https://doi.org/10.59277/AERD.2024.2.01

Dr. Koride PADMAVATHI[1], **Dr. Prof. L. GANESH**[2], **Dr. Prof. Sanyal PAROMITA**[3]

[1] *Professor, Ramiah University of Applied sciences, Bangalore – 54, India*
padmavathikoride.ms.mc@msruas.ac.in
[2] *Professor, CHRIST (Deemed to be university), Banaglore – 29, India*
ganesh.l@christuniversity.in
[3] *Professor, Florida State University, Texas, USA*
psanyal@fsu.edu

DRIVERS FOR COLLATERAL AND COLLATERAL SUBSTITUTES: A STUDY OF RURAL BORROWERS IN ERSTWHILE ANDHRA PRADESH

ABSTRACT

Formal lenders widely accepted land collateral against loans. Those who were too poor to offer collateral, used collateral substitutes. Yet, both collateral and collateral substitutes are pointers to information asymmetry, where the lender did not know the borrower well enough. But in rural communities, lenders, aware of borrower types, might segregate borrowers into two categories, namely, honest and opportunistic. Quite expectedly, honest borrowers are exempt from offering collateral. Instead, they find personal guarantors substituting collateral. This study, based on face-to-face interviews of 839 rural borrowers from four districts of Andhra Pradesh and Telangana states in Southern India, follows a systematic sampling, and investigates the drivers for collateral, and those for finding personal guarantors who substitute collateral. The study builds a lender, borrower payoff matrix, linking borrower type, and collateralization to the payoffs to both the parties therein.

Key words: Collateral, collateral substitutes, loan guarantee, repayment strategies

JEL Classification: D14, Q14

1. INTRODUCTION

Lending contracts were marked by high information asymmetry. In the absence of perfect information, lenders depended upon expensive signals which helped screen the borrowers. Collateral was one such signal. Offering a collateral made the loan contract expensive for the borrower. Likewise, screening the collateral quality and subsequent enforcement involved cost and time of the lender. Yet collateral contracts stayed because they signalled borrowers' quality to lenders (Bond and Rai, 2009; Pearson, 2008).

Collateral was linked to repayments. Offering a collateral was a tested method to avoid moral hazard, compelling the borrower to repay. Further, collateral could reduce the interest rates, which are otherwise used as a risk sharing mechanism in high-risk credit contracts (Pearson, 2008). Borrowers unwilling to forgo collateral, tended to repay the loans with higher discipline and promptness (Sarap, 1991). Interestingly, borrowers' risk profile was linked to the collateral value, wherein higher risk borrowers chose lower risk collateral, and a higher interest rate (Kwon, 2021). Higher the quality of collateral, lower the default risk in Vietnam. Intuitively though, wealthier borrowers offered a better-quality collateral, linking higher wealth to a lower default risk (Le and Nguyen, 2019). In a study involving 100 respondents in Tanzania, collateralizing loans was offered as a solution to mitigate default risk (Makorere, 2014). But there was mixed evidence as far as collateral is concerned, with regard to avoiding default risk. In Vietnam, when banks collateralized SME loans, they tended to take it easy on screening, and monitoring, attracting higher risk clients than when the loans were not collateralized (Jamenez and Saurina, 2004). Even the microloans extended through savings banks were not free from risk. In Spain, data from 3 million bank records showed how the savings bank loans were riskier than those extended by banks (Jemenez and Saurina, 2004).

The propensity to demand collateral and the nature of collateral offered depended on the source of loans. In Madurai district, Tamil Nadu, formal banks demanded land collateral, while informal lenders like moneylenders, lent against vessels, gold or other movable assets. The nature of collateral dictated the interest rates. Land collateral served to reduce the interest rate while inferior collateral increased the interest rates (Swaminathan, 1991).

Microcredit was extended by Self-Help Groups (SHGs) and savings banks for channelling formal credit from banks through semi-formal sources, and for alleviating poverty (Higashikata and Tsukada, 2010; K. Kalpana, 2015; Maiangwa, 2012). In India, SHGs used peer pressure, group lending and mutual guarantees as collateral substitutes, thereby mainstreaming microfinance (P. Satish, 2005). Social collateral, fundamental to group lending initiatives, created pareto efficient outcomes (Barboza, 2019).

Those who were too poor to offer collateral and where microcredit may either be too little prevalent or insufficient to meet the credit needs, collateral substitutes worked in credit contracts. In Thailand, bicycles and other moveable assets promising immediate liquidity were often substituted for collateral (Menkhoff *et al*., 2012). In India, the poor offered substitutes like vessels or gold, where land collateral was scarce (Sarap, 1991).

In closely-knit rural communities with little information asymmetry, guarantors could ensure collateral-free loans. Guarantees were typically based on kinship relationships marked by reciprocity of norms and caste networks, thus helping the defaulters as well (Sarap, 1991). A survey of 1972 small business firms in US showed how collateral was not a substitute for loan guarantee. Loan

guarantee itself reduced the likelihood of collateral requirement. Loan guarantee further reduced the interest rates (Posey, 2011).

Studies have linked collateral to reducing ex-ante information asymmetry and ex-post moral hazard (Berger *et al*., 2011; Pearson, 2008). Offering collateral helped obtain a cheaper loan at a lower interest rate (Kwon, 2021). Collateral was associated with reduced lending risk. This study, based on a face-to-face survey of 839 rural borrowers drawn from 6 villages in erstwhile Andhra Pradesh (AP) state in southern India, answers the following questions: But how does one measure the lending risk? How does the borrower signal his repayment intentions to the lender? What are his instalment financing strategies? Does the borrower borrow from one source to pay another loan? Is he in debt traps? Conversely, does he intend to repay the loan first thing? Is he willing to sacrifice his consumption to finance instalments? The inside information on borrowers' repayment planning helps us categorise the borrowers as honest or strategic. This inside information, not otherwise available in public domain (through credit records), drives the borrowers' likelihood of offering a collateral. Conversely, borrower can obtain third party guarantees to substitute collateral, based on his instalment finance strategies.

