The Impact of Microcredit Access on the Well-Being of the Poor in Developing Countries: A Randomized Study in Hyderabad, India Revisited

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Abstract:

Microfinance is a banking service provided to low-income individuals or groups that would have limited access to financial services otherwise. Its proponents argue that microlending in developing countries should lift borrowers out of poverty by enabling them to gain access to funds to create and grow businesses. Since microfinance was made available at a large scale in 1976 by Muhammad Yunus and the Grameen Bank, microfinance has become increasingly popular in developing countries as a means to fight poverty, winning them the Nobel Peace Prize in 2006. The question of the legitimate effectiveness of microcredit access on poverty alleviation thus arises. Using data from a randomized study in Hyderabad, India and in controlling for the overall growth of outcome averages used to describe poverty, I firstly show that microcredit access has even less of an impact on poverty alleviation at the aggregate level than what is currently shown in the literature. Moreover, I show using an instrumental approach that at the borrower level, we obtain similar results to those of the current literature on the aggregate impact of MFI access. After presenting these results, I then discuss the potential furthering of the current literature on microfinance as a means of poverty alleviation as well as discuss policy and measures to improve MFI effectiveness.

I. Introduction

Microfinance is a banking service provided to low-income individuals or groups that would have limited access to financial services otherwise. It most commonly includes microloans, but it may also include checking and savings accounts, micro-insurance products, and even services pertaining to financial literacy and business education. The main argument for microlending in developing countries is that it should allow the poorest individuals access the necessary funds to create and expand a business, which would not be possible otherwise either because they do not have access to other financial institutions or do not qualify for loans.

Although microlending has existed since the 18th century, large-scale microlending was only made possible in 1976 by the Grameen Bank of Bangladesh. Ever since, MFIs have become increasingly popular in developing countries and as of more recently in developed countries as a means to fight poverty without relying on State welfare programs. Because of this success, the Grameen Bank and its founder, Muhammad Yunus, were jointly awarded the Nobel Peace Prize 30 years later in 2006. In 2017, there were reportedly over 139 million active MFI borrowers (83% of which were women) in the world for 981 MFIs, and a total gross loan portfolio of about 114 billion USD[1].

Within the past decade, there has been increasing wariness of MFI practices after multiple the launching of IPOs[2], leading to high interest rates and sparking and multiple microfinance crises[3]. Despite its increasing presence in today's world and increasing of financial access, the question of the impact of MFI presence on poverty alleviation arises. Thus, in this paper, I use data from a randomized study on MFI borrowing and economic and social outcomes in Hyderabad, India to evaluate the impact of MFI presence on poverty alleviation in developing countries.

Earlier literature on the subject finds that microfinance benefits the poorest and has a lasting impact on poverty reduction amongst participants as well as spillover effects at the village level. Khandker (2003), using panel data from a Bangladeshi household survey, shows that borrowing from one of three participating MFIs[4] induces an increase in per capita consumption for borrowers and spillover effects on village-level consumption and is thus

[1] According to the Convergences International Microfinance Barometer 2018 and based data provided by financial services through MIX Market (http://www.themix.org/mixmarket).
[2] For example, the successful IPO of Banco Compartamos in 2007 and that of SKS Microfinance in 2010 (https://www.centerforfinancialinclusion.org/a-tale-of-four-ipos-is-public-investment-in-microfinance-becoming-ok-again/)
[3] For example, in Nicaragua (2008), Bosnia and Herzegovina (2009), Kolar, India (2009), Andhra Pradesh (2010), and Pakistan (2010) (https://www.microfinancefocus.com/6-microfinance-crises-sector-does-not-want-remember

[4] BRAC, The Grameen Bank, and BRBD.

effective at alleviating moderate poverty. One of the main drawbacks to this study as well as that those of much of the earlier literature is that MFIs are often present in areas with relatively higher poverty rates, making their placement non-random which may bias their estimations.

However, the most recent literature on the effects of microfinance consist in randomized studies, mitigating the sample selection bias introduced with the earlier literature. Banerjee et al. (2014), in randomly selecting treatment and control neighborhoods from areas with very limited MFI access, show at the aggregate level that although microcredit access induces a temporary change in consumption structure and an increase in household business investment in control neighborhoods, but an insignificant impact on overall consumption and income. Moreover, they find that in addition to economic indicators, measures of social progress[5] are limitedly impacted by the introduction of microcredit. These findings echo those of other randomized studies across various contexts and across the world[6], suggesting strong external validity.

The recent studies discussed here suggest one thing in common: the presence of MFIs has a limited impact on alleviating poverty at the aggregate level, which is all the more true in the long run. A potential explanation for this given in the literature is the extremely low take-up rate of microloans in areas with MFI presence. Crépon et al. (2014) highlight that slightly positive but insignificant point estimates at the aggregate level could translate into larger and significant instrumental estimates at the borrower level, suggesting a model using treatment as an instrument for borrowing.

