	-0.0710 (0.108)
SHG membership (in years)		-0.0329** (0.0140)		-0.0331** (0.0138)
Constant	-1.258 (0.767)	0.890** (0.441)	-1.322* (0.753)	0.890** (0.441)
/athrho			0.228 (0.919)	
Rho (P-value in parentheses)			0.224 (0.804)	
Observations	289	647	289	647
LR Chi2	68.30	31.93	61.25	
Prob < Chi2	0.000	0.006	0.000	
Pseudo R2	0.207	0.035		

Source: Based on own household survey data. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; due to missing values in the data the number of observations in Column (2) and (4) are lower than the total sample size of 658 households.

holds, it is plausible that those households take the risk of investing the loan in agriculture. Moreover, our proxy for agricultural activity, *Land owned five years ago*, has a positive point estimate: The more land the household owned five years prior to the survey, the more likely the household is to invest the loan in agriculture. This is plausible, as more land opens more room for investments or may necessitate additional maintenance investments, relative to holding less land. Finally, the farther away a household is from the nearest market, the more likely the household is to invest in agriculture. Productivity is lower in more remote areas (Stifel & Minten, 2008). The likelihood of investing credit in agriculture may be positively related to the degree of remoteness, as discussed in Section 3.4.1.

As stated above, the bivariate probit model, which corrects for sample selection, yields similar parameter estimates. The outcome equation is displayed in Column (3) of Table 10. The exclusion restriction, *SHG membership (in years)*, is negative and significant, as expected (see Column (4)). In addition, *Education of SHG member* is negative and significant in that selection equation. This may initially appear puzzling, as better-educated women would be expected to better judge the opportunities and risks of taking a loan and would thus be expected to be more likely to take an SHG loan. This appears particularly likely in our context of rural India, where there remains welfare potential to be tapped through investments. However, as the aim of SHGs is to improve the livelihoods of poor and deprived women it appears plausible that, within an SHG group, the less-educated women may be more likely to take a loan, as they may be particularly encouraged by the group (Galab & Rao, 2003).

The bivariate probit model further indicates that no endogeneity bias from unobserved differences among SHG borrower and non-borrower households is present when the outcome equation is estimated separately. As indicated by ρ , the correlation between the outcome and selection equations' error terms amounts to 0.224 and is insignificant with a corresponding P-value of 0.804.

3.6.2 Discussion of marginal effects

To gauge the size of our effects, we display the marginal effects at the mean in Table 11 for the univariate probit model, the bivariate probit model with sample selection and the IV probit model. The signs and magnitudes of the marginal effects are very similar across the three models. We find that a one-unit increase in a woman's level of loan control reduces the likelihood of investing the SHG loan in agriculture by 17.8%; the

Table 11. *Marginal effects (at means): Likelihood of investing credit in agriculture*

	Univariate probit	Bivariate probit with sample selection	IV probit
	(1)	(2)	(3)
Level of SHG woman's loan control (ordinal scale)	-0.178 (3.58)***	-0.168 (2.15)**	-0.199 (1.71)*
Male head (dummy)	0.152 (0.70)	0.159 (0.78)	0.146 (0.67)
Education of head (in years)	0.023 (1.66)*	0.022 (1.50)	0.023 (1.63)
Age of head (in years)	-0.006 (1.07)	-0.006 (1.17)	-0.006 (1.09)
Head is married (dummy)	-0.095 (0.42)	-0.106 (0.49)	-0.094 (0.42)
Age of SHG member (in years)	0.005 (0.88)	0.005 (0.89)	0.006 (0.90)
Education of SHG member (in years)	-0.018 (1.40)	-0.019 (1.53)	-0.018 (1.35)
Hindu household (dummy)	0.181 (1.15)	0.162 (0.84)	0.180 (1.15)
General caste (dummy)	0.145 (2.17)**	0.133 (1.50)	0.145 (2.17)**
Household size (in members)	0.015 (0.88)	0.017 (1.02)	0.015 (0.89)
Land owned five years ago (in acres)	0.077 (3.81)***	0.073 (2.17)**	0.076 (3.64)***
Taluka main city (in km)	-0.002 (0.47)	-0.003 (0.61)	-0.002 (0.50)
Next market for agric. produce (in km)	0.018 (3.55)***	0.018 (3.03)***	0.018 (3.56)***
Respondent never read newspaper (dummy)	0.001 (0.02)	-0.005 (0.07)	-0.000 (0.00)
Respondent is risky (dummy)	0.066 (0.89)	0.059 (0.73)	0.064 (0.86)
Observations	289	289	289

Source: Based on own household survey data. Robust standard errors in parentheses. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

effect size is -16.8% in the bivariate probit model with sample selection and -19.9% in the IV probit model. The problem of interpreting this effect stems from the ordinal scale. The effect states the percentage change in our outcome measure for an increase in women's loan control by one unit. However, a caveat remains, namely that we cannot distinguish the differences among the different levels of women's loan control and have to interpret the effect's magnitude carefully. Thus, below, we discuss the marginal effects of the model, where loan control is modeled using binary variables.

First, however, we discuss the marginal effects of the control variables. Although the effects of *Education of head* are very similar in magnitude (ranging between 2.2% and 2.3% in all three models) and show the same sign in all three models, the significance varies. The effect of the household head's education, albeit positive in all models, is statistically significant only in the univariate probit model in Column (1). Nevertheless, the significance is weak. The effect of *General caste* ranges between 13.3% and 14.5% in all three models but is only statistically significant (at the 5-% level) in the univariate probit and the IV probit model. The effect of land owned five years ago is statistically significant in all three models. For each additional acre of land size, the likelihood of investing the SHG loan in agriculture increases by 7.7% in the univariate probit model, see Column (1). In the bivariate probit with sample correction, the effect amounts to 7.3%, see Column (2), and in the IV probit to 7.6%, see Column (3). Finally, the effect of *Next market for agric. produce* is positive and significant in all three models. Each additional kilometer of distance increases the likelihood of investing the SHG loan by 1.8% in all three models. Nevertheless, although we find differences in statistical significance for some effects, our main effect, *Level of SHG woman's loan control*, remains statistically significant across all three models. The variation in significance can stem from larger standard errors in the IV probit and bivariate probit model with sample selection (Cameron & Trivedi, 2009).

As discussed above, the marginal effects in all three models are very similar, but we cannot distinguish at which stage the loan control of women over their SHG loans really matters for the household's likelihood of investing the SHG loan in agriculture. The marginal effects, provided in Table 12, show that the likelihood of investing the SHG loan in agriculture is 25.6% lower for households in which the SHG member woman exhibits full control over the loan, relative to households, in which women exhibit no loan control. The effect is significant at the 5-% level. In contrast, if the SHG member

Table 12. *Marginal effects (at means): Likelihood of investing credit in agriculture (binary measures for loan control)*

	Univariate probit model with two binary loan control regressors
SHG woman has full loan control (dummy)	-0.256 (2.40)**
SHG woman has partial loan control (dummy)	0.038 (0.34)
Male head (dummy)	0.077 (0.36)
Education of head (in years)	0.024 (1.74)*
Age of head (in years)	-0.006 (0.96)
Head is married (dummy)	-0.092 (0.41)
Age of SHG member (in years)	0.005 (0.78)
Education of SHG member (in years)	-0.018 (1.44)
Hindu household (dummy)	0.180 (1.12)
General caste (dummy)	0.145 (2.16)**
Household size (in members)	0.019 (1.05)
Land owned five years ago (in acres)	0.075 (3.69)***
Taluka main city (in km)	-0.001 (0.22)
Next market for agric. produce (in km)	0.017 (3.29)***
Respondent never read newspaper (dummy)	0.025 (0.36)
Respondent is risky (dummy)	0.064 (0.88)
Observations	289

Source: Based on own household survey data. Robust standard errors in parentheses.

Significance: *** p<0.01, **p<0.05, * p<0.1.

women only exhibits partial control, the effect is nearly zero and insignificant. Thus, women's full loan control is of particular relevance for the investment outcome, relative to the case of no loan control. In contrast, the difference between partial loan control and no loan control does not affect the likelihood of agricultural investments. Recall that the significant marginal effect of the ordinal scaled measure for women's loan control, from the univariate probit model in Column 5 of Table 11 is -17.8%. In comparison with the marginal effects from the binary measures in Table 12, we see the

effect of the ordinally scaled measure is driven by the change from partial control to full control and not by the change from no control to partial control. Among the control variables, the same variables as in the univariate probit model with the continuous measure of women's loan control (Table 11) are significant. Moreover, these effects are very similar in magnitude and show the same sign. These variables are *Education of head (in years)*, *General caste (dummy)*, *Land owned five years ago (in acres)* and *Next market for agric. produce (in km)*.

3.7 Discussion and policy implications

We find that a household's likelihood of investing the SHG loan in agriculture decreases with increasing loan control by SHG women. In particular, when women fully control their SHG loans, compared to the case of no loan control, the effect is strong. We interpret our results in the context of differences in investment patterns between men and women. The more control a woman has over her SHG loan, the less her male spouse has control over the loan, and thus the less likely is an investment in a domain controlled by men, namely agriculture. This inverse relationship shows that the level of women's loan control is relevant for the household's decision regarding agricultural investments. Our findings suggest a tradeoff between a woman's level of control over her SHG loan and potential welfare improvements for the whole household. In our sample of SHG member households, we can show that the tradeoff is present.

