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on informal interest rate*

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The effect of participation in microfinance programs on informal interest rate*

Tiziana Venittelli[†]

Abstract

A recent theoretical strand of the rural credit market literature points out the hypothesis of a complementarity relationship between formal and informal credit suppliers in developing countries. To lower their agency costs, banks would set up a credit supply that resorts to well-informed moneylenders. However, when the formal credit suppliers are Microfinance Institutions (MFIs), the benefits potentially arising from the duality in the market may also be reaped by moneylenders. Both the group-lending mechanism - which allows MFIs to transfer agency costs to borrowers - and the requirement to invest the credit in productive activities potentially make MFI clients less risky for moneylenders. In this paper, I focus on the rural credit market of Andhra Pradesh and find evidence that participants to microcredit programs obtain lower interest rates from informal credit providers.

Keywords: Microfinance, Moneylenders, Complementarity

JEL classification: G21, O12, O17

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1 Introduction

In recent years public policies of many developing countries have started to support investments in productive activities with microfinance programs. The objective of such policies is to ensure better credit market access to the poorest, subtracting them from exploitative moneylenders. However, the coexistence of both formal and informal lenders in the market motivated some researchers to question the substitutability between the two suppliers, in favor of a potential complementarity relationship. Due to asymmetric information problems, formal financial institutions have the incentive to set up a credit supply that force borrowers to resort to informal financial providers. To do so, they apply more binding constraints to the loan repayment (Jain & Mansuri, 2003) or partially ration borrowers' credit needs (Andersen & Malchow-Moller, 2006; Jain, 1999). Therefore, banks use the well-informed moneylenders' superior ability in monitoring borrowers to lower their agency costs.

For the specific case of microcredit suppliers, Jain & Mansuri (2003) argue that both the weekly loan installments imposed by MFIs to repay the loan - long before borrowers realize the return on investments - and the working capital needs generated by the businesses they started up favor not only the moneylenders' survival, but even their expansion.¹ Mallick (2012) finds evidence that the informal credit price in Bangladesh is higher in villages with a larger number of MFIs, thus supporting Jain and Mansuri's hypothesis on the increased demand for informal loans. Berg *et al.* (2013) partially confirm Mallick's results for Bangladesh, finding

¹According to the authors, when the MFIs entry the market they could accept also credit-seekers previously rationed by moneylenders. So that, on the one hand, informal lenders lower the amount of credit *per borrower*, because of the MFIs entry, but if the number of borrowers who enter the market increases more, they might face an increase of the credit demand.

that the interest rate charged by moneylenders increases significantly at sufficiently high levels of MFI coverage, while there is no significant effect at low levels of MFI coverage. Their results, however, seem to be more consistent with the hypothesis of adverse selection that affects moneylenders after MFIs entrance in the market. In this respect Venittelli (2016) shows that the per village number of MFI loans has a positive effect on the informal interest rate in Andhra Pradesh only in areas where the informal credit market is not in competition, while the effect is negligible in more competitive markets. She argues that where the informal credit price is high, because of moneylenders market power, borrowers prefer microfinance to the informal indebtedness after the MFIs entrance in the market, making the pool of moneylenders' clients worsened.

Another way to solve the asymmetric information problems may consist of the dynamic incentives (Varghese, 2005). Because borrowers are not able to pledge collateral, banks lower default risk with frequent installments loans repayment and disbursing larger amount of credit if debtors repay regularly previous debts. As the author argues, borrowers with profitable projects, but bad luck in some periods, will be definitively rationed. So moneylenders ensure that poorer people with positive net return business could repay in any circumstance. The empirical evidence shows that debt repayment by borrowers with access to informal market does not depend on their income trend.