When interpreting the results of the literature, there are a couple of drawbacks to consider. Firstly, none of the literature makes a clear attempt to include a parameter for average outcome growth factors affecting their results. Indeed, Banerjee et al (2014) state that their study was conducted during a period of high economic growth and Augsburg et al. (2015) that of economic decline with the 2008 financial crisis. Secondly, the literature mainly focuses on intent to treat estimates (ITT), omitting treatment on the treated (TOT) estimates completely despite the low take-up rate of treatment.

Using the same dataset as Banerjee et al. (2014) from a randomized study conducted in Hyderabad, India, in addition to testing their findings using different estimation methods, I contribute to the literature in three ways. Firstly, Banerjee et al. (2014) use an approach of simple difference in averages between treatment and control means to conduct their study. Here, I use a difference-in-difference approach to estimate the treatment effect while controlling for

[5] For example, the share of children in school and working and the share of female-managed businesses.
[6] These include the findings of Augsburg et al. (2015) in Bosnia and Herzegovina, Angelucci et al. (2015) in Mexico, Attansio et al. (2013) in rural Mongolia, Crépon et al. (2014) in rural Morocco, Tarozzi et al. (2013) in Ethiopia, and Karlan & Zinnman (2017) in the Philippines.

factors that affect both treatment and control groups before and after treatment. Secondly, I conduct a treatment on the treated estimation by using the method proposed by Crepon et al. (2014) to evaluate the treatment effect on borrowers rather than on the treatment population as a whole. Finally, I discuss the drawbacks of my findings and discuss policy to improve MFI effectiveness in alleviating the poor.

II. Data Analysis

The data I use in my estimations is collected from a collaborative project between the Center for Microfinance at the Institute for Financial Management in Chennai and Spandana, made available by IFMR LEAD[7]. Besides feasibility constraints, I chose this dataset because it includes survey data spanning over the longest period of time in the studies I observed on microfinance and would thus allow me to conduct estimations in both the short and long run. Moreover, in terms of active borrowers, Andhra Pradesh, the state of Hyderabad, was known to have the highest growth in terms of the number of active borrowers and gross loan portfolio until the microfinance crisis of 2010, occurring after the survey period[8].

Spandana is one of the largest and fastest growing MFIs in the world in terms of reach[9]. As of March 2018, Spandana has a gross loan portfolio of 456 268 090 USD as well as 1.6 million borrowers for a total of 694 branches in 15 Indian States. Unlike other MFIs, Spandana has no requirements with regards to how loans are used in order to borrow, such as the projected return of investment, as long as it is paid back according to loan terms. Moreover, Spandana's main services consist in microlending and does not provide education on financial literacy or how to run a business. Finally, we must note that Spandana is a for-profit institution just like many other MFIs, but that all profits were reinvested during the period of the study.

In the context of the randomized study, the main product proposed by Spandana was a classic group loan targeted at women. In order to qualify for a group loan, individuals must be part of a self-formed lending group, comprised of 6-10 women. In addition, individuals must be aged 18-59, have lived in the area for at least one year, have proof of residency and identity, and 80% of the women forming a group must be property owners. Moreover, we must keep in mind that there was no rule in study against borrowing from other slums but was only observed by about 5% of households in control areas at the first endline[10].

[7] The data can be accessed on the IFMR website (https://ifmrlead.org), or Harvard Dataverse website (https://doi.org/10.7910/DVN/BQ7PFF)
[8] According to Banerjee et al. (2014).
[9] According to MIX Market, Spandana had 772,775, 972,212, and 2,432,000 active borrowers in 2005, 2007, and 2009 respectively.
[10] Defined as the share of control households with a Spandana loan.

The amount of the first loan is of 10,000 rupees (≈562 USD at the 2017 PPP-adjusted exchange rate[11]) for a 24% APR. If the loan is paid off in full and within the loan period of 50 weeks, then a loan can be renewed for a second cycle. Moreover, the total amount borrowed per cycle cannot exceed 20,000 rupees (≈1124 USD). Had there been less restrictions on borrowing and a lower interest rate, then we may have obtained different results, including a higher take-up rate of the treatment, which we also must keep in mind when evaluating them.

This dataset is constructed using data from a baseline survey from a sample of 1,200 households, as well as two follow-up endline surveys following up the same sample of around 6,600 household, conducted approximately 12-15 months and 3.5 years after the baseline survey respectively. The timeline of the experiment can be found in Figure 1[12]. In 2005, 52 of 104 neighborhoods in Hyderabad were randomly selected for the opening of a Spandana Branch, comprising the treatment group, while the rest were not (control group). The neighborhoods were selected based on limited microfinance presence (only around 1.1% of households were active borrowers between treatment and control groups as baseline[13]), as well as limited presence of migrant worker-households[14]. Moreover, the areas were chosen as neighborhoods where Spandana was interested in opening branches but also willing not to[15]. At the beginning of the study, many MFIs were present in several districts of Andhra Pradesh, but most were not yet present in Hyderabad, the State's capital.