The rest of the paper is organised as follows. Section II reviews the literature. Section III discusses the methodology and the methods used for data collection and analysis. Section IV discusses the results and conclusions.

2. LITERATURE REVIEW

COLLATERAL AND DEFAULTS

Collateral in loan contracts transferred the risk of default from lender to borrower. Nevertheless, collateralized loan contracts were not convenient. They added the cost of verification to the lenders. And made defaults costly for the borrowers. Yet, collateral stayed because of a reduced risk of ex-ante information asymmetry and ex-post moral hazard. Collateral improved repayments and reduced the risk of borrower runs (Kwon, 2021; Makorere, 2014; Nwachuku, 2013; Menkhoff *et al*., 2011; Berger *et al*., 2011; Bond and Rai, 2009).

But not all loans were insured by collateral. A study of 3 million credit records in Spanish banks found how collateral increased the probability of default. The default probability decreased only when the loans were 100% secured or where the lending was relationship based. Alternatively, default probability reduced if the collateral was of high quality (Le and Nguyen, 2019). Additionally, collateral decreased the borrower quality because lenders relaxed the screening process for collateralized loans (Jiménez and Saurina, 2004). A disadvantage of collateral was that observably riskier borrowers were more likely to pledge

collateral than the unobservably riskier ones. In Bolivia, where borrowers' credit registries were available in public domain, the borrowers with a better repayment history were less likely to offer a collateral than those without. Worse still, borrowers whose credit registries were unavailable in public domain offered collateral more often (Berger *et al*., 2011).

How to observe the borrower's riskiness? Borrower riskiness is gauged by the publicly available information contained in credit registries of Bolivia. Conversely, when the credit registries contained private information, borrower riskiness could not be observed. In Thailand it was noted how a greater observable riskiness led to a higher degree of collateralization (Menkhoff *et al.*, 2012; Berger *et al*., 2011; Bond and Rai, 2009).

Lenders dealt with the problem of reducing borrower's' riskiness by increasing the relationship length. Longer relationships reduced the ex-ante information asymmetry because banks could observe the borrower types (Berger *et al.*, 2011). Besides, frequent transactions between the borrower and the lender obfuscated the need for collateral. They allowed for trust-based lending and guarantees to substitute collateral (Berger *et al*., 2011; Menkhoff *et al*., 2012; Pearson, 2008; McIntosh and Wydick, 2005; Vogelgesang, 2003). Despite reducing ex-ante information asymmetry, relationship length could not mitigate the ex-post moral hazard problem in Bolivia (Berger *et al*., 2011).

SOURCE OF CREDIT AND COLLATERAL

In Bangladesh and Thailand, formal agricultural loans are collateralized (Menkhoff *et. al*, 2012; Pellegrina, 2011). Formal lenders demanded land collateral more often if amortising land was legally permissible. Land collateral was preferred because it was easier to assess the collateral value (Feder, Onchan and Raparla, 1988). Interestingly, lenders' valuation of collateral was different from that of borrowers' (Menkhoff *et al*., 2012). But the land itself was a scarce resource, often competed for by male family members (Fletschner, 2009), making it difficult to access formal loans for all credit needs. Consequently, rural borrowers obtained loans from moneylenders by collateralizing inferior goods like brass vessels, promise of labour in the future, and in some instances, gold (Swaminathan, 1991; Sarap, 1991).

Collateralized formal loans crowded in informal loans from friends and relatives in China (Turvey and Kong, 2010). Moneylenders in rural communities had an informational advantage, obfuscating the need for collateral (Menkhoff *et al*., 2012). In Madurai district in southern India, informal lenders accepted a wide variety of articles like brass vessels, labour, mortgages, and promissory notes as collateral, and offered loans at a higher interest rate. Occasionally, lenders charged lower interest rates for all types of loans (Swaminathan, 1991).

SHGS AND SOCIAL COLLATERAL

Social collateral, a collateral substitute used in group lending, led to pareto efficient outcomes, amenable for all (Barboza, 2019). In India, the NABARD-filliped SHG-bank linkage programme grew by leaps and bounds. Between 1992–1993 to 2011, the SHG-bank linkage programme reached 4.7 million SHGs, covering approximately 75 million women borrowers, elevating it to the status of the world's largest microcredit programme. As on March 2011, 7.46 million savings accounts were registered with banks (Tirupal, 2016; NABARD, 2011)[1]. SHGs in India enjoyed the flexibility of fixing their own lending terms, after receiving grants from banks (Satish, 2005). With reference to YSR district in AP, SHGs promoted by DWCRA (Development of Women and Children in Rural Areas), not only promoted collateral-free, group loans, but contributed to women's empowerment (Geetanjali and Prabhakar, 2017). Using technologies like group lending and peer pressure, SHGs and credit cooperatives offered collateral free loans world-over (Pillai and Nadarajan, 2010; Maiangwa, 2012; Barboza, 2019; Satish, 2005).

COLLATERAL SUBSTITUTES

What happens when the borrowers were too poor to offer collateral? Menkhoff *et al*. (2012) examined collateral substitutes in Thailand. Collateral substitutes like third party guarantees, pledged savings, unconventional collateral like bicycles, were pledged for securing loans. (Menkhoff *et al*., 2012; Hartungi, 2007).

CASTE AND BORROWING

In India, caste was strongly linked to borrowing. The formal banks were mandated to lend to Scheduled Castes (SCs) and Scheduled Tribes (STs), under the government of India's priority sector lending scheme. Evidence showed how the success of the scheme was at best, mixed. The SCs and STs did access formal loans from nationalised banks, where they were prioritised. When it came to District Credit Cooperative Banks (DCCBs) however, the upper castes received an advantage, while the SCs and STs were marginalised. The Other Backward Castes (OBCs), those lower in the caste hierarchy as compared to the upper castes, neither received credit as a priority basis from nationalised banks, nor were prioritised at the DCCBs. Thus, the OBCs were caught in the middle (Kumar, 2013).