A group of studies highlight potential benefits for both the formal and informal institutions, deriving from the market duality. In the Bell's model (Bell, 1990) borrowers choose banks as leading credit source, due to the lower interest rate they charge with respect to the informal sector. However, the upper limit to the credit price imposed by public policies creates credit rationing for some

borrowers, who resort to moneylenders. The empirical evidence from rural Indian market shows that villages with formal financial institutions have better informal credit market conditions. If banks support borrowers' investments, local income and wealth are expected to raise and, as a result, informal lending activities are expected to become less risky. This would suggest that moneylenders may benefit from the entrance of financial institutions in the rural market. As Andersen & Malchow-Moller 2006 point out in their theoretical model, both the formal and informal sector take advantage by co-financing the borrowers' projects. Banks partially ration their clients, forcing them to ask for informal loans to fully meet their investment needs. Thanks to the co-financing, formal institutions transfer monitoring costs on better informed moneylenders while moneylenders increase efficiency by reducing their operational scale.² Also Jain (1999) shows that co-financing is the Pareto-efficient Nash equilibrium of the game.

In this paper I investigate the complementarity relationship between a specific type of formal institution, i.e. the MFI, and the informal credit providers. In particular, I empirically test if previous participation in microcredit programs helps borrower to obtain better financial market access conditions, i.e. lower informal interest rate. I argue that when the formal lender is a traditional MFI, some benefits deriving from the coexistence of both the formal and the informal providers in the market may be also reaped by the latter. Indeed, when MFIs enter the rural market, they stimulate individuals' entrepreneurship as they require the credit to be invested in productive activities and not consumed. This, in turn, increases the probability that borrowers' income and wealth raise, reducing the default risk.

²Without a formal credit market moneylenders have to satisfy the whole credit demand and, as a consequence, to borrow money from the bank.

Moreover, using weekly public meeting, MFIs provide business training, that again increases the chance for borrowers' investments success, hence, the probability they repay. Finally, through the group-lending mechanism MFIs transfer agency costs to borrowers: if debtors are jointly liable in repaying the debt they choose to associate with safe members and they are incentivated to monitor each other or help each other in bad times, to reduce the probability to repay the other members' default (Stiglitz, 1990; Ghatak & Guinnane, 1999; Ghatak, 2000; Armendariz & Morduch, 2010). As a consequence, if an MFI client needs further credit to her business and is forced to ask for an informal loan, the moneylender may benefit from her participation in microfinance program. On the one hand, the informal lender has not to bear agency costs, especially monitoring costs, because of client's participation to the group-lending; she knows the members of the group monitor each other. On the other end, the moneylender knows that the MFI clients are entrepreneurs with continuous business training and likely ask for informal loans to cover working capital needs created by their business; they are not consuming the credit. In other words, client's participation in microfinance programs reduces agency costs and riskiness for moneylenders. To the best of my knowledge, this is one of the first papers analyzing empirically the positive externalities produced by microcredit programs on moneylenders' credit price. Using households data from Andhra Pradesh, collected by the Centre for Microfinance of the Institute for Financial Management and Research in 2009, I provide evidence that MFIs clients who are involved in group-lending and invest in productive activities obtain lower interest rate from the informal credit market.

The paper is organized as follows. In section 2, I present the empirical strategy. I then present the data used in the empirical analysis in section 3 and discuss the

results in section 4. Section 5 concludes.

2 Empirical strategy

To investigate how the participation in microfinance programs affects the borrower's informal credit market access in Andhra Pradesh, I estimate the following equation by OLS:

$$Y_{ij} = \alpha + \beta MFIparticipation_{ij} + X_{ij} \gamma + D_j + \epsilon_{ij} \quad (1)$$

where Y_{ij} is the outcome that household i in village j achieves in the informal market, as represented by the interest rate on the money borrowed from an informal provider.³ In some model specifications I consider as alternative outcome variable the amount of money that the household borrows from the informal lender. According to Jain and Mansuri (2003), the amount of money demanded to the moneylender declines after participating in microfinance programs. The household resorts to moneylenders only to satisfy additional credit needs which occur after formal indebtedness.

