

Relief from Usury: Impact of a Self-Help Group Lending Program in Rural India

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Abstract: Provision of low-cost credit to the poor through self-help groups (SHGs) has been embraced by the Government of India and the World Bank as a key poverty-reduction strategy with an investment of over \$6 billion (\$2 billion from the World Bank). Existing evidence on the impact of this approach is thin. We conducted a randomized controlled trial evaluating the impact of Jeevika, a government-led program in Bihar that formed SHGs through which members were able to borrow at less than half the prevailing informal lending rate. This intervention, which was randomized at the panchayat level, led to a dramatic decline in the use of informal credit as households substituted to lower-cost SHG credit. Two years after the start of the program, the average annual interest rate on new loans in treatment areas was 11 percentage points (16.5%) lower than in control areas. In addition, informal lender borrowing rates faced by landless households in treatment areas declined by two percentage points in response to the infusion of low-cost credit, reducing by 40% the gap in rates paid by landless versus landowning households. There is some evidence of a positive impact on asset ownership among landless households, but no significant effect on women's empowerment, nor on consumption expenditures.

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1. Introduction

Provision of low-cost credit to the poor through self-help groups (SHGs) has been embraced by the World Bank and government of India as a key poverty-reduction strategy. Under this approach, poor women are mobilized into small groups, through which they can access financial services, information about livelihoods opportunities and government programs, and other benefits such as training. In addition to the goal of connecting the poor to services, SHG interventions also aim to empower women by expanding their social networks, developing their capacity for collective action and political participation, and offering leadership opportunities. Such programs are in place or proposed in Afghanistan, Bangladesh, Sri Lanka, Malawi, Madagascar, and Zambia, and constitute a key component of India's poverty reduction effort, previously under the National Rural Livelihoods Mission (NRLM) and now the Deen Dayal Upadhyaya Antyodaya Yojana. In this paper, we evaluate the Bihar Rural Livelihoods Program, also known as Jeevika, an SHG program implemented by the Government of Bihar. Since it was launched in 2006, Jeevika has formed over 150,000 SHGs with a total of 1.8 million members (World Bank, 2017).

In addition to testing for direct impacts of the program on household-level economic outcomes and indicators of women's empowerment, we go beyond the previous literature on SHG-based lending interventions to consider its indirect impacts on rural credit markets. According to government sources, 33.2% of all loans in rural India are from traditional moneylenders (GoI, 2014). Reliance on informal credit is even more pronounced in the state of Bihar, where 47.7% of outstanding debt held by farm households is from informal sources (RBI, 2007). Traditional moneylenders charge between 12 and 150 percent annual interest, compared to typical rates of 6 to 20 percent offered by formal banks on larger loans (RBI, 2011). In this context, the public, for-profit, and non-governmental sectors have all invested heavily in rural credit markets since the early 2000s (RBI, 2007; Galab and Rao, 2003, Brishti and Chowdhury, 2013). The impact of these efforts depends, to a large extent, on how the entry of a new creditor affects interest rates charged by incumbent informal lenders.

Similar to other large-scale government-led SHG programs in India, Jeevika forms SHGs of 10 to 15 women, which are federated into village organizations (VOs) and larger cluster-level federations (CLFs). While Jeevika targets the poor, any adult woman residing in an area

where the program was active is able to join. At the weekly SHGs meetings, members are led through a curriculum on women's empowerment and basic literacy and numeracy, and make deposits into a revolving group fund. Approximately three months after formation, conditional on consistent savings deposits, SHGs are eligible to borrow up to 50,000 Rs¹ of project funds through the VO at a monthly rate of 1%. SHG members may borrow these funds at 2% per month, which was less than half of the mean prevailing informal lending rate in the sample at the beginning of the evaluation period. Members of the SHG are collectively liable for loans taken from the VO.

Despite the significant resources invested in SHG-based credit interventions, evidence on their impact is thin and relies almost exclusively on observational data. The three published evaluations of large-scale, government-led projects that, like Jeevika, made lending capital available to SHGs, all use propensity score matching (PSM) as an identification strategy. Deininger and Liu (2013) combine PSM and differences-in-differences to evaluate the Andhra Pradesh District Poverty Initiative Project (AP-DPIP) using two rounds of panel data, with controls drawn from a random sample of mandals where the project had not yet entered. Datta (2015) evaluates the first phase of Jeevika² using one round of retrospective data from program and non-program areas, and Khanna et al. (2015) use the same strategy to evaluate impacts of the Tamil Nadu Empowerment and Poverty Alleviation (Pudhu Vaazhvu). A significant reduction in high-cost debt is found by both of the studies that analyze this outcome (Datta; Khanna et al.). In terms of down-stream impacts, all three studies find improvements in women's agency in both the public and private domains. Khanna et al. and Datta, to a limited extent, detect impacts on asset holdings, but Deininger and Liu do not observe this. The two studies that considered food security or nutrition reported improvements on these outcomes (Deininger and Liu; Datta). Finally, Khanna et al. find an increase in skilled employment in program areas.

Only one published RCT of which we are aware evaluates the impacts of an SHG-based livelihoods intervention (Desai and Joshi, 2014), but this program did not provide lending capital, relying only on women's own savings for the group revolving funds. The authors find impacts on women's participation in household decisions and civic life, but no impact on income or

¹ Approximately \$875 US at the time of the evaluation.

² Phase one of Jeevika began in 2006 and phase two began in 2011. The present evaluation covers the first two years of Jeevika's second phase.

consumption levels.

Critical to the identification of potential impacts of the SHG intervention on credit markets, we find that Jeevika had a strong direct effect on household use of informal credit. Just over two years after program initiation, households in program areas were 51 percentage points more likely to include a member who belonged to an SHG than those in control areas. While borrowing from all sources increased in both treatment and control areas during the study period, new borrowing from informal lenders was 18% lower in program panchayats compared to control areas, as households replaced these sources of credit with SHG loans approximately one for one. Largely as a result of changes in loan source, the average annual interest rate on new loans in treatment areas was 11 percentage points (16.5%) lower than in control areas. Apparently in response to the infusion of low-cost credit, informal borrowing rates faced by landless households in treatment areas declined by two percentage points reducing by 40% the gap in rates paid by landless versus landowning households. There is some evidence of a positive impact on asset ownership among landless households, but no significant effect on women's empowerment, nor on consumption expenditures.

In the next section, we review the theory and evidence regarding the interactions between informal rural credit markets and interventions providing lower-cost credit. We then describe the design of the evaluation, before turning to the results, which we discuss in the final section.

2. Interactions between credit interventions and existing informal markets

As noted by Besley (1994), rural credit markets are likely to be characterized by multiple constraints and potential market failures, making the impact of external intervention unclear. One of the motivations for public investment in micro-lending was an anticipated negative impact on informal sector rates through competitive pressure (Hoff and Stiglitz, 1990). The fact that high informal lending rates have continued to exist alongside far lower-cost institutional credit has generated an extensive theoretical literature exploring the interaction between formal and informal credit markets. Informal lenders are often modeled as engaging in monopolistic competition (Hoff and Stiglitz, 1998), implying that competition may bring down lending rates. However, due to both

potential economies of scale in lending (Hoff and Stiglitz, 1998; Jain, 1999), and the information asymmetries that characterize credit markets, competition also has the potential to increase costs to borrowers.

The implications of asymmetric information in credit markets have been extensively studied in the theoretical literature, with several authors noting that access to an outside lending option leads to moral hazard among borrowers, increasing default risk and thus lending rates (Hoff and Stiglitz, 1998; Kahn and Mookherjee, 2005; McIntosh and Wyndick, 2005). A second channel through which a new entrant could positively affect incumbent rates is its impact on the composition of borrowers. If the new entrant is particularly good at identifying borrowers with a low likelihood of default, one of the commonly assumed advantages of the joint liability lending model used by SHGs and many other microfinance institutions (MFIs) (Ghatak, 1999), its entry could segment the market, driving up the average default risk of borrowers it does not serve and thus rates in the rest of the market (Bose, 1998; Demont, 2016).³ Even if, as suggested by the empirical findings of Maitra et al. (2014), borrowers facing higher informal rates are more likely to take up a joint liability lending contract, Mookherjee and Motta (2016) show how selection according to other observable borrower characteristics could still increase informal interest rates.

