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Relief from Usury

Impact of a Community-Based Microcredit Program in Rural India

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Abstract

The impact of micro-credit interventions on existing credit markets is theoretically ambiguous. Previous empirical work suggests the entry of a joint-liability lender may lead to a positive impact on the informal lending rate. This paper presents the first randomized controlled trial–based evidence on this question. Households in rural Bihar, India, were offered low-cost credit through a government-led self-help group program, the rollout of which was randomized at the panchayat level. The intervention led to a dramatic 14.5 percent decline in the use of informal credit, as households substituted to lower-cost self-help group loans. Due to the program, the average rate paid on recent loans fell from 69 to 58 percent per year overall. Rates on informal loans also declined slightly. Among landless households, informal lending rates fell from 65.5 to 63.2 percent, decreasing by 40 percent the gap in rates paid by landless versus landowning households. Two years after the initiation of the program, significant positive impacts on asset ownership among landless households were apparent. Impacts on various indicators of women's empowerment were mixed, and showed no clear direction when aggregated, nor was there any impact on consumption expenditures.

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Produced by the Research Support Team

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1. Introduction

The vast majority of credit utilized by the global poor is from informal sources such as moneylenders, friends, or merchants (Banerjee and Duflo, 2007). Interest rates on these informal loans are typically high, particularly for the poorest, who borrow lower amounts and have little collateral to offer. A host of institutions, ranging from large commercial enterprises to small non-governmental organizations, have entered rural credit markets in recent years with the aim of providing lower-cost credit to the poor. While the impact of this so-called microfinance revolution on household-level outcomes has now been well documented through a number of experimental and non-experimental studies, its effect on informal credit markets, which continue to supply the lion's share of credit in these settings, has received far less attention. We address this gap through an RCT based on the randomized roll-out of Jeevika, a government-led self-help group (SHG) program in the state of Bihar, India, which offered loans to SHG members.

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. 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). This allows room for competition to bring down lending rates, but due largely to the information asymmetries that

characterize credit markets, the opposite result may also obtain.

An increase in lending rates could potentially arise through a number of channels. First, as noted by Hoff and Stiglitz (1998) and echoed by Jain (1999), scale economies in lending could be eroded by competition. A second possibility is 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, 2998; McIntosh and Wyndick, 2005). A third channel is through composition of the pool 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).[1] 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 lead to even higher 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 could in fact be complements. 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 these debts, potentially increases demand for informal credit, and puts upward pressure on informal interest rates. On the other hand, if the loans offered through the new entrant into the credit market provide borrowers facing repayment difficulties with a way to service their informal debt, this could bring down the costs of debt collection (Aleem 1990), potentially 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 thin. Three previous studies have used the approach of instrumenting for MFI entry, either using

[1] 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.

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 panchayats[2] in rural Bihar, overcomes this limitation.

Critical to the identification strategy, the SHG intervention had a strong direct effect on household use of informal credit. Just over two years after program initiation, households in panchayats selected for early roll-out 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 overall during the study period, new borrowing from informal lenders was 18% lower in program panchayats compared to control areas, where households instead took advantage of the lower-interest loans offered by SHGs. We find that this exogenous shock to informal credit markets

[2] Village government units typically consisting of between two and four villages.

brought on by randomized SHG entry led to a fall of 3.8 percentage points in the average annual informal borrowing rate on a base of 68.8 percent.

Program impacts are generally more pronounced for landless households than for those that own land. Members of landless households were more likely to join an SHG and to take on more debt through the program, and the decline in lending rates is driven by a reduction in the rates faced by these households.

In addition to its unique contribution to understanding how the entry of a new lending institution can affect informal credit markets, this study also contributes to the substantial recent literature estimating household-level impacts of access to group-based lending (Desai and Joshi, 2014; Angelucci et al, 2015; Attanasio et al., 2015; Banerjee et al., 2015; Crépon et al., 2015; Datta, 2015; Khanna, Kocchar and Palaniswamy, 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 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. Finally, there is scant evidence from RCTs that these programs affect indicators of female empowerment.[3]

Given previous findings, it is not surprising that, in the short-run, Jeevika, which did not have a significant impact on total borrowing, also did not lead to significant impacts on consumption levels or on women's economic or decision-making roles or capabilities. In the high-indebtedness environment of rural Bihar, the primary impacts of the program were to shift a portion of households' debt burden from high-cost loans on which monthly rates averaged over 5 percent per month, to much lower-cost SHG loans and to reduce the cost of borrowing from the informal sector. The estimated impact of Jeevika on households' debt servicing costs is economically significant, but a longer time horizon may be required before this translates into measurable changes in the consumption or asset positions of households, or in the empowerment of women

[3] Non-experimental evidence based on regression discontinuity designs or propensity score matching have also not shown any impact on income or consumption, but have shown substantial effects on women's empowerment (Khanna, Kocchar and Palaniswamy, 2015; Datta, 2015; Desai and Joshi 2014).

