

Psychology of Debt in Rural South India*

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Using a panel dataset built from an original household survey carried out in 2016-17 and 2020-21 in rural South India, we analyse the relationship between personality traits (conscientiousness, openness, extraversion, emotional stability, agreeableness) & cognitive skills (Raven matrices, literacy and numeracy scores) and financial decision-making. We focus on the recourse, the negotiation, and the management of debt. We find that certain personality traits such as openness, extraversion, and conscientiousness are generally significantly associated with negotiating and managing debt. The magnitude and statistical significance of the association between personality traits and debt differs across castes (Dalit, non-Dalit) and sex. These findings suggest the use of personality traits and cognitive skills for females as a way to overcome the weight of social identity in a rural caste-segmented patriarchal context.

Keywords: Personality traits, gender, caste, social identity, Tamil Nadu.

JEL Codes: D14, D91, O1.

1 Introduction

For more than a decade, there has been an increasing interest in the psychology economics literature regarding the interaction of personality traits (Borghans et al., 2008) and cognitive skills (Hanushek & Woessmann, 2008) with various economic choices. Researchers mainly investigate the relationship with the labour market (Heckman et al., 2006) and education (Almlund et al., 2011). However, few researchers investigate the relationship with household finance, while there is a recent growing body of interest (Gomes et al., 2021; Guiso & Sodini, 2013), especially among behavioural economists (Beshears et al., 2018).

Bauer et al., 2012

Empirical studies focused on cognitive skills and household finances, especially debt, find that individuals with higher math scores are substantially less likely to exhibit

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27 financial distress in the USA (Agarwal & Mazumder, 2013). Also, in the USA, Angrisani
28 et al. (2020) find that cognitive skills are an essential predictor of debt burden in older
29 age, and individuals with higher cognitive ability have taken on higher debt levels than
30 individuals with lower cognitive ability.

31 Studies mainly use the Brief Self-Control Scale (Tangney et al., 2004) concerning
32 personality traits and debt because of “the theoretical link impulsivity has with
33 intertemporal choice”, such as debt (Lea, 2020, p.157). Among those who deal with
34 Big-5 personality traits¹, conscientiousness appears most often associated with debt.
35 Indeed, Donnelly et al. (2012) find that a higher level of conscientiousness is associated
36 with more active financial management in the USA, while Letkiewicz and Heckman
37 (2019) find that more conscientious people are less likely to default on student loans,
38 also in the USA. In the UK, conscientiousness is negatively correlated with the level of
39 unsecured debt (Brown & Taylor, 2014). However, Nyhus and Webley (2001) find that
40 emotional stability is positively correlated with debt in the Netherlands, and Brown
41 and Taylor (2014) find that extraversion, agreeableness, and openness to experience are
42 generally strongly associated with the level of debt.

43 Research on the relationship between household debt and personality traits and
44 cognitive skills (PT&CS) has always been conducted in the north. To our knowledge,
45 no articles have looked at this relationship in developing countries while, first, credit
46 as an exit from poverty (Burgess & Pande, 2005) has been a strong argument for
47 financial inclusion policies in developing countries, making its study all the more
48 important. Indeed, credit appears as a potential tool for business creation, improved
49 access to education and health, enhanced decision-making, and women's empowerment
50 (Demirguc-Kunt et al., 2018), although the literature is mitigated on the practical effects
51 (Ali et al., 2022; Collins et al., 2009; de Koker & Jentzsch, 2013). Second, most of
52 the household debt in developing countries is informal (Badarinza et al., 2019) even
53 though households have access to formal debt (Banerjee & Duflo, 2007). Informal debt
54 is negotiable (as interest, for instance), especially in India, which paves the way to
55 express individual skills during the negotiation process (Elfenbein, 2015).

¹Big-5 model constitutes the main taxonomy. It identifies five dimensions of personality: emotional stability –ES– (tendency to experience negative emotions); extraversion –EX– (capacity to experience positive emotions, the tendency to seek stimulation and company from others); openness to experience –OP– (capacity to be creative and unstructured); agreeableness –AG– (perceptions of others that are caring, compassionate, and altruistic); conscientiousness –CO– (capacity to display self-discipline, act dutifully, and strive for achievement against measures or outside expectations).

This paper attempts to fill this gap by considering the case of rural Tamil Nadu in South India. This context is all the more interesting that the incidence of debt is high with high amounts, segmented among caste and sex, with a definite social meaning, and where a significant proportion of debt is negotiable.

Using a national representative survey, (Rajakumar et al., 2019) show that since the 1980s in India, the incidence of indebtedness has increased for rural and urban households (respectively from 19 to 32% and from 17 to 22%) with an increase in the share of household indebted to formal and informal sources. However, this incidence of debt is largely underestimated, and micro-level studies indicate an incidence of debt of around 80-90% (Jones, 1994). Furthermore, the average amount of debt per household strongly increased between 1951 and 2012 (from ₹283 to ₹33k). Given this dynamic, we expect that good debt management –that can be achieved through the PT&CS– is essential, while psychology literature highlights individual behaviour and psychology in debt management (Amar et al., 2011).

The situation is not homogeneous among individuals, as many disparities coexist between caste and sex. Indeed, in rural India, caste shapes credit sources, segmenting local informal credit circuits and affecting access to formal finance (Kumar, 2013). For instance, Dalits (or “untouchables”), the low caste individuals, have a higher incidence of indebtedness but borrow smaller amounts (Guérin et al., 2013). Across sex, the relative amount of debt is higher for females than for males, while males earn much more, females in the poorest households have the highest borrowing responsibilities, and Dalit females tend to face a higher debt burden than non-Dalit ones (Reboul et al., 2021). Recent crises such as the microfinance crises of 2010 (Nair, 2011), the demonetisation of November 2016 (Guérin et al., 2017), or the lockdowns of 2020-21 (Guérin et al., 2022) have exacerbated disparities between caste and sex, making the understanding of household and individual debt even more essential.

In addition to the debt incidence, the cornerstone of indebtedness in India resides in its social meaning (Guérin et al., 2014). The set of rights and obligations of debt links debtors and creditors into a strong relationship that has consequences in terms of social belonging, status, and dignity. For instance, contrary to the past –where workers are obligated to work for one owner– workers now sometimes have to offer services due to the loan. It includes numerous everyday services such as running errands to the shops

or domestic work, which can be time-consuming for the borrower. The set of rights and obligations and then the social meaning of debt is not fixed but continuously bargained and negotiated between stakeholders. Therefore, it can potentially open the way to express its skill during the negotiation process (Elfenbein, 2015).

In this article, using descriptive statistics and econometrics with probit and OLS, we explore the relationship between three aspects of individual debt (recourse, negotiation, and management) and personality traits as classified by the Big-5 taxonomy and cognitive skills (using math score, literacy score, and Raven matrices)². We segment analysis by caste (Dalit, non-Dalit) and sex to capture the weight of social identity in the expression of individual characteristics as recent studies highlight their contribution to economic outcomes (Benjamin et al., 2016; Benjamin et al., 2010). In rural South India, anthropological studies already show that interaction between skills and social structures matters for job success (Carswell & De Neve, 2018), and economic studies show that it matters for social mobility (Michiels et al., 2021). Thus, we aim to further our understanding of individual debt and financial decision-making determinants, especially the role of personality traits and cognitive skills, in caste-segmented patriarchal rural areas.

By doing so, we contribute to the economic literature on the understanding of indebtedness in rural India (Guérin et al., 2013) and, more broadly, the understanding of household finances in developing countries (Badarinza et al., 2019). Also, we contribute to psychology economic literature on the role of PT&CS on economic outcomes (Almlund et al., 2011), and especially indebtedness (Agarwal & Mazumder, 2013; Brown & Taylor, 2014), as well as psychology literature on the role of PT&CS in the negotiation process (Elfenbein, 2015). Last, by trying to capture the weight of social identity in the expression of individual characteristics, we contribute to the economic literature on the role of social identity in preferences and economic choices (Benjamin et al., 2016; Benjamin et al., 2010).

After controlling for important covariates (income, shock exposure, or lender characteristics, for instance), our findings suggest that a high level of openness-extraversion is a liability in the negotiation and the management of debt. In contrast, a high level of conscientiousness is a strong asset in these two aspects of debt. Also, the literacy

²Assuming consistent measurement of PT&CS, we thereby include variables into the regression that are usually part of the unexplained individual heterogeneity captured by the error term.

score and the Raven score are positively correlated with debt management capacities. The magnitude and statistical significance of the correlations differ across castes and sex, suggesting the use of individual skills as a way to overcome the weight of social identity, especially for females, in a rural caste-segmented patriarchal context.