The mechanisms described above all require that informal and formal credit are substitutes. It is also possible that due to differences in the terms of loans offered by traditional informal lenders and new entrants, credit from these two sources is complementary. Jain and Mansuri (2003) develop a model in which the rigid repayment schedules imposed by MFIs lead households to use loans from informal lenders to service MFI debt. This mechanism could potentially increase demand for informal credit and thus put upward pressure on the interest rate. On the other hand, if the loans offered through the new entrant provide borrowers facing repayment difficulties with a way to service their informal debt, this could bring down the costs of debt collection (Aleem 1990), reducing lending rates.

While the potential impacts have been extensively described in the theoretical literature, empirical evidence on the impact of new lender entry on informal credit markets is comparatively scant.

³ While some prospective borrowers are actively screened out by MFIs and SHGs, capacity constraints may also limit the number who can be covered through such programs. This implies that while average default risk among the pool of borrowers from the informal market increases, there remain many low-risk borrowers within this pool.

Three previous studies have used the approach of instrumenting for MFI entry, either using administrative targeting variables (Kaboski and Townsend, 2012) or the error structure of a predictive model of entry (Mallick, 2012; Berg, Emran and Shilpi, 2015). Two of these studies, both based on data from Bangladesh, find a positive impact of MFI entry on informal lending rates (Mallick; Berg, Emran and Shilpi), though in the latter the effect is only significant when MFI coverage rates are high. Kaboski and Townsend, using data from Thailand, find no statistically significant impact on lending rates, but a small positive effect on the probability of default on other loans. A fourth study uses panel data from the Indian state of Jharkhand, and finds an inverse U-shaped relationship between SHG coverage and the rates charged by moneylenders, consistent with a model in which the SHG lender has superior information on borrowers' creditworthiness and serves those with lower risk of default (Demont, 2016).

The identification of causal impacts in these studies relies on the assumption that community characteristics associated with the entry of new lenders do not affect informal credit rates directly. Given the multiple objectives of MFIs, which may include profit (or at least cost-recovery) as well as a social mission to assist the poor, it is impossible to sign the direction of potential bias in estimates from observational studies. The use of random assignment to a credit market intervention permits causal inference based on a much weaker set of assumptions. However, previous randomized evaluations of microcredit programs have not reported impacts on interest rates, presumably due to a lack of power on this outcome. The present study, which is based on the randomized roll-out of a government-led SHG program that offered microcredit and credit linkages to formal banks to the poor across 179 panchayats⁴ in rural Bihar, overcomes this limitation.

In addition to contributing to the empirical literature on SHG-based lending interventions, and shedding light on the interaction between interventions offering low-cost credit and informal credit markets, this study also contributes to the substantial recent literature estimating household-level impacts of access to group-based lending (Angelucci et al, 2015; Attanasio et al., 2015; Banerjee et al., 2015; Crépon et al., 2015). In general, this literature shows that even when an expansion in access to credit results in households taking on more overall debt, impacts can be quite limited in

⁴ Village government units typically consisting of between two and four villages.

the short to medium run (Banerjee, Karlan and Zinman, 2015). While it is common to see shifts in livelihood activities, typically away from wage labor and toward self-employment, total household income is not generally affected. Similarly, impacts on overall consumption are rare, while reallocation away from “discretionary” spending (temptation goods, entertainment, and celebrations) is more commonly observed.

3. Setting and intervention

At the time the program was initiated, Bihar was home to 32 million people living below the poverty line, and 66% of the rural population was landless (GoI, 2011). Rural Bihar had extremely low rates of participation in microcredit through Microfinance Institutions (MFIs) or Self Help Groups (SHGs) (World Bank, 2007). This prompted the Government of Bihar, with funding from the World Bank, to implement the Bihar Rural Livelihoods Project, also known as Jeevika, the Hindi word for livelihood. The primary aim of Jeevika is to provide disadvantaged groups, in particular the landless and members of Scheduled Castes, access to (relatively) low-cost credit. When Jeevika enters a new village, Community Mobilizers employed through the program target households living in particularly poor areas, and encourage the women in these households to form self-help groups (SHGs) of 10 to 15 members. These groups then meet weekly, initially with a Community Mobilizer, who leads members through a curriculum on women’s empowerment and provides basic literacy and numeracy training.⁵ Members are required to contribute a minimum of 2 Rupees (\$0.035 USD)⁶ each week toward a personal savings account held by the SHG. After three months of demonstrating consistent savings, an SHG is eligible to join the local Village Organization (VO), through which its members may access up to Rs. 50,000 (875 USD) in lending capital. SHGs can borrow these funds from the VO at a non-compounding interest rate of 1% per month, and SHG members may borrow at 2% per month. VOs are further federated into Cluster Level Federations (above the panchayat level), which then establish linkages to the formal banking sector. Over the longer term, Jeevika is also meant to deliver other development interventions and livelihoods training to SHG members, however these activities were not implemented in the study

⁵ SHG members are taught to sign their names, and how to read basic sign posts, such as bus names, etc.

⁶ USD equivalents are calculated using the average exchange rate from initiation of the program to the end of data collection.

area during the period spanned by data collection.

4. Methods

3.1 Experimental design and timeline

In order to evaluate the impacts of Jeevika, the rollout of the project was randomized across 180 panchayats, randomly selected from within 16 blocks in seven districts where Jeevika was planning to scale up. In each of the study panchayats, one to two villages (depending on the number of villages in the panchayat) were then randomly selected for data collection.

Within each of the study villages, hamlets (tolas) in which the majority of the population belonged to a scheduled caste or scheduled tribe were identified through a focus group discussion, mirroring Jeevika's strategy for identifying the target population of poor women for recruitment into SHGs. In Bihar, tola boundaries are easily distinguishable. After entering a given tola, field staff selected households following a random walk and skipping households based on the total tola population size and target sample size. Survey staff aimed to include 70% SC/ST households, and 30% households from other castes in each village, in order to ensure variation in socio-economic status within the sample. If the households in selected tolas included fewer SC/ST households than this, households from a non-SC/ST majority tola were also included in the sample.

Baseline and follow up surveys included detailed questions on debt, asset holdings, consumption expenditures, livelihood activities, and women's mobility, role in household decisions, and aspirations. In addition, in each village and during each round of data collection, a focus group discussion was conducted, through which data were collected on village level attributes such as local sources of credit, interest rates from each source, local wage rates, and the presence of or distance to markets and other institutions and amenities.

The baseline survey was administered during July to October of 2011 to 8988 households across 333 villages in 179 panchayats.⁷ Following the baseline survey, panchayats were stratified on the

⁷ One of the selected Panchayats could not be surveyed due to security concerns.

16 administrative blocks in the sample and the panchayat-level mean of outstanding high cost (monthly interest rate of 4% or higher) debt held by households at baseline. They were then randomly assigned to an early rollout group or a late rollout group using the random number generator within the Stata statistical analysis software package. The project began in the early rollout panchayats between January and April 2012, and the follow-up survey was completed between July and September, 2014. Implementation in late rollout areas began after the 2014 round of data collection.

3.2 Analysis

The SHG intervention is expected to lead to a series of potential impacts, which we classify as direct, indirect and downstream. One or more direct impacts (increased SHG membership; increased utilization of credit through SHGs) is a necessary but insufficient condition for the intervention to lead to indirect effects on informal credit markets. Changes in downstream outcomes (wealth, consumption level, women's empowerment) may follow from either direct or indirect impacts.