CMF hired a market research company in order to conduct the survey in each of the sample areas. The baseline survey was conducted in 2005 in the following way: the field officers were asked to map each neighborhood and stop at every n^{th} house in order to select 20 households per area, but we are unsure if it was followed very rigorously. This method of sampling, as opposed to randomly choosing households from a list, was quickly chosen in order to meet tight time constraints and is a clear flaw within the study as pointed out by Banerjee et al. (2014). We must thus keep this in mind when considering the results of these estimations and in particular, that of my first analysis in which I use data from baseline.

Between April 2006 and 2007, Spandana began their operations in treatment areas. Then, after selecting a new sample of households in both of each treatment and control areas,

[11] According to the OECD website the PPP-adjusted exchange rate was 1 USD = 17.729 Rs. in 2017 (https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm), which I will be using throughout this paper to do currency conversions.
[12] The information collected on the experimental setup was collected from Banerjee et al. (2014).
[13] See table 1, appendix 2.
[14] According to Banerjee et al. (2014), there were originally 120 neighborhoods in the study, 16 of which were dropped due to high prevalence of migrant-workers.
[15] Which I assume is so that Spandana was willing to participate in the study by staying out of control neighborhoods.

the first endline survey was conducted between August 2007 and April 2008[16]. In May 2008, Spandana also moved into the control areas as did other MFIs in both treatment and control groups. The second endline survey was then conducted between November 2009 and June 2010 just before the start of the Andhra Pradesh microfinance crisis in October 2010. The study aimed to resurvey the same households as in the first endline for a re-contact rate of about 90%.

When choosing the endline sample, Banerjee et al. (2014) made the decision to oversample individuals who, according to the census before endline 1, had characteristics suggesting high likelihood of having borrowed from Spandana: those that had resided in the area for at least three years and contained at least one woman aged 18 to 55. This decision was made based on the low rates of MFI borrowing even in treatment areas revealed by the census in an attempt to increase the power of their estimations. To correct for this, I use propensity score weighting in my estimations as to weigh each observation such that the results better represent the population as a whole, as did Banerjee et al. (2014).

The baseline survey contained questions pertaining to household and neighborhood characteristics, lending, businesses, and consumption. Since this survey was conducted under tight time constraints, less questions were asked than at endline. The two endline surveys contained additional questions in these categories as well as those pertaining to income and indicators of social progress. Summary statistics for the main outcome variables and household characteristics at baseline and at endlines 1 and 2 can be found in tables 1A, 1B and 1C respectively[17].

The baseline sample is comprised of a total of 2,440 households across all areas, with half in each of treatment and control areas. The average household in control areas had 5 members (3.4 adults and 1.6 children), zero had loans from Spandana, a very small amount had loans from other MFIs (around 1.1% of surveyed households), and approximately two-thirds had a loan of any sort, all sources combined. Moreover, there were 0.32 businesses per household and total household consumption was of 4888.43 rupees per month (≈ 274.71 USD). With the exception of the number of children in the household (approximately 0.1 more children per household on average in treatment areas, difference relatively significant[18]), the share of households with a Spandana loan, (0.7 pp higher in treatment areas, difference very significant), the amount borrowed from Spandana (68.97 rupees$\approx$4 USD higher[19], relatively

[16] However, no treatment area was surveyed until at least one year had passed since the opening of the branch.
[17] See appendix 2
[18] Somewhat significant = significant at the 10% level, relatively significant= significant at the 5% level, Very significant= significant at the 1% level.
[19] In treatment areas compared to control areas.

significant), there were no significant differences in outcome and household averages with regards to treatment areas.

The first endline sample is comprised of a total of 6,863 households across all areas, with 3,264 in treatment areas and 3,5999 in control areas. The average household in control areas had around 5.9 members (4 adults and 1.8 children), 7.4% had a loan from Spandana, 19.2% had a loan from another MFI, and 84.6% had a loan of any sort, all sources combined. Moreover, there were 0.523 businesses per household and total expenditure was of 7396 rupees per month (≈417.17 USD) on average in control areas. With the exception of the share of households with a Spandana loan (11.3 pp higher, difference very significant), the amount borrowed from Spandana per household (1416 rupees≈80 USD higher, difference very significant), the share of households with a commercial bank loan (6.4 pp higher, difference very significant), the share of households with any kind of loan (1.7 pp lower, somewhat significant), and total expenditure on durable goods per month (67.45 rupees ≈ 3.8 USD, somewhat significant), there were no significant differences in outcome and household averages with regards to treatment areas.

The second endline sample follows up the first and has a follow-up rate of about 90%. The average household in control areas had 5.9 members (4 adults and 1.8 children), 7.7% had a loan from Spandana, 19.5% had a loan from another MFI, and 83.7% had any kind of loan, all sources combined. Moreover, there were 0.529 businesses and household consumption per month was of on average in control areas of 7646.43 rupees (≈431.3 USD). Besides the share of households with a Spandana loan (10.7 pp higher, difference very significant), the total number of businesses per household (3.8 pp higher, somewhat significant), total expenditure on non-durable goods (289 rupees ≈ 16.3 USD higher, relatively significant), and total overall expenditure (250 rupees ≈ 14.10 USD higher, somewhat significant), there were no significant differences in outcome and household averages with regards to treatment areas.