The rest of the article is organised as follows: Section 2 presents the survey data and methodology, while section 3 reports descriptive statistics and an overview of indebtedness across castes and sex. The econometric relationship between PT&CS and indebtedness is developed and commented on section 4. Section 5 discusses the main findings, and we conclude with section 6.

2 Data and methodology

2.1 Data

Our analyses are based on NEEMSIS (Networks, Employment, dEbt, Mobilities and Skills in India Survey) surveys, which has two waves carried out respectively in 2016-17 and 2020-21 (Nordman et al., 2017). This survey (<https://neemsis.hypotheses.org/>) is a longitudinal data collection tool³ that builds on a survey wave implemented in 2010 within the project RUME (RUral Microfinance and Employment survey). NEEMSIS-1 (2016-17) and NEEMSIS-2 (2020-21) used here are the second and third waves of a longitudinal household survey in ten villages of Tamil Nadu. Located in the Cuddalore and Villupuram districts, a mostly agricultural area, the villages benefit from the proximity of two large industrial towns (Neyveli and Cuddalore) and a regional business centre (Panruti). The survey uses a stratified sample framework based on three dimensions: proximity to small towns (Panruti, Villupuram, and Cuddalore), an agro-ecological criterion, and caste affiliation. Thus, half of the villages have irrigated land (the other half is dry) and, within villages, half of the sample was selected from the most upper and middle caste part of the village “Ur”. In contrast, the other half comes from the “Colony” part, where Dalits mainly live.

An important caveat lies in the non-weighting of the data. Since the last Indian census was conducted in 2011, the precise composition of villages at the survey time

³This survey took place within two IRD-IFP research programmes located within the Observatory of Rural Dynamics and Inequalities in South India (ODRIIS – <https://odriis.hypotheses.org/>) hosted at the French Institute of Pondicherry, India.

147 was unknown. Then, according to the 2011 Census, Dalits are oversampled⁴. However,
148 due to the current processes of migration of upper castes to towns (Harriss & Jeyaranjan,
149 2016), the weight of Dalits is larger in 2016–17 than in 2011. In addition, almost half
150 the sample (42%) was interviewed after the November 2016 demonetisation. We do not
151 study its impact but control it in the analysis, as the shock disrupted local financial
152 circuits with consequences potentially differentiated along with sex and caste (Guérin
153 et al., 2017).

154 NEEMSIS-2 recovered 485 households (1.42% attrition rate) from 2016-17. In
155 addition, 129 new households were randomly added to the 2016-17 sample (for a total
156 of 614 households in 2020-21). Another essential caveat lies in the time period of the
157 survey. The whole sample was surveyed between December 2020 and September 2021,
158 after the first lockdown of March to May 2020 and during the second lockdown of April
159 to June 2021. Less than 2% of the households answered “yes” to the question: “Did
160 someone in the household catch COVID-19 or has been suspected to be a COVID-19
161 case?”. Then, in the following analysis, we control for it as far as possible while keeping
162 in mind that we cannot separate the time trend and the lockdown effect with our current
163 data⁵.

164 In NEEMSIS-1 & NEEMSIS-2, two household members, called “ego 1” (mostly house-
165 hold questionnaire respondent) and “ego 2” (one younger household member randomly
166 selected on a criterion of age), are directly addressed individual questionnaires that
167 provide, for instance, a range of information on PT&CS.

168 NEEMSIS-1 & NEEMSIS-2 stand out from other Indian data sources, such as the All
169 India Debt and Investment Survey (AIDIS). It has the rare and valuable advantage of
170 recording debt at the individual level by identifying the person who went to the lender
171 and borrowed in her own name.

172 Regarding the reliability of the collected information, the great expertise of the
173 fieldwork team⁶ helped formulate questions appropriately. This involved, for instance,
174 the use of specific terms that are less degrading than the generic term “debt”, lists of
175 the main local lenders, and asking indirect questions. Data accuracy is reflected by an

⁴ Accounting for roughly one and a half times their actual weight in 2011.

⁵ ODRIIS Observatory is a long-term project and new waves of surveys are planned. It will then be possible to separate the time effect from the lockdown effect.

⁶ Some research team members are present in the region for numerous quantitative and qualitative surveys for more than 20 years.

incidence of indebtedness higher than in the estimates of the nationwide AIDIS: 99% of households are in debt in our case study, as opposed to 30% in rural Tamil Nadu in 2012, according to the AIDIS (NSSO, 2014). Indeed, debt data are notoriously difficult to collect and prone to underreporting due to recall issues and social desirability biases (Karlan & Zinman, 2008). Moreover, the moderate magnitude of the survey, compared to nationally representative datasets, ensures the high quality of the data. Finally, the tablet-based mode of data collection improved data quality by including constraints on answers to prevent inconsistencies.

2.2 Construction of personality traits & cognitive skills variables

Our survey allows us to construct PT&CS for both waves (2016-17 and 2020-21). The exogeneity of PT&CS is often assumed in economic literature because of stability over time, while there is no consensus in psychology (Caspi et al., 2005). Our data allow us to examine the stability over time of personality traits for 835 individuals. Our results suggest stability for a minor part of the population (Natal & Nordman, 2022). Thus, to avoid endogeneity issues through reverse causality between debt and PT&CS we use 2016-17 measures of PT&CS on debt in 2020-21, following Anger et al. (2017).

Measures of cognitive skills include three score variables: literacy, numeracy, and Raven Coloured Progressive Matrices tests⁷. Literacy and numeracy tests measure crystallised intelligence (knowledge learned), while Raven progressive matrices capture concepts of fluid intelligence (the rate at which people learn). These scores are constructed by summing up the correct answers of a set of four questions for the literacy and numeracy tests and 36 for the Raven test. We standardise resulting scores to ensure comparability of results between personality traits and cognitive skills.

Regarding personality traits, our data allow us to construct Big-5 personality traits, which constitute the main taxonomy. It identifies five dimensions of personality: emotional stability –ES– (tendency to experience negative emotions); extraversion –EX– (capacity to experience positive emotions, the tendency to seek stimulation and company from others); openness to experience –OP– (capacity to be creative and unstructured); agreeableness –AG– (perceptions of others that are caring, compassionate, and altru-

⁷Raven's Coloured Progressive Matrices are a cognitive, visual and non-verbal test that does not require formal education. It captures the ability to think and make sense of complex data and logical reasoning.

istic); conscientiousness –CO– (capacity to display self-discipline, act dutifully, and strive for achievement against measures or outside expectations). In our dataset, based on 35 affirmative questions (John & Srivastava, 1999), we averaged answers of a Likert scale from “Almost never” to “Almost always”, which belong to a determined trait after correcting for acquiescence bias⁸. The resulting mean represents the score on each naïve trait. McDonald’s ω , a measure of internal consistency, are mostly satisfactory (higher than 0.7) for 2016-17 dataset: 0.81 for openness; 0.86 for conscientiousness; 0.59 for extraversion; 0.60 for agreeableness and 0.80 for emotional stability.

As warned by Laajaj and Macours (2019), the Big-5 taxonomy is limited in developing countries for several reasons: the enumerator-respondent interactions in face-to-face interviews can induce a bias; the low education levels can make questions more difficult to understand and can induce a systematic response pattern, especially the acquiescence bias. However, our intimate knowledge of the survey field and the fact that we used a relatively small, experienced, and well-trained team of interviewers succeeded in minimising bias in the data due to a misunderstanding of the questions. Moreover, the language in the question set was adjusted to accommodate a low-literacy population, and a careful translation to local Tamil was developed after numerous discussions and tests among the survey team, which included local enumerators.

In addition to the naïve Big-5 model, we implement our own factor analysis of the 35 questions using a principal component analysis with an oblique quartimin rotation. The resulting factors are relatively similar to the Big-5 taxonomy, and internal consistency is satisfactory: Factor 1 as approximately emotional stability ($\omega = 0.88$); Factor 2 as approximately conscientiousness ($\omega = 0.84$); Factor 3 as openness-extraversion ($\omega = 0.81$); Factor 4 as weak emotional stability ($\alpha = 0.54$) and Factor 5 as approximately agreeableness ($\omega = 0.56$). As Factor 4 represents a weak measure (in the sense that it captures only two items of emotional stability), we choose to exclude it from analyses. Then we retain emotional stability, conscientiousness, openness-extraversion, and agreeableness as personality traits for further analyses. Also, openness-extraversion is interpreted the same way as the “beta factor” of Digman (1997) and Anusic et al. (2009), which represent the extent to which a person actively searches for a new and rewarding intellectual and social experience.

⁸The tendency to answer more in one direction –agree or disagree– over the other.

To remove the effect of age on the PT&CS measures –that might induce endogeneity through measurement errors, we run univariate OLS regressions with PT&CS as endogenous variables and age as exogenous variable. Following literature (Brown & Taylor, 2014; Nyhus & Pons, 2005), we standardised the resulting residuals and used them as age-effect-free PT&CS.