On the one hand, the inverse relationship found in our analysis implies that there is less agricultural investment than is potentially possible. Investments in agriculture are important for welfare development because of their potential for increasing productivity. This may lead to income increases for the investing households as a whole, including the SHG member women.

On the other hand, less loan control for SHG women leaves them with the obligation to repay the loan, while eliminating their ability to generate the funds for repayment. In the absence of alternative sources of funds to repay the loan, this can impair the women's credit risk reputation and thus may further reduce loan uptake through the SHG. Less access to additional credit can further impede (agricultural) investments. The dynamics that might follow the tradeoff remain unclear. Does the tradeoff cease to exist when women may ultimately be denied further access to loans in an extreme case and SHG loan control is no longer an issue due to a lack of loans? Alternatively, does the tradeoff

remain stable, as women manage to repay their loans, despite their inability to draw on their loan to generate the necessary funds, when they lack loan control?

We suggest measures intended to diminish the tradeoff, but not in the way, described above, whereby the denial of further loans to women solves the tradeoff. First, in the long run, policies should enable women to invest in agriculture. Currently, women may withdraw from agricultural investments because agriculture remains prone to men's control²⁰. Easing access to land for women may enable women to invest in agriculture. This needs to be complemented by general policies fostering gender equality (Roy, 2015; Hunt & Kasynathan, 2001)²¹.

Moreover, according to Upadhyay (2005), women in India can be disadvantaged in marketing agricultural produce because, as mentioned in Section 3.2, marketing activities such as finding a buyer, negotiating the price or transporting the produce to the market is controlled by men. Evidence from Sub-Saharan Africa also shows that women are disadvantaged when marketing agricultural produce. Banerjee et al. (2014) find female farmers to be discriminated against in the form of lower prices when marketing agricultural produce in Cameroon. According to Handschuch and Wollni (2016), women face higher barriers than men when marketing traditional food crops in Kenya and suggest that women may increasingly participate in markets when they are members of a farmer group. For India, such evidence remains scarce. However, further research may investigate the extent to which marketing opportunities can be improved for women in India to enable women to invest in agriculture.

Second, in the short term, we suggest measures that may facilitate women's investment in agriculture by focusing on women's loan control. Although it requires more detailed theoretical elaboration and practical testing, we suggest one potential approach below. Our suggestion calls, first, for capacity-building measures in women's SHGs and, second, for rural development policy measures to enable such SHG capacity building²². According to Holvoet (2005), women's status in decision making improves through participating in group-lending and when the former is combined with technical and social awareness training.

We focus on a somewhat different, yet similar, suggestion. SHGs may consider offering an additional means of loan distribution. To reduce men's influence on SHG member

²⁰ See e.g. Agarwal (2003) for elaboration on the example of gender and land rights in India.

²¹ See e.g. Alesina et al. (2013) for recent research on gender roles and agriculture.

²² See Greany et al. (2016) for an example of innovations in SHGs.

women's loans, we suggest that SHGs offer the following to their member women: Cash loans are not forwarded from the SHG to the SHG member woman, as fungible cash loans are always vulnerable to eventual acquisition. Instead, the SHG and the member woman should develop an investment agreement, whereby the SHG, the SHG member woman and an investment counterpart are involved. For illustrative purposes, imagine an investment in seeds. The investment counterpart would be the corresponding seed trader. The investment agreement than incorporates monetary transfers from the SHG to the trader. The trader confirms the inflow of money on behalf of the SHG woman and grants her the right to collect the seeds. Finally, the SHG woman has to repay the loan plus interest to the SHG. No cash flow from the SHG to the SHG member women is involved, and thus cash cannot be acquired by the men in the SHG member women's households.

The model is not limited to investment counterparts in agriculture. In principle, the primary investment domains, to which the model can be applied, may be identified at the local level. However, to address the above-mentioned tradeoff, we suggest a focus on agriculture. Such a measure requires coordination with stakeholders as potential investment counterparts as illustrated above. However, as the women may still prefer to simply take the cash home, this model should instead be an additional offer, as mentioned above, and not entirely replace the current practice of handing out the cash to the women directly. However, the suggestion outlined briefly above requires further theoretical investigation and practical testing, which is left for further research. This approach offers the potential for diminishing the tradeoff we observed by increasing women's loan control.

Note that the elaborated suggestions are all intended to enable the women to invest in agriculture. However, their preferences for investment purposes may vary. In Figure 2 in Section 3.5, we show that many women who fully control their SHG loans also invest in *Home improvement* or utilize the loan for *General/regular expenses*. Does this investment behavior reflect the women's investment preferences, or are the current choices an outcome of the unattractiveness of investing in agriculture? The extent to which measures intended to attract women's investment in agriculture can be successful in achieving this goal remains to be addressed.

Our suggestion for diminishing the tradeoff does not mean that women should be solely encouraged to make agricultural investments and, more important does not imply

dissuading them from other investment activities. On the contrary, the suggested measures are intended to remove constraints on women's investment decisions. Removing such constraints offers the potential for welfare gains through additional productivity-increasing agricultural investments while not curbing women's level of loan control.

3.8 Conclusion

In our econometric analysis, we find that the likelihood of investing credit in agriculture diminishes with increasing control of SHG women over their SHG loans. This inverse relationship between women's level of control over SHG loans and agricultural investments suggests that women's SHG loan control matters for the household's investment outcomes. This contrasts with the findings of Garikipati (2008), where investments in family land (another measure of agricultural investments) are not significantly affected by women's level of loan control. However, Garikipati (2008) finds a significant decrease in the likelihood of using the SHG loan for family farm/enterprise working capital given greater loan control by women. Complementing Garikipati (2008), we present a comparison of estimations that ignore potential endogeneity biases with estimations that address them. We find similar results across all specifications.

Our finding calls for measures to reduce the tradeoff between women's loan control and potential benefits at the household level (stemming from agricultural investments). Suggested approaches to diminish the tradeoff are improved access to land rights and markets for women in our rural study area setting in India. Further, increased loan control in combination with agricultural investment counterparts can be explored to address the tradeoff.

A disadvantage of our analysis is that we cannot determine whether the women abandon loan control voluntarily. However, we cannot exclude the possibility of an involuntary loss of loan control. Our policy suggestions thus suggest that women can voluntarily transfer loan control while remaining protected from involuntary loss of loan control relative to the case lacking such policies.

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Appendix 3.1: Falsification test for exclusion restriction

VARIABLES	Dependent variable: Household invests SHG loan in agriculture (dummy)	Dependent variable: Household has taken SHG loan (dummy)
	Probit (1)	Probit (2)
Level of SHG woman's loan control (ordinal scale)	-0.448*** (0.126)	
Male head (dummy)	0.385 (0.546)	0.272 (0.229)
Education of head (in years)	0.0592* (0.0357)	0.00139 (0.0185)
Age of head (in years)	-0.0161 (0.0147)	-0.00832 (0.00744)
Head is married (dummy)	-0.245 (0.569)	-0.292 (0.260)
Age of SHG member (in years)	0.0135 (0.0157)	0.00398 (0.00773)
Education of SHG member (in years)	-0.0457 (0.0328)	-0.0397** (0.0185)
Hindu household (dummy)	0.474 (0.390)	-0.246 (0.225)
General caste (dummy)	0.373** (0.170)	-0.0926 (0.106)
Household size (in members)	0.0403 (0.0436)	0.0415 (0.0265)
Land owned five years ago (in acres)	0.194*** (0.0507)	-0.00388 (0.0220)
Taluka main city (in km)	-0.00575 (0.0106)	-0.0105 (0.00651)
Next market for agric. produce (in km)	0.0458*** (0.0128)	0.0120 (0.00778)
Respondent never read newspaper (dummy)	0.00502 (0.170)	-0.112 (0.108)
Respondent is risky (dummy)	0.171 (0.186)	-0.0715 (0.108)
SHG membership (in years)	0.0103 (0.0234)	-0.0329** (0.0140)
Constant	-1.326* (0.764)	0.890** (0.441)
Observations	289	647
LR Chi2	31.93	31.93
Prob < Chi2	0.00659	0.00659
Pseudo R2	0.2080	0.0351

Source: Based on own household survey data.

Robust standard errors in parentheses.

Significance: *** p<0.01, ** p<0.05, * p<0.1.

Due to missing values in the data the number of observations in Column (2) is lower than the total sample size of 658 households.