(Sanyal, Rao and Majumdar, 2015).

2. 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.[4] Members are required to contribute a minimum of 2 rupees ($0.035 USD)[5] each week toward a personal savings account held by the SHG. After several weeks 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. The mean credit available per SHG member is approximately Rs. 4,000, assuming the average group size is halfway between the allowable minimum and maximum number of members. 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 area during the period spanned by data collection.

3. Methods

[4] SHG members are taught to sign their names, and how to read basic sign posts, such as bus names, etc.
[5] USD equivalents are calculated using the average exchange rate from initiation of the program to the end of data collection.

3.1 Experimental design

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 or two villages were then randomly selected for data collection.

Since the intervention was targeted to poorer households, within each of the study villages, hamlets in which the majority of the population belonged to a scheduled caste or scheduled tribe were identified. Households were then randomly selected from these hamlets to be interviewed. A baseline survey was administered during July to October of 2011 to 8,988 households across 333 villages in 179 panchayats.[6] Following the baseline survey, panchayats were randomly assigned to an early rollout group or a late rollout group, after stratifying the sample on administrative block and the panchayat-level mean of outstanding high cost (monthly interest rate of 4% or higher) debt held by households at baseline. 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. 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, 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.

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 though 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.

[6] One of the selected Panchayats could not be surveyed due to political instability.

Based on the registered pre-analysis plan,[7] we estimate the following ANCOVA specification to test the reduced-form, intent-to-treat impact of Jeevika on each group of outcomes:

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

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):[8]

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

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.

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

[7] https://www.socialscienceregistry.org/trials/570.

[8] 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.

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

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 the earlier literature and include regressions of indices for each family of outcomes (as in Kling, Liebman, and Katz, 2007).[9] P-values for these regressions are calculated using the step-down procedure in Hochberg (1988), which controls the family-wise error rate across all indices.

4. Results

4.1 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

[9] See, for example, Banerjee et al. (2015).
[10] Interest rates are generally non-compounding in this setting.

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 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.

4.2 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 also higher in treatment areas at the 5% level, 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. The difference in interest rates reported at the household level appears to be driven by landless households. Attrition, at 3%, is low given the three-year interval between surveys, and does not differ between treatment and control areas.

4.3 Direct impacts: SHG membership and borrowing

Table 2 presents estimates of the impact of access to Jeevika 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. Given the

higher interest rates and lower use of credit among the landless at baseline, landless households had the most to gain through participation in Jeevika. Consistent with this, we find that take-up of the program is more pronounced among these households, who were 11 percentage points more likely to belong to an SHG than landowning households in program areas (Panel B).

While the program appears to have had a slight negative impact (Rs. 860, $p<0.1$) on the total amount of outstanding household debt (column 3), we see a significant increase of close to Rs. 2,000 in the value of debt owed to SHGs (column 4), and an offsetting decrease in loans from informal sources of credit (Table 3, column 2).[11] Scaling the increase in SHG debt by program-induced SHG membership, this result implies that 96% of the lending capital initially transferred to groups through Jeevika had been extended as credit to households by the time of the follow-up survey.

The magnitude of first-order program effects differs by landholding status. The increase in SHG debt is higher among the landless than the landed by Rs. 390. In contrast, the negative impact of the program on new informal debt is twice as large among land-owning households (Table 3, column 3, panel B), reflecting lower baseline borrowing among the landless. The large decrease in informal borrowing among landholding households exceeds the expansion in loans taken through SHGs by these households, resulting in a marginally significant negative estimate of the program effect on overall indebtedness for this subsample (Table 2, column 3), and a significant decrease in overall borrowing over the past year (column 7). For landless households, on the other hand, the expansion in SHG borrowing exceeds the decline in informal borrowing, resulting in a positive (but not significant) point estimate on total new borrowing. The lack of an impact on total borrowing overall suggests that on average, the study population was not credit constrained prior to the intervention.