2.3 Measures of debt

To fully understand the role of PT&CS on debt, we analyse three aspects of debt: the recourse –or the intensity of debt, the negotiation, and the management (see Table 1).

In the first aspect, we aim to investigate whether PT&CS of borrowers influence the recourse of debt that we measure with the probability that an individual is in debt and, if yes, the total raw amount of debt⁹. Following the literature (Brown & Taylor, 2014), we can expect a negative correlation between conscientiousness and the total amount of debt, and a positive correlation with emotional stability (Nyhus & Webley, 2001). Also, we can expect a correlation between the amount of debt and extraversion, agreeableness, and openness to experience (Brown & Taylor, 2014).

We focus on debt negotiation between the lender and the borrower for the second aspect. As a measure, we first use the interest service ratio (ISR) of debt which represents the share of annual income dedicated to the repayment of interest. Second, the probability that the lender provides financial support¹⁰ to the borrower. The structure of our dataset allows us to use a third measure of negotiation for several individuals (those who have at least one main loan¹¹): the probability that the borrower does not need to provide services¹² to obtain the loan. Our intuition is that individuals enter into a negotiation process to obtain the “best conditions” for the loan, such as paying as little interest as possible, receiving support from the lender and not needing to offer a service that can be time consuming. Following literature (Barry & Friedman, 1998),

⁹All outstanding loans at the time of the survey were recorded, from credit by neighbours to bank loans, and this paper examines the totality of this stock of debt.

¹⁰Depending on the negotiation process, the lender puts his client in touch with other lenders when he cannot lend himself.

¹¹We have more details for the three main loans of the household. Main loans are selected on the amount criterion and sources criterion (preferably informal loan).

¹²Depending on the negotiation process, individuals have to offer services due to the loan, including numerous everyday services such as running errands to the shops or domestic work, which can be very time-consuming.

we can expect that extraversion and agreeableness “tend to be a liability in strictly competitive situations” (Elfenbein, 2015, p. 133).

For the last aspect, we leave the negotiation framework between debtor and creditor and focus on individual behaviour. We expect to capture how PT&CS influences individual behaviour in terms of debt management in rural India. Using the sample of individuals with at least one main loan, we use two measures of debt management: (i) the probability that the borrower borrows elsewhere to repay the debt rather than using normal income or working more and (ii) the probability that the borrower has a problem to repay the loan. Following the literature (Donnelly et al., 2012), we can expect individuals with a higher level of conscientiousness have higher debt management capacity.

To avoid reverse causality between PT&CS and debt, we are only interested in debt construct between 2016-17 and 2020-21, thus, debt construct after the measure of PT&CS, following Anger et al. (2017).

[Table 1 around here]

2.4 Econometric framework

We regress the four personality traits from factor analysis (emotional stability, conscientiousness, openness-extraversion and agreeableness) and the three measures of cognitive skills (numeracy, literacy and Raven) ($PTCS'_i$) on our seven dependent variables (Y_i presented in Table 1).

Our analysis faces non-random sample selection issues because of our dependent variables: the sample is restricted to those who declared a non-zero and non-missing debt (except for the probability that an individual is indebted). We can rely on the Heckman procedure to overcome this sample selection issue. However, a solid theoretical background is needed to determine exclusion restriction variables that may affect the participation decision to debt but not the other dependent variables. Exclusion restriction variables fromn the literature¹³ are not relevant in our context, and we do

¹³Cox and Jappelli (1993) used years of education, occupation, area income, employment status and rural-urban status, while Bertaut and Starr (2002) used the proportion of household heads employed in the financial services in the region and the proportion of household heads employed in a workplace of 500 or more. Duca and Rosenthal (1993) assumed that the same variables determined the probability of having debt and the amount borrowed. However, Lennox et al. (2011) point out that an absence of exclusion restriction in the first stage can lead to severe multicollinearity in the second stage.

not have sufficient theoretical background to choose one over another. Thus, we follow del Río and Young (2006) by excluding non-participants to debt in our subsequent regressions¹⁴.

Therefore, we use OLS for continuous variable and probit model with maximum likelihood estimation for dummy variables (see Table 1), to estimate eq.1.

$$Y_i = \beta_0 + PTCS'_i * \beta_1 + X'_i * \beta_2 + \epsilon_i \quad (1)$$

Our control variables (X'_i) take the existing classic controls. At the individual level we use age; age square; sex; dummy variable which takes 1 if individual is the household head, 0 otherwise; main occupation defines as the most time-consuming activity; dummy variable which takes 1 if individuals received formal education through school, 0 otherwise and a dummy variable which take 1 if individual is married, 0 otherwise. At the household level we control for caste (Dalit or not); monetary value of assets (include gold; land; house; livestock; agricultural equipment and consumption good); total annual income; household size; shock exposure (dummy variable which takes 1 if the household experienced a marriage of at least one of the household members between 2016-17 and 2020-21 or/and whether the household has been surveyed after the demonetisation of November 2016, 0 if not). Also, at the household level, we control for the “degree” of exposition of COVID-19. We add a dummy variable that takes one if the household had to sell assets to cope with the difficulties of the lockdown. As stated earlier, the amount of debt is estimated in $t + 1$, and our independent variables in t . Therefore, we control for the indebtedness situation in t by adding a dummy variable that takes one if individual is indebted in 2016-17, zero otherwise.

In order to control our regressions as best as possible, we add two control variables when we consider the negotiation of debt: the percentage of loans from an individual of the same sex and the percentage from an individual of the same caste. Our intuition is that negotiations can be easier when the lender and the borrower have the same sex or

¹⁴Using localisation, race and employment status as exclusion restriction, their results from Heckman procedures are no different from those from OLS regressions excluding non-participants. It suggests that “any corner-solution biases are small” del Río and Young, 2006, p.1125. Another way to estimate our model is to use the tobit model, which allows for the truncation of the dependent variables. However, it would be unsuitable as the data are not censored or truncated but defined on \mathbb{R}^+ .

313 caste. We believe that caste solidarity (Guérin et al., 2021) can facilitate negotiation.
314 When we consider debt management, we add the total amount of debt as a control
315 variable. Our intuition is that the higher the debt, the more difficult it is to manage.
316 Here, we are talking about management and especially repayment. Indeed, in our
317 context, literature already shows that the highest debt is not necessarily “bad” (Carswell
318 et al., 2021).

319 To take into account the weight of social identity we analyse, the relationship
320 according to social identity in order to determine to what extent, within a social identity,
321 individuals manage to distinguish themselves by their PT&CS. Although splitting
322 samples may improve the model specification, we use the full sample of individuals
323 with interacted variables between PT&CS and sex (eq.2), caste (eq.3) and both sex and
324 caste (eq.4) so as to maximise statistical power. Interaction effects is complicated to
325 interpret in nonlinear models because the magnitude of the coefficient depends on all
326 the covariates in the model, and it can have different signs for different observations,
327 making simple summary measures of the interaction effect difficult (Ai & Norton, 2003;
328 Greene, 2010). Two approaches exist in the literature (Buis, 2010; Karaca-Mandic et al.,
329 2012), depending on the research question: the marginal effect and the cross-derivative.
330 The marginal effect shows how $P(Y = 1)$ changes as X changes after controlling in
331 some way for the other variables in the model, while the cross-derivative show how the
332 marginal effect of an explanatory variable changes when another explanatory variable
333 changes. Thereby, we compute marginal effect (ME) at representative values of sex and
334 caste and all other variables at the mean to determine how the effects of PT&CS vary
335 according to individual characteristics. This allows us to create nine artificial subgroups
336 of ME for each PT&CS variable: average individual (eq.1); average male and average
337 female (eq.2); average Dalit and non-Dalit (eq.3); average non-Dalit male, Dalit male,
338 non-Dalit female and Dalit female (eq.4).

$$Y_i = \beta_0 + PTCS'_i * \beta_1 + X'_i * \beta_2 + PTCS'_i * Sex_i * \beta_3 + \epsilon_i \quad (2)$$

$$Y_i = \beta_0 + PTCS'_i * \beta_1 + X'_i * \beta_2 + PTCS'_i * Caste_i * \beta_3 + \epsilon_i \quad (3)$$

$$Y_i = \beta_0 + PTCS'_i * \beta_1 + X'_i * \beta_2 + PTCS'_i * Sex_i * Caste_i * \beta_3 + \epsilon_i \quad (4)$$

We cluster the standard errors at the household level to consider the fact that observations within each household are not i.i.d.¹⁵.

3 Descriptive statistics

Our final sample consists of 835 individuals from 473 households.