MFI participation is the main independent variable, defined as a dummy variable equal to one if any member of the household has joined a group-lending before or at the same time of the informal indebtedness - in this last case the month and the year of the indebtedness from both an MFI and an informal provider is

³I consider any loan traded on the informal market in the study, including those provided by friends and relatives, since they usually require interest rates for the lending activities they are engaged in. According to the data, the average interest rate required by professional moneylenders is 33%, while that required by landlords is 28%. On average employers impose an interest rate far lower than that of friends or relatives - 18.8% of the former versus 26% of the latter.

the same.⁴ I first define *MFI participation* as the participation in JLGs, i.e. the typical microfinance program organized by private MFIs. However, to check the robustness of the results for any microfinance program, in some specifications I also use the participation in SHGs, i.e. microfinance programs supported by governments. It is not obvious that the hypothesis under study holds also in case of public programs. Indeed, the supply of microfinance services may differ both in terms of loan purpose, not requiring the investment in productive activities, and of group-lending organization, allowing for groups consisting in larger number of members with respect to those organized by private institutions. The higher the number of components, the lower the effectiveness of the mutual monitoring, and therefore the weaker the power to push the other members to behave in a non-opportunistic way. Finally, allowing that credit could be used for consumption needs, so reducing the resources available to repay the debt, may have adverse effects, as the moneylender faces an over-indebted and so a very risky borrower.

The X vector groups a large set of household characteristics that potentially influence the borrowers' riskiness. It includes the household head's characteristics, such as age, gender, education, caste, religion and marital status and some household characteristics, as the monthly expenditure and the owned land for agricultural use. It also includes a proxy for the productive use of the money consisting in a dummy equal to one if the two main household's activities are self employment⁵ - the probability that the household asks a loan for productive uses increases

⁴I consider also the case in which the indebtedness dates coincide, to account for the fact that while the process to join an MFI program should require a long time to be fulfilled, borrowers, whose microcredit demand has been accepted but not yet satisfied, might have anticipated the request for informal loan to fully meet their credit need.

⁵Unfortunately, I cannot use the direct information about the informal loan use, because the survey allows for the respondent's multiple answer, so that for about 700 observations we cannot distinguish between consumption and investment in productive activities.

if the household is involved in self-employment activities. Furthermore, the X vector includes dummies for other form of indebtedness, namely debts from bank and participation in chit funds, and a set dummies for the type of informal lender, distinguishing among debts from professional moneylenders, landlords, employers and friends or relatives.

D_j is the set of all village dummies - that serves as village fixed effects - to account for all the environmental characteristics that may affect the formal and informal credit supply, as the rural credit market structure and the village development that may influence the potential impact of the borrowers' investments, hence the success of the productive activities that borrowers may realize - and as a consequence the riskiness of the formal and informal loan. Finally, ϵ_{ij} is the error term.

The fact that the participation in MFIs programs precedes the informal indebtedness allows me to mitigate potential endogeneity concerns due to the simultaneity in the relationship between informal credit market conditions and participation in group-lending. Yet, the large number of covariates included in the model increases the confidence that results are not driven by omitted variables potentially correlated to both the outcome and the main independent variable. Moreover, to avoid the possibility that the outcome is predetermined with respect to some covariates, only the informal loans borrowed in 2009 enter the study.⁶ Therefore, imposing the above sample restriction makes sure the results obtained are more reliable.

I first regress the informal interest rate (*Interest*) - calculated in percentage per

⁶Indeed, while data are collected in 2009 - so that household information, as for example the monthly expenditure, the agricultural land or the head's education, are related to that year - the date of informal indebtedness could be earlier.

year - on *JLG* a dummy indicating whether any household member is involved in a joint liability group. Then, I replicate the analysis by replacing this latter variable with *SHG*, a dummy indicating whether any household member is involved in a self help group. Yet, I show the results obtained from a model in which I regress the amount of money that the household borrows from an informal provider (*Amount*) - as alternative outcome variable - on both *JLG* and *SHG*. Finally as robustness check I replicate the analysis clustering the standard error at the village level.

3 Data

Data are collected by the Centre for Microfinance of the Institute for Financial Managment and Research⁷ in 2009, according to which 8 districts, 64 villages and 1922 households of Andhra Pradesh are selected with the three stages sampling design.⁸ The survey is one of the first studies on microfinance penetration in India at national level. The dataset includes information about household financial choices, both from formal - indebtedness from banks - and informal market - indebtedness from professional and unprofessional moneylenders (traders, landlords, employers, neighbors, friends and relatives). Moreover, it includes borrowing throughout

⁷The IFMR -Chennai- is one of the most prestigious Business Schools and Academic Institutions in India. From 1970 it gained recognition as Institution of National Importance by the Ministry of Indian Finance. The IFMR mission focuses primarily on issues related to growth and development of the Indian territories with particular attention to the field of finance and research. The Centre collaborates with a large number of academic Institutions across the world including MIT, through the Jameel Poverty Action Lab.