III. Method

In order to address multiple gaps in the current literature, I use two different models to address the question of the legitimate impact of microcredit access on poverty alleviation in this context. Firstly, in order to control for the effects of the overall growth of outcome variables affecting both treatment and control areas on my estimations, I firstly use a difference-in-difference approach on to obtain ITT estimates. I do this analysis for the treatment on my outcome variables between both baseline and the first endline as well as baseline and the second endline, performing the analysis twice. Secondly, I use the assignment to a treatment area as an

instrument for taking up a Spandana loan in an instrumental variable approach to obtain TOT estimates or the treatment effect isolated to Spandana borrowers.

In my first analysis, I have outcome variables on borrowing, businesses, and consumption[20]. With regards to lending, my outcome variables are comprised of dummy variables for being a borrower from each of Spandana, another MFI, a commercial bank, an informal source, and from any source as well as the amount currently being borrowed for each type of loan. Secondly with regards to businesses, I have as outcome variables for the entire sample the number of businesses per household and the number of female-managed businesses per household, and for businesses, total revenue, expenditure, profits, and investment per month as well as the number of employees and number of hours worked by the household members in the family business. Finally, with regards to consumption, I have as outcome variables total expenditure, expenditure on non-durable goods, expenditure on durable goods per month, as well as a home durable index[21]. As for control variables, following Banerjee et al. (2014), I include total area population debt, number of businesses, expenditure per capita, and literacy rate at baseline.

In my second analysis, I have outcome variables on businesses, income, labor supply, consumption, and social progress. For business outcomes, I have the total amount of business assets, the monthly amount of investment, revenue, expenses, and profit, number of employees, and for the entire sample the share of households with at least one business, the share of households with a new business, the number of new businesses, the share of households that had to shut down a business during the study, the total number of female-managed businesses, as well as a business index. Secondly, for outcomes on income, I have monthly total income, self-employment income, labor income, and an income index. Thirdly, for labor supply outcomes, I have the number of hours worked per week in total as well as the number of these hours worked both inside the household business and for a wage for the entire household, teenagers, and the household head and spouse, as well as a labor index. Next, with regards to consumption, my outcome variables are comprised of expenditure per capita per month in total, on durable goods, non-durable goods, food, healthcare, education, temptation goods, and festivals, and a consumption index. Finally, I include social outcomes, including: the share of both female and male children in school, the number of hours worked in the past week for both female and male children, the women's empowerment index, the share of female-managed businesses, and a social index. As for control variables, since we are estimating results at the borrower level, I also include individual control variables, contrary to Banerjee et al. (2014):

[20] The definitions of my outcome variables with respects to survey questions, as reported by Banerjee et al. (2014), can be found in appendix 1.
[21] Index variable definitions can be found in appendix 2 under the tables in which they are found.

the day, month, and year of the survey visit, adjusted household size, the number of adults and children, whether the head of household is male or not, the age of the head of household, the number of prime-aged women in the household (18-45), whether the spouse of the head of household is literate, whether the spouse works for a wage, whether the household owns land in the city or Hyderabad, and whether the household owns land in a village.

IV. Models

A) Model 1: Intent to Treat Estimation

For my first analysis, I take the following equation:

$$Y_{ia} = \beta_0 + \beta_1 Treat_{ia} + \beta_2 D_{Year} + \beta_3 Treat_{ia}\, D_{Year} + B_4\, X'_a + e_{ia}$$

This model identifies the treatment effect β_3 on the evolution of a dependent variable, Y_{ia}, between the baseline survey and either the first or second endline survey, indicated by year, for household *i* living in area a. My exogeneous variables include $Treat_{ia}$, a dummy variable equal to 1 if the household lives in a treatment area and 0 otherwise, D_{Year}, a dummy variable equal to 1 if the observation took place in one of the endline surveys and zero otherwise, and $Treat_{ia} \times D_{Year}$, an interaction term equal to 1 if both D_{Year} and $Treat_{ia}$ are equal to 1 and zero otherwise. Here, I use 2005, 2007, and 2009 to indicate the years of the baseline and first and second endline surveys respectively since these indicate the starting year of each survey period. Finally, X'_a is a vector of area-level control variables described in the previous section.

B) Model 2: Treatment on the Treated Estimation

For my second analysis, I take the following equations to conduct an instrumental approach using two-stage least squares:

$$H_{ia} = \alpha_0 + \alpha_1 Borrow_{ia} + \alpha_2 G'_{ia} + u_{ia} \quad (1)$$

$$Borrow_{ia} = \pi_0 + \pi_1 Treat_{ia} + \pi_2 G'_{ia} + v_{ia} \quad (2)$$

I then take the estimated value of (2)

$$\widehat{Borrow}_{ia} = \widehat{\pi_0} + \widehat{\pi_1} Treat_{ia} + \widehat{\pi_2} G'_{ia} \quad (3)$$

I then replace (2) by (3) in (1)

$$H_{ia} = \gamma_0 + \gamma_1 \widehat{Borrow}_{ia} + \gamma_2 G'_{ia} + \varepsilon_{ia} \quad (4)$$

I now estimate (4) using OLS.