Almost half of them are Dalits (see Table 2). In terms of assets, middle-upper castes households are three times richer than Dalits on average –respectively ₹1,560k and ₹510k (which represent respectively around \$20k and \$7k)¹⁶. This economic advantage of non-Dalits is also found with income: the total income of middle-upper castes is 37% higher than that of Dalits. Between Dalit and non-Dalit households, the same proportion faced a shock (around 56%) or had to sell assets to cope with the difficulties of the lockdown (around 15%).

[Table 2 around here]

At ego level (see Table 3), 55% of our sample are males and, among them, 46% are Dalits (among females, 50% are Dalits). Males are, on average, older than females and three-quarters of them are the head of the household (female household heads represent 9%). In terms of education, males are more formally educated than females. Disparities in terms of sex are also found in occupations. Males are overrepresented in stable occupations (agriculture, regular salaried job or self-employment) and females are overrepresented in precarious employment (agricultural coolie or NREGA). Non-agricultural coolie appears as an exception: 16% of males are, while 11% of females are. Last, the average annual income of females is almost four times lower than that of males.

[Table 3 around here]

Figure 1 shows the distribution of each PT&CS standardised, net of life-cycle. It appears that males tend to have a higher score for each personality trait: they are more salient in terms of emotionally stability, conscientiousness, openness-extraversion and

¹⁵We have data for two individuals from the same household, and the individuals may share resources such as incomes or assets for instance.

¹⁶\$1=₹75 at the end of January 2022.

365 agreeableness. Concerning cognitive skills, males also tend to have higher scores for
366 Raven test, numeracy and literacy tests than females.

367 [Figure 1 around here]

368 Our sample of indebted individuals consists of 640 individuals: 332 males and 308
369 females, which represent 72% of males and 83% of females (see Table 3). We do not
370 observe significant disparities between males and females in terms of the amount of
371 debt. However, the situation is much more unfavourable for females, as their income
372 is four times lower than males. It appears that males have lower interest service ratio
373 (on average, 46% of their income is dedicated to the repayment of interest of the debt,
374 two times lower than for females) and a higher probability that the lender provides
375 financial support to them. This finding suggests that males are more able to negotiate
376 this aspect of their debt than females. However, in terms of services rendered by the
377 borrower due to the loan, females have a higher probability of no need to provide one
378 (69%) than male (44%). Interestingly, males have a higher probability of borrowing
379 elsewhere to repay the debt than females (respectively 37% and 25%), suggesting that
380 females have better debt management than males. Last, we do not observe significant
381 differences in terms of the repayment problem between males and females.

382 [Table 4 around here]

383 **4 Results**

384 To interpret the results, marginal effects at representative values on the predicted value
385 of the PT&CS are reported for the four specifications described previously. According
386 to specifications, the representative values are (eq.1) the average individual (All); (eq.2)
387 the average male (Male) and the average female (Female); (eq.3) the average non-Dalit or
388 the average middle-upper caste (MUC) and the average Dalit (Dalit); (eq.4) the average
389 non-Dalit male (MUC male), the average Dalit male (Dalit male), the average non-Dalit
390 female (MUC female) and the average Dalit female (Dalit female). All PT&CS are
391 standardised to ensure comparability between them. Therefore, we will speak in terms
392 of one standard deviation (sd) more of PT&CS. An important caveat to acknowledge
393 prior to exposing the findings of our empirical analysis is the magnitude of the effects.

394 Personality traits range from -4 to 4. Thus, one more standard deviation represent a
395 gap of 12.5% in more.

396 **4.1 Recourse to debt**

397 **Probability of being indebted** Table 5 presents the multivariate probit analysis results
398 of the probability for an individual to be in debt in 2020-21. McFadden's pseudo R^2
399 indicates a good goodness-of-fit for all the specifications –they are all above the 0.2
400 threshold (McFadden, 1979). Moreover, we observe that all p-values associated with the
401 simultaneous coefficient nullity test (LR χ^2) are low enough to conclude that at least
402 one of the regression coefficients in the model is not equal to zero.

403 The results show that 2016-17 cognitive skills and personality traits are not corre-
404 lated with the probability of being indebted in 2020-21 at 95% confidence level (cl) for
405 the average individual (eq.1). However, if we accept a 10% risk of error, agreeableness
406 is negatively correlated, other things equal. By refining the regression by sex (eq.2), we
407 observe that the previous relationship seems to be male-driven: all else being equal,
408 at 5% risk of error, when agreeableness increases by one sd, the predicted probability
409 of being in debt decrease by 7 percentage points (pp). By refining the regression by
410 caste (eq.3), we observe that literacy is positively correlated for the average non-Dalit
411 individual. With the more precise regression (eq.4), we do not observe correlation at
412 95% cl.

413 If we accept a 10% risk of error, for the average female, literacy is positively corre-
414 lated, and Raven is negatively correlated, with the same magnitude (4 pp), all else being
415 equal. Relationship with literacy test seems to be more precise for non-Dalit and then
416 for the average non-Dalit female, other things equal. Last, the negative relationship
417 with Raven seems to be more precise for non-Dalit females at 90% cl.

418 [Table 5 around here]

419 **Total amount of debt** Table 6 presents results from the multivariate OLS analysis of
420 the total amount of debt. The goodness-of-fit is relatively low compared to the previous
421 analysis, and all p-values associated with the F-stat are low enough.

422 At 5% risk of error, we do not observe correlations with any PT&CS for the average
423 individual, average male, female, average Dalit or non-Dalit. With the most accurate

specification (eq.4), Raven is positively correlated (+24 pp) with the amount of debt for the average Dalit female, all else being equal.

At 10% risk of error, agreeableness is negatively correlated for the average individual, without a more precise relationship according to sex or caste.

[Table 6 around here]

4.2 Debt negotiation

Interest service ratio Table 7 presents results from the multivariate OLS analysis of the interest service ratio for an individual. The goodness-of-fit is relatively low and all p-values associated to the F-stat are low enough.

At 5% or 10% risk of error, we do not observe correlations with any PT&CS for the average individual. By refining the regression by sex (eq.2), we observe a negative relationship with literacy for the average male, other things equal. By caste (eq.3), we observe a positive relationship with openness-extraversion for the average Dalit. The magnitude is higher for literacy (-15 pp) than openness-extraversion (+13 pp), and we observe a more precise relationship with eq.4 for the average Dalit female and openness-extraversion (+24 pp, at 1% risk of error), other things equal.

[Table 7 around here]

The lender provides financial support to the borrower Table 8 presents results from the multivariate probit analysis of the lender's probability of providing financial support to the borrower. McFadden's pseudo R^2 indicates a good goodness-of-fit, and all p-values associated with the simultaneous coefficient nullity test are low enough.

At 5% risk of error, we do not observe correlations with any PT&CS for the average individual (eq.1). At 10%, agreeableness is positively correlated, other things equal, and the relationship is Dalit-driven: all else being equal, at 95% cl, when agreeableness increase by one sd, the predicted probability that the lender provides financial support to the borrower increase by 2 percentage points (pp). By refining the regression by sex (eq.2), emotional stability and literacy are positively correlated for the average female, respectively +5 pp at 95% cl and +6 pp at 90% cl.

[Table 8 around here]

No need to provide services Table 9 presents the multivariate probit analysis of the probability that the borrower does not need to provide services due to the loan. McFadden's pseudo R^2 indicates a good goodness-of-fit and all p-values associated with the simultaneous coefficient nullity test are low enough.

Results show that cognitive skills are better predictors compared to personality traits. Indeed, at 5% risk of error, for the average individual (eq.1), numeracy score is negatively correlated (-10 pp), and the relationship seems to be clearer for the average male (-11 pp) (eq.2) and average Dalit (-16 pp) (eq.3). In the more precise specification (eq.4), the correlation is significant at 5% risk of error for the average Dalit female (-22 pp), other things equal. At 10% risk of error, for the average male (eq.2), literacy is positively correlated (+10 pp), as for the average Dalit (eq.4, +15 pp, at 95% cl) and then for the average Dalit male (+14 pp, at 90% cl), all else being equal. Moreover, at 95% cl, Raven is negatively correlated for the average non-Dalit female (eq.4): all else being equal, when Raven increase by one sd, the predicted value of the probability that the lender does not need to provide service decrease by 21 pp at 95% cl. At 10% risk of error, the correlation is reverse for the average non-Dalit male (+10 pp) (eq.4), other things equal.

Regarding personality traits, for the average individual (eq.1) only conscientiousness is positively correlated (+6 pp, at 10% risk of error). The correlation seems to be female-driven (+10 pp, at 90% cl) (eq.2) and especially non-Dalit-driven (eq.4). Indeed, all else being equal, when conscientiousness increases by one sd, the predicted value of the probability increase by 58 pp at 95% cl. Last, openness-extraversion is negatively correlated for the average non-Dalit individual (eq.3) at 10% risk of error, and the relationship is male-driven (eq.4, -11 pp, at 5% risk of error).