Following the registered pre-analysis plan,⁸ we estimate the following ANCOVA specification to test the reduced-form, intent-to-treat impact of Jeevika on each group of outcomes:

$$y_{ivp2014} = \alpha_0 + \alpha_1 JEEVIKA_p + \alpha_2 y_{ivp2011} + (\alpha_3 X_{ivp}) + \alpha_4 S_p + \varepsilon_{ivp} \quad (1)$$

where y_{ivpt} is the outcome of interest for household i in village v in panchayat p in year t , $JEEVIKA_p$ is random assignment of the panchayat to early (2012) rollout of the intervention, X_{ivp} is a vector of pre-specified baseline controls used in the primary specification, S_p represents the vector of stratification dummies, and ε_{ivp} is a random individual-level error (notation constant across specifications for simplicity). In addition, to test for heterogeneous treatment effects on households that were landless at baseline, we estimate specification (2):⁹

⁸ <https://www.socialscisearch.org/trials/570>

⁹ Analysis of heterogeneous effects based on both baseline landholdings and caste was specified in the pre-analysis plan for this study. There is significant overlap between the landless and SC/ST populations in the sample, and impacts on SC/ST households are very similar to impacts on the landless.

$$y_{ivp2014} = \beta_0 + \beta_1 JEEVIKA_p + \beta_2 LL_{ivp} + \beta_3 LL_{ivp} * JEEVIKA_p + \beta_4 y_{ivp2011} + (\beta_5 X_{ivp}) + \beta_6 S_p + \varepsilon_{ivp} \quad (2)$$

where β_1 represents the treatment effect on land holding households, β_2 is the difference in outcome y between landed and landless households in control areas at follow-up, $\beta_1 + \beta_3$ is the treatment effect on landless households, and $\beta_2 + \beta_3$ is the difference in the outcome between the landed and landless at follow-up in the presence of the intervention.

Specifications (3) and (4) below mirror those above aside from the omission of non-stratification baseline controls, and are used to test for balance on key outcomes and demographic variables at baseline.

$$y_{ivp2011} = \gamma_0 + \gamma_1 JEEVIKA_p + \gamma_2 S_p + \varepsilon_{ivp} \quad (3)$$

$$y_{ivp2011} = \theta_0 + \theta_1 JEEVIKA_p + \theta_2 LL_{ivp} + \theta_3 LL_{ivp} * JEEVIKA_p + \theta_4 y_{ivp2011} + \theta_5 S_p + \varepsilon_{ivpb} \quad (4)$$

Huber-White clustering of standard errors at the panchayat level is employed in all specifications. Since we test multiple hypotheses, many of which are closely related, we follow earlier literature and include regressions of indices for each family of outcomes (as in Kling, Liebman, and Katz, 2007). We take a family to be a set of outcomes measuring the same conceptual outcome, and construct an index of these outcomes as follows. The values of variables within a family are first adjusted so that higher values corresponds to “better” outcomes. Z-scores for each component variable then are calculated by subtracting the control group mean from the treatment group mean, and dividing by the control group standard deviation. If an individual has a response to at least one component measure of an index, then, any missing values for other components are imputed at the random assignment group mean – i.e., treatment observations have the treatment group mean, and

control observations have the control group mean. This is the procedure followed in Kling, Liebman and Katz (2007). We then use the Hochberg step-up procedure (Hochberg, 1988) to obtain corrected p-values for these family-level indices, while controlling for the Family Wise Error Rate (FWER) across all families. To implement this procedure, the p-values for the coefficients of the treatment indicator in each of the regressions for the indices are ranked in increasing order. Each original p-value is multiplied by $(m + 1 - k)$, where m is the number of indices and k is the rank of the original p-value. If the resulting value is greater than 1, we assign an adjusted p-value of “>.999.”

5. Results

5.1 Baseline credit access by landholding status

We begin the analysis with a description of credit use and costs, assets, and welfare indicators by landholding status at baseline. As shown in Table 1, landless households are more likely to hold any debt than those with land. They also have a larger number of loans than landowning households, but a lower mean level of outstanding debt, implying a smaller average loan size. This pattern echoes Banerjee and Duflo’s (2010) discussion of the high administrative cost of lending to the poor. Indeed, the debt held by landless households is more expensive. Despite a lower overall level of indebtedness, landless households hold slightly more debt on which the monthly interest rate is 4% or higher, defined by Jeevika as “high-cost debt”. The mean (simple) monthly interest rate paid by the landless is half a percentage point higher than that paid by landholding households, indicating an annual difference of 6 percentage points.¹⁰ Given the mean level of indebtedness, this difference implies an additional debt servicing cost of 569 Rs per annum, equivalent to 61.5% of the mean monthly consumption expenditure among the landless.

We also see that landless households have fewer interest-free loans. This suggests that informal risk-sharing mechanisms (which typically operate through gift giving or interest-free loans) are less available to landless households than to other households. Finally, the last four rows of Table 1 show that landless households are also economically disadvantaged in terms of their ownership

¹⁰ Interest rates are generally non-compounding in this setting.

of productive assets aside from land, and have lower material well-being in terms of ownership of durable consumption goods, housing quality, and consumption expenditures.

5.2 Balance at baseline

In order to establish the validity of the randomized assignment to early rollout, we test for pre-treatment balance across treatment and control groups in the primary outcomes of interest, as specified in the pre-analysis plan, and other important household characteristics. Differences in means for each variable are estimated through linear regressions in which controls for stratification variables are included and standard errors are clustered at the panchayat level. Results, shown in table A1 (column 1), indicate that households in treatment areas are 2 percentage points more likely to include an SHG member. This difference, while small, is significantly different from zero at the 5% level. Relatedly, the mean outstanding SHG debt is higher in treatment areas, though the difference is small in economic terms (50 rupees). Monthly interest rates measured at the household level are higher in treatment areas, and this appears to be driven by informal lending rates. Informal lending rates measured in the FGD data, on the other hand, are well balanced. An index of productive assets, constructed according to the method proposed in Filmer and Pritchett (2001), is 0.1 points lower (0.06 of a standard deviation) in treatment areas as well. We also test for differences among landless and landed households in treatment versus control areas (columns 2 and 3). Again we find small differences in SHG enrollment and debt, and in asset holdings across treatment and control groups. Attrition, at 3%, is low given the three-year interval between surveys, and does not differ between treatment and control areas.

5.3 Direct impacts: SHG membership and borrowing

Table 2 presents estimates of the impact of access to Jeevika in Phase II on SHG membership and outstanding debt to SHGs; overall loans taken, amount borrowed and interest rates. Results shown in columns 1 and 2 of Panel A indicate that over 60% of households in treatment areas had at least one member in a self-help group by follow-up, compared to 10% of households in control areas. We find that take-up of the program is higher among the landless, in line with the program's aim of targeting the poor, but that a significant share of landowning households also participated. Landless households were 9.7 percentage points more likely to belong to an SHG than landowning households in program areas, and 54 percentage points more likely to belong to a group than their

landless peers in non-program areas, while landowning households saw a 43 percentage point increase in their likelihood SHG membership as a result of Jeevika (Panel B). We also see (in column 2) that access to Jeevika resulted in 4 percentage points more households taking out any loans, indicating impacts on the extensive margin of credit use that are consistent with findings on the elasticity of demand for credit in Mexico reported by Karlan and Zinman (2013).

On average, households in both treatment and control areas became more indebted over the period covered by the evaluation. Jeevika did not lead to higher indebtedness among households in treatment relative to control areas, and may even have had a negative effect on the relative debt level (Rs. 860, $p < 0.1$) (column 3). We do, however, see a dramatic program effect on the source and cost of household debt, with a significantly higher value (of close to Rs. 2000) owed to SHGs (column 4), and a corresponding decrease in high-cost debt (column 5). Scaling the increase in SHG debt by program-induced SHG membership and assuming the mean group size was the midpoint of the allowable range, 96% of the lending capital transferred to groups through Jeevika had been extended as credit to households at the time of the follow-up survey, as intended.