Appendix 3.2: Likelihood of investing credit in agriculture (IV probit)

VARIABLES	2 nd stage (1)	1 st stage (2)
Level of SHG woman's loan control (ordinal scale)	-0.502* (0.294)	
Male head (dummy)	0.368 (0.552)	-0.432* (0.223)
Education of head (in years)	0.0580 (0.0356)	-0.0201 (0.0132)
Age of head (in years)	-0.0161 (0.0148)	-0.00768 (0.00566)
Head is married (dummy)	-0.237 (0.567)	0.228 (0.246)
Age of SHG member (in years)	0.0142 (0.0158)	0.00977 (0.00606)
Education of SHG member (in years)	-0.0448 (0.0331)	0.0212* (0.0127)
Hindu household (dummy)	0.456 (0.397)	0.135 (0.157)
General caste (dummy)	0.367** (0.169)	-0.0156 (0.0714)
Household size (in members)	0.0389 (0.0439)	-0.000665 (0.0203)
Land owned five years ago (in acres)	0.192*** (0.0525)	-0.0268 (0.0167)
Taluka main city (in km)	-0.00541 (0.0107)	-0.00539 (0.00501)
Next market for agric. produce (in km)	0.0455*** (0.0128)	-0.00104 (0.00587)
Respondent never read newspaper (dummy)	-0.000428 (0.170)	-0.0285 (0.0766)
Respondent is risky (dummy)	0.161 (0.188)	-0.0903 (0.0738)
Respondent trusts moneylenders (dummy)		0.589*** (0.0728)
Constant	-1.165 (0.881)	1.392*** (0.342)
/athrho	0.037 (0.188)	
/lnsigma	-0.532 (0.041)	
Rho (P-value in parentheses)	0.037 (0.844)	
Sigma	0.588	
Observations	289	
LR Chi2	63.03	
Prob < Chi2	0.000	

Source: Based on own household survey data.

Robust standard errors in parentheses.

Significance: *** p<0.01, ** p<0.05, * p<0.

Appendix 3.3: Likelihood of investing credit in agriculture

VARIABLES	Probit
SHG woman has full loan control (dummy)	-0.646** (0.269)
SHG woman has partial loan control (dummy)	0.0962 (0.280)
Male head (dummy)	0.196 (0.551)
Education of head (in years)	0.0610* (0.0351)
Age of head (in years)	-0.0144 (0.0150)
Head is married (dummy)	-0.233 (0.564)
Age of SHG member (in years)	0.0124 (0.0158)
Education of SHG member (in years)	-0.0460 (0.0319)
Hindu household (dummy)	0.456 (0.408)
General caste (dummy)	0.367** (0.170)
Household size (in members)	0.0474 (0.0452)
Land owned five years ago (in acres)	0.188*** (0.0507)
Taluka main city (in km)	-0.00229 (0.0106)
Next market for agric. produce (in km)	0.0429*** (0.0130)
Respondent never read newspaper (dummy)	0.0628 (0.173)
Respondent is risky (dummy)	0.162 (0.185)
Constant	-1.560** (0.779)
Observations	289
LR Chi2	76.42
Prob < Chi2	0.000
Pseudo R2	0.219

Source: Based on own household survey data.

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

CHAPTER 4

GENERAL CONCLUSION

Access to financial resources, in particular credit, offers the potential to alleviate poverty. This dissertation focuses on two studies of financial decision making to contribute to the understanding of financial outcomes in rural India, where poverty remains pressing. The focus on financial decision making in rural India complements the attention that has been devoted to the supply side of financial services, related market failures and the counter measures implemented to address them.

4.1 Summary of findings

For the first study (Chapter 2), we conducted an experiment with respondents from SHG member households in rural India. In the experiment, we simulated a tax on mental capacity and tested its influence on the respondent's level of financial literacy. Moreover, we tested the influence of a financial incentive on the respondent's level of financial literacy. According to the official poverty line for the State of Maharashtra, we divided our sample into poor and non-poor. For the respondents belonging to poor households, we found that the tax on mental capacity negatively influences the respondent's level of financial literacy. For the respondents who belong to non-poor households we found no evidence of a negative influence of the tax on mental capacity on the respondent's level of financial literacy. Further, exposure to the financial incentive increases the level of financial literacy for the poor and non-poor alike. The financial incentive does not demand additional overall mental capacity from the respondents. In a third treatment, the respondents were exposed to the mental capacity tax and the financial incentive in a double treatment. For the poor respondents, this double treatment led to no difference in the level of financial literacy, relative to the control group. However, it did for the non-poor respondents. The non-poor respondents in that treatment scored higher than the control group.

The findings show that, in the context of poverty, financial literacy is negatively affected by the tax on mental capacity. Moreover, this loss of financial literacy can be counteracted through financial incentives. In the context of financial decision making in rural India, where poverty is present, the tax on mental capacity may be one factor that hampers financial decision making. Subsequently, imperfect financial decision making may undermine an individual's efforts to overcome poverty. In Section 4.2, we will outline and discuss the policy implications of our findings.

In the second study (Chapter 3), we analyzed the relationship between an SHG member woman's level of loan control and the likelihood of the household of investing that SHG loan in agriculture. We found that the likelihood of investing the SHG loan in agriculture diminishes with an increase in loan control by the SHG woman. The inverse relationship between women's loan control and agricultural investments suggests that loan control matters for the investment outcome. This may impose a burden on the borrower women. Agriculture is a domain controlled by men, and the household is more likely to invest in that domain when the SHG member women exhibit lower loan control. This leaves the obligation to repay the loan with the SHG women, but removes their ability to utilize the loan to generate the funds for loan repayment. Thus, they might be left with a burden that, unfortunately accompanies increased access to credit through women's SHGs. Nevertheless, the household as a whole may reap the benefits from productive investments in agriculture.

Regarding the literature on women's empowerment, we build on the finding that it is crucial to distinguish between women's access to and control over loans (Goetz & Gupta, 1996; Rahman, 1999). We contribute to the literature on financial decision making by presenting econometric evidence that loan control by SHG women over their SHG loans determines the financial outcomes of the household.

The findings from Chapter 3 shed further light onto the process of financial decision making in the context of rural India. A household's investment decision depends on control over the loan. Moreover, productive investments (the evidence is restricted to SHG loans here) may, on the one hand, promise welfare improvements for the whole household but, on the other hand, may also imply detrimental consequences for women regarding their ability to repay loans.

4.2 Policy recommendations

We derive separate policy recommendations from each of the two studies. In Chapter 2 we have shown that a tax on mental capacity can negatively influence financial literacy, when poverty is present. Thus, we derive policy recommendations of two types from Chapter 2. First, in line with the World Bank (2015), we argue that poor people may be assisted in financial matters to circumvent the lower level of financial literacy. According to Beck et al. (2005), bank paperwork can prove to be difficult for clients. Thus, e.g., bank staff that assist clients in completing bank paperwork may overcome a potentially insufficient level of financial literacy.

Further, we suggest that it is worthwhile to explore measures that go beyond simply assisting individuals whose financial literacy is negatively affected by a tax on mental capacity. We show that, in principle, a financial incentive can increase financial literacy for individuals negatively affected by a tax on mental capacity. Financial incentives could be included in financial literacy trainings to incentivize additional learning effort. Moreover, financial incentives could be implemented in conditional cash-transfer-systems. Cash inflows can enable individuals to meet financial obligations and thus reduce the effect of the mental capacity tax. Consequently, effective cash-transfer-systems may increase financial literacy.

In Chapter 3, we have shown that an inverse relationship exists between an SHG woman's level of loan control and a household's likelihood of investing the SHG loan in agriculture. This inverse relationship suggests a tradeoff between an SHG woman's level of loan control and the potential benefits for the household as a whole, stemming from productive agricultural investments. We suggest measures to diminish the tradeoff. First, easing access to land and markets may enable women to invest in agriculture. Second, we suggest that measures that strengthen women's loan control may diminish the tradeoff. SHGs may consider introducing an additional channel for distributing loans. Then, the SHG member women may choose not to receive the loan directly but have it forwarded to an agricultural investment counterpart. In this way, the cash loan cannot be acquired by the male spouse and the women can undertake an agricultural investment.

4.3 Limitations and further research

The findings from Chapter 2 rely on an experiment conducted during our household survey in rural India. To derive robust conclusions for policy recommendations, its external validity needs to be tested with broader populations than that studied here. Our sample is restricted to member households of women's SHGs.

Moreover, the experimental setting simplifies the real world to a large extent and depicts only one scenario among many. The effects we found for the tax on mental capacity might vary if we alter the treatment design. The treatment may have provided different results if the hypothetical financial obligation were not Rs. 50,000 but instead lower or higher. Similarly, we expect our financial incentive treatment's effect to vary with the amount provided and with the threshold number of correct questions that

qualifies a respondent for earning the financial reward. Further research may elicit responsiveness in the treatment effects toward the treatment design in a systematic way.

In Chapter 3, the results rely on econometric methods for cross-sectional data. The issue of endogeneity, although addressed in several ways, remains a potential source of bias of our results. We instrument our main explanatory variable, *Level of SHG woman's loan control*, but unobserved factors may still lead to biased coefficients of other independent variables. In a panel data set with several survey rounds, we could control for unobserved factors, assuming that they are consistent over time, and thus further control for endogeneity bias. Unfortunately, we were unable to rely on panel data.

Furthermore, had the necessary data been available, we could have relied on different modeling approaches for the potentially endogenous loan control variable in the IV probit estimations. A more suitable instrument could have been drawn from past loan control behavior, which is not influenced by current investment decisions. Thus, our results should be interpreted with caution, and they lack a further robustness check in the form of another specification of our IV probit estimation.

Similarly, the exclusion restriction in the bivariate probit model with sample selection could be complemented by a further robustness check. Distance to the SHG meetings, e.g., would be an option for an alternative exclusion restriction. However, the necessary information is not available in the data.

To avoid endogeneity bias and the need for counter-measures in further studies, the explanatory variables should be genuinely exogenous in nature. A potential approach would be to rely on a controlled experimental setting, in which the respondent's level of loan control would be randomly assigned. Investment decisions regarding funds could be modeled and the available options for what to do with the funds could be randomly limited across the respondents.