⁸The 22 districts of the Indian Country, with at least one rural area, are divided in 4 strata according to the percentage of families under the poverty line - the estimated share of rural households falling under the poverty line is based on Chaudhuri & Gupta (2009) - and the percentage of women belonging to at least one joint liability group. In each stratum 2 districts are randomly selected without replacement. The villages in every district are divided in 4 strata according to the distance from the nearest bank branch. In each stratum 2 villages are selected with probability proportional to the total households number without replacement. In each village 30 households are randomly selected.

Joint Liability Groups (JLGs) and Self Help Groups (SHGs). Information about personal and economic household head's characteristics - like gender, age, education, religion, caste, marital status, political role in the village, job - and about the economic condition of the household - like income sources, remittances, monthly expenditure, owned land, home characteristics - are also available in the dataset. Finally the study includes villages features information.

Table 1 provides a description of the variables used in the empirical analysis. Table 2 reports the descriptive statistics. As one can see from the latter table, households with at least a member who participates in a group-lending as *JLGs* represent 10% of the sample, of which those engaged in self-employed activities are about 6.5%. Participation in *SHGs* is more common, involving almost 70% of the households, of which those investing in productive activities are slightly more than 45%. Indebtedness from banks is also widespread (41%), while households with a member who participate in chit funds are less than 9%. Hence, due to the fact that debts from multiple credit sources is highly frequent, variables accounting for other types of indebtedness are also included in the empirical analysis.

Focusing on the informal credit providers, as expected indebtedness from friends and relatives represents the most common debt form (almost 70%), followed by landlords (15.5%), professional moneylenders (12.8%) and employees (2.2%). Finally, regarding the other informal debt conditions, while the provision of some types of collateral is not widespread (less than 4%), repayment methods based on periodic installments are more often used (28%) to incentivate borrowers to repay the debt.

4 Results

The estimated results regarding the relationship between participation in JLG and informal interest rate, are reported in Table 3. According to column 1, belonging to a JLG makes informal credit market access worse for borrowers in Andhra Pradesh, implying an increase of the informal interest rate by about 1.8%. However, a study of IFMR (Johnson & Meka, 2010) confirms that MFIs that operate in Andhra Pradesh do not force their clients to invest in productive activities, suggesting that the moneylender might face an *already indebted borrower*, i.e. a microcredit participant, asking money for consumption needs, hence a very risky individual. This justifies the higher interest rate.

To distinguish the “already MFIs clients” who invest the money from those who do not, I create an interaction dummy between *JLG* and *Self-employed*. The probability to ask money for productive uses is higher if the main activities in the household are related to self-employment. Reading across the results in column 2 of Table 3, I find that the informal interest rate charged to a JLG participant who is self-employed is 4.5% lower than that charged to the other informal borrowers, while being member of a JLG that likely uses money for consumption gives a penalty of about 4.8% in terms of informal interest rate. Results are robust to the specifications in columns (3) - (5) in which I gradually add the full set of control variables. Interestingly, the relationship holds also after controlling for *Self-employed*, a dummy equal to one if the informal loan is demanded by households that invest in productive activities. Moreover, while being self-employed does not influence the informal credit access *per se*, the participation in a group-lending coupled with self-employed status does affect the informal interest rate,

thus suggesting the importance of the mechanism related to the reduction of the informal agency costs.