[1] As per NABARD 2022–2023 report, 97% of SHGs from TS and 89% of those from AP are credit-linked. As per the same report, AP SHGs saved Rs.18,606 crores, while their counterparts in Telangana saved Rs. 5,156 crores, occupying the first two places in the country. [A crore denotes ten million (10,000,000) and is equal to 100 lakh in the Indian numbering system].

As per data of India Human Development Survey 2011–2012, caste differences persisted even when accounting for income. Brahmins topped the list when accounting for income and expenditure, followed by OBCs, SCs and lastly STs. However, complex simulations after accounting for all the variables like income, demographics, land ownership and credit histories, the differences between SCs and STs and the upper castes with regard to loan application and approval, were lessened. When accounting for land ownership, the caste discrimination between upper castes and SCs/STs was obliterated in loan application and approval, in the case of small farmers (owning less than five acres of land). In the case of farmers owning more than five acres of land, caste discrimination persisted in both loan application and approval. In other words, STs apply for loans less often and get rejected more often than upper castes, when they own larger tracts of land (Kumar and Venkatachalam, 2019).

GAPS

Studies have underscored the role of collateral in alleviating the moral hazard in loan contracts. Credit contracts used collateral as a means of reducing the risk of ex-post moral hazard (Pearson, 2008; Bond and Rai, 2009). Nevertheless, lenders went easy on the ex-ante information asymmetry when the loans were collateralized, leading to a pool of higher risk borrowers (Jamnez and Saurina, 2004)). Studies further highlighted the role of guarantees in securing loans. While guarantees were not a substitute or a complement for collateral, they worked best in closely-knit rural communities where kinship networks and reciprocity of norms prevailed. Studies nevertheless were ambivalent on the link between collateral and loan defaults, without conclusively pointing to the impact of collateral on defaults. Furthermore, studies did not link the likelihood of individual borrower to offer a collateral, and his ability to find guarantors, with his plans for repaying loan instalments.

In addressing these gaps, the study raises the following questions. How does the borrowers' repayment plan impact collateral? How does the borrowers' repayment planning affect their ability to find guarantors, who could secure them uncollateralized loans? Does caste influence the collateral? If yes, how? Do bank-linked SHGs indeed offer collateral-free loans as they promise? How does this affect borrowers' preference for formal banks, and bank-linked SHGs? In other words, this study examines the link between individual borrowers' repayment planning and their likelihood of offering a collateral. Next, this study examines the link between individual borrowers' repayment planning and their ability to find guarantors to substitute collateral. Finally, this study links the source of credit to the borrowers' likelihood of offering a collateral.

In answering the questions, this study explores the following research questions:
A. What drives borrowers to offer a collateral?
B. What drives borrowers to find guarantors as a substitute for collateral?

3. MATERIALS AND METHODS

In erstwhile Andhra Pradesh (AP), banks extended credit to SHGs under the priority sector lending scheme (Premchander, 2003). The AP- MFI (AP Micro Finance Institutions) 2011 act capped the loan sizes, interest rates of the usurious MFIs, and coercive recovery agents. These measures led to mass defaults by the over-indebted borrowers, sending the MFIs into a tailspin, prompting the moneylenders to fill up the credit vacuum (Koride and Gurtoo, 2019). Consequently, the state had three prominent lenders in the rural areas – the formal banks, the semi-formal SHGs and the informal moneylenders.

Following the default crisis, the principal researcher conducted face-to-face interviews with 839 rural borrowers drawn from four districts of the erstwhile AP, using two-staged cluster sampling. Stage one of clustering involved ranking all the 23 districts in the state on microfinance prevalence, from 1 to 23. Microfinance prevalence was measured using the number of bank-linked SHGs promoted by the Society for Elimination of Rural Poverty (SERP), and the volume of microcredit disbursed through these SHGs. Next, the top-ranked (Chittoor), bottom-ranked (Nalgonda), and two middle performing districts (Adilabad and Srikakulam), representing credit surplus, credit constrained, and moderate credit access environments, were chosen for the study (all these districts had active SHGs promoted by SERP). Following this, villages from each of these districts were chosen at random. In stage two of clustering, the researcher identified broad occupational groups (landed farmers, landless farmers, off-farm business persons, and workers) and savings and lending groups in these villages (SHGs, cooperatives/ chit funds). Survey participants were recruited by visiting local marketplaces, temples, farms and SHGs. In total, about 210 respondents were selected from each of the three districts. In Nalgonda, the researcher could interview only 209 respondents (due to paucity of time), adding up to 839 respondents in all.

An original survey instrument was built to gather information on demographics of borrowers, loan information (with detailed question on top two loans), business investments, SHG group dynamics, gender dynamics, impact on borrowers, and repayment drivers. The variables were formulated based on constructs drawn from literature. The study chose binary variables in most cases and a few categorical variables because these are easier to administer to semi-literate and illiterate rural respondents. The variables represented demographic details, loan details and details of borrower repayment strategies and borrower credit preference. In the loan details, those pertaining to the top two loans alone were captured (the study measures the borrowing behaviour of individual borrowers). Table 1 presents the list of predictors.

Table 1

Predictors for borrowing behaviour

No.	Predictors for borrowing behaviour
1.	Number of banks in the village
2.	Distance to the nearest bank in Km.
3.	Interest on loan 1 per month
4.	Time-lag between application & approval of loan 1
5.	Due date of loan 1
6.	Lenders' flexibility for loan1
7.	Interest on loan 2 per month
8.	Time-lag for loan 2
9.	Due date of loan 2
10.	Lenders' flexibility for loan2
11.	Total current loans Rs.
12.	Source of loan 1
13.	Use of loan 1
14.	Purpose of loan 1
15.	Repayment priority loan 1
16.	Source of loan 2
17.	Use of loan 2
18.	Purpose of loan 2
19.	Repayment priority loan 2
20.	During time-lag postpone investment
21.	During time-lag borrow from another source
22.	Having a bank account?
23.	Having a chit-fund/coop membership
24.	No. of years of borrowing
25.	Caste
26.	Gender
27.	Family size
28.	No. of earning members in the family
29.	Monthly income Rs.
30.	Trade
31.	Education
32.	No. of acres of farm owned
33.	Income from crop 1 Rs.