In general, financial decision making remains a research area that may offer contributions to understanding individual and household behavior. In the particular context of poverty, this focus may help further research to identify approaches for policy interventions.

4.4 References

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Appendix 4: Questionnaire

HOUSEHOLD SURVEY QUESTIONNAIRE

Welcome to the survey on training participation and investment decisions. This research is conducted on behalf of Georg-August University, Germany. We would be pleased if you participate in our survey. Participation is completely voluntary. Your information will only be used anonymously. After full completion of the survey you will be receive a compensation payment.

HOUSEHOLD CODE:

FOR SUPERVISOR
completeness of questionnaire is approved
(YYYY/MM/DD)

FOR ENUMERATOR
Hereby I declare that each section of the questionnaire, the Financial Literacy test and the Ravens Test is filled out completely and correct by the respondent.
Enumerator name: _____
Enumerator signature: _____

Household code: _____
Date of interview (YYYY/MM/DD) _____
Start time (24 Hrs) _____
End time (24 Hrs.) _____
Supervisor is present? _____

SECTION 1: Household identification

1.1 Taluka TAL		1.12. What is the type of housing? HSE 1= Kachcha, 2= Semi Kachcha, 3 = Paikka	
1.2 Village VIL		1.13 What was the type of housing 5 years ago? HSEFA 1= Kachcha, 2= Semi Kachcha, 3 = Paikka	
1.3. Sampling Group: 1= Control group, 2= Text, 3= Money, 4= Text + Money	SAMP	1.14. Toilet facility TO/ 1= yes, 2= no, 3= yes, but no use	
1.4a SHG Name	1.4b SHG Members Name:	1.15. Does the household have a ration card? RCRD Please code the answer with the codes: 0 = no ration card, 1=white card, 2= orange card, 3= yellow card, 4 = yellow card with Antyodaya Anna Yojana (AAY) Stamp	
1.5 Year and Month of Joining		1.16. Year the household started farming in this village YFRM	
1.6 Full name of household head		1.17 If the household does not know exactly, in which year farming in this village started, was it before 1950? 1= Yes, 2= No FRM5	
1.7 Mobile phone number of household head		1.18 Did any shock happen within the last 12 months? See Codes Below (if no event happened put "N.A.") EV/NT	No 1 No 2 No 3
1.8 Full name of general decision maker if it is the household head use code = 1			
1.9. Mobile phone number of decision maker. If it is the household head use code = 1			
1.10 Full name of respondent. If it is the household head use code = 1			
1.11 Mobile phone number of respondent if it is the household head use code = 1			

Shock Codes:

1 = Drought 2= Flood 3= Erosion 4=rain/hail 5= Pest/Disease on crops 6= Theft of crops 7 = loss of livestock 8 = Fire 9 = Conflict/Violence 10= household member illness 11 = household member death

SECTION 2: HOUSEHOLD DEMOGRAPHICS

Please list all household members (that are under care of the household head in terms of food and shelter provision)

1. NAME	2. SEX Male= 1 Female=0	3. AGE years	4. Relationship to the household head 1 = Male-Head 2 = Spouse of head 3 = Female-Head 4 = Husband of Head 5 = Son/daughter 6 = Son/daughter in law 7 = Father/mother 8 = Sister/brother 9 = Niece/nephew 10 = Grandchild 11= Grandparent 12 = Servant/Worker 13 = Father/Mother in law 14 = Other: specify in table	5. Marital status 1 = Married 2 = Single 3 = Divorced 4=Separated 5 = widowed 6=premarriage	6. Religion 1 = Hindu 2 = Muslim 3 = Sikh 4=Christian 5 = Other: specify	7. Caste 1=SC (Scheduled Caste) 2=OBC (Other Backward Class) 3=ST (Scheduled Tribes) 4=Gen (General) 5=other: specify in table	8. Presence For how long does this household member live in this place? 1= since birth 2= since 2 years 3= since 5 years 5= less than 10 years 6= longer than 10 years	9. If in question 8, other than =1, where has the household member lived before? 1=same area, less than 1km/1hour away 2=Not more than 5km/5hour away 3=not more than 10km/10hours away 4=another town, more than 10 km from here	10. Schooling How many years of schooling did he/she have Number of years (total of all including university, or college)	11. What is the highest degree of that person? 1 = No degree 2=less than primary 3=primary 4=secondary 5=HSC,SSC 6=Graduate 7= Other, specify in table	12. Annual income What is the annual income of this person in Rs.	13. Is this person currently enrolled in the DAN health insurance program? 1= Yes 2= No 3= Don't know	
MID	NAME	SEX	AGE	RELATE	MARRY	RELIGION	CASTE	PRESENCE	LBEF	SCHOOL	DEGR	AMINC	DAN
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													

SECTION 3: LAND HOLDINGS, TENURE

- 3.1. What is the total area of land that the household currently owns? a) Size _____ SZECO b) Unit _____ SZECOU
 3.2. What is the total area of land that the household owned 5 years ago? a) Size _____ SZEOB b) Unit _____ SZEOBU
 3.3. What is the total area currently cultivated by the household? a) Size _____ SZEC C b) Unit _____ SZECU
 3.4. How much land did the household sell in last 12 months? a) Size _____ SZESL b) Unit _____ SZESLU c) Price of land sold in Rs _____ PRSL
 3.5. How much land did the household purchase in last 12 months a) Size _____ SZEPU b) Unit _____ SZEPUU c) Price of land purchase in Rs _____ PRPU
 3.6. Ask the characteristics of the plots **owned or used** by the household and conservation measures used: [Reference period: March 2013 to end of March 2014]

PLOT ID	1. Name of the plot	2. What is the area of the plot? Please first list all plots in the table and then continue with question 3, etc. for all plots	3. What type of tenure is this plot? 1 = owned and possessed/operated land 2 = land leased in others 3 = owned land leased out to others 4 = sharecropping 5 = Forest land 6 = other, specify in table	4. If in question 3 = 1 or 3, in which year did the household first acquire this plot? If in Question 3 = 2, 4, 5 or 6, put "n.a." in the cell	5. If in question 3 = 1 or 3, how did your household acquire this land? 1 = Inherited 2 = Purchased 3 = Purchased 4 = Use right given by local leader 5 = other, specify in table If in Question 3 = 2, 4, 5, or 6 put "n.a." in the cell	7. If land leased-out (question 3=2), what is the rent received? If in Question 3 = 1 or 2, put "n.a." in the cell		8. What legal title do you have for this plot? 1 = Sales receipt 2 = Customary right 3 = Customary 4 = other (specify in table) 5 = none	9. Who owns the plot? If the land is not owned, who controls the plot? 1=Head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member	10. Main water source 1 = irrigated 2= rain-fed	11. What is the rough value of this land? (in Rs)	12. How far is this plot away from the household?		13. Soil Type 1=shallow red 2= grey soils 3=deep black soils 4= medium deep black soils 5= Other, specify in table	14. Conservation type on the plot 0= None 1=Stone bund 2=Soil bund 3= Cover crops 4= Mulching 5= Other, specify in table
						Amount In Rs.	Frequency 1 = month 2 = year 3 = other, specify					In km	Minutes walking		
PID	PNAME	PAREA	PUNIT	PYR	PACQ	PRENTA	PRENTF	PLEGAL	GENL	PIRR	PVALUE	PKM	PMIN	SOIL	CONST
1															
2															
3															
4															
5															
6															
7															
8															

Unit Code: 1= acres, 2 = ha, 3 = Gunta, 4 =feet

SECTION 4: CROP PLANTING AND MANAGEMENT

4.1. Fill in columns for each season, parcel ID and crops planted first (questions 2 and 3). If one plot covers more than one crop use a new line for the next crop! Make sure that the Parcel IDs are matched with Sections 3. Thereafter continue with question 4 and complete each row for crop management.

1. Season	2. Plot ID	3. Crop codes below	4. Main tillage method used on this field	5. Month crop planted	6. Area planted	7. What type of seed did you use?	8. Source of seed	9. Did you buy this seed	10. Cost of seed if purchased this season		11. Quantity of seed used on this plot?	12. How many weeding did the hh do in this field?	13. How many times was the field sprayed with insecticide? (Enter '0' if not sprayed)	14. Applied manure and/or compost to this field?	15. Quantity of basal dressing fertilizer applied?		16. Source of this fertilizer	17. Quantity of top dressing applied?		18. Source of this top dressing	19. Machinery Cost	20. Other Cost
									Unit	Amount in Rs					SE	SEEON		Quantity	Cost (Rs/bag)			
RABI=1 OCT 2013								BUY						MANU			BSSO			TODSO	MAC	OTHE
SUMMERCROP=2																						
KHARIF=3																						

Crop Code	
1 = Sorghum/Jowar	6 = chick peas
2 = Sugarcane	7 = Pearl Millet
3 = Paddy rice	8 = Groundnut
4 = Wheat	9 = Maize
5 = Grapes	10 = Soybean
	11 = pigeon pea
	12 = Mango
	13 = Sapota
	14 = Custard Apple
	15 = Onion
	16 = Tomato
	17 = Potato
	18 = Brinjal
	19 = Okra
	20 = chilli
	21 = Cole flower
	22 = Rose
	23 = Manigold
	24 = Tuberose
	25 = Chrysanthemum
	26 = Banana
	27 = Ragi
	28 = other, specify here
	29 = other, specify here:
	30 = other, specify here:
	31 = other, specify here:
	32 = other, specify here:

SECTION 5: LABOUR INPUT AGRICULTURE
5.1 Please list the family member and paid workers on your cultivated land. Please list each season separately!