I use this model to estimate the treatment effect γ_1 of taking up a microloan, represented by $Borrow_{ia}$, a dummy variable equal to 1 if the household takes out a loan from Spandana and 0 otherwise, on a dependent variable H_{ia} for household *i* living in zone *a.* The instrument I use, $Treat_{ia}$, is a dummy variable equal to 1 if the household lives in a treatment area and 0 otherwise. The term G'_{ia} represents a vector of individual and area-level control variables described in the previous section.

V. Results

A) Intent to Treat Estimates

1. Borrowing

Firstly, I evaluate the impact of MFI branch access the evolution of borrowing outcome variables from baseline to endlines 1 and 2, the estimations of which can be found in tables 2A1 and 2A2 respectively. Between baseline and endline 1, we observe a positive and highly significant treatment effect on the likelihood of borrowing from both Spandana and a commercial bank, as well as the amount borrowed from Spandana. Moreover, we observe a negative and relatively significant treatment effect on the likelihood of a household to be a borrower of an MFI other than Spandana. Between baseline and endline 2, we continue to observe a positive and very significant treatment effect on the likelihood of borrowing from both Spandana and a commercial bank, as well as the amount borrowed from Spandana. Moreover, we continue to observe a negative treatment effect on the likelihood of borrowing from another MFI that has now become very significant. Other than these results, there are no significant treatment effects on borrowing, which does not seem surprising. However, the treatment effect with regards to bank lending is worth taking note of, as it may suggest that households are borrowing to repay other loans.

2. Businesses

Secondly, I evaluate the impact of MFI branch access on the evolution of business outcome variables between from baseline to endlines 1 and 2, the estimations for which can be found in tables 2B1 and 2B2 respectively. Between baseline and endline 1, we observe a relatively significant negative treatment effect on the number of business employees. Besides this, as for all the outcome variables in endline 2, we do not observe any other treatment effects, as opposed to Banerjee et al. (2014). Indeed, we observe overall highly significant increases in most of the outcome variables between baseline and endlines 1 and 2, which may suggest that much of the power of their estimations may be attributed to high overall growth of the outcome variables during the period of the study.

3. Consumption

Thirdly, I evaluate the impact of MFI branch access on the evolution of outcome variables on consumption between baseline and endlines 1 and 2, the estimations of which can be found in tables 2C1 and 2C2 respectively. We do not notice any treatment effects on these variables at endline 1. At endline 2, we observe a relatively significant and negative impact on both overall consumption as well as that of non-durable goods. These results prove contrary to Banerjee at al. (2014), who find positive and significant treatment effect on durable goods at endline 1. Furthermore, we observe the same highly significant overall increases in all of the outcome variables at endline 1, which just as for the business outcomes may capture the power of the estimations found in the literature.

B) Treatment on the Treated Estimates

1. Businesses

Firstly, I evaluate the impact of borrowing from Spandana on business outcomes, everything else held constant, at both the first and second endlines. The results of these estimations can be found in tables 3A1 and 3A3 for endline 1 and 3A2 and 3A4 for endline 2. At endline 1, we find a highly significant positive treatment effect on the total number of female-managed businesses as well as on the business index, as well as a relatively significant one on business assets, the total number of businesses, and the total number of new businesses and a somewhat significant one on monthly business investment. At endline 2, we find a positive and highly significant treatment effect on business assets and the total number of businesses and relatively significant one on monthly profits and the likelihood of owning a business. The results suggest that borrowers may make most of their business investments when they first gain access to credit, which eventually pays off in the form of increased business assets and profits. We may also wonder if investment in more efficient technology is the cause of significantly higher profits amongst borrowers.

2. Income

Secondly, I evaluate the impact of borrowing from Spandana on household income, everything else held constant, at both the first and second endlines. The results of these estimations can be found in tables 3B1 and 3B2. At endline 1, we observe a highly significant negative impact of borrowing from Spandana on labor income as well as the income index, but no significant impact on overall income. At endline 2, we observe a relatively significant positive effect of borrowing from Spandana on self-employment income (business profits).

These results may suggest that although we notice a short-run decrease in labor income and a long-run increase in self-employment income amongst borrowers, overall income seems to be unaffected by borrowing from Spandana.

3. Labor Supply

Thirdly, I evaluate the impact of borrowing from Spandana, everything else held constant, on household labor supply at both first and second endlines. The results of these estimations can be found in tables 3C1 and 3C2 respectively. We observe at endline 1 that borrowing from Spandana has a highly significant and positive effect on the number of hours worked in total as well as that in the household business for household heads and their spouses. Moreover, we observe a relatively positive treatment effect on the number of hours worked in per week in total for adults and teens as well as a negative one on those hours worked outside the household business. Furthermore, we observe a somewhat significant negative treatment effect on hours worked outside the home for adults and teens. At endline 2, the only effects of borrowing on labor supply seem to be a relatively significant negative impact on in weekly hours worked outside the home per month as well as a somewhat significant positive on the weekly hours worked in the household business for the household head and spouse. These results suggest that being a Spandana borrower induces a trade-off of hours worked for a wage for an increase in hours worked for one's own business.