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. 1,880

[11] Informal sources include moneylenders, shopkeepers, neighbors, friends, relatives, chit funds, casual employers, casual employees and village temples. We exclude interest free loans, which likely reflect informal risk-sharing mechanisms rather than the informal credit market.

lower in treatment areas by the endline, a 14.5% reduction relative to control panchayats. Credit was offered 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.[12] The impact on interest rates is especially pronounced for landless households, who faced higher rates at baseline. Jeevika reduces the difference in average borrowing rates on new loans faced by landholding and landless households by 73% (Table 2, panel B, column 6).

We also see in column 2 that access to Jeevika resulted in a 4 percentage point increase in the number of households borrowing at all, indicating impacts on the extensive margin apart from the intensive margin discussed above. This is consistent with findings in Mexico by Karlan, Mullainathan and Zinman (2009), that price reductions lead to more borrowers as well as larger loan sizes.

4.4 Indirect impacts: Informal credit markets

Despite the significant resources made available for household borrowing through Jeevika, and the high take-up of the program, even in program areas 65% of the increase in outstanding debt between the baseline and follow-up surveys was from informal lenders. This underscores the importance of understanding the impact of this and other microcredit interventions on the informal credit market.

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

[12] The household average interest rate excludes any interest free loans.

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).[13] 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 is no longer statistically significant (column 8). The number of informal credit sources listed in the 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).

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.

[13] 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.

Two of the potential mechanisms described above 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.[14] 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.

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

While Jeevika had immediate and dramatic effects on credit markets in targeted villages, we see more limited short-term impacts on household asset possession, material well-being or various measures of women's economic and social empowerment (Tables 4 and 5). We do see significant positive effects of the program on asset holdings among landless households (Table 4). Consumption assets, productive assets, and housing quality are all significantly affected within this sub-group.

The program's effect on women's empowerment is less clear. We see a positive impact on an index of collective action, but a negative impact on women's role in decision-making within the household (both $p<0.1$). 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.

4.6 Robustness tests

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 as upper and lower bounds of the true effect in Tables A2 through A5. Treatment effects are similar in magnitude and significance under these alternative

[14] 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 that 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.

specifications. The results from the simple difference estimators (A3, panels A and B, column 4) provide reassurance in particular for the validity of the interest rate results, since baseline rates are imbalanced at baseline in the opposite direction as the estimated treatment effect.

5. Discussion

Chronic indebtedness and exploitative moneylenders are well-established tropes in the 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 is 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 per year 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 years after initiation of the program, a significant impact on the asset position of landless households was already observed. No impact on consumption expenditures was seen, and only weak and conflicting effects on various measures of women's empowerment were seen. Given that the intervention reduced debt servicing costs substantially, it is possible that asset impacts will strengthen with time, and that other downstream impacts may still arise.

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

	Means			Landless - Landed (se)
	Obs	*Landless*	*Landed*	Difference in Means
Credit Markets: Interest Rates, Amounts Borrowed, Loan Terms				
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)
Material Well-Being: Assets and Consumption Expenditures				
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)
					Panel A: Main effects				
Jeevika	51.04***	0.04***	-0.86*	1.97***	-1.88***	-0.95***	-0.20	1.91***	0.80***
	(1.54)	(0.01)	(0.44)	(0.09)	(0.38)	(0.07)	(0.32)	(0.10)	(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
					Panel B: Heterogeneous effects by landholdings				
Jeevika	42.97***	0.06***	-2.28*	1.69***	-1.46	-0.65***	-1.65**	1.67***	0.69***
	(2.25)	(0.02)	(1.36)	(0.15)	(0.89)	(0.12)	(0.81)	(0.16)	(0.04)‡‡‡
Landless HH	-1.55	0.07***	-4.64***	-0.01	-0.51	0.56***	-1.62**	0.01	-0.01
	(1.25)	(0.02)	(1.18)	(0.06)	(0.88)	(0.09)	(0.77)	(0.07)	(0.02)
Jeevika X landless	11.27***	-0.02	2.05	0.39**	-0.59	-0.41***	2.06**	0.33*	0.16***
	(2.19)	(0.02)	(1.59)	(0.16)	(1.07)	(0.14)	(0.98)	(0.18)	(0.04)
Linear combinations									
Effect of Jeevika if landless	54.25***	0.04***	-0.22	2.07***	-2.04***	-1.06***	0.41	2.00***	0.85***
	(1.61)	(0.01)	(0.50)	(0.10)	(0.46)	(0.08)	(0.40)	(0.11)	(0.03)‡‡‡
Effect of landless if Jeevika	9.72***	0.05***	-2.58**	0.38**	-1.10	0.15	0.44	0.34**	0.15***
	(1.85)	(0.01)	(1.16)	(0.16)	(0.71)	(0.10)	(0.70)	(0.16)	(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									
Treatment if landless									0.000
Treatment if landed									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, landessness, 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