Source: Authors' contribution.

4. RESULTS AND DISCUSSION

4.1. TESTING RESEARCH QUESTION 1

This study investigates the factors causing borrower to offer collateral. The dependent variable is binary, the response to the question "Have you offered collateral before?", with two outcomes yes or no. The predictor variables are a

combination of binary, categorical and continuous variables (Table 1). Hence, we use the logistic regression. Table 2 shows the output for the logistic regression, "Have you given collateral before?"

Table 2

Binary logistic regression output – drivers for borrower offering a collateral
D.V: Have you given collateral before? Yes/ No

Variable name	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
Guarantee a substitute for collateral (YES)	.320	1.989	.872	1.377	.028	67.956
No. of banks in the village	3.302	1.459	.024**	27.178	1.557	474.562
Distance to nearest bank Km	-1.447	.558	.009***	.235	.079	.702
Gender (Male)	.221	2.027	.913	1.248	.023	66.237
Number of earners in family	.679	1.010	.502	1.971	.272	14.271
Source of loan1			.200			
Source of loan (Banks)	-.683	5.171	.895	.505	.000	12742.154
Source of loan (regional rural banks)	35.207	18629.954	.998	1.9E16	.000	.
Source of loan (SHG-Bank loans)	41.800	19.485	.032**	1.4E18	36.991	5.4E31
Source of loan (Moneylenders)	11.736	6.375	.066*	124997.9	.468	33393963817
Source of loan (Friends & relatives)	11.899	6.369	0.062*	147074.8	.557	38818572526
Are lenders flexible? (Yes)	7.410	3.235	.022**	1651.869	2.916	935917
Repayment priority (1)	-6.477	2.847	.023**	0.002	.000	0.408
Instalment finance-Hand loans from friends/relatives (Yes)	5.821	2.462	.018**	337.243	2.708	41998
Instalment finance Cut on food & clothing (Yes)	-13.793	5.982	.021**	.000	.000	0.126
Did you fail to pay instalment (Yes)	-5.699	2.899	.049**	.003	.000	0.983
CREDIT PREF Banks1			.573			
CREDIT Preference Banks (1)	-.506	4.875	.917	.603	.000	8509
CREDIT Preference Banks (1)	3.622	4.944	.464	37.428	.002	605054
CREDIT Preference Banks (2)	5.483	4.608	.234	240.504	.029	2011782
CREDIT Preference Banks (3)	3.745	5.299	.480	42.314	.001	1370299
CREDIT Preference Banks (4)	-3.702	5.202	.477	.025	.000	661.2
CREDIT Preference SHG-Bank linkage loan			.257			
CREDIT Preference SHG-Bank linkage loan (1)	-4.634	4.371	.289	.010	.000	51.0
CREDIT Preference SHG-Bank linkage loan (2)	-8.540	4.465	.056*	.000	.000	1.237
CREDIT Preference SHG-Bank linkage loan (3)	-11.728	5.520	.034**	.000	0.000	.403
CREDIT Preference SHG-Bank linkage loan (4)	-1.703	2.738	.534	.182	.001	38.9

Variable name	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
CREDIT Preference SHG-Bank linkage loan (5)	-3.607	2.342	.124	.027	.000	2.673
CREDIT Preference Moneylenders loan 4			.472			
CREDIT Preference Moneylenders loan (1)	1.831	6.581	.781	6.238	.000	2494494.5
CREDIT Preference Moneylenders loan (2)	4.587	6.532	.483	98.202	.000	35631589.4
CREDIT Preference Moneylenders loan (3)	5.208	6.615	.431	182.673	.000	77976549.4
CREDIT Preference Moneylenders loan (4)	10.652	7.842	.174	42293.313	.009	200156454391.38
CREDIT Preference Moneylenders loan (5)	8.798	7.122	.217	6621.982	.006	7649792941.9
Repayment incentive Access another loan (Yes)	-.015	.950	.987	.985	.153	6.342
Repayment Reasons Good economy (Yes)	-.648	1.717	.706	.523	.018	15.131
Repayment Reasons Repay even otherwise (Yes)	-5.696	6.800	.402	.003	.000	2060.291
Purpose of loan 1			.496			
Purpose of loan 1 (Agriculture)	-1.462	2.760	.596	.232	.001	51.82
Purpose of loan 1 (Business Investment)	-4.202	3.090	.174	.015	.000	6.381
Purpose of loan 1 (land buy)	-2.117	3.028	.485	.120	.000	45.557
Purpose of loan 1 (Housing)	-.086	2.779	.975	.918	.004	212.908
Purpose of loan 1 (Health)	-6.686	3.617	.065*	.001	.000	1.495
Purpose of loan 1 (Consumption)	-3.911	3.007	.193	.020	.000	7.257
Purpose of loan 1 (Education)	-15.967	40192.973	1.00	.000	.000	.
Purpose of loan 1 (Multiple uses)	-14.709	5.922	.013**	.000	.000	.045
Purpose of loan 1 (Borewell)	7.100	40192.97	1.000	1211.42	.000	.
Caste			.164			
Caste (OC)	25.253	13.011	.052*	92725283058.302	.780	1.1E22
Caste (OBC)	12.622	8.025	.116	303246.9	.045	2.05E14
Caste (SC)	17.716	9.001	.049**	4.9E6	1.076	2.2E15
Caste (ST)	5.960	6.825	.382	387.759	.001	249963878.12
Interest per month	1.642	1.100	.135	5.167	.599	44.600
Crop income in rupees	.000	.000	.050**	1.000	1.000	1.000
Constant	-14.8	9.618	.123	.000		
*, **, *** represent 90%, 95%, 99% confidence levels						
Cox& Snell R square:0.479; Nagelkerke R square 0.767						
Sample size= 839						

Source: Authors' contribution.