4. Consumption

Now, I estimate the impact of borrowing from Spandana, everything else held constant. on outcome variables for consumption at endlines 1 and 2. The results for these estimations can be found in tables 3D1 and 3D2 respectively. At endline 1, we notice that borrowing from Spandana induces a very significant decrease in monthy festival expenditure per capita and a relatively significant one on monthly consumption of temptation goods par capita. Moreover, we observe a relatively significant positive effect of treatment on the monthly consumption of durables per capita. At endline 2, we observe that borrowing from Spandana induces a relatively significant negative impact on monthly expenditure on healthcare and temptation goods per capita as well as a somewhat significant negative one on monthly total expenditure and expenditure on nondurables. However, we observe a somewhat significant impact of borrowing from Spandana on monthly festival expenditure per capita. We may take note that these results strongly echo those of Banjeree et al. (2014).

5. Social Progress

Finally, I evaluate the impact of borrowing from Spandana, everything else held constant, on social outcome variables at endlines 1 and 2. The results of these estimations can be found in tables 3E1 and 3E2 for endlines 1 and 2 respectively. At endline 2, borrowing from Spandana had a very significant negative impact on the share of teen girls in school and a somewhat significant positive impact on the woman's empowerment index. At endline 2, borrowing from Spandana had a relatively negative impact on the percentage of woman-managed businesses. These results are is surprising in the sense that increased financial access would not be expected to be detrimental to social progress.

VI. Conclusion

To conclude, based on these results, microfinance seems to have even less of an impact on objective measures of poverty at the aggregate level than what was initially thought in the literature and a limited impact at the borrower level. Once we control for growth in outcome variables observed between baseline and endline across both treatment and control areas, the few significant point estimates of Banerjee et al. (2014) become insignificant, and in particular regarding a temporary increase in the consumption of durable goods as well as investment in businesses. Indeed, we observe that much of the power of the estimations of the treatment effect can be attributed to high and very significant growth in most of our outcome variable averages between baseline and endline. At the borrower-level, although we observe a significant temporary change in consumption structure and increase in business investment, as well as a long-run significant positive impact on business profits from borrowing, we do not observe any significant change in overall income. In addition, in the long-run, overall consumption and most notably that of healthcare and education are shown to be significantly lower through borrowing from Spandana. Moreover, the effects borrowing on social outcomes seem to be limited if not detrimental to social progress. Thus, these results strongly echo those of Banerjee et al. (2014) at the aggregate level.

In this case, the hypothesis of a low take-up rate as an explanation for the limited impact of MFI access on poverty evoked in the literature and most notably in Crépon et al. (2014) does not seem to hold. Thus, as the results to not to seem any brighter at the borrow-level than at the aggregate level in terms of MFI effectiveness in poverty alleviation, this suggests that we should focus on changing how MFIs work first rather than increasing their reach. Indeed, many critics of MFIs condemn their high interest rates and their motives to maximize profits at all costs rather than actually helping the poor.

However, we should also consider that outside of objective economic indicators, the simple increase in consumption choices may induce welfare increases for poor households in a subjective sense according the population's preferences. Indeed, we observe in the case of the second model that with the easing of credit constraints, individuals temporarily change the structure of their consumption by purchasing more durable goods and less temptation goods. This may suggest a low discount factor on average thus leaving room for individual welfare increases with the introduction of MFIs.

VII. Discussion

Despite the contribution of this study to the current literature, there are several drawbacks to take into account when considering its results. In addition to considering these, I discuss some possibilities for future research on the subject of impact of microfinance on poverty. Finally, I briefly compare Spandana to MFIs present in developed countries and discuss policy on how to improve their effectiveness.

To start off, the main drawbacks to this study are linked to sampling methods and availability of data. The baseline sample is significantly smaller (by over 4,000 observations) and is different from that of the two endlines, which overlap. Moreover, due to tight time constraints, there were fewer questions within the baseline survey than in the endline survey we are uncertain that the sampling procedure was followed very rigorously as baseline[22]. Therefore, we are unsure how representative the baseline sample is of the population, which should be considered when considering the results obtained from my first analysis. Thus, a consideration for further research on the subject of this study would be to take a larger and completely random sample of households at each wave before and after the treatment to create a repeated cross-section and perform an estimation using the same difference-in-difference approach as to test these findings. An alternative to this would be to survey the same random sample of households before and after treatment to conduct a panel data study and notably using a fixed-effects model to remove the effects of some unobservable characteristics not easily identified in the data.