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)
	Panel A: Main Effects						*Panel A: Mean monthly lending rate*		
Jeevika	-0.06***	-2.65***	-2.04***	-0.12*	-0.16**	0.09***	-0.32*	-0.32	-0.16
	(0.01)	(0.39)	(0.30)	(0.07)	(0.07)	(0.01)‡‡‡	(0.18)	(0.23)	(0.24)
New borrower					-0.10				
					(0.07)				
Jeevika X new borrower					0.16				
					(0.11)				
Linear combinations									
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			
	Panel B: Heterogeneous effects by landholdings						*Panel B: Number of informal lenders*		
Jeevika	-0.04**	-3.41***	-3.14***	0.05		0.07**	-0.27**	-0.08	-0.16**
	(0.02)	(1.09)	(0.77)	(0.10)		(0.03)‡‡‡	(0.12)	(0.07)	(0.07)
Landless HH	0.08***	-3.04***	-1.69**	0.48***		-0.02			
	(0.02)	(1.05)	(0.75)	(0.09)		(0.03)			
Jeevika X landless	-0.03	1.12	1.56*	-0.23*		0.03			
	(0.02)	(1.32)	(0.94)	(0.13)		(0.04)			
Linear combinations									
Effect of Jeevika if landless	-0.07***	-2.30***	-1.58***	-0.19**		0.10***			
	(0.01)	(0.49)	(0.38)	(0.08)		(0.02)‡‡‡			
Effect of landless if Jeevika	0.05***	-1.92*	-0.13	0.25**		0.00			
	(0.02)	(1.02)	(0.64)	(0.09)		(0.03)			
Additional baseline controls?	yes	yes	yes	yes		yes	yes	yes	yes
Number of observations	8987	8987	8987	6211		8988	333	333	333
Number of clusters	179	179	179	179		179	179	179	179
R-squared	0.09	0.07	0.05	0.22		0.06	0.32	0.25	0.42
Mean of dep var, omitted cat	0.63	20.23	13.12	5.12		0.01	2.85	1.37	1.41
Hochberg-corrected p-values									
Treatment if landless						0.000			
Treatment if landed						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, landessness, 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 Assset 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)
	Panel A: Main Effects					
Jeevika	0.10**	-0.01	0.01	-0.18	0.00	0.02
	(0.04)	(0.02)	(0.03)	(0.43)	(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
	Panel B: Heterogeneous effects by landholdings					
Jeevika	-0.07	-0.13	-0.09*	-0.44	-0.01	-0.06*
	(0.07)	(0.08)	(0.06)	(1.02)	(0.04)	(0.03)
Landless HH	-0.31***	-0.33***	-0.21***	1.28	-0.07*	-0.17***
	(0.06)	(0.06)	(0.05)	(0.90)	(0.04)	(0.03)
Jeevika X landless	0.25***	0.17*	0.15**	0.35	0.03	0.11***
	(0.08)	(0.09)	(0.06)	(1.24)	(0.05)	(0.04)
Linear combinations						
Effect of Jeevika if landless	0.18***	0.04*	0.06*	-0.09	0.01	0.05***
	(0.05)	(0.02)	(0.03)	(0.52)	(0.02)	(0.01)‡‡‡
Effect of landless if Jeevika	-0.07	-0.16***	-0.06	1.63*	-0.04	-0.06***
	(0.05)	(0.05)	(0.04)	(0.90)	(0.04)	(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						
Treatment if landless						0.000
Treatment if landed						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 landessness at baseline and its interaction with treatment status in Panel B). Stratification dummies and baseline controls († in Table A1) are included in all specifications.

Columns 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)
			Panel A: Main Effects			
Jeevika	-0.52	-0.08*	1.96*	-0.01	0.28	-0.00
	(0.83)	(0.05)	(1.05)	(0.02)	(1.41)	(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
			Panel B: Heterogeneous effects by landholdings			
Jeevika	1.10	-0.11	2.09	-0.00	2.94	0.01
	(1.93)	(0.06)	(1.56)	(0.03)	(2.98)	(0.02)
Landless HH	7.10***	-0.02	-0.14	0.04**	-10.53***	0.03*
	(1.82)	(0.04)	(1.12)	(0.02)	(2.47)	(0.02)
Jeevika X landless	-2.40	0.04	-0.19	-0.01	-3.33	-0.02
	(2.33)	(0.06)	(1.49)	(0.03)	(3.35)	(0.02)
Linear combinations						
Effect of Jeevika if landless	-1.30	-0.07	1.90*	-0.01	-0.39	-0.01
	(1.02)	(0.05)	(1.10)	(0.02)	(1.61)	(0.01)
Effect of landless if Jeevika	4.70**	0.01	-0.33	0.03	-13.86***	0.01
	(1.70)	(0.05)	(1.18)	(0.02)	(2.94)	(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						
Treatment if landless						0.57
Treatment if landed						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, landessness, 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.