The substitution of credit source from informal moneylenders to Jeevika results in a marked decline in the average interest rate on households' outstanding debt, and in the amount of debt for which the monthly rate is 4% per month or higher. On average, such "high cost" debt is Rs. 1880 lower in treatment areas by the endline, a 14.5% reduction relative to control panchayats. Households could access credit through Jeevika SHGs at a monthly rate of 2%, less than half the mean baseline informal lending rate. Together with the high levels of loan take-up through the program, this implies a strong direct impact on the average interest rate paid by households on recent loans. Mean monthly rates paid on all loans taken within the past 12 months were a close to a full percentage point lower in program areas, a reduction of 16.5% compared to control panchayats.¹¹

The magnitude of first-order program effects differs by landholding status. The increase in outstanding SHG debt is higher among the landless than the landed by Rs. 390, in line with the targeting of poor households by Jeevika (column 4, Panel B). The value of new SHG loans over the past year is also marginally higher among landless households in the treatment group compared

¹¹ The household average interest rate excludes any interest free loans.

to their land-holding neighbors (column 4, Panel B). More difficult to explain is the apparent negative impact of the program on the value of new debt from all sources taken on by land-holding households over the past year (column 7, Panel B). This is reflected in the (marginally significant) negative impact of the program on total debt held by this subsample relative to their peers in control areas (column 3, Panel B).

The impact on interest rates is especially pronounced for landless households, who faced higher rates at baseline, as noted in Table 1. Jeevika reduced the average per annum interest rate paid by landless households on new loans by 12.7 percentage points from 68.2 in control areas (column 6, panel B), a proportional reduction of 18.7% that narrowed the gap in rates faced by landholding and landless households by 73%.

In the presence of a baseline difference in outcomes, the ANCOVA estimator is generally less biased than either the simple difference or difference-in-difference estimators, which tend to under- or over- correct for the baseline difference respectively (Frison and Pocock, 1992). We present these two alternative estimators for Jeevika's direct impacts as upper and lower bounds of the true effect in Table A2. Treatment effects are generally similar in magnitude and significance under these alternative specifications.

5.4 Indirect impacts: Informal credit markets

As noted above, the average level of indebtedness increased over the evaluation period. This was primarily driven by borrowing from the informal sector. Even in program areas, 65% of the increase in outstanding debt between the baseline and follow-up surveys was from informal lenders, underscoring the importance of understanding the impact of this and other microcredit interventions on the informal credit market.

Jeevika dampened the expansion in informal borrowing among households residing in treatment relative to control areas (columns 1 to 3, Table 3). The dampening effect on informal borrowing is especially strong for landowning households (Panel B, column 3, Table 3), and drives the negative impact on total borrowing among this subgroup shown in Table 2. For landless households, on the other hand, the expansion in SHG borrowing exceeds the reduction in informal borrowing relative to control areas. We therefore see a positive (but not significant) point estimate

on total new borrowing relative to control areas among landless households.

As seen in Table 3 (column 4), our results indicate that Jeevika led to a reduction of 0.12 in the average monthly lending rate paid by households on loans taken from informal lenders over the past year ($p < 0.1$). This impact is driven entirely by the program's effect on landless households, for which the estimated impact is a reduction of 0.19% per month ($p < 0.05$). This reduction represents 40% of the gap in informal monthly borrowing rates between landless and landholding households in non-program areas.

The estimated impact of Jeevika on informal interest rates using household-level data includes effects of the program on the composition (or assumed composition) of borrowers. If, as posited by Demont, the lowest-risk borrowers are able to obtain loans through Jeevika, informal lenders are left with a higher-risk pool of clients, pushing up average informal lending rates. The interest rate paid on informal loans at baseline is uncorrelated with take-up of SHG credit by endline among landless households in our data, after controlling for the same set of baseline controls used in the estimation of treatment effects (coefficient = -0.003, p -value = 0.960). However, we cannot rule out the possibility that lenders' assumptions about prospective borrowers could be affected by Jeevika's entry. Indeed, splitting the sample by 'repeat borrowers' – those who had taken out a loan in the year prior to the baseline survey, versus new borrowers, we see that the negative impact on rates was entirely due to the impact on repeat borrowers (Table 3, column 5). This finding is consistent with lenders treating unknown borrowers with greater suspicion when joint-liability loans are widely available.

Village-level focus group discussions were used to elicit the publicly known 'going rate' for informal credit, and are thus expected to be less affected by the composition of borrowers. The point estimate of the intervention's impact on interest rates using these village-level data is indeed larger than that obtained using household reports, and is significant at the 10 percent level despite reduced power to detect impacts at the village level (Table 3, column 7, Panel A).¹² The effect on rates is concentrated among those charged by professional moneylenders (as opposed to friends and relatives), though restricting loans to this group reduces number of observations and the effect

¹² Controls in this case are village-level means of the household-level baseline variables included in the models with household-level outcomes. For villages with no rate recorded at baseline, the mean rate at the panchayat (16 observations) or district (2 observations) level is used.

is no longer statistically significant (column 8). The number of informal credit sources listed during in village-level survey shows a decline in Jeevika areas (Panel B, column 7). This is driven by fewer friends and relatives listed as sources of credit (column 8); there is no significant impact on the number of professional moneylenders or shopkeepers (column 9).

Results for indirect impacts using the alternative (simple difference and difference-in-differences) estimators are shown in Table A3. Overall the estimated effect magnitudes and significance levels are similar. The estimated impact on informal interest rates in the overall sample is larger in magnitude, and differs from zero at a higher degree of statistical significance in the case of the simple difference estimator (Table A3, panel A, column 4). This result provides reassurance for the validity of interest rate results, as baseline imbalance for this variable goes in the opposite direction as the estimated treatment effect.

Figure 1 illustrates the distribution of monthly informal lender rates reported at the village level by treatment group pre- and post-intervention. The 2% lending rate offered by Jeevika is barely represented, providing confidence that the estimated impact of the program on this outcome is not driven by misclassification of SHG loans as informal loans.

5.5 Downstream impacts: Assets, consumption and women's empowerment

While Jeevika had immediate and dramatic effects on household level borrowing patterns and also appeared to affect credit markets in targeted villages, we see null to limited impacts on household asset possession, material well-being and various measures of women's economic and social empowerment within the two-year window covered by the evaluation. Table 4 presents the impact of the program on three asset indices, one for production assets, one for consumption assets, and one for housing quality. Each index is based on a set multiple of binary asset ownership variables, aggregated using the method proposed by Filmer and Pritchett (1994). We observe a positive impact of Jeevika on the ownership of consumption assets. While this effect is statistically significant, it is modest in magnitude, equivalent to 0.06 standard deviations of this variable in control group at follow-up. The effect is concentrated among landless households, for whom the difference in means across treatment versus control areas represents 0.13 standard deviations of the index (Table 4, Panel B). We also observe marginally significant positive effects of the program on both productive assets and housing quality among landless households (Table 4, Panel

B), though these effects these do not hold for the overall sample. Normalizing the estimated effects by the standard deviation of each index among landless households in the control group at follow-up, Jeevika appears to have increased both productive asset ownership and housing quality by approximately 0.06 standard deviations. No impact is observed for any subgroup on access to entitlements or consumption value. The impact on the index representing this family of outcomes is positive and highly statistically significant ($p < 0.01$) for landless households (Table 4, column 6, Panel B), but weakly negative ($p < 0.1$) for landowning households.

Given the baseline imbalance observed in the indices of consumption and productive assets at baseline, we turn to the alternative specifications presented in Table A4. While the results hold up in the simple differences specifications (which does not correct for baseline imbalance), the difference-in-difference estimator (known to over-correct) shows no significant impact of the program on any of the asset indices, including among landless households. This suggests some caution in attributing impacts on asset holdings to the intervention.