[Table 9 around here]

4.3 Debt management

Borrow elsewhere to repay the debt Table 10 presents the multivariate probit analysis of the probability that the borrower needs to borrow elsewhere to repay the loan. McFadden's pseudo R^2 indicates a relatively good goodness-of-fit and all p-values associated with the simultaneous coefficient nullity test are low enough.

At 95% cl for the average individual (eq.1), emotional stability is positively correlated (+6 pp), and the relationship is male-driven (+9 pp) (eq.2) and non-Dalit-driven (+10 pp) (eq.3). Then, all else being equal, for the average non-Dalit male (eq.4), when emotional stability increases by one sd, the probability that the borrower needs to borrow elsewhere to repay the loan increase by 11 pp, at 95% cl. Moreover for the average individual (eq.1), agreeableness is negatively correlated (-5 pp) at 90% cl. The correlation seems to be driven by the Dalit male (-10 pp, at 5% risk of error) (eq.2).

Regarding cognitive skills, literacy is negatively correlated (-9 pp) for the average individual, while numeracy is positively correlated (+7 pp), at 5% risk of error (eq.1). These two cognitive skills seems to be non-Dalit-driven (eq.3) and especially for non-Dalit males (respectively -17 pp and +14 pp, at, at least, 95% cl) (eq.4).

[Table 10 around here]

Has problems to repay Table 11 presents the multivariate probit analysis of the probability that the borrower has problems repaying the loan. McFadden's pseudo R^2 indicates a relatively low goodness-of-fit, but all p-values associated with the simultaneous coefficient nullity test are low enough.

For the average individual (eq.1), at 5% risk of error, conscientiousness is negatively correlated (-6 pp) and emotional stability is positively correlated with the same magnitude. Both are female-driven (eq.2), especially Dalit female (eq.4) for emotional stability (+14 pp) and non-Dalit one (eq.4) for conscientiousness (-18 pp). Also, we observe that openness-extraversion is positively correlated at 10% risk of error for the average female (eq.2), and at 5% for the average non-Dalit (eq.3). Then, for the average non-Dalit female (eq.4), when openness-extraversion increases by one sd, the probability that the borrower has problems repaying the loan increases by 17 pp, all else being equal.

Regarding cognitive skills, only Raven is correlated at 95% cl for the average individual (-6 pp) (eq.1). The correlation seems to be driven by males (-10 pp) (eq.2) and non-Dalit individual (-11 pp) (eq.3), at 5% risk of error.

[Table 11 around here]

5 Discussion

Statistics presented in the previous section reveal several important insights on the influence of PT&CS on recourse to debt, negotiation, and management. In what follows, we propose an explanation of our statistics.

5.1 How PT&CS influence recourse to debt?

An interesting finding of this paper is that cognitive skills and personality traits appear to play a limited role in the recourse to debt in a rural developing contexts such as rural Tamil Nadu, in India. At least, our data do not allow us to show a correlation, except a negative one, between the probability of being in debt and the agreeableness among males. This result is interesting as it is consistent with Brown and Taylor (2014), who find that agreeableness is negatively correlated with the level of unsecured debt in the UK.

5.2 How PT&CS influence negotiation of debt?

In terms of negotiation of debt, our results are consistent with those of Barry and Friedman (1998) in developed countries: extraversion tends to be a liability in strictly competitive situations” (Elfenbein, 2015, p.133). Indeed, among Dalit females, those with higher openness-extraversion scores also have higher level of interest service ratio. Among non-Dalit males, those with a higher openness-extraversion scores are also those with a lower probability of no need to provide services in return for the loan. In both cases, this is not the optimal situation from the borrower’s point of view because individuals will pay more interest and have to provide a time-consuming service. An individual with low extroversion tends to be calmer, which can be a strong asset in the negotiation process. An individual with low openness to experience tends to be more suspicious leading him to ask himself more questions to know where he is going in the negotiation and thus better “defend” his interests. Last, low openness to experience is associated with more “simplicity” and a more prominent “direct side”, which can make it easier to defend its own interests in a negotiation process.

However, our results on agreeableness are not consistent with the literature (Barry & Friedman, 1998), which finds that it is also a liability in a negotiation situation. Indeed,

the more agreeable an individual is, the better he negotiates his debt with our data. As agreeableness partly encompasses the concept of trust, a trustworthy individual is probably able to negotiate his debt better, to the extent that, in our context, trust and reputation play a crucial by conditioning creditworthiness (Hilger & Nordman, 2020).

Moreover, we have identified the positive contribution of emotional stability and conscientiousness in negotiating debt, especially among females and non-Dalit ones. For emotional stability, the more emotionally stable an individual is, the fewer emotions interfere with their ability to reason and make decisions, and the better they can cope with a stressful situation. However, debt negotiation can be stressful and intense as, in our context, debt refers to individual reputation and social status in the village (Guérin et al., 2014). For conscientiousness, it is a concept that includes, in part, the “ability to hold a course of action” and “identify a goal”, which is essential when seeking to defend its own interests in a negotiation process.

Regarding cognitive skills, only crystallised intelligence (measured with literacy and numeracy tests) is correlated with debt negotiation. However, the way it is vagueness. While literacy score contributes positively to debt negotiation, literacy score contributes negatively which makes the interpretation too sensitive.

Another interesting finding of this paper is that females are more able to use their personality traits during the negotiation of debt to obtain the “best” conditions. This may suggest that females know that their social identity is a “disadvantage” and then use their personality traits to best negotiate the debt. Conversely, males know that they do not need to mobilise their skills because their male identity has an intrinsically substantial weight in the negotiation process. This assumption collaborates with Michiels et al. (2021) findings. They find that the female’s personality traits are better predictors of income mobility in rural India than males’ personality traits.

Last, it seems that the weight of caste identity is more important than the gender one, to the extent that, globally, among caste, few individuals stand out from others because of their personality traits.

5.3 How PT&CS influence the management of debt?

As for the negotiation of debt, conscientiousness seems to be a strong asset for managing debt, especially for females. Indeed, more conscientious females have a lower probabil-

572 ity of having a problem repaying the debt. The same interpretations as for negotiation
573 can be made here, and this finding is consistent with the literature (Donnelly et al.,
574 2012). Conscientiousness is a concept that includes, in part, the “ability to hold a course
575 of action” and “identify a goal”, which is essential when individuals, especially females,
576 need to manage their debt.

577 Moreover, it seems that emotional stability is rather ambivalent to the extent that, on
578 the one hand, it allows for better debt negotiation. However, on the other hand, more
579 stable individuals have worse debt management, especially females and Dalit females.

580 For openness-extraversion, our findings are similar to those for debt negotiation.
581 Indeed, a higher level of openness-extraversion is a liability in debt management,
582 especially for females and non-Dalit ones.

583 Regarding cognitive skills, our results are consistent with the literature. Agarwal
584 and Mazumder (2013) find that individuals with a higher math score (a measure
585 of crystallised intelligence) are less likely to make financial mistakes. We find that
586 individuals with higher literacy scores have better managing capacities¹⁷.

587 Another interesting finding of this paper is that the more individuals have a high
588 level of fluid intelligence (measure with Raven matrices), the fewer they have prob-
589 lems repaying the debt. This result is consistent with the literature in psychology
590 which shows that fluid intelligence is associated with better management skills such as
591 multitasking (Konig et al., 2005).

592 Last, as for the negotiation of debt, it seems that females are more able to use their
593 personality traits to manage debt. As for the negotiation of debt, we can interpret this
594 result as the fact that personality traits allow females to differentiate themselves in a
595 context where the weight of being a female is heavy.

596 **6 Concluding remarks**

597 In this paper, using an original dataset from rural South India, we have analysed the
598 financial practices of a rural population and especially their recourse to debt, the
599 negotiation of debt, and the management. In our context debt appears as a set of rights
600 and obligations that are continuously bargained and negotiated between stakeholders.

¹⁷Measured with the probability that the borrower needs to borrow elsewhere to repay the debt.

601 Complex forms of power and domination are encompassed in debt relationship. Thus,
602 we have focused on the correlation with cognitive skills (Raven, numeracy and literacy
603 scores) and personality traits (based on Big-5 taxonomy) while taking into account the
604 weight of social identity (caste and sex).

605 By doing so, we have joined two disciplinary approaches: Behavioural economics,
606 which provides evidence that cognitive and socioemotional skills are likely to impacts
607 individual choices and outcomes. While behaviourist approaches are often disconnected
608 from the analysis of social structures, we complement our approach with a structuralist
609 view that recognises that individuals are embedded in social relations that make up the
610 collective structure (Polanyi, 1944).