Column 6 presents coefficients in a regression of z-scores of the outcome variables in this "family" - working women, decision making, collective action, mobility, aspirations - 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 A1. Summary Statistics and Randomization Balance across Treatment Groups at Baseline

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

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		
	Obs	*Overall*	*Control*	*Treatment*	*Full sample* (1)	*Landless* (2)	*Landed* (3)
Productive asset index (†)	8988	0.14	0.18	0.09	-0.10***	-0.03	-0.19
					(0.04)	(0.04)	(0.12)
Consumption asset index (†)	8988	-0.24	-0.27	-0.21	0.06	0.13**	-0.01
					(0.05)	(0.05)	(0.08)
Housing quality index (†)	8988	-0.12	-0.12	-0.12	0.02	0.02	0.02
					(0.03)	(0.04)	(0.07)
Consumption value per AE (†)	8988	0.69	0.68	0.69	0.01	0.01	0.00
					(0.01)	(0.01)	(0.01)
Entitlements accessed by HH (†)	8988	66.59	66.05 %	67.13 %	1.40	0.88	1.13
					(1.33)	(1.37)	(2.28)
Women's Roles and Capabilities							
Prop. HH women work for income (†)	8985	77.08	77.68 %	76.47 %	-1.31	-1.75	-1.01
					(1.12)	(1.16)	(2.00)
Women's HH decision-making index (†)	8988	5.97	5.98	5.97	-0.00	0.06	-0.16**
					(0.05)	(0.06)	(0.08)
Women's collective action index (†)	8988	81.70	81.93 %	81.46 %	-0.11	0.47	-1.48
					(0.97)	(1.20)	(1.74)
Women's mobility (†)	8303	0.31	0.30	0.31	0.01	0.00	0.02
					(0.01)	(0.02)	(0.02)
Aspirations for girls (†)	5235	28.75	28.00 %	29.48 %	1.38	2.67	-1.13
					(1.41)	(1.63)	(2.75)
Attrition							
Attrition	8988	2.89	2.83 %	2.95 %	0.15	0.18	0.05
					(0.28)	(0.39)	(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
		All loans	All loans	SHG loans	Total	SHG	> 4% /mo	All loans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Simple Difference Estimator, no Baseline Controls							
Overall Jeevika impact	51.36***	0.04***	-0.12	1.93***	-0.88*	1.99***	-1.80***	-0.98***
	(1.55)	(0.01)	(0.33)	(0.10)	(0.45)	(0.09)	(0.39)	(0.07)
Impact on landholding HHs	43.03***	0.06***	-1.80**	1.68***	-2.71*	1.69***	-1.61*	-0.69***
	(2.31)	(0.02)	(0.83)	(0.16)	(1.40)	(0.14)	(0.91)	(0.12)
Impact on landless HHs	54.52***	0.04**	0.61	2.03***	0.09	2.10***	-1.84***	-1.08***
	(1.61)	(0.01)	(0.40)	(0.11)	(0.51)	(0.10)	(0.46)	(0.08)
	Panel B: Simple Difference Estimator with Baseline Controls							
Overall Jeevika impact	51.36***	0.04***	-0.21	1.91***	-0.93**	1.97***	-1.88***	-1.00***
	(1.55)	(0.01)	(0.32)	(0.10)	(0.43)	(0.09)	(0.38)	(0.07)
Impact on landholding HHs	42.97***	0.06***	-1.65**	1.68***	-2.32*	1.70***	-1.46	-0.72***
	(2.25)	(0.02)	(0.81)	(0.16)	(1.35)	(0.15)	(0.89)	(0.12)
Impact on landless HHs	54.25***	0.04**	0.39	2.00***	-0.28	2.07***	-2.04***	-1.09***
	(1.61)	(0.01)	(0.40)	(0.12)	(0.50)	(0.10)	(0.46)	(0.08)
	Panel C: Difference in Differences Estimator							
Overall Jeevika impact	49.09***	2.26	-0.04	1.88***	-0.63	1.93***	-1.79***	-1.04***
	(2.54)	(1.73)	(0.51)	(0.14)	(0.69)	(0.12)	(0.56)	(0.12)