1. Season	2. List the workers WNUM	3. Family or external worker WTYP 1 = Family member 2 = Hired worker	4. Gender of Worker WGEN 1 = male 2 = female	5. Is the worker child or grown up WGCH 1 = adult 2 = child	6. On average this person works on the farm how many			7. If the person is a hired worker (question 3 = 2) what is the wage per hour or per day?	
					... hours per day? (in hours)	... days per month? (in days)	... months per season? (in month)	Wage in Rs.	Unit 1=Per hour 2=Per day
RABI=1 [OCT 2013 – MAR 2014]	1				HPD	DPM	MPS	WAG	WUNIT
	2								
	3								
	4								
	5								
	6								
	7								
SUMMER CROP=2 MAR 2013 – JUN 2013	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
KHARIF=3 JUL 2013 –OCT 2013	1								
	2								
	3								
	4								
	5								
	6								
	7								

SECTION 6a: CROP PRODUCTION COSTS AND HARVEST PER SEASON

6a.1. Fill in columns for crops for all season first. After this complete each question

1. Season	2. Crop see codes below Fill in all crops for all seasons first. Then fill out the remaining table	3. Quantity of crop harvested		4. How much of this was stored for consumption by the household?		5. How much of this was stored for selling later by the household?		6. Who decides about the utilization of this crop?
		Quantity	Unit	Quantity	Unit	Quantity	Unit	
RABI=1 [OCT 2013 – MAR 2014]	CROP	QHARV	QUNIT	QCONS	QUNIT	QST	QUNIT	SADEC
SUMMER CROP=2 MAR 2013 – JUN 2013								
KHARIF=3 JUL 2013 –OCT 2013								

SECTION 6b FOOD SECURITY
Please give one option of the following for this household. Enter here: _____
1= landless
2= some land, but no produce
3= Food crop – sufficient for less than 3 months
4= Food crop – sufficient for 3-9 months
5= Food crop – sufficient for 10-12 months
6= Substantial surplus produce - sold

SECTION 6c Agricultural Discussion
How often do you or any other household member discuss about agricultural practices with relatives or friends? APDISC _____
0=Never, 1= more than once a week, 2= about once a week, 3= about once or twice a month, 4= about once a month, 5= less than once a month, 6=unplanned, 7= other, specify

Crop Code	1 = Sorghum/Jowar	6 = chick peas	11 = pigeon pea	16 = Tomato	21 = Cole flower	26 = Banana	31 = other, specify here:
2 = Sugarcane	7 = Pearl Millet	12 = Mango	17 = Potato	22 = Rose	27 = Ragi	27 = Ragi	32 = other, specify here:
3 = Paddy rice	8 = Groundnut	13 = Sapota	18 = Brinjal	23 = Marigold	28 = other, specify here	28 = other, specify here	
4 = Wheat	9 = Maize	14 = Custard Apple	19 = Okra	24 = Tuberose	29 = other, specify here:	29 = other, specify here:	
5 = Grapes	10 = Soybean	15 = Onion	20 = chilli	25 = Chrysanthemum	30 = other, specify here:	30 = other, specify here:	

SECTION 7: CROP MARKETING

Ask the following questions for the total quantity sold per season																	
2. Crop see codes below	3. Who primarily decided to sell this crop? 1=Head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member	4. What quantity did the household sell in total during that season Unit: 1=kg, 2= tons, 3 = qtls, 4= other, specify in table	5. Was the crop graded or sorted before sale? 1=Yes 2=No	6. What was the quality of the produce? 1=high 2=fair 3=low	7. Month this crop was sold 1=Jan, 2= Feb, 3=Mar, 4=Apr, 5=May, 6=Jun, 7=Jul, 8=Aug, 9=Sep, 10=Oct, 11=Nov, 12=Dec (if more than 1 month put all months in cell)	8. To whom did the household sell? 1= processor 2=Trader 3=Retail Shop 4=Individual Consumer 5=Cooperation 6=Institution (e.g. school) 7=Supermarket 8=other: specify	9. For how long do you sell to this buyer? 1=first time 2=also the season before 3=also the year before 4=also 2 years before 5= more than 3 years before	10. Type of market 1=Spot 2=Contract 3=Contract & certified 4= oral agreement with contractor 5= other: specify in table	11. Where did the household sell? 1=home 2=Local market 3=Taluk Market 4= District market 5= Other: specify in table	12. Was the buyer known ahead? 1=Yes 2=No	13. How far was the point of sale from the household? in km	14. Transport cost PER UNIT for the crop to the point of sale. If own transport was used, how much would you have charged per Unit? Unit: 1=kg, 2= tons, 3 = qtls, 4= other, specify in table		15. Selling price per unit Unit: 1=kg, 2= tons, 3 = qtls, 4= other, specify in table		16. When did you receive the payment? 1=Instantly 2=within 1 week 3=within 3 weeks 4=within 6 weeks 5=within 3 months 6= within 6 Months 7= it took more than 6 months 7= still waiting	17. Was the price of the transaction known before the transaction? 1=Yes 2=No
												Transp. Cost in Rs	Unit	Price Rs	Unit		
CROP	DEC	QTN	LUN	GRA	MTH	SELL	LNG	MAR	PLACE	BUY	DIST	TRANS	TUNIT	PR	UNIT	PKNOW	
RABI=1																	
[OCT 2013 – MAR 2014]																	
SUMMER CROP=2																	
[MAR 2013 – JUN 2013]																	
KHARIF=3																	
[JUL 2013 –OCT 2013]																	

Crop Code

1 = Sorghum/Jowar	11 = pigeon pea	21 = Cole flower	26 = Banana	31 = other, specify here:
2 = Sugarcane	12 = Mango	22 = Rose	27 = RagI	32 = other, specify here:
3 = Paddy rice	13 = Sapota	23 = Marigold	28 = other, specify here	
4 = Wheat	14 = Custard Apple	24 = Tuberose	29 = other, specify here:	
5 = Grapes	15 = Onion	25 = Chrysanthemum	30 = other, specify here:	
	16 =Tomato			
	17 = Potato			
	18 = Brinjal			
	19 = Okra			
	20 = chilli			

SECTION 8: AGRICULTURAL EXTENSION AND FARMING ADVICE

8.1. Did anyone in this household receive extension advice from any source in the past 12 months? EXTE _____ 1 = YES 2 = NO > go to 8.3
 8.2. Fill in the table below on details of extension services

1. SOURCE	2. Did anyone in this household receive extension advice from this [SOURCE] in the past 12 months? 1 = Yes 2 = No > next source	3. Which household member commonly received advice from [SOURCE] 1=Head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member	4. How many times did the household receive advice from the source (see question 1) in the past 12 months? TOTAL OF ALL (number farm visits, household member visiting field an institution, send person, phone calls etc.)
EXTSO	EXTSOYN	EXAD1	EXFQ
NABARD	1		
Input supplier	2		
NGO	3		
Cooperative/Farmer's association	4		
Farmers Meeting	5		
Other smallholder farmer	6		
Radio	7		
TV	8		
Other (specify)	9		

Codes: how to know about the activity

- 1 = friend
- 2 = relative
- 3 = Government Officer
- 4 = NABAR Officer
- 5 = radio
- 6 = TV
- 7 = public poster
- 8 = public open event
- 9 = former participant
- 10 = other: specify in table

8.3 Did anyone in this household participate in the following group based extension activities in the past 5 years? GEXTEN

1. Activity	2. Participation 1 = Yes 2 = No > Next activity	3. How many times member (s) participated in [...] TOTAL OF ALL	4. What was the main benefit of this activity? 1=Extension & Training 2=Produce & marketing 3=Input acquisition 4=Financial e.g. credit 5=Emergency support 6=Savings 7=Other specify	5. How did the hh get to know about the activity? See codes below
GEA	STATUS	GENO	TOP1 TOP2	HINKOW
Demonstration/Trials	1			
Field days/tours	2			
Farmer Field Schools	3			
Other (specify)	4			

SECTION 9a: GROUP PARTICIPATION

9a.1. Does any household member participate in a group **GROUP** _____ 1= Yes, 2 = No (go to section 9a2. Below)

GROUP	1. Does any member of household participate in the following 1=Yes 2=No	2. Name of group	3. Who in the household is an active member? If it is more than one member use several codes per cell. 1=HH head, 2=Spouse, 3=Head & Spouse 4= other male household member, 5= other female household member	4. For how long have they been a member (years)	5. Leadership role of member in this group (e.g. chairman, secretary etc.) 1 = Yes 2 = No	6. What were the motives of joining the group? Select 2! 1=Extension & Training 2=Produce & marketing acquisition 3=Input Savings 4=Access to loan 5= Emergency support 6= Other- specify in table	7. What services do you get from this group [List 3 items in order of importance] 0=none 1=Extension & Training 2=Produce & marketing 3=Input acquisition 4=Access to loan 5= Savings 6= Emergency support 7=Other- specify in table	8. How often did the respondent participate in meetings in last 12 months?
	GMEM	GNAME	GWHO	GYR	GLR	MOT1 MOT2	GSV1 GSV2 GSV3	MEET
Chailanya SHG 1								
Other SHG 2								
Farmer group 3								
Farmer group 4								
Farmer group 5								
Women's group 6								
Health/Nutrition program 7								
Social/spiritual 8								
Political 9								
Business 10								
Other specify 11								

9a.2. Has any member of this household participated in any mobile phone based information systems (e.g. SMS information services) in the last 5 years? **GMS** _____ 1=Yes 2=No >go to 9a4

9a3. If yes in question 9a2, what is your main motivation to participate in this service? **MOTM** _____ 1=price info, 2= info, where to sell, 3=info on whom to sell, 4=other: specify here: _____

9a4. If no in question 9a.2, why do you not participate? **RNOT** _____ 1= don't know about such service, 2= don't know how to access such service, 3=to expensive, 4= no mobile network in my area, 5 = other: specify here: _____

Please now compare your household situation 5 years ago and today in terms of the following aspects on a scale of [1= Not at all 2 = Little 3 = Somewhat 4 = To a great extent].