Collateral and loan repayment

If the loans are the not collateralized, the borrower is likely to accord top priority to repayment by 500 times (repayment priority=1), at 95% confidence level (p-value=0.024). Collateral was expected to offset default risk by reducing ex-ante information asymmetry and ex-post moral hazard. Collateral mitigated default risk in the context of bank loans (Berger *et al*., 2011; Bond and Rai, 2009), which were flooded with loan applications from a huge number of borrowers, many of them anonymous. Consequently, the risk profile of the borrower was either partially or completely unknown to the lender. Thus, we had "observably risky" borrowers (Berger *et al*., 2011), who are known defaulters, or who are at a higher risk of defaulting on repayments. Such borrowers offered collateral. There are, however, borrowers whose risk profile was unknown to the banks ("unobservably risky"). These borrowers did not offer a collateral (Berger *et al*., 2011). In this study we find unobservably risky borrowers offering collateral. That is why, borrowers offering collateral do not prioritise repaying these loans first. A key difference between the bank borrowers and rural borrowers is that the latter reside in a close-knit community together with lenders, where everybody knows everybody. In rural areas information spreads like wildfire. In such instances, defaults adversely affect the reputation, and the prospect of securing future loans (Sarap, 1991). But collateral offers a buttress for borrowers, whose reputation effect is taken care of in case of delayed repayments. Thus, borrowers offering collateral are in no hurry to pay up their loans. This argument does not hold for missed repayments. Those missing repayments are 99.7% less likely to offer a collateral, at 95% confidence levels (p-value= 0.049). Thus, collateral indeed offsets the default risk. Borrowers not pledging collateral are more likely to default on instalments, for they have nothing to lose in case of default, except for a tarnished reputation.

Borrowers could be categorised as honest and disciplined, cutting on consumption expenditure to pay up loan instalments, making them less risky. Alternatively, they could be poor planners, borrowing from one source to pay the other, potentially getting into debt traps, or high risk. Rural lenders, arguably aware of these categories, demand a collateral based on the degree of riskiness. Thus, borrowers cutting on food and clothing to finance their loan instalments have no likelihood of offering collateral (the Exp (B)=0), at 95% confidence levels. Conversely, those borrowing from friends and relatives to repay instalments (the high-risk category), are 33624% more likely to have offered collateral, at 95% confidence levels (p-value= 0.018).

Banks, SHGs and collateral

The odds of a borrower offering collateral increases by 2617% with every unit increase in the number of banks in the village at 95% confidence levels (p value=0.024) and decreases by 4.26 times for every unit increase in the distance to the nearest bank at 99% confidence levels (p value=0.009). Bank loans are

collateralized with land collateral, where it is legally permissible to do so (Feder, Onchan and Raparla, 1988; Ono and Usengi, 2009; Menkhoff *et al*., 2012). Higher availability of bank loans translates to higher borrowing from banks, and hence of higher chances of offering a collateral. Longer bank distance, conversely, decreases the chances of borrowing from banks and hence of offering a collateral. A highly intuitive finding.

Loan sources from SHG-bank linkage route are 1.42*10E18 times more likely to be collateralized, at 95% confidence levels (p-value=0.032). Consequently, those not offering a collateral have zero likelihood of preferring SHG-bank loans, at 95% confidence levels (p-value=0.034). SHG-bank loans are expected to be collateral-free, with banks capitalising on the social capital and peer pressure to ensure recovery. The capital from banks is down marketed through SHGs, who offer a convenient lending platform to the banks. Traditionally, SHGs or the savings groups world-over offered collateral-free loans against peer monitoring and joint liability. Such loans propelled women's empowerment, while alleviating poverty (Datta, 2015; Sanyal, 2009; K. Kalpana, 2015). But the ground reality appears to be something else – possibly the banks use the SHG savings (to be deposited with the banks for attracting a matching loan), as collateral.

Lender flexibility and collateral

Borrowers are more likely to find their lenders flexible if they have offered a collateral, at 95% confidence level (p-value=0.022). Borrowers offering a collateral find their lenders flexible. In other words, these lenders may be offering favourable loan terms to the borrowers who offered a collateral. The loans terms themselves may be defined by a higher size of loan, more repayment time, and a more favourable attitude when repayments are delayed. Traditionally, collateral mitigated the adverse selection problems. It was the low-risk borrowers who offered collateral because their collateral was safe (Jemenez and Saurina, 2004; Stiglitz and Weiss, 1981). The lower risk borrowers possibly enjoyed a favourable relationship with their lenders, and hence found them flexible.

Loan purpose and collateral

Those borrowing for multiple purposes are not likely to use collateral (Exp (B)=0), at 95% confidence level (p-value=0.013). Apparently multiple uses of loans, either for paying other loans or for meeting urgent consumption needs, are met by quid pro quo borrowing among a network of friends and relatives. Such loans, based on social capital, are interest free and collateral free (Turvey and Kong, 2010, Swaminathan, 1991).

Caste and collateral

Belonging to Scheduled Caste (SC) increases the likelihood of offering collateral by 49426938%, at 95% confidence level (p-value=0.049). Studies have

linked caste to borrowing, loan application and approval in India. SCs access bank loans, apply for bank loans and get their applications approved by banks as frequently as upper caste borrowers (Kumar, 2013; Kumar and Venkatachalam, 2019). Banks collateralize their loans, implying SCs are more likely to offer collateral.

4.2. TESTING RESEARCH QUESTION 2

Results for guarantee as a collateral substitute

This study investigates the drivers for borrower finding personal guarantors to substitute collateral. The dependent variable is binary, with two outcomes. The predictor variables are a combination of binary, categorical and continuous variables (Table 1). Hence, we use the logistic regression. Table 3 shows the output for the logistic regression, "Is guarantee a substitute for collateral?".