Turning to the other covariates, the head's age and education are negatively correlated to the informal credit price: the potential better economic conditions of more educated and older individuals reduce the lender's risk premium. Also the coefficient of the household expenditure, a proxy of the borrower's economic condition, has a negative sign, while the household agricultural land is in a non-linear relationship with the informal interest rate - the upward sloping curve suggests that only the households with a high number of hectares of land are less risky for the informal lender. Both the collateral and a regular repayment schedule have a positive sign, confirming as in previous studies (Venittelli, 2016; Bhattacharjee & Rajeev, 2010) that moneylenders ask for supplementary burdens in situation in which they face very risky borrowers. However, for many variables the correlation disappears when we add the village dummies (column 5). As for the other controls - not showing in the table - the most influencing factors affecting the informal credit price are the household caste - with some penalties for those belonging to the most disadvantaged one - and having debts from formal institutions, that likely makes the potential borrower riskier because over-indebted.

I replicate the analysis above using the participation in SHG - the microfinance program supported by government - as the main independent variable. Results in Table 4 show that being a member of a self help group does not affect the informal credit market access even if the borrower is self-employed (columns 1 and 2). A crucial difference with the joint liability groups, however, is that in the data I use the self help groups may involve a larger number of members with respect to the typical SHG characterized by 10-12 members. Such a large number of

individuals in a group-lending does not allow members to monitor each other, so that moneylenders cannot avoid agency costs in this case. To capture the mechanism under study we add a triple interaction between the SHG-Self-employed interaction and a dummy indicating whether the SHG the borrower belongs to is characterized by a maximum of 10 members. Reading across the third row of results in Table 4, I find that participating in small SHGs improve the informal credit market access, lowering the annual informal interest rate by 2%. The small number of members facilitates the mutual monitoring and this once again might help the moneylender to lower the lending costs.

Previous studies on the interaction between formal and informal credit market suggest that, when formal institutions enter the market, the demand *per borrower* for informal credit amount reduces (Jain and Mansury, 2003); after the entrance borrowers shift their credit demand from the informal to the formal sector, resorting to moneylenders only to satisfy additional and residual credit needs. I test this hypothesis by regressing the amount of money that an household borrows from the informal sector on either JLG or SHG participation. Results in Table 5 indicate no significant correlation in the relationships under study. However, the coefficient estimates, although not statistically significant, is even positive in case of self-employed clients of MFIs (column 2), suggesting that informal indebtedness is not at all residual to the formal one.

Finally, I test whether the main results are robust to clustering the standard errors at village level, i.e. allowing the errors to be correlated for all individuals in the same village. Results in Table 6 confirm the previous findings. In particular, the coefficients of both the interaction between JLG and Self-employed and between SHG and Self-employed for small groups - remain significant at 5% and

10%, respectively.

The results of this analysis seems to be consistent with the hypothesis that the participation in microfinance programs helps individuals to improve their access to the informal credit market in developing areas. Imposing investment in productive activities, MFIs induce borrowers to rise their income perspectives, affecting positively their chances to repay also the informal debt. At the same time, the participation in a group-lending with joint liability leads borrowers to select the safest people and to monitor each other, to avoid to repay the debt of the other members whose failure probability increases with their riskiness. Both the lower risk premium and the possibility to transfer screening and monitoring costs on borrowers allow moneylenders to reduce the interest rate on their credit supply. Of course, we must be cautious in attributing causal interpretation to the results presented in this paper, considering that potential endogeneity issues cannot be excluded and that the analysis of the main mechanisms at work would need a deeper study to be confirmed.

5 Conclusion

Microfinance programs have achieved great popularity in recent years. In an attempt to encourage the poorest' financial inclusion, subtracting them from exploitative moneylenders, governments have constantly increased their financial support to the microcredit in developing countries. However, the existing evidence shows that informal credit providers have not reduced their supply in rural area even where MFIs have grown faster, therefore suggesting that a potential complementarity relationship between the two suppliers might exist.

In this paper I investigate the effect of the participation in microcredit programs on the borrowers' informal credit market access in Andhra Pradesh. I find some positive externalities produced by microcredit on the informal financial market, consisting in the reduction of the informal interest rate charged by moneylenders on the loans demanded by clients who are already microfinance participants. I argue that the investment in productive activities and the participation in JLGs or small SHGs make microfinance clients less risky for the informal providers; indeed, while being entrepreneur increases the chances of debt repayment, the group-lending mechanism, by encouraging the borrowers to select and monitor each other, reduces the agency costs for moneylenders.