Impact on landholding HHs	40.89***	4.61*	-1.65	1.57***	-1.93	1.54***	-1.10	-0.56***
	(2.96)	(2.72)	(1.10)	(0.18)	(1.62)	(0.17)	(1.10)	(0.16)
Impact on landless HHs	52.19***	1.35	0.63	2.00***	-0.00	2.08***	-2.04***	-1.19***
	(2.78)	(1.91)	(0.50)	(0.15)	(0.65)	(0.14)	0.60	(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)
	Panel A: Simple Difference Estimator, no Baseline Controls			
Overall Jeevika impact	-0.06***	-2.00***	-2.58***	-0.11
	(0.01)	(0.32)	(0.40)	(0.07)
Impact on landholding HHs	-0.04*	-3.27***	-3.54***	0.07
	(0.02)	(0.79)	(1.11)	(0.11)
Impact on landless HHs	-0.07***	-1.43***	-2.06***	-0.19**
	(0.01)	(0.39)	(0.50)	(0.09)
	Panel B: Simple Difference Estimator with Baseline Controls			
Overall Jeevika impact	-0.06***	-2.06***	-2.65***	-0.12*
	(0.01)	(0.30)	(0.38)	(0.07)
Impact on landholding HHs	-0.04**	-3.12***	-3.29***	0.05
	(0.02)	(0.77)	(1.08)	(0.10)
Impact on landless HHs	-0.07***	-1.61***	-2.34***	-0.19**
	(0.01)	(0.38)	(0.48)	(0.08)
	Panel C: Difference in Differences Estimator			
Overall Jeevika impact	-7.92***	-1.96***	-2.58***	-0.22*
	(1.70)	(0.50)	(0.63)	(0.12)
Impact on landholding HHs	-5.00*	-3.42***	-3.64***	0.13
	(2.76)	(1.03)	(1.30)	(0.16)
Impact on landless HHs	-9.05***	-1.33**	-2.07***	-0.34**
	(1.87)	(0.49)	(0.65)	(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)
	Panel A: Simple Difference Estimator, no Baseline Controls					
Overall Jeevika impact	EL_informal_rate_s1	0	176	EL_number_informal_s1	0	179
	0	0	0.36	0	0	0.21
	Panel B: Simple Difference Estimator with Baseline Controls					
Overall Jeevika impact	EL_informal_rate_s2	0	176	EL_number_informal_s2	0	179
	0	0	0.41	0	0	0.25
	Panel C: Difference in Differences Estimator					
Overall Jeevika impact	-0.32	-0.37	-0.23	-0.20	0.02	-0.17
	(0.26)	(0.30)	(0.37)	(0.17)	(0.10)	(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 Assset 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)
	Panel A: Simple Difference Estimator, no Baseline Controls				
Overall Jeevika impact	0.13**	-0.05	0.02	-0.14	0.01
	(0.06)	(0.03)	(0.04)	(0.48)	(0.02)
Impact on landholding HHs	-0.07	-0.20*	-0.08	-0.43	-0.02
	(0.09)	(0.10)	(0.07)	(1.11)	(0.04)
Impact on landless HHs	0.24***	0.03	0.08**	-0.15	0.02
	(0.06)	(0.03)	(0.04)	(0.55)	(0.02)
	Panel B: Simple Difference Estimator with Baseline Controls				
Overall Jeevika impact	0.10**	-0.01	0.01	-0.18	0.00
	(0.04)	(0.02)	(0.03)	(0.43)	(0.02)
Impact on landholding HHs	-0.07	-0.13	-0.09*	-0.44	-0.01
	(0.07)	(0.08)	(0.06)	(1.02)	(0.04)
Impact on landless HHs	0.18***	0.04*	0.06*	-0.09	0.01
	(0.05)	(0.02)	(0.03)	(0.52)	(0.02)
	Panel C: Difference in Differences Estimator				
Overall Jeevika impact	0.07	0.04	0.02	-1.21	-0.01
	(0.07)	(0.04)	(0.04)	(1.67)	(0.03)
Impact on landholding HHs	-0.03	0.01	-0.10	-0.86	-0.03
	(0.10)	(0.12)	(0.07)	(2.48)	(0.04)
Impact on landless HHs	0.10	0.04	0.07	-0.87	0.01
	(0.07)	(0.03)	(0.04)	(1.65)	(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.

Figure 1. Interest rates on loans from informal lenders, FGD data.