Table 3

Binary logit regression results testing for guarantee as a collateral substitute.
D.V: Is guarantee a collateral substitute? Yes/ No

Variable names	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
No of banks in village	-5.081	2.332	**.029****	.006	.000	.600
Caste	3.861	1.928	**.045****	47.501	1.086	2077.030
Gender (MALE)	-1.258	1.836	**0.493**	.284	.008	10.381
Family size	2.011	.905	**.026****	7.472	1.269	44.004
Trade/ profession			**.714**			
Trade/ profession (Agriculture)	-22.938	40192.9	**1.000**	.000	.000	.
Trade/ profession (2)	-18.077	40192.9	**1.000**	.000	.000	.
Trade/ profession (3)	26.429	40558.6	**.999**	3E11	.000	.
Trade/ profession (4)	-19.588	40192.9	**1.000**	.000	.000	.
Trade/ profession (5)	-29.887	40192.9	**.999**	.000	.000	.
Trade/ profession (6)	17.638	56841.4	**1.000**	45714053.136	.000	.
Trade/ profession (7)	-5.108	42426.3	**1.000**	.006	.000	.
Have chit-fund/ cooperative membership? (Yes)	3.555	2.609	**.173**	35.000	.210	5819.743
Years of borrowing	.361	.191	**.059**	1.435	.987	2.086
Repayment priority (1)	4.162	2.420	**.085**	64.191	.560	7361.519
Lenders flexible? (Yes)	-21.159	5377.22	**.997**	.000	.000	.
Purpose of loan			**.652**			
Purpose of loan (Agriculture)	-17.111	13.074	**.191**	.000	.000	4977.075
Purpose of loan (Business investment)	-12.361	12.336	**0.316**	.000	.000	135576.381
Purpose of loan (Land Purchase)	7.508	10.73	**.484**	1822.194	.000	2.5E13
Purpose of loan (Housing)	-6.014	11.615	**.605**	.002	.000	18848347.1

Variable names	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
Purpose of loan (Health)	-10.920	12.268	**.373**	.000	.000	501300.505
Purpose of loan (6)	-4.512	11.302	**.690**	.011	.000	45819634.9
Purpose of loan (Education)	-2.906	40192.9	**1.000**	.055	.000	.
Purpose of loan (8)	8.104	14221.4	**1.000**	3308.903	.000	.
Purpose of loan (Borewell digging)	-37.576	40192.9	**.999**	.000	.000	.
Time-lag between application & approval of loan	-.330	.563	**.558**	.719	.238	2.168
Borrow during time-lag (Yes)	-3.213	2.884	**.265**	.040	.000	11.474
Instalment finance - cut on food & clothing (Yes)	-3.354	2.407	**.163**	.035	.000	3.910
Did you fail to pay instalment? (Yes)	-.074	1.821	**.968**	.929	.026	32.929
CREDIT Preference Banks1	.463	.494	**.349**	1.589	.603	4.187
Instalment finance - Hand-loans from friends/relatives (Yes)	-6.167	2.510	**.014****	.002	.000	.287
Instalment finance – moneylender loan (Yes)	-4.583	2.329	**.049****	.010	.000	.982
Interest per month on loan 1	-1.034	.829	**.212**	.356	.070	1.806
CREDIT Preference - Loan from friends & relatives	1.202	.872	**.168**	3.326	.602	18.383
Repayment incentive-Access larger loan (Yes)	-1.171	1.908	**.539**	.310	.007	13.035
Repayment reason - Regular wages (Yes)	3.445	2.191	**.116**	31.335	.428	2296.699
Repayment reason - Repay even otherwise (Yes)	14.906	6.567	**.023****	2974278.2	7.651	1.1E12
Repayment reason - good economy (Y)	7.897	3.918	**.044****	2688.9	1.242	5819743.9
Constant	25.725	40550.9	**.999**	1.4E11		
*, **, *** represent 90%, 95% and 99% confidence levels						
Cox & Snell R square=0.381; Nagelkerke R square =0.761						
Sample size=839						

Source: Authors' contribution.

Repayment planning and guarantees

Those who finance instalments using hand-loans from friends and relatives are 99.8% less likely to find guarantors to substitute collateral, at 95% confidence level (p-value=0.014). Those who use moneylender loans to finance instalments are 90% less likely to find guarantor for substituting their loan collateral, at 95% confidence level (p-value= 0.049). In other words, serial borrowing, and debt traps prevent borrowers from finding guarantors to substitute collateral. Results clearly

point to the easy availability of information in close-knit rural communities, which enable guarantors to evaluate borrowers' repayment intentions. The problems of ex-ante information asymmetry, ex-post moral hazard and adverse selection do not appear to mar the rural credit markets where borrowers' financial information is freely available (Sarap, 1991).

Borrowers committed to loan repayment even when they are short of income, wages, or even when there is no promise of a future loan (repay even otherwise) are 2974277% more likely to find guarantors to substitute collateral, at 95% confidence level (p-value=0.023). These behaviours confirm to the low-risk behaviour discussed above. Such low-risk borrowers not only do not offer collateral, but even find guarantors to substitute collateral. Nevertheless, borrowers who promise loan repayment only when the economy is good, in a clear sign of opportunism, are 2689% times likely to find guarantors, at 95% confidence levels (p-value=0.044). This result is intriguing and requires more investigation.

Banks and guarantees

Larger the number of banks in the village, 99.7% lower the likelihood of finding loans on guarantees, at 95% confidence level (p-value=0.029). This is an intuitive finding because banks collateralize loans. Bank prevalence increases the likelihood of borrowers borrowing collateralized loans from banks, underscoring the pecking order theory in credit preference. Studies showed how borrowers preferred formal banks over other lenders, approaching semi-formal SHGs or informal moneylenders only when they failed to qualify for bank loans (Osei-Assibey, 2012).