The paper provides a novel explanation of the relationship between MFIs and informal financial suppliers; therefore, further research is needed to strengthen the evidence and the considerations that emerge from this analysis.

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Table 1: Variables description

Interest	Interest rate charged by any informal provider (in %)
Amount	Amount of money borrowed from an informal provider (in rupees)
JLG	Dummy=1 if any household member belonged to a JLG before the informal loan
SHG	Dummy=1 if any household member belonged to a SHG before the informal loan
Male	Dummy=1 if the household head is male
Age	Household head's age
Education	Household head's education in completed years of schooling
Religion: Hinduist	Dummy =1 if the household head is hinduist
Religion: Muslim	Dummy =1 if the household head is muslim
Religion: Christian	Dummy =1 if the household head is christian
Caste: SC	Dummy =1 if the household head belongs to the SC caste
Caste: ST	Dummy =1 if the household head belongs to the ST caste
Caste: OBC	Dummy =1 if the household head belongs to the OBC caste
Caste: MBC	Dummy =1 if the household head belongs to the MBC caste
Caste: General	Dummy =1 if the household head belongs to the General caste
Marital status: Married	Dummy =1 if the household head is married
Marital status: Separated	Dummy =1 if the household head is separated/divorced
Marital status: Widowed	Dummy =1 if the household head is widowed
Marital status: Single	Dummy =1 if the household head is single
Expenditure	Monthly household expenditure in rupees
Agricultural Land	Household land for agricultural use (in hectares)
Self-employed	Dummy=1 if the two leading activities in the household are self-employment
Collateral	Dummy=1 if the informal provider demands any type of collateral
Repayment	Dummy=1 if the informal loan's repayment is based on frequent installments. =0 if borrower repays at a given date or when she is able to repay
Lender type: Moneylender	Dummy=1 if the informal provider is a professional moneylender
Lender type: Landlord	Dummy=1 if the informal provider is a large landowner
Lender type: Friend	Dummy=1 if the informal provider is a friend or a relative
Lender type: Employer	Dummy=1 if the informal provider is the borrowers employer
Formal loan	Dummy =1 if the household has a loan from a bank
Chit fund	Dummy =1 if any household member takes part in a chit fund

Table 2: Descriptive Statistics

	observations	mean	std. dev.	min	max
Interest	3176	26.646	12.763	0	120
JLG	3176	0.100	0.300	0.	1
JLG x Self-employed	3176	0.065	0.247	0	1
SHG	3176	0.692	0.462	0	1
SHG x Self-employed	3176	0.459	0.498	0	1
Male	3176	0.867	0.339	0	1
Age	3176	44.694	12.763	20	100
Hindu	3176	0.914	0.280	0	1
Muslim	3176	0.037	0.190	0	1
Christian	3176	0.048	0.215	0	1
Caste: SC	3176	0.207	0.405	0	1
Caste: ST	3176	0.083	0.276	0	1
Caste: OBC	3176	0.486	0.500	0	1
Caste: MBC	3176	0.035	0.183	0	1
Caste: General	3176	0.189	0.392	0	1
Education	3176	3.239	4.306	0	16
Married	3176	0.879	0.326	0	1
Separated	3176	0.006	0.077	0	1
Widowed	3176	0.110	0.313	0	1
Single	3176	0.005	0.073	0	1
Expenditure	3176	583.065	748.864	0	7000
Agricultural land	3176	1.297	2.565	0	45
Self-employed	3176	0.644	0.479	0	1
Collateral	3176	0.038	0.191	0	1
Repayment	3176	0.281	0.450	0	1
Moneylender	3176	0.128	0.334	0	1
Landlord	3176	0.155	0.362	0	1
Friends - relatives	3176	0.696	0.460	0	1
Employer	3176	0.022	0.146	0	1
Formal loan	3176	0.416	0.493	0	1
Chit fund	3176	0.084	0.278	0	1