Several variables were constructed to measure different aspects of women's decision-making role, autonomy, capacity for collective action, and aspirations. These variables were constructed to maximize the degree of variation in the sample. The first is an index representing women's participation in household decision making. This is a binary variable, taking a value of 1 when women have any say in one or more of the following decisions: purchases of durables, purchases of personal items, migration of family or primary earner, own labor, borrowing for the family, politics (such as who to vote for), and education of children. The variable takes a value of 0 when the respondent has no say in any of these decisions. The women's mobility index is a binary variable, taking a value of 1 if a woman is allowed to go alone to more than half the places (including the health clinic, public distribution store, bank, and relatives in a different village) she has need to visit. The index for propensity toward collective action is a binary variable, indicating whether women indicate an inclination to engage in collective action to resolve issues in the village relating to receiving entitlements, domestic violence, and consumption of alcohol in the village. For each of the three questions, collective action is coded as 1 if the respondent says she would ask community members to intervene, gather community members to intervene together or intervene herself. The overall collective action index is 1 if any of the sub-indices are 1, indicating propensity for collective action in one or more spheres. Finally, the index for aspirations for girls

is a binary variable, which takes a value of 1 if a woman wishes for her daughter to finish high school or higher levels of education.

In Table 5, we see a positive impact on the index of propensity for collective, but a negative impact on women's role in decision-making within the household (both weakly significant at $p < 0.1$). These two effects cancel each other out in the aggregated index for this family of outcomes, resulting in an estimated family-wise treatment effect of zero. Neither the index of women's mobility, nor women's aspirations for their daughters' educational attainment were significantly affected by the intervention, nor do we see differential effects by landholdings status. Because of the weakness of these results in the primary specification, we do not present results from alternative estimators for this set of outcomes.

6. Discussion

Chronic indebtedness and exploitative moneylenders are well-established tropes in fictional and cinematic accounts of poverty in rural India. Several studies, including an important recent survey by the National Sample Survey (NSS, 2014) and technical papers by the Reserve Bank of India (RBI 2007, RBI 2011) have documented the widespread reliance of rural households on high-cost debt from the informal sector at rates of up to 150 percent per annum. Over the past two decades, micro-finance institutions have rapidly expanded into markets previously served almost exclusively by traditional moneylenders. One would expect this influx of competition to affect existing credit markets, but the nature of these impacts are not obvious *ex ante*.

The limited empirical literature on this question consists of observational studies and finds zero or positive impacts on lending rates charged by informal sector lenders. Despite the existence of a large literature on the impact of micro-credit programs, no randomized impact evaluation to date has documented a significant effect on interest rates. This is the first study to do so. The randomized roll-out evaluated in this study, conducted in seven of the 38 districts of Bihar, increased self-help group (SHG) membership by 50 percentage points. Those who joined a Jeevika SHG shifted almost 30% of their household debt from high-interest informal sources to Jeevika, on average. The massive influx of relatively low-cost credit extended through Jeevika allows us

to detect, for the first time, the impact of a micro-finance intervention on informal credit markets through a randomized evaluation.

At baseline, annual informal interest rates paid by landless households were an average of 6.1 percentage points higher than those paid by the landed. SHG entry caused a shift in the informal lending rate offered to these households that reduced this gap by approximately 40%, while the point estimate of the impact on rates paid by landowning households is close to zero and not statistically significant. The fact that the impact on lending rates is limited to the economically marginalized is indicative of the segmented nature of credit markets in this context.

Using the impact on the overall informal interest rate based on the focus group data (-0.32% per month), and assuming that households' informal debt can eventually be refinanced at the lower prevailing rate, we estimate that Jeevika will reduce the average cost of servicing debt to informal creditors by Rs. 624, equivalent to 90% of the mean monthly reported consumption expenditure in this sample. The magnitude of this effect is comparable to the direct average annual savings of Rs. 886 achieved by shifting a portion of household debt out of the high-cost informal sector to lower-cost SHG loans.

Two potential mechanisms for the reduction in interest rates are consistent with the combination of reduced demand for informal credit and lower interest rates: a decrease in the administrative costs associated with lending due to the use of SHG credit to service informal debt, and increased competitive pressure in the context of a market in which lenders exercise market power.¹³ Household data on use of loans at endline indicate that only 2.8% of SHG loans in treatment areas, and 2.4% in control areas, were used for debt service, casting doubt that this mechanism plays a major role, and leaving a reduction in market power as the most convincing explanation.

Two years after initiation of the program, some evidence of impacts on the asset position of landless households was already observed, though no impact on consumption expenditures was seen. Given that the intervention reduced debt servicing costs substantially, it is possible that asset

¹³ A third potential mechanism is that the cost of informal lending falls as demand shrinks due to increasing marginal costs. This however is at odds with evidence about the cost structure of informal lending, which is characterized by large fixed costs and not generally limited by availability of lending capital (Aleem, 1990). The fact demand for informal credit falls most dramatically among landowners, but the decrease in interest rates is driven by landless households, provides additional evidence against this mechanism.

impacts will strengthen with time, and that other downstream impacts may still arise.

The lack of impact on women's empowerment detected through this evaluation is inconsistent with quantitative and qualitative evaluations of Jeevika's first phase (Datta, 2016; Paromita et al., 2016). A qualitative evaluation comparing implementation of the program in its first and second phases by Majumdar and colleagues (2017) explains the discrepancy. The authors document differences in the nature of SHG mobilization during the two phases of the project. They find that this phase of the project proceeded in a more scripted in the second phase, and focused on material benefits (access to loans) rather than the possibility of collective problem-solving to overcome common challenges. This led to lower intensity of participation in the project among members, and ultimately to less impact on non-material outcomes. Jeevika's first phase, while not as large as the second, covered 400,000 households. The concordance of qualitative and non-experimental quantitative findings on significant impacts on women's empowerment during this phase suggest that meaningful changes on this outcome can be achieved through large-scale SHG-based interventions, but the findings from phase provide a cautionary tale about the pace of implementation.

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Table 1: Credit access, assets, and consumption, by landholding status

	Means			Landless - Landed (se)
	<i>Obs</i>	<i>Landless</i>	<i>Landed</i>	Difference in Means
<i>Credit Markets: Interest Rates, Amounts Borrowed, Loan Terms</i>				
Any Outstanding Debt	8988	0.87	0.81	0.06*** (0.01)
No. of Loans (per HH)	8988	2.04	1.87	0.18*** (0.04)
Total Outstanding Interest-Bearing Debt (000 Rs.)	8988	8.95	12.92	-3.97*** (0.48)
Total Outstanding High Cost Debt (>48% p.a., 000 Rs)	8988	7.68	7.54	0.14 (0.33)
Average Interest Rate	6462	5.46	4.95	0.50*** (0.05)
Interest Free Loans (No. per HH)	8988	0.11	0.27	-0.16*** (0.02)
<i>Material Well-Being: Assets and Consumption Expenditures</i>				
Productive Asset Index (Filmer-Pritchett)	8988	-0.21	1.00	-1.21*** (0.08)
Consumption Asset Index (Filmer-Pritchett)	8988	-0.60	0.65	-1.25*** (0.04)
Housing Index (Filmer-Pritchett)	8988	-0.22	0.13	-0.34*** (0.04)
Real Total Monthly Consumption PA (Rs 000)	8988	0.67	0.74	-0.08*** (0.01)

Note : Standard errors of differences in means are clustered at the panchayat level to account for sampling design.