Caste and gender

Lower the borrowers' caste in the caste hierarchy, higher the likelihood of finding loan guarantors, at 95% significance level (46% higher odds; p-value = 0.045). Larger the borrowers' family, higher the likelihood of finding loan guarantors, at 95% significance level (6 times higher odds; p-value=0.026). Interestingly, being a male decreased the likelihood of finding loan guarantors by 53%, underscoring the stronger social networks among women. But the variable was not significant. These findings point to the strength of social networks and the reciprocity of norms, with those belonging to lower castes and from larger families enjoying stronger social networks. Quid pro quo lending between friends and relatives, exchanged on the strength of social networks, are both interest free and collateral free (Swaminathan, 1991; Turvey and Kong, 2010). Lower caste borrowers, specifically SCs, are more likely to offer collateral. This could point to the success of priority sector lending scheme where nationalised banks lend to borrowers belonging to lower castes for fulfilling their (banks') lending criteria, against collateral (Kumar, 2013; Kumar and Venkatachalam, 2019).

5. CONCLUSIONS

In the study, we investigate research questions 1 and 2. We identify the drivers for collateralization and for finding guarantors for securing loan, to avoid the need for a collateral. We identify two distinct borrower categories. One, the honest borrowers who plan the financing of their instalments, avoid over-borrowing and debt traps. Two, those with a poor repayment planning as evidenced in faulty instalment financing, over-borrowing and consequently falling into debt traps. Most importantly, the information asymmetry plaguing the lending contracts appears to be absent or at best, minimum. The knowledge of borrower types enables lenders to take a call on whether to demand a collateral for their loans. The lender has two choices, namely, to accept a collateral or not. Likewise, the borrower has two choices, namely, to default or not to default. We capture these binaries in a 2X2 matrix and evaluate the outcomes.

In case of collateral free loans, where repayment is assured, the costs for the lender and the borrower are equal at 50:50. The first quadrant represents an opportunistic borrower likely to default. He offers a collateral, leading to his loss of say, α. The lender accepts the collateral but may have to forego a few instalments, if the not entire loan altogether, in lieu of this collateral, valued at α. Thus, both parties suffer losses, namely, foregoing the collateral and foregoing the loan, creating a suboptimal outcome of 50- α. In quadrant II, an opportunistic, lemon borrower does not offer collateral, but defaults, leading to a realignment of costs. Now the borrower bears 0 cost, while the lender bears 100% of the cost. In quadrant III, an honest borrower offers a collateral, and incurs an additional cost of α, adding on to the existing cost of 50, totalling 50+ α. The lender, on the other hand, is free to use/ pledge the collateral, while receiving his repayment, leading to a lessened cost of 50- α, when servicing an honest borrower. Quadrant IV shows how an honest borrower with no intention to default, escapes offering a collateral because the lender knows his true intentions. This quadrant leads to the optimal outcome of 50+α to both parties. The borrower does not have to lose control over the collateral, while the lender does not have to forego the loan repayments.

Borrower payoffs ⟹ Lender outcomes ⇩	**Offer a collateral**	**Not offering collateral**
Default	(50- α):(50-α)	0:100
No default	50+ α:50- α	50+ α: 50+ α

Source: Authors' contribution.

Figure 1. Lender-borrower payoff matrix.

Figure 1 shows us how there is an optimal outcome along the diagonal, wherein an honest borrower does not offer a collateral (quadrant IV) or when an opportunistic borrower with a high default risk offers a collateral (quadrant I).

Quadrant II represents lemon borrowing, while quadrant III shows over-vigilance by lenders in the face of information asymmetry. The optimal outcomes are possible only in the case of absence of information asymmetry.

In rural communities where information is freely available, the lender, fully aware of the borrower quality and his repayment planning, can waive off collateral requirement for an honest borrower and vice-versa. Borrowers' repayment planning strategies, repayment intentions and default history, all well-known to lenders, drive loan collateralization. Findings show how the low-risk borrowers comply and pay up instalments even at the cost of consumption spending. Their loans are not collateralized. Further, they can find personal guarantees to offset the need for collateral. Conversely, borrowers could be high-risk, borrowing from one source to pay the other, and getting into debt traps. Such borrowers must collateralize their loans and do not find guarantors to guarantee their loans. Further, lender-borrower relationship length and proximity mitigated the default risk despite the absence of collateral (Jamenez and Saurina, 2004). Defaulting in such an environment adversely affected borrower reputation, evidently delimiting his borrowing options.

6. RECOMMENDATIONS

In southern Indian states of AP, Telangana and Karnataka, institutional lenders lent to larger landowners, while the smaller landowners and tenant farmers were crowded out of the lending scheme (because institutional lenders accepted land collateral and refused smaller land holders and tenant farmers). Consequently, the small and marginal farmers in these states were excessively burdened by informal, expensive debt (Reddy, Raju and Bose, 2020). This study reconfirms this finding and shows how bank prevalence increases loan collateralization. Conversely, loans are guaranteed less often where there is bank prevalence. With no credible sources for borrower verification, the banks are compelled to collateralize their loans, as is evidenced in the findings. Can banks extend loans to smaller and marginalised farmers without a collateral, based on mutual guarantee? Can banks mimic the lending methods of informal lenders to gain the informational advantage? Nationalized banks using business correspondents or business facilitators (drawn from local community) could offset the need for collateral by using inside information about borrower repayment planning.

This study finds how SHG-bank loans are collateralized (even where they are expected to be collateral-free), pointing to a possible hidden collateral that banks demand. It is possible that the SHG members' savings must be compulsorily deposited with the banks before they receive the first matching grant. This aspect

requires further research. SERP, which promotes SHGs in both AP state and Telangana state, needs to reassess the lending modalities of banks to SHGs.