Table 3: Participation in microfinance and informal interest rate: JLGs

	Interest				
	(1)	(2)	(3)	(4)	(5)
JLG	1.804**	4.801**	3.451*	4.141**	4.185**
	[0.907]	[1.864]	[2.051]	[1.964]	[1.791]
JLG x Self-employed		-4.545**	-3.986*	-4.833**	-5.794***
		[2.061]	[2.235]	[2.153]	[1.959]
Self-employed			-0.490	-0.843	-0.692
			[0.550]	[0.538]	[0.525]
Male			0.435	-0.185	-0.050
			[1.227]	[1.177]	[1.045]
Age			-0.178*	-0.174*	-0.141
			[0.099]	[0.098]	[0.093]
Age squared			0.001	0.001	0.001
			[0.001]	[0.001]	[0.001]
Education			-0.267***	-0.219***	-0.082
			[0.057]	[0.057]	[0.055]
Expenditure			-0.000*	-0.000	-0.000
			[0.000]	[0.000]	[0.000]
Agricultural land			1.033***	0.890***	0.293**
			[0.135]	[0.132]	[0.131]
Agricultural land squared			-0.032***	-0.029***	-0.013***
			[0.005]	[0.005]	[0.004]
Collateral			3.113**	2.605**	1.630
			[1.367]	[1.325]	[1.057]
Repayment			4.452***	4.102***	3.613***
			[0.480]	[0.467]	[0.444]
Other debts dummies				yes	yes
Village dummies					yes
Observations	3289	3287	3187	3176	3176

Notes. OLS estimates in columns (1)-(5). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Columns (3)-(5) include dummies for household head's caste, religion, marital status and dummies for informal lender's type. Finally the regressions in column (3)-(5) include dummies for household indebtedness with formal provider, participation in chit funds.

Table 4: Participation in microfinance and informal interest rate: SHGs

	Interest					
	(1)	(2)	(3)	(4)	(5)	(6)
SHG	-0.181 [0.492]	0.171 [0.703]	0.171 [0.703]	-0.372 [0.929]	-0.639 [0.889]	-1.305 [0.859]
SHG x Self-employed		-0.575 [0.647]	0.241 [0.683]	0.904 [1.098]	0.856 [1.061]	1.487 [1.030]
SHG x Self-employed x Group max 10			-2.059*** [0.618]	-1.919*** [0.603]	-1.787*** [0.597]	-1.436** [0.604]
Self-employed				-0.972 [0.911]	-1.458* [0.882]	-1.901** [0.834]
Male				0.505 [1.240]	-0.113 [1.181]	0.104 [1.050]
Age				-0.168* [0.099]	-0.162* [0.098]	-0.132 [0.094]
Age squared				0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
Education				-0.257*** [0.057]	-0.214*** [0.056]	-0.081 [0.055]
Expenditure				-0.000* [0.000]	-0.000 [0.000]	-0.000 [0.000]
Agricultural land				1.047*** [0.134]	0.946*** [0.131]	0.369*** [0.131]
Agricultural land squared				-0.033*** [0.005]	-0.031*** [0.005]	-0.016*** [0.004]
Collateral				3.256** [1.353]	2.647** [1.332]	1.679 [1.069]
Repayment				4.556*** [0.486]	4.133*** [0.471]	3.739*** [0.449]
Other debts dummies					yes	yes
Village dummies						yes
Observations	3289	3287	3287	3187	3176	3176

Notes. OLS estimates in columns (1)-(6). Robust standard errors in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Columns (4)-(6) include dummies for household head's caste, religion, marital status and dummies for informal lender's type. Finally the regressions in column (4)-(6) include dummies for household indebtedness with formal provider and participation in chit funds.