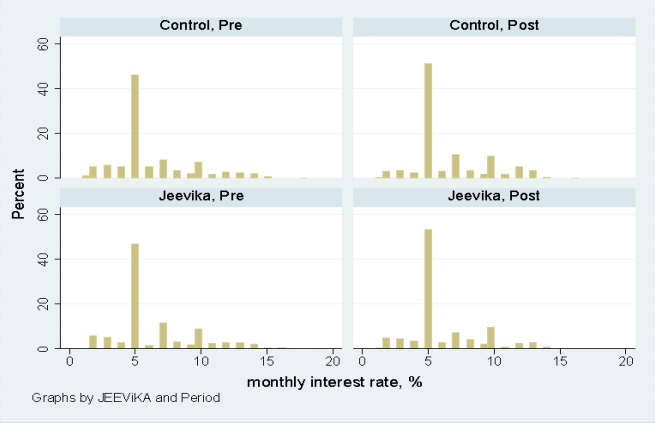

Table B1. Direct Effects of Jeevika

	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)
	Panel A: Overall Program Effects								
Jeevika	51.19***	0.04***	-0.78*	1.98***	-1.79***	-0.96***	-0.10	1.92***	0.81***
	(1.57)	(0.01)	(0.46)	(0.09)	(0.39)	(0.07)	(0.32)	(0.10)	(0.03)‡‡‡
Additional baseline controls?	no	no	no	no	no	no	no	no	no
Hochberg-corrected p-value									0.00
	Panel B: Heterogeneous effects by household landholding status								
Jeevika	42.93***	0.05***	-2.48*	1.68***	-1.52*	-0.63***	-1.76**	1.66***	0.69***
	(2.31)	(0.02)	(1.40)	(0.15)	(0.91)	(0.12)	(0.83)	(0.16)	(0.04)‡‡‡
Landless HH	2.35*	0.12***	-8.16***	0.02	-1.01	0.85***	-2.77***	0.04	0.04*
	(1.21)	(0.01)	(1.21)	(0.04)	(0.86)	(0.10)	(0.77)	(0.06)	(0.02)
Jeevika X landless	11.41***	-0.02	2.57	0.42**	-0.35	-0.45***	2.38**	0.36**	0.16***
	(2.23)	(0.02)	(1.61)	(0.17)	(1.08)	(0.14)	(0.99)	(0.18)	(0.04)
Linear combinations									
Effect of Jeevika if landless	54.34***	0.03**	0.08	2.10***	-1.87***	-1.08***	0.62	2.02***	0.85***
	(1.63)	(0.01)	(0.50)	(0.10)	(0.46)	(0.08)	(0.39)	(0.11)	(0.03)‡‡‡
Effect of landless if Jeevika	13.75***	0.10***	-5.59***	0.44**	-1.36*	0.40***	-0.39	0.40**	0.20***
	(1.92)	(0.01)	(1.06)	(0.16)	(0.67)	(0.09)	(0.64)	(0.17)	(0.04)
Additional baseline controls?	no	no	no	no	no	no	no	no	no
Hochberg-corrected p-value									
Treatment if landless									0.00
Treatment if landed									0.00

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 landessness at baseline and its interaction with treatment status in Panel B). Stratification dummies are included in all specifications.

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 B2. 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	Index of Dependent Variables	Informal	Money-lenders / Shopkeepers	Friends / Relatives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Main Effects					*Panel A: Mean monthly lending rate*		
						EL_informal_rate		
Jeevika	-0.06***	-2.58***	-1.98***	-0.13*	0.09***	_m1	0	176
	(0.01)	(0.41)	(0.31)	(0.07)	(0.01)‡‡‡	0	0	0.36
Additional baseline controls?	no	no	no	no	no	no	no	no
Hochberg-corrected p-value					0.00			
	Panel B: Heterogeneous effects by landholdings					*Panel B: Number of informal lenders*		
Jeevika	-0.04**	-3.55***	-3.27***	0.07	0.07**	EL_number_informal_	0	179
	(0.02)	(1.11)	(0.78)	(0.11)	(0.03)‡‡‡	0	0	0.21
Landless HH	0.12***	-5.38***	-2.79***	0.82***	-0.03			
	(0.02)	(1.02)	(0.75)	(0.09)	(0.03)			
Jeevika X landless	-0.03	1.49	1.86**	-0.29**	0.02			
	(0.02)	(1.32)	(0.94)	(0.13)	(0.04)			
Linear combinations								
Effect of Jeevika if landless	-0.07***	-2.06***	-1.41***	-0.22**	0.09***			
	(0.01)	(0.49)	(0.38)	(0.08)	(0.02)‡‡‡			
Effect of landless if Jeevika	0.09***	-3.89***	-0.93	0.54***	-0.00			
	(0.02)	(0.85)	(0.58)	(0.09)	(0.02)			
Additional baseline controls?	no	no	no	no	no	no	no	no
Hochberg-corrected p-values								
Treatment if landless					0.00			
Treatment if landed					0.00			

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 landessness at baseline and its interaction with treatment status in Panel B). Stratification dummies are included in all specifications. Village level regressions are from a separate village focus group discussion dataset.