REFERENCES

1. Barboza, G. (2019). Social collateral, dynamic incentives, and joint liability in a two-step trust game: Lending to the unbankable. *Economic Notes: Review of Banking, Finance and Monetary Economics*, 48(2), e12132.
2. Berger, A. N., Frame, W. S., & Ioannidou, V. (2011). Tests of ex-ante versus ex-post theories of collateral using private and public information. *Journal of Financial Economics*, 100(1), 85–97.
3. Bond, P., & Rai, A. S. (2009). Borrower runs. *Journal of Development Economics*, 88(2), 185–191.
4. Dalla Pellegrina, L. (2011). Microfinance and investment: A comparison with bank and informal lending. *World Development*, 39(6), 882–897.
5. Datta, U. (2015). Socio-economic impacts of JEEViKA: A large-scale self-help group project in Bihar, India. *World Development*, 68, 1–18.
6. Feder, G., Onchan, T., & Raparla, T. (1988). Collateral, guaranties and rural credit in developing countries: evidence from Asia. *Agricultural Economics*, 2(3), 231–245.
7. Fletschner, D. (2009). Rural women's access to credit: market imperfections and intrahousehold dynamics. *World Development*, 37(3), 618–631.
8. Geethanjali, R., & Prabhakar, K. (2013). Economic development of women through self-help groups in YSR district, Andhra Pradesh, India. *Studies on Home and Community Science*, 7(1), 25–34.
9. Hartungi, R. (2007). Understanding the success factors of micro-finance institution in a developing country. *International Journal of Social Economics*, 34(6), 388–401.
10. Jiménez, G., & Saurina, J. (2004). Collateral, type of lender and relationship banking as determinants of credit risk. *Journal of Banking and Finance*, 28(9), 2191–2212.
11. Kalpana, K. (2015). Economic Entitlements via Entrepreneurial Conduct? Women and Financial Inclusion in Neo-liberal India. *Journal of World-Systems Research*, 50–68.
12. Koride, P., & Gurtoo, A. (2019). Individual borrowing and default behaviour in surplus and constrained credit environments. *Current Science*, 117(2), 227–234.
13. Kumar, S. M. (2013). Does access to formal agricultural credit depend on caste? *World Development*, 43, 315–328.
14. Kumar, S. M., & Venkatachalam, R. (2019). Caste and credit: a woeful tale? *The Journal of Development Studies*, 55(8), 1816–1833.
15. Kwon, S. (2021). A credit rationing model of the medium risk borrowers with low-valued collateral. *Applied Economics Letters*, 29(21), 1970–1974.
16. Le, C. H., & Nguyen, H. L. (2019). Collateral quality and loan default risk: the case of Vietnam. *Comparative Economic Studies*, 61(1), 103–118.
17. Maiangwa, M. G. (2012). Misconceptions about the Credit, Savings and Loan Repayment Behaviour of the Poor: A Review. *PAT*, 8(1), 80–90. Available at: http://patnsukjournal.net/Vol8No1/p7.pdf.
18. Makorere, R. F. (2014). Factors affecting loan repayment behaviour in Tanzania: Empirical evidence from Dar es Salaam and Morogoro regions. *International Journal of Development and Sustainability*, 3(3), 481–492.
19. McIntosh, C., & Wydick, B. (2005). Competition and microfinance. *Journal of Development Economics*, 78(2), 271–298.
20. Menkhoff, L., Neuberger, D., & Rungruxsirivorn, O. (2012). Collateral and its substitutes in emerging markets' lending. *Journal of Banking and Finance*, 36(3), 817–834.

21. Ono, A., & Uesugi, I. (2009). Role of collateral and personal guarantees in relationship lending: Evidence from Japan's SME loan market. *Journal of Money, Credit and Banking*, 41(5), 935–960.
22. Osei-Assibey, E., Bokpin, G. A., & Twerefou, D. K. (2012). Microenterprise financing preference: Testing POH within the context of Ghana's rural financial market. *Journal of Economic Studies*, 39(1), 84–105.
23. Pearson, R. S. (2008). *Relationship banking in a competitive environment with and without information sharing: The importance of credit bureaus in microfinance* (Doctoral dissertation, The Ohio State University).
24. Pillai, T., & Nadarajan, S. (2010). Impact of microfinance – an empirical study on the attitude of SHG leaders in Kanyakumari district – Tamilnadu. *International Journal of Enterprise and Innovation Management Studies*, 1(3), 89–95.
25. Reddy, A. A., Raju, S. S., & Bose, A. (2020). Farmers' Income, Indebtedness and Agrarian Distress in India. *The Microfinance Review*, 12(1), 20–38.
26. Sanyal, P. (2009). From credit to collective action: The role of microfinance in promoting women's social capital and normative influence. *American Sociological Review*, 74(4), 529–550.
27. Sarap, K. (1991). Collateral and other forms of guarantee in rural credit markets: evidence from eastern India. *Indian Economic Review*, 167–188.
28. Satish, P. (2005). Mainstreaming of Indian microfinance. *Economic and Political Weekly*, 1731–1739.
29. Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), 393–410.
30. Swaminathan, M. (1991). Segmentation, collateral undervaluation, and the rate of interest in agrarian credit markets: Some evidence from two villages in South India. *Cambridge Journal of Economics*, 15(2), 161–178.
31. Takahashi, K., Higashikata, T., & Tsukada, K. (2010). The short-term poverty impact of small-scale, collateral-free microcredit in Indonesia: A matching estimator approach. *The Developing Economies*, 48(1), 128–155.
32. Tirupal, D. T. (2016). Women Empowerment Through SHGs In India And Andhra Pradesh. *International Journal of Recent Research in Commerce Economics and Management (IJRRCEM)*, 3(1), 42–50.
33. Turvey, C. G., & Kong, R. (2010). Informal lending amongst friends and relatives: can microcredit compete in rural China? *China Economic Review*, 21(4), 544–556.
34. Vogelgesang, U. (2003). Microfinance in times of crisis: The effects of competition, rising indebtedness, and economic crisis on repayment behaviour. *World Development*, 31(12), 2085–2114.