611 After controlling for important covariates (income, shock exposure, or lender char-
612 acteristics, for instance), our findings suggest that a high level of openness-extraversion
613 is a liability in debt negotiation and debt management, while a high level of consci-
614 entiousness is a strong asset in these two aspects. Regarding cognitive skills, literacy
615 and Raven scores are positively correlated with debt management capacities. Also, we
616 highlight the use of personality traits and cognitive skills to overcome the weight of
617 social identity, especially for females. Last, we find no contribution of personality traits
618 and cognitive skills on the recourse to debt in rural South India, at least, our data do not
619 allow us to show correlations. These interesting findings highlight the use of individual
620 skills in debt negotiation and debt management that are still strongly organized by
621 diverse forms of domination according to social identity.

622 Our paper thus contributes to the growing literature on individual and household
623 finances, furthering our understanding of the determinants of debt negotiation and debt
624 management. Also, it contributes more generally to the expanding literature exploring
625 the implications of personality traits for economic outcomes and the literature exploring
626 the interaction between social identity and economic choices.

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Tables and figures

Table 1: Details of dependents variables.

Aspects	Dependent variables	Sample	Type	Method
Recourse	(a) Prob. that individual is in debt	Full Indebted	Bin. Cont.	Probit OLS
	(b) Total amount of debt			
Negotiation	(c) Debt interest service ratio	Indebted	Cont.	OLS
	(d) Prob. that lender provide financial support to borrower			
	(e) Prob. that borrower no need to provide services			
Management	(f) Prob. that borrower borrow elsewhere to repay the debt	Main loan	Bin.	Probit
	(g) Prob. that borrower have a problem to repay the loan			

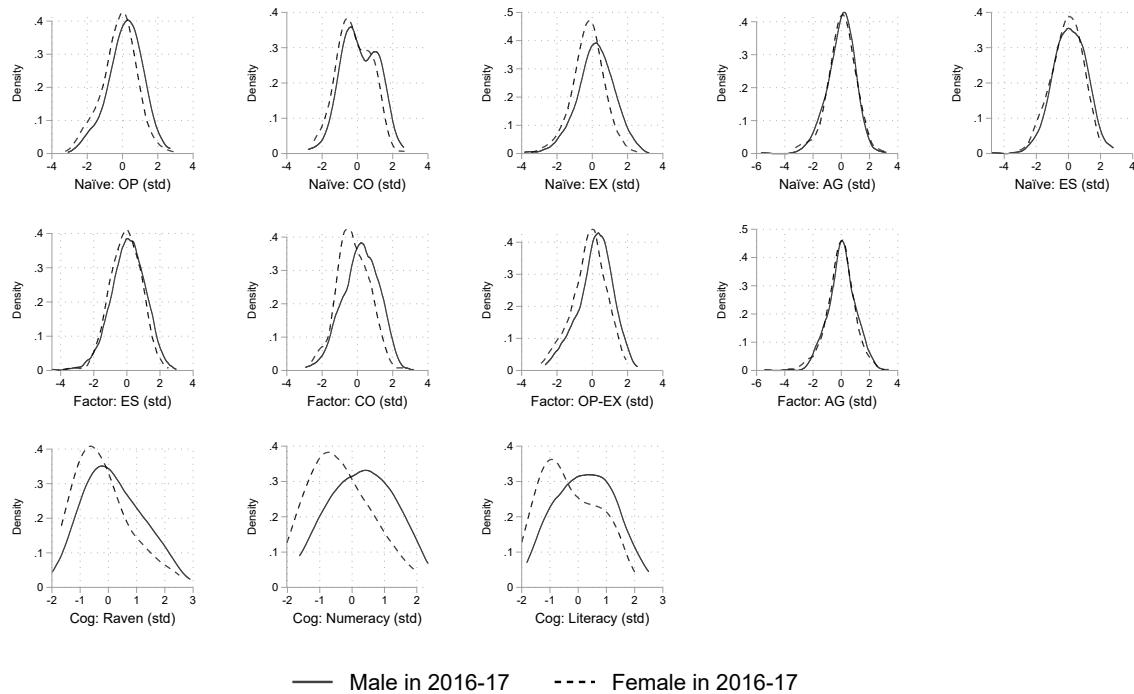


Figure 1: Distribution of PT&CS – The resulting PT&CS are based on the standardised residual from univariate OLS regression with age as exogenous variable. This is PT&CS purged from life-cycle effects.

Source: NEEMSI-1 (2016-17); author's calculations.

Table 2: Statistics descriptive of household characteristics in 2016-17.

	Non-dalits			Dalits			Diff	
	N	Mean	Std Err.	N	Mean	Std Err.	t-stat	p-value
Household size	245	4.47	1.93	228	4.93	2.06	-2.53	0.01
Assets (₹1k)	245	1560.53	2499.12	228	513.83	851.67	6.18	0.00
Total income (₹1k)	245	182.76	195.79	228	133.20	104.51	3.47	0.00
Shock (=1)	245	0.56	0.50	228	0.57	0.50	-0.15	0.88
Sell assets to face lockdown	245	0.15	0.35	228	0.16	0.37		
Loc: ELA	245	0.09	0.29	228	0.13	0.33		
Loc: GOV	245	0.17	0.38	228	0.00	0.00		
Loc: KAR	245	0.11	0.31	228	0.10	0.30		
Loc: KOR	245	0.09	0.29	228	0.10	0.30		
Loc: KUV	245	0.11	0.31	228	0.09	0.28		
Loc: MAN	245	0.09	0.28	228	0.12	0.32		
Loc: MANAM	245	0.07	0.25	228	0.12	0.33		
Loc: NAT	245	0.09	0.29	228	0.11	0.32		
Loc: ORA	245	0.09	0.29	228	0.12	0.32		
Loc: SEM	245	0.10	0.30	228	0.11	0.32		

Source: NEEMESIS-1 (2016-17); author's calculations.

Table 3: Statistics descriptive of individuals characteristics in 2016-17.

	Male			Female			Diff	
	N	Mean	Std Err.	N	Mean	Std Err.	t-stat	p-value
Dalits (=1)	462	0.46	0.50	373	0.50	0.50	-1.10	0.27
Age	462	44.50	14.42	373	40.29	11.66	4.66	0.00
HH head (=1)	462	0.76	0.43	373	0.09	0.29	26.74	0.00
Married (=1)	462	0.81	0.39	373	0.84	0.36	-1.33	0.18
School educ (=1)	462	0.69	0.46	373	0.53	0.50	4.69	0.00
MO: No occ.	462	0.09	0.28	373	0.14	0.34	-2.27	0.02
MO: Agri	462	0.19	0.39	373	0.10	0.30	3.68	0.00
MO: Agri coolie	462	0.16	0.37	373	0.25	0.44	-3.25	0.00
MO: Coolie	462	0.16	0.36	373	0.11	0.31	2.09	0.04
MO: Regular	462	0.22	0.42	373	0.08	0.27	6.01	0.00
MO: SE	462	0.16	0.37	373	0.08	0.28	3.54	0.00
MO: NREGA	462	0.02	0.15	373	0.24	0.43	-9.39	0.00
Multiple occupation (=1)	462	0.37	0.48	373	0.50	0.50	-3.82	0.00
Total individual income (₹1k)	422	88.89	102.44	322	23.56	43.51	11.78	0.00

Source: NEEMESIS-1 (2016-17); author's calculations.

Table 4: Statistics descriptive of dependent variables in 2020-21.

	Male			Female			Diff	
	N	Mean	Std Err.	N	Mean	Std Err.	t-stat	p-value
Prob. that individual is in debt	462	0.72	0.45	373	0.83	0.38	-3.73	0.00
Total amount of debt (₹1k)	332	124.91	189.72	308	117.14	126.15	0.61	0.54
Interest service ratio (%)	275	0.46	0.98	238	0.91	1.21	-4.64	0.00
Lender provide fin. supp. to borrower	332	0.95	0.22	308	0.83	0.37	4.68	0.00
No need to provide services	289	0.44	0.50	191	0.69	0.47	-5.52	0.00
Borrow elsewhere to repay the debt	289	0.37	0.48	191	0.25	0.43	2.86	0.00
Have a problem to repay the loan	289	0.45	0.50	191	0.50	0.50	-1.09	0.27

Source: NEEMESIS-2 (2020-21); author's calculations.

Table 5: Marginal effects from the multivariate probit analysis of the probability of being in debt.