Table 2. Direct Effects of Jeevika

	SHG Membership (%)	Any Loans Taken in the last year?	Outstanding Debt (000 Rs.)			Interest Rates	New Loans Taken, past year (000 Rs.)		Family
			All Loans	SHG Loans	High Cost (≥ 4% / month)	Monthly rate on new loans	Total	SHG	Index of Dependent Variables
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
<i>Panel A: Main effects</i>									
Jeevika	51.04*** (1.54)	0.04*** (0.01)	-0.86* (0.44)	1.97*** (0.09)	-1.88*** (0.38)	-0.95*** (0.07)	-0.20 (0.32)	1.91*** (0.10)	0.80*** (0.03)‡‡‡
Additional baseline controls?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	8851	8987	8987	8987	8987	6805	8987	8987	8988
Number of clusters	179	179	179	179	179	179	179	179	179
R-squared	0.36	0.09	0.08	0.13	0.06	0.20	0.04	0.10	0.24
Mean of dep var, omitted cat	10.37	0.74	17.94	0.13	12.97	5.75	11.50	0.14	0.00
Hochberg-corrected p-value									0.00
<i>Panel B: Heterogeneous effects by landholdings</i>									
Jeevika	42.97*** (2.25)	0.06*** (0.02)	-2.28* (1.36)	1.69*** (0.15)	-1.46 (0.89)	-0.65*** (0.12)	-1.65** (0.81)	1.67*** (0.16)	0.69*** (0.04)‡‡‡
Landless HH	-1.55 (1.25)	0.07*** (0.02)	-4.64*** (1.18)	-0.01 (0.06)	-0.51 (0.88)	0.56*** (0.09)	-1.62** (0.77)	0.01 (0.07)	-0.01 (0.02)
Jeevika X landless	11.27*** (2.19)	-0.02 (0.02)	2.05 (1.59)	0.39** (0.16)	-0.59 (1.07)	-0.41*** (0.14)	2.06** (0.98)	0.33* (0.18)	0.16*** (0.04)
<i>Linear combinations</i>									
Effect of Jeevika if landless	54.25*** (1.61)	0.04*** (0.01)	-0.22 (0.50)	2.07*** (0.10)	-2.04*** (0.46)	-1.06*** (0.08)	0.41 (0.40)	2.00*** (0.11)	0.85*** (0.03)‡‡‡
Effect of landless if Jeevika	9.72*** (1.85)	0.05*** (0.01)	-2.58** (1.16)	0.38** (0.16)	-1.10 (0.71)	0.15 (0.10)	0.44 (0.70)	0.34** (0.16)	0.15*** (0.04)
Additional baseline controls?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	8851	8987	8987	8987	8987	6805	8987	8987	8988
Number of clusters	179	179	179	179	179	179	179	179	179
R-squared	0.36	0.09	0.09	0.13	0.06	0.21	0.04	0.10	0.24
Mean of dep var, omitted cat	8.97	0.64	24.51	0.11	13.62	5.12	13.52	0.09	-0.03
Hochberg-corrected p-values									
<i>Treatment if landless</i>									0.000
<i>Treatment if landed</i>									0.000

Notes: Standard errors clustered at the panchayat level shown in parentheses. Coefficients are from an ANCOVA specification - linear regressions of each outcome on its value at baseline, and an indicator of treatment status; panel B has linear regressions of each outcome on indicators of treatment status, landlessness, and their interaction. Stratification dummies and baseline controls († in Table A1) are included in all specifications. Landless status is landlessness at the time of the baseline survey.

Columns 9 presents coefficients in a regression of z-scores of the outcome variables in this "family" - SHG membership, any loans taken, all outstanding debt, outstanding SHG debt, outstanding High-cost debt, interest rates, total amount borrowed last year, SHG amount borrowed last year - following Kling, Liebman, and Katz (2007). p-values for these regressions are reported using Hochberg's step-down method to control the FWER across all index outcomes.

* p<0.1, ** p<0.05; *** p<0.01

‡ p-adjusted < 0.1, ‡‡ p-adjusted < 0.05, ‡‡‡ p-adjusted < 0.01

Table 3. Effects of Jeevika on the informal credit market (Indirect)

	Household Survey Data						Village FGD Data		
	Any Informal Loans Taken?	Outstanding Informal Debt (000 Rs.)	New Informal Loans Taken (000 Rs.)	Informal Interest rate	Informal Interest rate	Index of Dependent Variables	Informal	Money-lenders	Friends / Relatives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel A: Main Effects</i>									
Jeevika	-0.06*** (0.01)	-2.65*** (0.39)	-2.04*** (0.30)	-0.12* (0.07)	-0.16** (0.07)	0.09*** (0.01)‡‡‡	-0.32* (0.18)	-0.32 (0.23)	-0.16 (0.24)
New borrower					-0.10 (0.07)				
Jeevika X new borrower					0.16 (0.11)				
<i>Linear combinations</i>									
Effect of Jeevika if new borrower					0.00 (0.12)				
Additional baseline controls?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	8987	8987	8987	6211	6211	8988	322	292	218
Number of clusters	179	179	179	179	179	179	179	176	147
R-squared	0.09	0.07	0.05	0.22	0.22	0.06	0.42	0.41	0.55
Mean of dep var, omitted cat	0.72	16.24	11.14	5.75	5.76	-0.00	5.73	6.00	5.36
Hochberg-corrected p-value						0.00			
<i>Panel B: Heterogeneous effects by landholdings</i>									
Jeevika	-0.04** (0.02)	-3.41*** (1.09)	-3.14*** (0.77)	0.05 (0.10)		0.07** (0.03)‡‡‡	-0.27** (0.12)	-0.08 (0.07)	-0.16** (0.07)
Landless HH	0.08*** (0.02)	-3.04*** (1.05)	-1.69** (0.75)	0.48*** (0.09)		-0.02 (0.03)			
Jeevika X landless	-0.03 (0.02)	1.12 (1.32)	1.56* (0.94)	-0.23* (0.13)		0.03 (0.04)			
<i>Linear combinations</i>									
Effect of Jeevika if landless	-0.07*** (0.01)	-2.30*** (0.49)	-1.58*** (0.38)	-0.19** (0.08)		0.10*** (0.02)‡‡‡			
Effect of landless if Jeevika	0.05*** (0.02)	-1.92* (1.02)	-0.13 (0.64)	0.25** (0.09)		0.00 (0.03)			
Additional baseline controls?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Number of observations	8987	8987	8987	6211	6211	8988	333	333	333
Number of clusters	179	179	179	179	179	179	179	179	179
R-squared	0.09	0.07	0.05	0.22	0.22	0.06	0.32	0.25	0.42
Mean of dep var, omitted cat	0.63	20.23	13.12	5.12	5.12	0.01	2.85	1.37	1.41
Hochberg-corrected p-values									
<i>Treatment if landless</i>						0.000			
<i>Treatment if landed</i>						0.000			

Notes: Standard errors clustered at the panchayat level shown in parentheses. Coefficients are from an ANCOVA specification - linear regressions of each outcome on its value at baseline, and an indicator of treatment status; panel B has linear regressions of each outcome on indicators of treatment status, landlessness, and their interaction. Stratification dummies and baseline controls († in Table A1) are included in all specifications. Landless status is landlessness at the time of the baseline survey. Village level regressions are from a separate village focus group discussion dataset.

Column 6 presents coefficients in a regression of z-scores of the outcome variables in this "family" - any loans taken, outstanding debt, new loans, interest rates - following Kling, Liebman, and Katz (2007). p-values for these regressions are reported using Hochberg's step-down method to control the FWER across all index outcomes.

* p<0.1, ** p<0.05; *** p<0.01

‡ p-adjusted < 0.1, ‡‡ p-adjusted < 0.05, ‡‡‡ p-adjusted < 0.01

Table 4. Effects of Jeevika on Household Asset position, Entitlements, and Welfare

	Consumption Asset Index	Productive Asset Index	Housing quality Index	Access to entitlements (% any)	Real Consumption per AE (000 Rs)	Index of Dependent Variables
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Main Effects</i>						
Jeevika	0.10** (0.04)	-0.01 (0.02)	0.01 (0.03)	-0.18 (0.43)	0.00 (0.02)	0.02 (0.01)
Additional baseline controls?	yes	yes	yes	yes	yes	yes
Number of observations	8987	8987	8987	8987	8987	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.36	0.23	0.33	0.09	0.06	0.34
Mean of dep var, omitted cat	0.18	-0.11	0.11	94.42	0.95	0.00
Hochberg corrected p-value						0.47
<i>Panel B: Heterogeneous effects by landholdings</i>						
Jeevika	-0.07 (0.07)	-0.13 (0.08)	-0.09* (0.06)	-0.44 (1.02)	-0.01 (0.04)	-0.06* (0.03)
Landless HH	-0.31*** (0.06)	-0.33*** (0.06)	-0.21*** (0.05)	1.28 (0.90)	-0.07* (0.04)	-0.17*** (0.03)
Jeevika X landless	0.25*** (0.08)	0.17* (0.09)	0.15** (0.06)	0.35 (1.24)	0.03 (0.05)	0.11*** (0.04)
<i>Linear combinations</i>						
Effect of Jeevika if landless	0.18*** (0.05)	0.04* (0.02)	0.06* (0.03)	-0.09 (0.52)	0.01 (0.02)	0.05*** (0.01)‡‡‡
Effect of landless if Jeevika	-0.07 (0.05)	-0.16*** (0.05)	-0.06 (0.04)	1.63* (0.90)	-0.04 (0.04)	-0.06*** (0.02)
Additional baseline controls?	yes	yes	yes	yes	yes	yes
Number of observations	8987	8987	8987	8987	8987	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.37	0.24	0.33	0.09	0.06	0.35
Mean of dep var, omitted cat	0.95	0.45	0.48	91.26	1.09	0.34
Hochberg-corrected p-values						
<i>Treatment if landless</i>						0.000
<i>Treatment if landed</i>						0.172

Notes: Standard errors clustered at the panchayat level are shown in parentheses. Coefficients are from an ANCOVA specification - linear regressions of each outcome on its value at baseline, and an indicator of treatment status (plus an indicator of landlessness at baseline and its interaction with treatment status in Panel B). Stratification dummies and baseline controls († in Table A1) are included in all specifications.