Furthermore, for my second model, suggested by Crépon et al. (2014), I use the random assignment of an individual to a treatment area as an instrument for borrowing. Conditional on the assignment to a treatment area, within the area, individuals can still decide to be treated or not. Therefore, including additional instruments could improve the robustness of the estimations in the second model. However, this seems to be the only contender for an

[22] According to Banerjee et al. (2014).

exogeneous instrument within the available data and is perhaps why it was specifically suggested in the literature. Moreover, at the time of the second endline, Spandana had started also moving into control areas and as we are evaluating the impact of borrowing from Spandana on borrowers for our outcome variables with regards to non-borrowers, we are unsure of the number of loan cycles obtained by each borrower. Thus, in a further study, I would suggest securing data on the number of loan cycles per MFI as to control for the amount of time households borrow on the impact of the treatment as well as attempt to prevent the treatment from spreading to the control group.

Thirdly, the nature of the main Spandana product, with strict requirements such as being female as well as part of a lending group as well and featuring a 24% APR, may give us different results than if the borrowing requirements were more lenient and interest rates lower. In this experiment, had we allowed more individuals, men, non-property owners, and migrants to take out loans, then we may have observed a larger and more significant treatment effect. Therefore, although these results seem disappointing, there may be cases in which MFIs are effective at alleviating poverty in developing countries that we have yet to observe.

Finally, a possible extension that has not yet been widely explored in the literature would be to evaluate the impact of microfinance on poverty in developed countries as to compare these results to those in the case of developing countries. For example, in France, where MFIs are known to have some of the highest levels of economic and social efficiency in the world[23], interest rates are low and (around 3% on average) and rely highly on government subsidies to remain sustainable. Considering the results of this study, we may wonder if the high interest rates imposed by Spandana, as many MFIs in developing countries, could be a potential explanation for their failure to objectively alleviate the poor.

Moreover, in developing countries, microfinance is not necessarily used for the same purposes. Continuing with the example of France, microloans are not only used to build small businesses but also to improve professional situations[24].We thus notice clear structural differences between developed and developing countries that could also potentially impact the effectiveness as well as the efficiency of MFIs that can not necessarily be influenced at internal MFI level.

Finally, analogous to questioning the measures we use to describe well-being, we may also consider the impact of increased financial inclusion brought about by MFI access on economic development as a whole. Amartya Sen, in *Development as Freedom* (2001) states that

[23] According to the European Microfinance Network survey in 2016 (Convergences International, 2018).
[24] For example, getting professional training or getting a driver's license for poor individuals in rural areas with limited access to transportation.

individual agency goes hand in hand with economic development. Out of the freedoms the author states in their work, financial inclusion and access to credit comprise one of them. However, Sen adds that if you are missing one freedom, which include political freedoms, transparency between people as well as protection from abject poverty, then true development cannot be achieved. Indeed, developing countries are often characterized by corruption and lack of social security[25].

Following Sen's thesis and based on these facts, although microfinance increases the choice set of individuals with regards to consumption, the effects of MFI presence could be limited due to the lack of other freedoms in the context of developing countries. Thus, this could be a potential explanation of the results obtained here as well as those of the literature. Indeed, we perhaps should not view the effects of microloan accessibility as a finality in itself but as a piece of a puzzle amongst many others that work to achieve economic development and together could intrinsically abolish global poverty.

[25] See current Corruption Perceptions Index and Human Development Index.

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Appendix 1: Variable Definitions[26]

1. Business Variables

Business: The survey defined a business as follows: "each business consists of an activity you conduct to earn money, where you are not someone's employee. Include only those household businesses for which you are either the sole owner or for which you have the main responsibility. Include outside business for which you are the person in the household with the most responsibility." Households who indicated that they owned a business were asked to answer a questionnaire about each business. The person in the household with the most responsibility for the business answered the questions about that business.

Female-run business: A business is classified as owned by a woman if the first person named in response to the question "Who is the owner of this business?" is female.

New business: A new business is one started in the year prior to the survey.

Old business: An old business is one started more than a year prior to the survey.

Business characteristics: All business characteristic variables reported in the paper (with the exception of industries in Table A4) are at the household level, i.e. if a household owns multiple businesses, the values for each business are summed to calculate a household-level total.

Business revenues: Respondents were asked: "For each item you sold last month, how much of the item did you sell in the last month, and how much did you get for them?" The respondent was asked to list inputs one by one. They were also asked for an estimate of the total revenues for the business. If the itemized total and the overall total did not agree, respondents were asked to go over the revenues again and make and changes, and/or change the estimate of the total revenues for the business last month.

Business inputs: Respondents were asked: "How much did you pay for inputs (excluding electricity, water, taxes) in the last day/week/month, e.g. clothes, hair, dosa batter, trash, petrol/diesel etc.? Include both what was bought this month and what may have been bought at another time but was used this month. List all inputs and then list total amount paid for each input. Do not include what was purchased but not used (and is therefore stock), i.e. if you purchased five saris this month but sold only four, then we need to record the purchase price of four saris, not five." The respondent could give a daily, weekly, or monthly number. All responses were then converted to monthly. The respondent was asked to list inputs one by one. They were also asked for an estimate of the total cost of inputs for the business. If the itemized

[26] All as described by Banerjee et al (2014). The survey instruments can be found on the Harvard Dataverse Website (https://doi.org/10.7910/DVN/BQ7PFF).

total and the overall total did not agree, they were asked to go over the inputs again and make and changes, and/or change the estimate of the total cost of inputs for the business last day/week/month. Respondents were asked about electricity, water, rent and informal payments. If they had not included them previously, these costs were added.