	(1)	(2)	(3)		(4)				
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	0.02 (0.02)	0.02 (0.03)	0.02 (0.02)	0.03 (0.03)	0.02 (0.02)	0.01 (0.04)	0.03 (0.04)	0.03 (0.03)	0.02 (0.02)
CO (std)	0.01 (0.02)	0.03 (0.03)	-0.00 (0.02)	0.03 (0.03)	-0.00 (0.02)	0.07 (0.05)	-0.01 (0.04)	-0.02 (0.03)	0.00 (0.02)
OP-EX (std)	-0.00 (0.02)	-0.00 (0.03)	0.01 (0.02)	-0.02 (0.02)	0.01 (0.02)	-0.02 (0.04)	0.01 (0.04)	-0.01 (0.03)	0.02 (0.02)
AG (std)	-0.03* (0.02)	-0.07** (0.03)	-0.00 (0.02)	-0.05* (0.03)	-0.02 (0.02)	-0.08* (0.04)	-0.06* (0.04)	-0.02 (0.03)	0.02 (0.02)
Literacy (std)	0.03 (0.03)	0.03 (0.04)	0.04* (0.02)	0.07** (0.03)	-0.01 (0.03)	0.09 (0.06)	-0.02 (0.05)	0.07* (0.04)	0.01 (0.03)
Numeracy (std)	-0.01 (0.02)	-0.00 (0.04)	-0.01 (0.02)	-0.02 (0.04)	0.01 (0.03)	-0.07 (0.06)	0.05 (0.05)	0.01 (0.04)	-0.01 (0.03)
Raven (std)	-0.01 (0.02)	0.02 (0.03)	-0.04* (0.02)	-0.03 (0.02)	0.00 (0.03)	-0.00 (0.04)	0.04 (0.05)	-0.06* (0.03)	-0.03 (0.03)
Observations	831	831		831		831		831	
Pseudo R ²	0.27	0.28		0.27		0.29			
Log-likelihood	-330.38	-327.15		-328.39		-322.61			
χ ²	255.20	261.02		263.38		274.50			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMESIS-1 (2016-17) & NEEMESIS-2 (2020-21); author's calculations.

Table 6: Marginal effects from the multivariate OLS analysis of the total loan amount.

	(1)	(2)	(3)		(4)				
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	3.73 (9.58)	10.70 (14.53)	-2.16 (11.83)	7.15 (17.24)	3.34 (7.36)	18.62 (27.31)	7.45 (12.46)	-5.75 (20.27)	-0.34 (8.41)
CO (std)	-11.39 (8.94)	-17.46 (13.75)	-6.64 (9.72)	-16.37 (15.50)	-11.19 (9.59)	-28.61 (26.55)	-13.31 (15.93)	-9.45 (16.83)	-8.22 (8.13)
OP-EX (std)	7.73 (7.61)	4.02 (10.40)	13.33 (8.41)	11.07 (11.57)	5.38 (8.81)	14.23 (14.76)	-4.90 (13.83)	8.85 (12.90)	14.81 (10.66)
AG (std)	-13.26* (7.02)	-16.90 (10.82)	-7.87 (7.51)	-18.30 (12.39)	-7.81 (6.62)	-24.50 (21.31)	-6.20 (9.79)	-10.31 (13.20)	-8.86 (7.79)
Literacy (std)	-1.95 (11.60)	-2.88 (16.00)	-1.76 (10.56)	-9.22 (16.23)	10.20 (11.95)	-16.23 (24.95)	13.34 (16.60)	-4.68 (15.67)	6.07 (11.87)
Numeracy (std)	5.75 (9.24)	11.32 (11.82)	0.24 (16.96)	24.33 (16.59)	-11.82 (9.40)	28.06 (23.26)	-2.63 (13.83)	23.30 (30.27)	-19.09 (11.98)
Raven (std)	3.47 (8.92)	6.91 (12.99)	-0.28 (13.77)	0.36 (14.29)	5.15 (8.35)	14.69 (19.84)	-10.49 (13.80)	-21.01 (24.38)	24.30*** (9.04)
Observations	636	636		636		636		636	
R ²	0.17	0.18		0.18		0.19			
Adjusted R ²	0.12	0.12		0.12		0.11			
F-stat	2.95	2.74		2.57		2.42			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMESIS-1 (2016-17) & NEEMESIS-2 (2020-21); author's calculations.

Table 7: Marginal effects from the multivariate OLS analysis of the interest service ratio.

	(1)	(2)		(3)		(4)			
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	-0.10 (0.07)	-0.08 (0.07)	-0.08 (0.11)	-0.11 (0.08)	-0.08 (0.10)	-0.09 (0.08)	-0.10 (0.13)	-0.14 (0.16)	-0.04 (0.15)
CO (std)	-0.04 (0.07)	-0.03 (0.07)	-0.07 (0.12)	0.02 (0.08)	-0.07 (0.10)	0.07 (0.07)	-0.11 (0.13)	-0.08 (0.19)	-0.06 (0.15)
OP-EX (std)	0.05 (0.05)	-0.01 (0.06)	0.13 (0.09)	-0.04 (0.07)	0.13* (0.07)	-0.06 (0.07)	0.03 (0.11)	-0.03 (0.15)	0.24*** (0.11)
AG (std)	0.04 (0.05)	0.04 (0.06)	0.03 (0.09)	-0.02 (0.07)	0.09 (0.08)	0.01 (0.07)	0.06 (0.10)	-0.10 (0.14)	0.12 (0.12)
Literacy (std)	-0.02 (0.09)	-0.15* (0.09)	0.16 (0.14)	0.01 (0.10)	-0.06 (0.13)	-0.08 (0.10)	-0.22 (0.14)	0.14 (0.18)	0.14 (0.20)
Numeracy (std)	-0.05 (0.08)	0.08 (0.08)	-0.23 (0.14)	-0.09 (0.10)	-0.02 (0.12)	0.06 (0.08)	0.08 (0.14)	-0.31 (0.21)	-0.17 (0.22)
Raven (std)	0.07 (0.06)	0.01 (0.06)	0.15 (0.12)	0.07 (0.07)	0.05 (0.11)	-0.01 (0.06)	0.06 (0.13)	0.24 (0.17)	0.04 (0.19)
Observations	511	511		511		511			
R ²	0.13	0.14		0.13		0.16			
Adjusted R ²	0.06	0.06		0.05		0.05			
F-stat	2.28	2.11		1.97		1.80			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSS-1 (2016-17) & NEEMSS-2 (2020-21); author's calculations.

Table 8: Marginal effects from the multivariate probit analysis of the probability of receiving financial support from lender.

	(1)	(2)		(3)		(4)			
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	-0.10 (0.07)	-0.08 (0.07)	-0.08 (0.11)	-0.11 (0.08)	-0.08 (0.10)	-0.09 (0.08)	-0.10 (0.13)	-0.14 (0.16)	-0.04 (0.15)
CO (std)	-0.04 (0.07)	-0.03 (0.07)	-0.07 (0.12)	0.02 (0.08)	-0.07 (0.10)	0.07 (0.07)	-0.11 (0.13)	-0.08 (0.19)	-0.06 (0.15)
OP-EX (std)	0.05 (0.05)	-0.01 (0.06)	0.13 (0.09)	-0.04 (0.07)	0.13* (0.07)	-0.06 (0.07)	0.03 (0.11)	-0.03 (0.15)	0.24*** (0.11)
AG (std)	0.04 (0.05)	0.04 (0.06)	0.03 (0.09)	-0.02 (0.07)	0.09 (0.08)	0.01 (0.07)	0.06 (0.10)	-0.10 (0.14)	0.12 (0.12)
Literacy (std)	-0.02 (0.09)	-0.15* (0.09)	0.16 (0.14)	0.01 (0.10)	-0.06 (0.13)	-0.08 (0.10)	-0.22 (0.14)	0.14 (0.18)	0.14 (0.20)
Numeracy (std)	-0.05 (0.08)	0.08 (0.08)	-0.23 (0.14)	-0.09 (0.10)	-0.02 (0.12)	0.06 (0.08)	0.08 (0.14)	-0.31 (0.21)	-0.17 (0.22)
Raven (std)	0.07 (0.06)	0.01 (0.06)	0.15 (0.12)	0.07 (0.07)	0.05 (0.11)	-0.01 (0.06)	0.06 (0.13)	0.24 (0.17)	0.04 (0.19)
Observations	511	511		511		511			
R ²	0.13	0.14		0.13		0.16			
Adjusted R ²	0.06	0.06		0.05		0.05			
F-stat	2.28	2.11		1.97		1.80			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSS-1 (2016-17) & NEEMSS-2 (2020-21); author's calculations.

Table 9: Marginal effects from the multivariate probit analysis of the probability of not providing a service to lender.