- 9a.5. Access to information on crop and livestock production has increased. **INFO1** _____
- 9a.6. Access to information on inputs such as seeds and fertilizers has increased. **INFO2** _____
- 9a.7. Access to information on markets has improved. **INFO3** _____
- 9a.8. Access to information on weather forecast has improved. **INFO4** _____
- 9a.9. Access to information on banks, credit, and savings has improved. **INFO5** _____

SECTION 9b: SHG, SANCHAYAN SAVINGS SCHEME, HEALTH

9b.1 Did any member of your household participate in the Sanchayan Savings Scheme from your SHG since the year 2011? *SAN* _____ 1 = YES 2 = NO > go to 9b.5

9b.2 If yes in 9b.1, how many household members enrolled in which year? *YPART*

Member (see section 2, question 4 for household member codes)	Year and month of opening account		Year and month of closing account	
	Year	Month	Year	Month
RELATE	YEARO	MONTHO	YEARC	MONTHC

9b.3 If yes in 9b.1, what was the motivation to participate in the Sanchayan Savings Scheme? – Rank maximum of 2 points *MOT1* _____ *MOT2* _____
 1 = Earn Interest Rate, 2 = Learn about Savings management, 3 = Pressure in my group, 4 = Try something new, 5 = Sanchayan was promoted really good in my group, 6 = Other specify here _____

9b.4 If yes in 9b.1, what did the household change after joining the program? *CHA1* _____ *CHA2* _____ *CHA3* _____
 0 = nothing, 1 = credit uptake increase, 2 = credit uptake decrease, 3 = credit volume increase, 4 = credit volume decrease, 5 = other: specify _____

9b.5 If no in 9b.1, why does no household member participate in this program? - *WHY* _____

1 = do not know the program, 2 = not offered in my SHG, 3 = no time, 4 = have sufficient saving possibilities, 5 = Pressure in my group, 6 = Sanchayan was not really promoted in my group,

7 = I closed my account, 8 = other: specify here _____

9b.6 If no in 9b.1 (no household member so far participated in the program), do you know participants of the program? *NFORM* _____ 1 = YES, 2 = NO > go to 9b.8

9b.7 If yes in 9b.6, how often do you talk with this participants? - *OFF* _____
 0 = Never 1 = more than once a week, 2 = about once a week, 3 = about once or twice a month, 4 = about once or twice a month, 5 = less than once a month, 6 = unplanned, 7 = other: specify here _____

9b.8 How often do you or any other household member discuss about savings opportunities with relatives or friends? *FIDISC* _____
 0 = Never 1 = more than once a week, 2 = about once a week, 3 = about once or twice a month, 4 = about once a month, 5 = less than once a month, 6 = unplanned, 7 = other: specify here _____

9b.9 How valuable do you think Sanchayan would be for the other members in your SHG? *VLSG* _____ 1 = Very Valuable, 2 = Somewhat Valuable, 3 = Not Very Valuable 4 = Not Valuable, 5 = Don't know

9b.10 In the last week, how much did your household spend on health care costs, excluding insurance reimbursements? *HLTH Rs* _____

9b.11 Amount you receive any reimbursements/funds to pay for medical bills this week (i.e., will receive funds at household level)? From Government *HGOV Rs* _____ Not Government _____ NG

9b.12 Did you receive any additional services from insurance/government/etc. that lowered the cost of medical care or improved medical care? *ADSV* _____ 1 = Yes, 2 = No, 3 = Don't Know, 4 = N.A.

9b.13 If yes in 9b.12, please describe *DSCSR*: _____

9b.14 Number of family members which had medical concern/illness this past week? *MDCNSW*: _____

9b.15. Did any household member visit one of the following in the last week? *HVIST* 1 = Yes, 2 = No,

- 1- Private health facility (e.g., doctor or any health care professional) *HVIST1* _____
- 2- Public health facility (e.g., doctor or any health care professional) *HVIST2* _____
- 3- Laboratory *HVIST3* _____
- 4- Medical Store (i.e., Pharmacy) *HVIST3* _____

SECTION 10: FINANCIAL ACTIVITY

10.1 Please fill out the table below

1.	2.	3.	4.
What type of program did you attend?	Did any member of your household participate in the program? 1= Yes, 2= No If no, go to next row	Duration of the program 1= <3 days 2= 3-7 days 3= 7-14 days 4= 14-30 days 5= other: specify	How satisfied have you been with the program? 1= fully 2= to some extent 3= not satisfied
PROG	PART	DUR	SAT
Formal Financial Literacy Program	1		
Credit Counselling by banks	2		
SHG capacity building	3		
Other: specify:	4		

10.2 Are you aware of the following institutions and financial tools?

10.3 Do you use them for financial services?

10.4 What is your overall degree of confidence with the following financial institutions/financial tools? –See codes below.

Institution/Financial tool

	10.2 Awareness	10.3 Utilization	10.4 Confidence
a. Commercial Bank	AWRA ___ 1 = YES 2 = NO	USEA ___ 1 = YES 2 = NO	TRUA ___
b. Cooperative Bank	AWRB ___ 1 = YES 2 = NO	USEB ___ 1 = YES 2 = NO	TRUB ___
c. Rural Regional Bank	AWRC ___ 1 = YES 2 = NO	USEC ___ 1 = YES 2 = NO	TRUC ___
d. SHG/JLG (Joint Liability Group)	AWRD ___ 1 = YES 2 = NO	USED ___ 1 = YES 2 = NO	TRUD ___
e. Chit Fund	AWRE ___ 1 = YES 2 = NO	USEE ___ 1 = YES 2 = NO	TRUE ___
f. Insurance company	AWRF ___ 1 = YES 2 = NO	USEF ___ 1 = YES 2 = NO	TRUF ___
g. Post office	AWRG ___ 1 = YES 2 = NO	USEG ___ 1 = YES 2 = NO	TRUG ___
h. Company shares	AWRH ___ 1 = YES 2 = NO	USEH ___ 1 = YES 2 = NO	TRUH ___
i. Government Bonds	AWRI ___ 1 = YES 2 = NO	USEI ___ 1 = YES 2 = NO	TRUI ___
j. Mutual funds	AWRJ ___ 1 = YES 2 = NO	USEJ ___ 1 = YES 2 = NO	TRUJ ___
k. Primary Credit Cooperative Society	AWRK ___ 1 = YES 2 = NO	USEK ___ 1 = YES 2 = NO	TRUK ___
l. Private Moneylender	AWRL ___ 1 = YES 2 = NO	USEL ___ 1 = YES 2 = NO	TRUL ___

Codes for degree of confidence

- 1= Yes. I would definitely trust them with my money
- 2= I might trust them with my money
- 3= Given a choice I would not like to trust them with my money
- 4= I would definitely not trust them with my money
- 5= can't say

10.5 In general, how much is your household expenditure in relation to your income in a typical month or week? EPIC ___ 1= I don't know, 2= almost equal, 3= expenses are higher, 4= income is higher

10.6 If you have money to spend in one month, what is your preference? – Please rank at least 3 of the alternatives below SURP

- a. I spent for additional requirement like clothes, household stuffs etc.
- b. I buy some valuable assets
- c. I use it as working capital for small enterprise activity
- d. I save for future requirement
- e. Other: specify _____
- f. Don't know

10.7 Do you keep record of you income and expenditures? NOTE ___ 1 = YES 2 = NO > go to 10.9

10.8 If yes in 10.7 do you separately calculate income and expenditures for private household and for your business (f.e. agriculture) SEP ___ 1 = YES 2 = NO

10.9 Does your household face financial difficulty? DIFF ___ 1 = YES 2 = NO

10.10 If yes in 10.9, why does your household face these problems? FPRO ___
1=bad luck (job loss, illness, shock), 2=not enough savings, 3=too much credit debt, 4= not following a financial plan, 5=unable to earn enough money, 6=other: specify here _____

10.11 Remaining Financial Items

1.	2.	3.	4.
Banking item	How many household members do use this financial item?	If more than zero persons are using the item, how many days in a week each person use it on average?	If in question 2 = 0, why is no household member using this item? Use codes below BNOUSE
BIT	BPEOP	BFRQ	
Mobile Banking			
Internet Banking			
Bank Account		N.A.	
Life Insurance		N.A.	
Health Insurance			