Columns 5 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 B3. Effects of Jeevika on Household Assset 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)
	Panel A: Main Program Effects					
Jeevika	0.10**	-0.01	0.02	-0.26	0.00	0.02
	(0.05)	(0.02)	(0.03)	(0.45)	(0.02)	(0.02)
Additional baseline controls?	no	no	no	no	no	no
Hochberg corrected p-value						0.99
	Panel B: Heterogeneous effects by household landholding status					
Jeevika	-0.07	-0.13	-0.09	-0.52	-0.02	-0.06
	(0.08)	(0.08)	(0.06)	(1.06)	(0.04)	(0.03)
Landless HH	-0.43***	-0.37***	-0.40***	2.62***	-0.16***	-0.22***
	(0.06)	(0.06)	(0.05)	(0.88)	(0.04)	(0.03)
Jeevika X landless	0.25***	0.17*	0.16**	0.30	0.03	0.10***
	(0.08)	(0.09)	(0.07)	(1.26)	(0.05)	(0.04)
Linear combinations						
Effect of Jeevika if landless	0.18**	0.04	0.07*	-0.22	0.01	0.05**
	(0.05)	(0.02)	(0.03)	(0.53)	(0.02)	(0.02)‡‡‡
Effect of landless if Jeevika	-0.19**	-0.20***	-0.24***	2.92***	-0.13**	-0.11***
	(0.06)	(0.05)	(0.04)	(0.93)	(0.03)	(0.02)
Additional baseline controls?	no	no	no	no	no	no
Hochberg-corrected p-values						
Treatment if landless						0.00
Treatment if landed						0.21

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 landessness at baseline and its interaction with treatment status in Panel B). Stratification dummies are included in all specifications.

Columns 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 B4. 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)
	Panel A: Main Program Effects					
Jeevika	-0.49	-0.08	2.12**	-0.01	0.69	-0.00
	(0.88)	(0.05)	(1.05)	(0.02)	(1.46)	(0.01)
Additional baseline controls?	no	no	no	no	no	no
Number of observations	8830	8841	8841	8029	3910	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.12	0.06	0.05	0.05	0.11	0.06
Mean of dep var, omitted cat	72.58	6.27	87.44	5.79	29.08	-0.00
Hochberg corrected p-value						0.81
	Panel B: Heterogeneous effects by household landholding status					
Jeevika	1.09	-0.10	2.21	-0.00	3.09	0.01
	(2.05)	(0.06)	(1.57)	(0.03)	(3.06)	(0.02)
Landless HH	13.79***	0.00	-0.45	0.08***	-17.75***	0.07***
	(1.73)	(0.04)	(1.05)	(0.02)	(2.31)	(0.02)
Jeevika X landless	-2.62	0.03	-0.11	-0.01	-2.84	-0.02
	(2.44)	(0.06)	(1.49)	(0.03)	(3.44)	(0.02)
Linear combinations						
Effect of Jeevika if landless	-1.53	-0.07	2.10	-0.01	0.25	-0.01
	(1.06)	(0.05)	(1.09)	(0.02)	(1.66)	(0.01)
Effect of landless if Jeevika	11.17***	0.04	-0.56	0.07***	-20.60***	0.05***
	(1.73)	(0.05)	(1.04)	(0.02)	(2.80)	(0.02)
Additional baseline controls?	no	no	no	no	no	no
Number of observations	8830	8841	8841	8029	3910	8988
Number of clusters	179	179	179	179	179	179
R-squared	0.14	0.06	0.05	0.05	0.14	0.07
Mean of dep var, omitted cat	61.26	6.29	87.77	5.14	45.87	-0.04
Hochberg-corrected p-values						
Treatment if landless						0.48
Treatment if landed						0.64

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 landessness at baseline and its interaction with treatment status in Panel B). Stratification dummies are included in all specifications.

Column 6 presents coefficients in a regression of z-scores of the outcome variables in this "family" - working women, decision making, collective action, mobility, aspirations - 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