Column 6 presents coefficients in a regression of z-scores of the outcome variables in this "family" - consumption assets, productive assets, housing quality, access to entitlements, real consumption per adult equivalent - following Kling, Liebman, and Katz (2007). p-values for these regressions are reported using Hochberg's step-down method to control the FWER across all index outcomes.

* p<0.1, ** p<0.05; *** p<0.01

‡ p-adjusted < 0.1, ‡‡ p-adjusted < 0.05, ‡‡‡ p-adjusted < 0.01

Table 5. Effects of Jeevika on Women's Economic Roles, Empowerment, and Aspirations

	Proportion HH women work for income (%)	Women's decision-making in HH index	Women's collective action index	Women's Mobility	Aspirations for girls	Index of Dependent Variables
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Main Effects</i>						
Jeevika	-0.52 (0.83)	-0.08* (0.05)	1.96* (1.05)	-0.01 (0.02)	0.28 (1.41)	-0.00 (0.01)
Additional baseline controls?	yes	yes	yes	yes	yes	yes
Number of observations	8830	8841	8841	8029	3910	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.17	0.07	0.05	0.06	0.16	0.08
Mean of dep var, omitted cat	72.58	6.27	87.44	5.79	29.08	-0.00
Hochberg corrected p-value						0.82
<i>Panel B: Heterogeneous effects by landholdings</i>						
Jeevika	1.10 (1.93)	-0.11 (0.06)	2.09 (1.56)	-0.00 (0.03)	2.94 (2.98)	0.01 (0.02)
Landless HH	7.10*** (1.82)	-0.02 (0.04)	-0.14 (1.12)	0.04** (0.02)	-10.53*** (2.47)	0.03* (0.02)
Jeevika X landless	-2.40 (2.33)	0.04 (0.06)	-0.19 (1.49)	-0.01 (0.03)	-3.33 (3.35)	-0.02 (0.02)
<i>Linear combinations</i>						
Effect of Jeevika if landless	-1.30 (1.02)	-0.07 (0.05)	1.90* (1.10)	-0.01 (0.02)	-0.39 (1.61)	-0.01 (0.01)
Effect of landless if Jeevika	4.70** (1.70)	0.01 (0.05)	-0.33 (1.18)	0.03 (0.02)	-13.86*** (2.94)	0.01 (0.02)
Additional baseline controls?	yes	yes	yes	yes	yes	yes
Number of observations	8830	8841	8841	8029	3910	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.18	0.07	0.05	0.06	0.17	0.08
Mean of dep var, omitted cat	61.26	6.29	87.77	5.14	45.87	-0.04
Hochberg-corrected p-values						
<i>Treatment if landless</i>						0.57
<i>Treatment if landed</i>						0.70

Notes: Standard errors clustered at the panchayat level shown in parentheses. Coefficients are from an ANCOVA specification - linear regressions of each outcome on its value at baseline, and an indicator of treatment status; panel B has linear regressions of each outcome on indicators of treatment status, landlessness, and their interaction. All specifications control for block dummies and mean high cost debt at the panchayat level at baseline. Additional controls († in Table 1) are included in even-numbered columns. Landless status is landlessness at the time of the baseline survey.

Table A1. Summary Statistics and Randomization Balance across Treatment Groups at Baseline

	Means				Difference in means, T-C (SE), Adjusted for stratification controls		
	<i>Obs</i>	<i>Overall</i>	<i>Control</i>	<i>Treatment</i>	<i>Full sample</i> (1)	<i>Landless</i> (2)	<i>Landed</i> (3)
Household Characteristics							
Caste Group	8988	71.91	71.77 %	72.05 %	0.30 (1.38)	-0.28 (1.40)	-0.93 (2.80)
Land Ownership	8988	28.73	29.63 %	27.82 %	-1.94* (1.12)	NA	NA
Household Size	8988	5.95	5.96	5.93	-0.04 (0.05)	-0.00 (0.06)	-0.10 (0.10)
Female HH Head	8988	16.31	16.56 %	16.06 %	-0.34 (0.90)	-0.48 (1.18)	-0.57 (1.31)
Self Help Groups, Savings and Debt							
SHG membership (†)	8988	6.19	5.14 %	7.25 %	2.48*** (0.81)	2.92*** (0.99)	1.34 (1.07)
Any Savings? (†)	8988	37.07	35.63 %	38.53 %	3.28* (1.93)	3.42 (2.16)	3.60 (2.48)
High cost debt (000 Rs.) (Real) (†)	8988	7.64	7.67	7.61	-0.03 (0.08)	0.19 (0.19)	-0.59 (0.44)
Total Debt (000 Rs.) (Real)	8988	10.09	10.24	9.93	-0.31 (0.20)	0.01 (0.28)	-0.83 (0.76)
Outstanding Informal Debt (000 Rs.) (Real)	8988	9.05	9.07	9.02	-0.02 (0.16)	0.00 (0.25)	0.05 (0.56)
Outstanding SHG Debt (000 Rs.) (Real)	8988	0.07	0.05	0.10	0.06*** (0.02)	0.03 (0.02)	0.13*** (0.05)
Credit Markets: Interest Rates and Number of Informal Lenders per Village							
Mean monthly interest rate paid (†)	6462	5.33	5.27	5.39	0.13** (0.05)	0.15** (0.06)	0.04 (0.08)
Mean monthly rate, informal loans	6391	5.34	5.28	5.41	0.13** (0.05)	0.15** (0.06)	0.03 (0.08)
Mean rate, informal loans (Village FGD data)	311	5.25	5.22	5.28	0.02 (0.15)	NA	NA
Number of informal lenders (FGD)	180	2.04	2.08	1.99	-0.03 (0.09)	NA	NA
Mean rate, moneylender loans (FGD)	311	5.25	5.22	5.28	0.09 (0.18)	NA	NA
Number of moneylenders (FGD)	180	2.04	2.08	1.99	-0.06 (0.05)	NA	NA
Mean rate, friend/relative loans (FGD)	311	5.25	5.22	5.28	0.07 (0.24)	NA	NA
Number of friends/relatives offering loans (FGD)	180	2.04	2.08	1.99	0.02 (0.07)	NA	NA

Notes: Adjusted differences in means across treatment groups and their standard errors (clustered at the panchayat level) are from separate linear regressions of each baseline variable on an indicator of treatment status, with controls for stratification variables (block dummies and panchayat mean high cost debt). The result for outstanding high cost debt is from a regression with the same specification as described previously, excluding the control for baseline panchayat high cost debt in order to avoid over-fitting. Outcomes marked with † are primary outcomes of interest according to the pre-analysis plan, and are used as controls in later regressions as specified in the plan. * p<0.1, ** p<0.05; *** p<0.01

Table A1. Summary Statistics and Randomization Balance across Treatment Groups at Baseline (continued)