Codes for not using financial item

- 1= don't have the required technological devices, 2= to expensive, 3= Don't know about it,
- 4=Don't know how to use it, 5= Don't trust, 6= other: specify here: _____

SECTION 11a: CREDIT

11a.1. During the last 12 months, has any member of your household borrowed any money or goods from family, friends, other private persons, commercial banks or other institutions?
 [CONSIDER ALSO VERY SMALL CREDITS] *HCRE* _____ 1 = Yes 2 = No > go to SECTION 11c

1. Please ask the respondent all of the following credit purposes First. Then continue with question 2	2. Household member ID See section 2, question 4 for household member codes	3. What type of account does this household member has? 1=only savings 2=savings +credit 3= only credit 4= no account 5= other, specify	4. Who decides about what to do with the credit? 1=HH head 2=Spouse 3=Head & Spouse 4= other male HH member 5= other female HH member	5. Source of credit/loan obtained 1 = buyer of my produce 2 = Employer 3 = Friend/Relative 4 = Landlord 5 = Government agency 6 = Commercial Bank 7 = Regional Rural Bank 8 = Cooperative Bank 9 = NGO 10 = Chattanya SHG 11 = Chattanya Federation 12 = other SHG 13 = Private Money lender 14 = Shop keeper 15 = Chit fund 16 = Others specify	5. Was this credit in cash or in kind 1 = in cash 2 = in kind 3 = mobile phone transaction 4 = cheque	6. What was the value of the loan [ESTIMATE VALUE IN CASH OR IN KIND] In Rs.	7. What kind of collateral/Mortgage did you provide to obtain this loan 1 = irrigated agric. land 2 = non-irrigated agric. Land 3= Gold 4= other metals, specify in table 5=4-wheeler 6 = 2-wheeler 7= Tractor 8= Bullock Cart 9= Other assets, specify in table 10 = Personal guarantee 11 = Group lending 12 = Co-signer 13 = livestock 14 = None 15 = Other: specify in table	8. What is the interest rate of this loan? Interest rate In % Unit 1 = Daily 2 = Weekly 3 = Monthly 4 = Annually 5 = Others specify	9. What is was the repayment period? In months	10. Would you have wanted a larger loan at the same interest or conditions 1 = Yes 2 = No > SECTION 11b	11. In total how much would you have wanted? In Rs.	12. Why did you not receive what you wanted? 1 = already 1 outstanding loan 2= individual credit limit 3= group credit limit 4= Pressure from others 5 = Lack of collateral 6 = Project not profitable enough 7= Lending policy of institution 8 = Other: specify in table
CRERE	RELATE	ACC	GENGRE	CRESO	CRETY	CREVA	COLL	INT	REP	WISH	WANT	WHY
Farm Fertilizer												
Farm Seeds												
Farm equipment												
Animals												
Agric. Land												
Farm building												
Home appliances												
vehicle: specify												
General/regular expenses												
education fees												
Health services												
For non-agric. Business												
Land												
Title/Certificate												
Product/Process												
Certification												
Legal court												
weather												
Social event/celebration												
Other												

SECTION 11b: CREDIT

11b.2 Does your household need more credit than what you already have? *MCRE* _____ 1 = Yes 2 = No > go to 11c

11b.3 Why do you need more credit? *MMCR* _____

- 4 = Animals, 5 = Agric. land, 6 = Farm building, 7 = Home improvement, 8 = vehicle, specify
- 9 = General/regular expenses, 10 = education fees, 11 = Health services, 12 = For non-agric. business,
- 13 = Land Title/Certificate, 14 = Product or process Certification, 15 = Legal court matter, 16 = Social Event/ceremony, 17 = Other: specify here _____

11b.4 Why does not any household member take more credit? *WNO* _____ 1= No lender will give me more credit,

2 = You don't know, who could lend you more, 3= You don't want to acquire more debt, 4= You can't repay more debt,

5= Another loan is already planned to be taken out, 6 = other: specify here _____

codes: claims against...

- 1 = friend
- 2 = relative
- 3 = trader/wholesale business
- 4 = Business correspondent
- 5 = other, please spell in the table

SECTION 11c: CREDIT CLAIMS OF THE HOUSEHOLD

1. Claim Number	2. Claim of the household against others The claim is against...? <i>(use codes right beside the table)</i> You can use a code several time, but please fill in each claim in new line	3. How many Rs does the household claim from this source... (in Rs)	4. Please indicate the month and year since when the claim is outstanding		5. Who decides about how to proceed with this claim? 1=HH head 2=Spouse 3=Head & Spouse member 4= other male household member 5= other female household member
			Month MM	Year YYYY	
CLANO	CLATYP	CLAAM			DECCLA
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

SECTION 12: SAVINGS

12.1 How does your household save monetary income? SPAT _____ 1=save per planned schedule, 2=save different amounts each month, 3=save whatever is left after meeting expenses, 4=Does not save, 5=other: specify, 6=Don't know

1. Please ask the respondent all of the following savings purposes First. Then continue with question 2 Did any household member save for one of the following items? 1= Yes 2= No	2. Household member ID See section 2, question 4 for household member codes	3. What kind of savings items does the household use? 1 = at home 2 = at friend/relative 3 = Post Office 4 = Chaitanya SHG 5 = other SHG 6 = Sanchayan Savings Scheme in my SHG 7 = Chaitanya Federation 8 = Insurance 9 = commercial bank 10 = cooperative bank 11 = Regional rural bank 12 = Business correspondent 13 = Chit fund 14 = mobile phone 15 = trader/wholesaler 16 = other: specify	4. What is the total amount The household has saved in this item until today? In Rs.	5. Does this member receive an interest rate for this savings item? 1=Yes 2=No > question 8	6. If yes in question 6, what is the interest rate? Interest rate In % Unit 1 = Daily 2 = Weekly 3 = Monthly 4 = Annually 5 = Others specify	7. Who decides about the item? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member
RELATE	RELATE	SAID	SVOL	SINT	SINT	SAVGEN
Farm inputs						
Farm equipment						
Animals						
Agric. Land						
Farm building						
House building						
vehicle: specify						
Food/clothes						
Pay school fees						
Health services						
For non-agric. Business						
Land Title/Certificate						
Product Certification						
Process Certification						
Wedding/Funeral/Festival						
Old age security						
income insecurity						
no specific purpose						
Other:						

SECTION 13b: INCOME FROM SELF-EMPLOYMENT
Does any household member has an own business? OWN B _____ 1= Yes, 2= No > go to **SECTION 13c**

1. Income earning household member [MATCH MID FROM SECTION 2]	2. What type of business do you have? See business codes below	3. What is the typical balance of earnings and costs in a low month?		4. What is the typical high month balance of earnings and costs?		5. In the last 12 months, how many months have been low and how many high months		6. Are you reinvesting your profits, when profits occur? 1=Yes 2=No	7. Is your business formally registered with a business license? 1=Yes 2=No	8. How many years do you have this business?	9. Do you face any problems with your business? 0=no problem 1=high cost 2=low demand 3=much paperwork 4=other: specify	10. Who decides about the income utilization? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member SEGEN	
		Earnings In Rs Per month	Costs in Rs per month	Earnings In Rs Per month	Costs in Rs per month	Low months	High months						LM
RELATE	NAME	BTYP	LE	LC	HE	HC	LM	HM	REINV	REG	SYRS	PROB	SEGEN

Business codes:
1 = processing of agricultural product
2 = Shop
3 = Extension Service
4 = trader (retail/wholesale)
5 = transport of goods
6 = Taxi/Auto Driver
7 = other (please spell it in the table above)

SECTION 13c: INCOME FROM GOVERNMENT SCHEME OR OTHER SOURCES
Does any household member get income from a source listed below? OTHSR _____ 1= Yes, 2= No > go to SECTION 14a

1. Item Number	2. Item Name	3. How many Rs does the household receive from this item...? If income is in kind, please ask for the value in Rs If household receives Rs. 0 from this item, please enter "0" ...per month (in Rs)	4. Who decides about the income utilization? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member, 5= other female household member
ITM	ITMNAM	ITMVAL	OTMGEN
1	Government Scheme	ITMFRE	
2	Remittances Source 1		
3	Remittances Source 2		
4	Remittances Source 3		
5	Rent from house, shops		
6	Food Aid		
7	National Rural Employment Guarantee Scheme		
8	Other: specify		
9	Other: specify		

SECTION 14a: LIVESTOCK OWNERSHIP

Does any household member hold any livestock? LVST

1= Yes, 2= No > go to SECTION 15

1. Livestock	2. Number currently owned	3. Estimate value of all number of this item in Rs.	4. How many did you buy in the last 12 months?	5. How many did you sell in the last 12 months ?	6. How many units of this item did your household use as security to get a loan in the last 12 months? If the answer is 0 go to question 8	7. For how many months did you use this item as loan security? In months	8. Who controls the revenue from this sale? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member
LRID	LRCU	LRVAL	LRBY	LRSEL	SECUN	DURLS	LRREV
Desi Cows	1						
Cross Breed Cow	2						
Desi Ox	3						
Cross Breed Ox	4						
Desi Buffalo	5						
Cross Breed Buffalo	6						
Heifer	7						
Calves	8						
Goat	9						
Sheep	10						
Poultry	11						