Table 5: Participation in microfinance and informal credit amount

	Amount				
	(1)	(2)	(3)	(4)	(5)
JLG	-162.017 [1425.834]	-330.017 [1142.656]			
JLG x Self-employed		252.412 [2348.257]			
SHG			-26.031 [724.477]	233.820 [956.007]	215.635 [955.992]
SHG x Self-employed				-417.919 [1300.895]	-707.116 [1402.362]
SHG x Self-employed x SHG max 10					726.748 [1114.097]
Self-employed	1928.209*** [706.025]	1901.402*** [701.996]	1954.639*** [709.215]	2236.471** [1117.085]	2211.701** [1117.590]
Male	-1485.142 [1507.108]	-1474.866 [1520.586]	-1534.715 [1498.777]	-1517.654 [1492.214]	-1502.410 [1492.348]
Age	525.686*** [147.483]	525.903*** [147.966]	541.068*** [146.917]	540.132*** [146.603]	540.530*** [146.533]
Age squared	-4.799*** [1.414]	-4.801*** [1.418]	-4.975*** [1.408]	-4.964*** [1.404]	-4.967*** [1.404]
Education	197.570** [84.192]	197.582** [84.204]	200.938** [84.073]	201.005** [84.108]	199.807** [83.989]
Expenditure	0.418 [0.446]	0.418 [0.447]	0.446 [0.442]	0.447 [0.442]	0.460 [0.443]
Agricultura land	1272.545*** [379.272]	1274.958*** [379.440]	1269.215*** [379.261]	1268.766*** [379.237]	1261.846*** [376.402]
Agricultural land squared	-16.918 [10.473]	-17.006 [10.491]	-16.694 [10.472]	-16.720 [10.479]	-16.623 [10.437]
Collateral	4843.970** [2392.173]	4840.994** [2380.010]	4860.922** [2367.261]	4863.724** [2366.747]	4784.539** [2407.544]
Repayment	1680.140** [751.464]	1682.174** [750.249]	1707.898** [752.945]	1696.840** [748.858]	1649.409** [758.140]
Other debt dummies	yes	yes	yes	yes	yes
Village dummies	yes	yes	yes	yes	yes
Observations	3171	3171	3171	3171	3171

Notes. OLS estimates in columns (1)-(5). Robust standard errors in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include dummies for household head's caste, religion, marital status and dummies for informal lender's type. They also include dummies for household indebtedness with formal provider and participation in chit funds.

Table 6: Participation in microfinance and informal credit: Robustness checks

	Interest		Amount	
	(1)	(2)	(3)	(4)
JLG	4.185*		-330.017	
	[2.362]		[1239.077]	
JLG x Self-employed	-5.794**		252.412	
	[2.406]		[1848.564]	
SHG		-1.305		215.635
		[1.266]		[1167.811]
SHG x Self-employed		1.487		-707.116
		[1.508]		[1817.648]
SHG x Self-employed x SHG max 10		-1.436*		726.748
		[0.843]		[1703.495]
Self-employed	-0.692	-1.901	1901.402**	2211.701*
	[0.861]	[1.289]	[899.139]	[1275.331]
Male	-0.050	0.104	-1474.866	-1502.410
	[1.846]	[1.887]	[2053.133]	[2037.305]
Age	-0.141	-0.132	525.903**	540.530**
	[0.135]	[0.136]	[217.035]	[216.112]
Age squared	0.001	0.001	-4.801**	-4.967**
	[0.001]	[0.001]	[2.126]	[2.120]
Education	-0.082	-0.081	197.582*	199.807*
	[0.088]	[0.085]	[110.140]	[110.448]
Expenditure	-0.000	-0.000	0.418	0.460
	[0.000]	[0.000]	[0.557]	[0.553]
Agricultural land	0.293	0.369**	1274.958**	1261.846**
	[0.186]	[0.182]	[500.334]	[493.790]
Agricultural land squared	-0.013**	-0.016***	-17.006	-16.623
	[0.005]	[0.005]	[13.007]	[12.911]
Collateral	1.630	1.679	4840.994*	4784.539*
	[1.322]	[1.297]	[2533.408]	[2594.697]
Repayment	3.613***	3.739***	1682.174*	1649.409*
	[0.655]	[0.681]	[911.830]	[910.059]
Other debt dummies	yes	yes	yes	yes
Village dummies	yes	yes	yes	yes
Observations	3176	3176	3171	3171

Notes. OLS estimates in columns (1)-(4). Standard errors are clustered at village level; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include dummies for household head's caste, religion, marital status and dummies for informal lender's type. They also include dummies for household indebtedness with formal provider and participation in chit funds.