	Means				Difference in means, T-C (SE), Adjusted for stratification controls		
	<i>Obs</i>	<i>Overall</i>	<i>Control</i>	<i>Treatment</i>	<i>Full sample</i> (1)	<i>Landless</i> (2)	<i>Landed</i> (3)
Productive asset index (†)	8988	0.14	0.18	0.09	-0.10*** (0.04)	-0.03 (0.04)	-0.19 (0.12)
Consumption asset index (†)	8988	-0.24	-0.27	-0.21	0.06 (0.05)	0.13** (0.05)	-0.01 (0.08)
Housing quality index (†)	8988	-0.12	-0.12	-0.12	0.02 (0.03)	0.02 (0.04)	0.02 (0.07)
Consumption value per AE (†)	8988	0.69	0.68	0.69	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Entitlements accessed by HH (†)	8988	66.59	66.05 %	67.13 %	1.40 (1.33)	0.88 (1.37)	1.13 (2.28)
<i>Women's Roles and Capabilities</i>							
Prop. HH women work for income (†)	8985	77.08	77.68 %	76.47 %	-1.31 (1.12)	-1.75 (1.16)	-1.01 (2.00)
Women's HH decision-making index (†)	8988	5.97	5.98	5.97	-0.00 (0.05)	0.06 (0.06)	-0.16** (0.08)
Women's collective action index (†)	8988	81.70	81.93 %	81.46 %	-0.11 (0.97)	0.47 (1.20)	-1.48 (1.74)
Women's mobility (†)	8303	0.31	0.30	0.31	0.01 (0.01)	0.00 (0.02)	0.02 (0.02)
Aspirations for girls (†)	5235	28.75	28.00 %	29.48 %	1.38 (1.41)	2.67 (1.63)	-1.13 (2.75)
<i>Attrition</i>							
Attrition	8988	2.89	2.83 %	2.95 %	0.15 (0.28)	0.18 (0.39)	0.05 (0.57)

Notes: Adjusted differences in means across treatment groups and their standard errors (clustered at the panchayat level) are from separate linear regressions of each baseline variable on an indicator of treatment status, with controls for stratification variables (block dummies and panchayat mean high cost debt). The result for outstanding high cost debt is from a regression with the same specification as described previously, excluding the control for baseline panchayat high cost debt in order to avoid over-fitting. Outcomes marked with † are primary outcomes of interest according to the pre-analysis plan, and are used as controls in later regressions as specified in the plan. * p<0.1, ** p<0.05; *** p<0.01

Table A2. Direct Effects, alternative estimators

	SHG membership (%)	Any loans taken	Loans taken past year (000 Rs)		Outstanding debt (000 Rs)			Monthly rate on loans taken last 12 months
	(1)	All loans (2)	All loans (3)	SHG loans (4)	Total (5)	SHG (6)	> 4% /mo (7)	All loans (8)
<i>Panel A: Simple Difference Estimator, no Baseline Controls</i>								
Overall Jeevika impact	51.36*** (1.55)	0.04*** (0.01)	-0.12 (0.33)	1.93*** (0.10)	-0.88* (0.45)	1.99*** (0.09)	-1.80*** (0.39)	-0.98*** (0.07)
Impact on landholding HHs	43.03*** (2.31)	0.06*** (0.02)	-1.80** (0.83)	1.68*** (0.16)	-2.71* (1.40)	1.69*** (0.14)	-1.61* (0.91)	-0.69*** (0.12)
Impact on landless HHs	54.52*** (1.61)	0.04** (0.01)	0.61 (0.40)	2.03*** (0.11)	0.09 (0.51)	2.10*** (0.10)	-1.84*** (0.46)	-1.08*** (0.08)
<i>Panel B: Difference in Differences Estimator</i>								
Overall Jeevika impact	49.09*** (2.54)	2.26 (1.73)	-0.04 (0.51)	1.88*** (0.14)	-0.63 (0.69)	1.93*** (0.12)	-1.79*** (0.56)	-1.04*** (0.12)
Impact on landholding HHs	40.89*** (2.96)	4.61* (2.72)	-1.65 (1.10)	1.57*** (0.18)	-1.93 (1.62)	1.54*** (0.17)	-1.10 (1.10)	-0.56*** (0.16)
Impact on landless HHs	52.19*** (2.78)	1.35 (1.91)	0.63 (0.50)	2.00*** (0.15)	-0.00 (0.65)	2.08*** (0.14)	-2.04*** (0.60)	-1.19*** (0.14)

Notes: All specifications control for stratification dummies. Results shown in Panel B are from specifications in which baseline controls (Table A1) are included.

Table A3. Effects on Informal Credit Market, alternative estimators

	Any informal loans taken	Informal loans taken past year (000 Rs)	Outstanding informal debt (000 Rs)	Monthly rate, informal loans taken last 12 months
	(1)	(2)	(3)	(4)
<i>Panel A: Simple Difference Estimator, no Baseline Controls</i>				
Overall Jeevika impact	-0.06*** (0.01)	-2.00*** (0.32)	-2.58*** (0.40)	-0.11 (0.07)
Impact on landholding HHs	-0.04* (0.02)	-3.27*** (0.79)	-3.54*** (1.11)	0.07 (0.11)
Impact on landless HHs	-0.07*** (0.01)	-1.43*** (0.39)	-2.06*** (0.50)	-0.19** (0.09)
<i>Panel B: Difference in Differences Estimator</i>				
Overall Jeevika impact	-7.92*** (1.70)	-1.96*** (0.50)	-2.58*** (0.63)	-0.22* (0.12)
Impact on landholding HHs	-5.00* (2.76)	-3.42*** (1.03)	-3.64*** (1.30)	0.13 (0.16)
Impact on landless HHs	-9.05*** (1.87)	-1.33** (0.49)	-2.07*** (0.65)	-0.34** (0.14)

Notes: All specifications control for stratification dummies. Results shown in Panel B are from specifications in which baseline controls (Table A1) are included.

Table A4. Effects on Informal Credit Market, Village Level Outcomes

	Monthly Interest Rate			Number of Lenders		
	Informal	Money-lenders	Friends and Relatives	Informal	Money-lenders	Friends and Relatives
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Simple Difference Estimator, no Baseline Controls</i>						
Overall Jeevika impact	-0.28* (0.16)	-0.31 (0.21)	-0.10 (0.20)	-0.24** (0.11)	-0.06 (0.07)	-0.14** (0.07)
<i>Panel B: Difference in Differences Estimator</i>						
Overall Jeevika impact	-0.32 (0.26)	-0.37 (0.30)	-0.23 (0.37)	-0.20 (0.17)	0.02 (0.10)	-0.17 (0.13)

Notes: All specifications control for stratification dummies. Results shown in Panel B are from specifications in which baseline controls (Table A1) are included.

Table A5. Effects on Household Asset position, Entitlements, and Welfare

	Consumption Asset Index	Productive Asset Index	Housing Quality Index	Access to Entitlements (% any)	Real Consumption per AE (000 Rs.)
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Simple Difference Estimator, no Baseline Controls</i>					
Overall Jeevika impact	0.13** (0.06)	-0.05 (0.03)	0.02 (0.04)	-0.14 (0.48)	0.01 (0.02)
Impact on landholding HHs	-0.07 (0.09)	-0.20* (0.10)	-0.08 (0.07)	-0.43 (1.11)	-0.02 (0.04)
Impact on landless HHs	0.24*** (0.06)	0.03 (0.03)	0.08** (0.04)	-0.15 (0.55)	0.02 (0.02)
<i>Panel B: Difference in Differences Estimator</i>					
Overall Jeevika impact	0.07 (0.07)	0.04 (0.04)	0.02 (0.04)	-1.21 (1.67)	-0.01 (0.03)
Impact on landholding HHs	-0.03 (0.10)	0.01 (0.12)	-0.10 (0.07)	-0.86 (2.48)	-0.03 (0.04)
Impact on landless HHs	0.10 (0.07)	0.04 (0.03)	0.07 (0.04)	-0.87 (1.65)	0.01 (0.03)

Notes: All specifications control for stratification dummies. Results shown in Panel B are from specifications in which baseline controls (Table A1) are included.