SECTION 14b: LIVESTOCK EXPENDITURE

14b.1. Please fill out the table below and refer to the period of last twelve months (March 2013 to February 2014)

1) Type of Expenditure	2) Did you spend on any [.....] 1 = Yes 2 = No > Next type	3) What was the cost per month in Rs?	4) How many months in the last 12 months did this cost happen?
LRTY	LREXP	LREXV	LNM
Hired labour for herding	1		
Livestock/poultry feed	2		
Veterinary services/medicine	3		
Other expenses: specify in table	4		

SECTION 14c: LIVESTOCK PRODUCTS AND INCOME14c.1. Did you produce any livestock products in this household in the past 12 months? *H/PRO* _____ 1 = YES 2 = NO > 14c.3

14c.2. Fill in the table below for details of livestock products and income

1. Livestock Product	2. Number of production months in the past 12 months <i>if 0 > Next product (next line)</i>		3. Average production per month (during production months)		4. Average sales per month (during production months)		5. What was the average consumption per month (during production months) from own production? For unit see question 3		6. Who controls the revenue from this product? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household	7. To whom do you mainly sell your products? 1= Trader 2= Retail shop 3= Individual consumer 4= Cooperative association 5= Institution (e.g. school) 6= Supermarket 7= Company 8= Others specify
	Quantity	Unit 1= Kgs 2 =Trays 3 = Litres 4 = Numbers 5 = Other (specify)	Quantity	Total value in (Rs)	Amount	Unit	Amount	Unit		
	LPQU	LPUNI	LSQTN	LSUN	LPEAT	LUNIT	LPEAT	LUNIT	LCON	LPSEL
Cow Milk	1									
Goat Milk	2									
Ghee	3									
Eggs	4									
Chicken	5									
Goat Meat	6									
Mutton	7									
Pork	8									
Other Meat	9									
Hides and	10									
Other:	11									
Other:	12									

14c.3. Did you get any income from hiring out livestock (like oxen/donkey/mule) during the last 12 months? *H/IRE* _____ 1 = Yes 2 = No > SECTION 1514c.4. How much did you get in the last 12 months? (Record cash value. If in kind, give estimated cash value in Rs.). *H/REA* _____

SECTION 15: ACCESS TO INFRASTRUCTURE

15.1. Fill in the table on household access to infrastructure

INFRAST

INFRA	1. What is the distance in km from your household to [...] Don't know= -999	2. How do you or other household members usually get to [...] 1= Walking 2 = Own car 3 = Own motorbike 4 = Bicycle 5 = Bus, taxi, Auto 6 = Others, specify	3. How long does it take to get to [...] by using this means of transportation?
	INFDIS	INFTRA	TIME
			UNIT (1=Minutes 2=Hours)
1 Taluka Main City			
2 Nearest bus stop			
3 Nearest all weather road			
4 Nearest extension office			
5 Nearest place where you can buy farm inputs			
6 Nearest market where you can sell your produce			
7 Nearest mobile phone mast			
8 Nearest public phone			
9 Nearest place, where you can use internet (Cybercafe)			
10 Nearest electricity supply			
11 Nearest financial institution			
12 Nearest animal health centre			
13 Nearest health centre, clinic or doctor			
14 Nearest primary school			
15 Nearest secondary school			

SECTION 16 EXPOSURE TO INFORMATION SOURCES

1. Information item

2. During the last 1 months, how often have you used the following information item?

1 = every day, 2 = At least once a week, 3= Less than once a week, 4 = Did not use this media item the last 4 weeks
5 = Have never used this item before

INF	
TV	USMED
Internet	
Newspaper	
Mobile Phone	
Visit public shows	
Other	
Other	

SECTION 17a HOUSEHOLD ASSETS

17a.1. Fill in the assets in usable and repairable condition that this household own.

Asset	1. Number of items currently owned <i>If the household don't own the asset, record zero and skip to next asset</i>	2. Estimate total value of all number s of this asset together In Rs.	3. Year when asset was acquired <i>If several assets, write year of first/oldest acquired asset and of the newest</i>	4. How many units did you buy of this item in the last 12 months?	5. How many units did you sell of this item in the last 12 months?	6. How many units of this item did your household use as security to get a loan in the last 12 months? If the answer is 0 go to question 8	7 For how many months did you use this item as loan security? In moths	8. Who in the household decides about the utilization of the asset? 1=HH head 2=Spouse 3=Head & Spouse 4= other male household member 5= other female household member	ASSET	ANUMBER	ASSVA	OLDA	YOUA	NUMBY	NUMSE	SECUN	DURLS	GASS
Farm Equipment																		
Storage Facility (GODOWN)	1																	
Polvhouse	2																	
Tractor	3																	
Tractor	4																	
Tractor attachment1:	5																	
Tractor attachment2:	6																	
Tractor attachment3	7																	
Planting Machine 1:	8																	
Planting Machine3:	9																	
Planting Machine2:	10																	
harvester	11																	
Wheelbarrow	12																	
Spraypumps	13																	
Diesel/Petrol pumps	14																	
Hand hoe (TIKAN)	15																	
Hoe (KUDAL)	16																	
Hoe (KHURPE)	17																	
Hand thresher	18																	

SECTION 17b: HOUSEHOLD ASSETS

17b.1. Fill in the assets in usable and repairable condition that this household own.

SECTION 17c: HOUSEHOLD ASSETS

17c.1. Fill in the assets in usable and repairable condition that this household own.

Asset	1. Number of items currently owned <i>If the household don't own the asset, record zero and skip to next asset</i>	2. Estimate total value of all numbers of this asset together In Rs.	3. Year when asset was acquired <i>If several assets, write first/oldest asset and of the newest</i>	4. How many units did you buy of this item in the last 12 months	5. How many units did you sell of this item in the last 12 months	6. How many units of this item did your household use as security to get a loan in the last 12 months? If the answer is 0 go to question 8	7. For how many months did you use this item as loan security? In months	8. Who in the household decides about the utilization of the asset? 1=HH head 2=Spouse 3=Head & Spouse 4= other household member 5= other
ASSET	ANUMBER	ASSVA	OLDA	YOUA	NUMBY	SECUN	DURLS	GASS
Farm Equipments								
FAVDI	15							
Plough sets (VAFA)	16							
Borehole	17							
Motorized thresher	18							
Rice winnower	19							
Drip Sprinkler (THBAK)	20							
Sprinkler (TUSHAR)	21							
Grinders/millers/Grinding	22							
Cutter	23							
Carts	24							
Other:	25							
Other Assets								
Basic household utensils	26							
Radio	27							
Black/White TV	28							
Color TV	29							
PC	30							
Mobile Phones	31							
Land phone	32							
	33							
Other Assets								
Other Assets	34							
Internet Device	35							
Fridge	36							
Stone wall	37							
Gas stove	38							
fan	39							
Gold	40							
Jewellery	41							
Generator	42							
Water tanks	43							
(Can) Batteries	44							
Bicycle	45							
2-Wheeler	46							
3-Wheeler	47							
4-Wheeler	48							
House	49							
Other:	50							
Other:	51							
Other:	52							

SECTION 18: TIME PREFERENCE TIMP

18.1 In the following 5 options will be given, please hypothetically choose one and circle the answer

Option	Immediate Payment	Payment after one year
1	Rs. 5000	Rs. 6000
2	Rs. 5000	Rs. 7000
3	Rs. 5000	Rs. 8000
4	Rs. 5000	Rs. 9000
5	Rs. 5000	Rs. 10000

18.2 Please choose one of the following options. Circle the amount in the text *TIMPM*
Would you prefer Rs 5000 in one month from today or Rs 8000 in 13 months from today?

SECTION 19: RISK

19.1 Please choose one of the following two options: RISK_____1= Option 1, 2= Option 2

- Take Rs. 100
- Take a chance to win Rs. 300 with a chance of 50% or loose Rs.100 with a chance of 50%

19.2.For Enumerator: Please indicate below, which event occurred! - *R/RES*

- Rs. 100
- Rs. - 100
- Rs. 300

19.3 How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?
Please rate yourself on a scale of 0 to 10, where 0 means you are "unwilling to take any risks" and 10 means you are "very much prepared to take risk".
Enter Number here _____ *RESTM*

SECTION 18: For Enumerator: READ THE FOLLOWING INSTRUCTIONS:

1. This is a game!
2. You now can make 5 choices between an immediate payment and a payment one month later!
3. This is a game! You cannot win real money!
4. This is the table of choices [Show the table to the respondent]
5. Please begin with option 1 and choose the immediate payment or the payment after one month!
6. Please circle for each option the option the respondent has chosen!

SECTION 19: For Enumerator: READ THE FOLLOWING INSTRUCTIONS

1. You now will be given two options, where you again cannot win real money
2. **Option 1:** Just take Rs 100 without any risk
3. **Option 2:** Taking a 50% chance of winning either Rs. 300, or losing Rs 100
4. You can't lose any real money
5. You can't win any real money
6. It is just a game!
7. Which option will you take? [Enter Decision on left side in **field 19.1**]
8. **If Option 1:** You would have chosen save Rs 100
9. **If Option2:** Please choose a side of this coin [Take a coin and show it]
10. I will throw the coin, if it lands with your side chosen up, you win, otherwise you loose