	(1)	(2)		(3)		(4)			
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	0.00 (0.04)	0.01 (0.05)	-0.03 (0.05)	0.04 (0.05)	-0.04 (0.05)	0.07 (0.06)	-0.07 (0.06)	-0.08 (0.07)	0.00 (0.07)
CO (std)	0.06* (0.03)	0.04 (0.04)	0.10* (0.05)	0.07 (0.05)	0.04 (0.05)	0.03 (0.06)	0.05 (0.06)	0.15** (0.07)	0.04 (0.07)
OP-EX (std)	-0.02 (0.03)	-0.05 (0.04)	0.03 (0.04)	-0.07* (0.04)	0.03 (0.04)	-0.11** (0.05)	0.03 (0.05)	-0.02 (0.06)	0.01 (0.06)
AG (std)	-0.02 (0.03)	-0.03 (0.04)	0.01 (0.04)	-0.02 (0.05)	-0.01 (0.04)	-0.05 (0.06)	0.02 (0.05)	0.05 (0.07)	-0.07 (0.05)
Literacy (std)	0.08 (0.05)	0.10* (0.06)	0.03 (0.07)	0.05 (0.06)	0.15** (0.07)	0.11 (0.07)	0.14* (0.08)	-0.04 (0.09)	0.16 (0.11)
Numeracy (std)	-0.10** (0.04)	-0.11** (0.06)	-0.05 (0.07)	-0.05 (0.06)	-0.16*** (0.06)	-0.12 (0.08)	-0.14* (0.08)	0.09 (0.10)	-0.22** (0.11)
Raven (std)	0.00 (0.04)	0.05 (0.05)	-0.09 (0.06)	0.01 (0.05)	-0.02 (0.05)	0.10* (0.06)	-0.07 (0.07)	-0.21** (0.09)	0.07 (0.09)
Observations	478	478		478		478			
Pseudo R^2	0.27	0.29		0.28		0.32			
Log-likelihood	-239.95	-235.89		-236.11		-225.09			
χ^2	152.18	162.32		162.45		187.52			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSIS-1 (2016-17) & NEEMSIS-2 (2020-21); author's calculations.

Table 10: Marginal effects from the multivariate probit analysis of the probability of borrowing elsewhere to repay the debt.

	(1)	(2)		(3)		(4)			
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	0.04 (0.03)	0.06 (0.04)	0.02 (0.05)	0.05 (0.04)	0.04 (0.04)	0.06 (0.05)	0.07 (0.05)	0.05 (0.07)	-0.00 (0.06)
CO (std)	0.01 (0.03)	0.03 (0.04)	-0.02 (0.05)	-0.05 (0.04)	0.06 (0.05)	-0.05 (0.05)	0.10** (0.05)	-0.06 (0.06)	-0.01 (0.07)
OP-EX (std)	0.02 (0.03)	0.03 (0.03)	0.00 (0.04)	0.04 (0.03)	0.01 (0.04)	0.06 (0.04)	0.02 (0.04)	-0.01 (0.06)	0.01 (0.06)
AG (std)	-0.04 (0.03)	-0.05 (0.03)	-0.04 (0.04)	-0.03 (0.04)	-0.04 (0.04)	0.00 (0.05)	-0.10** (0.04)	-0.10* (0.06)	0.01 (0.06)
Literacy (std)	-0.08** (0.04)	-0.12** (0.05)	-0.01 (0.06)	-0.14*** (0.05)	0.00 (0.05)	-0.19*** (0.06)	-0.07 (0.06)	-0.09 (0.08)	0.11 (0.09)
Numeracy (std)	0.05 (0.03)	0.05 (0.04)	0.05 (0.06)	0.09* (0.05)	0.02 (0.05)	0.13* (0.07)	0.01 (0.06)	-0.01 (0.09)	0.05 (0.09)
Raven (std)	0.04 (0.03)	0.05 (0.04)	0.00 (0.05)	0.08* (0.04)	-0.02 (0.04)	0.06 (0.05)	0.05 (0.05)	0.14* (0.07)	-0.14* (0.08)
Observations	478	478		478		478			
Pseudo R^2	0.14	0.16		0.16		0.19			
Log-likelihood	-255.61	-252.49		-251.52		-243.39			
χ^2	88.29	97.00		100.88		130.87			
p-value	0.00	0.00		0.00		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSIS-1 (2016-17) & NEEMSIS-2 (2020-21); author's calculations.

Table 11: Marginal effects from the multivariate probit analysis of the probability to have problem to repay the debt.

	(1)		(2)		(3)		(4)		
	All	Male	Female	MUC	Dalits	MUC male	Dalits male	MUC female	Dalits female
ES (std)	0.07** (0.03)	0.04 (0.04)	0.12** (0.05)	0.07 (0.05)	0.06 (0.04)	0.03 (0.06)	0.03 (0.06)	0.13* (0.08)	0.13* (0.07)
CO (std)	-0.06* (0.03)	-0.03 (0.04)	-0.12** (0.05)	-0.06 (0.05)	-0.05 (0.04)	0.02 (0.06)	-0.07 (0.05)	-0.21*** (0.08)	-0.04 (0.07)
OP-EX (std)	0.04 (0.03)	0.01 (0.03)	0.10** (0.05)	0.07* (0.04)	0.02 (0.04)	0.01 (0.05)	0.01 (0.05)	0.19** (0.08)	0.04 (0.06)
AG (std)	0.01 (0.03)	0.01 (0.04)	0.04 (0.04)	0.09** (0.05)	-0.03 (0.04)	0.13** (0.05)	-0.08 (0.05)	0.09 (0.07)	0.06 (0.06)
Literacy (std)	0.01 (0.04)	0.05 (0.05)	-0.05 (0.07)	-0.00 (0.05)	0.03 (0.06)	0.06 (0.06)	0.06 (0.07)	-0.05 (0.10)	-0.01 (0.10)
Numeracy (std)	0.01 (0.04)	0.01 (0.05)	-0.01 (0.07)	0.01 (0.06)	0.02 (0.05)	0.01 (0.07)	0.03 (0.07)	-0.04 (0.10)	0.00 (0.10)
Raven (std)	-0.06** (0.03)	-0.09** (0.04)	-0.00 (0.05)	-0.02 (0.04)	-0.10** (0.05)	-0.09* (0.05)	-0.07 (0.07)	0.14** (0.07)	-0.16** (0.08)
Observations	478	478		478		478		478	
Pseudo R^2	0.09	0.10		0.11		0.14			
Log-likelihood	-299.25	-295.77		-295.25		-283.54			
χ^2	50.12	60.51		58.08		93.79			
p-value	0.06	0.04		0.06		0.00			

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSI-1 (2016-17) & NEEMSI-2 (2020-21); author's calculations.

Appendix

Table 12: Details of personality traits questions.

Variable	Question	Big-5 traits
curious	Are you curious, interested in learning new things?	OP
interestbyart	Are you interested in nature, art or music?	OP
repetitivetasks	Do you prefer work that involves repetitive tasks and routines?	OP
inventive	Are you inventive, and discover new ways of doing things?	OP
liketothink	Do you like to think a lot, and reflect about ideas?	OP
newideas	Do you come up with original or new ideas?	OP
activeimagination	Do you have an active imagination?	OP
organized	Are you organized?	CO
makeplans	Do you make plans and stick to them?	CO
workhard	Do you work hard to do things well and on time?	CO
appointmentontime	Do you get to work and appointments on time?	CO
putoffduties	Do you put off your duties in order to relax?	CO
easilydistracted	Do you get easily distracted?	CO
completedduties	Do you complete your duties on time?	CO
enjoypeople	Do you enjoy being with people?	EX
sharefeelings	Do you easily share your thoughts and feelings with other people?	EX
shywithpeople	Are you shy with people?	EX
enthusiastic	Are you enthusiastic and full of energy?	EX
talktomanypeople	In social gatherings, do you like to talk to many people?	EX
talkative	Are you talkative?	EX
expressedthoughts	Are you comfortable expressing your thoughts and opinions to others?	EX
workwithother	Do you work well with other people?	AG
understandotherfeeling	Do you try to understand how other people feel and think?	AG
trustingofother	Are you generally trusting of other people?	AG
rudetoother	Do you tend to be rude to other people?	AG
toleratefaults	Do you tolerate faults in other people?	AG
forgiveother	Do you forgive other people easily?	AG
helpfulwithothers	Are you helpful with others?	AG
managestress	Do you manage stress well?	ES
nervous	Do you get nervous easily?	ES
changemood	Do you have sudden changes in your mood?	ES
feeldepressed	Do you feel sad, depressed?	ES
easilyupset	Do you get easily upset?	ES
worryalot	Do you worry a lot?	ES
staycalm	Do you stay calm in tense or stressful situations?	ES

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard error in parentheses.

Source: NEEMSIS-1 (2016-17) & NEEMSIS-2 (2020-21).

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