Business profits: Computed as monthly business revenues less monthly business input costs.

Employees: Respondents were asked: "How many employees does the business have? (Employees are individuals who earn a wage for working for you. Do not include household members)."

Outside activities work hours: Respondents were asked, for each working household member: "What is the nature of his/her work?" and "How much time in the previous week did he / she spend working in this job?" Outside activities work hours are calculated by summing work hours in all jobs classified as "Work for a wage," "Casual labor" or "other" across all working household members.

Self-employment work hours: Respondents were asked, for each working household member: "What is the nature of his/her work?" and "How much time in the previous week did he / she spend working in this job?" Household self-employment hours are calculated by summing work hours in all jobs classified as "Own business / HH business / self-employed" across all working household members.

2. Expenditure

Expenditure comes from the household survey, which was answered by the person "who (among the women in the 18-55 age group) knows the most about the household finances." Respondents were asked about "expenditures that you had last month for your household (do not include business expenditures)" in categories of food (cereals, pulses, oil, spices, etc.), fuel, and 16 categories of miscellaneous goods and services. They were asked annual expenditure for school books and other educational articles (including uniforms); hospital and nursing home expenses; clothing (including festival clothes, winter clothes, etc.) and gifts; and footwear.

Per capita expenditure is total expenditure per adult equivalent. Following the conversion to adult equivalents used by Townsend (1994) for rural Andhra Pradesh and Maharashtra, the weights are: for adult males, 1.0; for adult females, 0.9. For males and females aged 13-18, 0.94, and 0.83, respectively; for children aged 7-12, 0.67 regardless of gender; for children 4-6, 0.52; for toddlers 1-3, 0.32; and for infants 0.05. Using a weighting that accounts for within-household economies of scale, or total household members (not adult equivalents) does not affect the results (available on request).

Expenditure (monthly): Sum of monthly spending on all goods where monthly spending was recorded, and 1/12 of the sum of annual spending on all goods where annual spending was recorded.

Non-durable expenditure (monthly): Total monthly expenditure minus spending on assets (see below).

"Temptation goods" (monthly): Sum of monthly spending on meals or snacks consumed outside the home; paan/betel leaves, tobacco and intoxicants; and lottery tickets/gambling.

3. Assets

Assets information comes from the household survey, which was answered by the person "who (among the women in the 18-55 age group) knows the most about the household finances." Respondents were asked about 40 types of assets (TV, cell phone, clock/watch, bicycle, etc.): if the household owned any, how many; if any had been sold in the past year (for how much); if any had been bought in the past year (for how much); and if the asset was used in a household business (even if it was also used for household use).

Assets expenditure (monthly): Total of all spending in the past year on assets, divided by 12.

Business assets expenditure (monthly): Total of all spending in the past year on assets which are used in a business (even if also used for household use), divided by 12.

Appendix 2: Tables

Table 1A: Summary Statistics of Household Characteristics and Dependent Variables at Baseline

	Control Areas			*Treatment Areas*			*Control-Treatment*	
Variables	***Obs***	***Mean***	***SD***	***Obs***	***Mean***	***SD***	***Diff.***	***p-value***
Household characteristics								
# of members	1,220	5.038	(1.666)	1,220	5.133	(1.785)	-0.095	0.174
# of adults (16 or above)	1,220	3.439	(1.466)	1,220	3.427	(1.52)	0.011	0.850
# of children (below 16)	1,220	1.599	(1.228)	1,220	1.703	(1.242)	-0.104	0.038
Head is male	1,216	0.907	(0.290)	1,217	0.895	(0.307)	0.012	0.312
Age of head	1,216	41.150	(10.839)	1,215	40.906	(10.890)	0.243	0.581
Education of head=0	1,216	0.370	(0.483)	1,217	0.362	(0.481)	0.008	0.694
Lending								
Has loan from Spandan	1,220	0	(0)	1,220	0.007	(0.081)	-0.007	0.005
Has loan from another MFI	1,220	0.011	(0.103)	1,220	0.017	(0.130)	-0.007	0.167
Has loan form commercial bank	1,220	0.036	(0.187)	1,220	0.038	(0.191)	-0.002	0.830
Has loan from informal source	1,220	0.629	(0.483)	1,220	0.633	(0.482)	-0.004	0.834
Has any kind of loan	1,220	0.676	(0.468)	1,220	0.681	(0.466)	-0.005	0.795
Spandana loan amount (Rs.)	1,213	0	(0)	1,218	68.966	(1032.83)	-68.966	0.020
Other MFI loan amount (Rs.)	1,213	201.154	(2742.364)	1,218	371.511	(6146.87)	-170.357	0.378
Commerical bank loan amount (Rs.)	1,213	7438.170	(173268.3)	1,218	2018.473	(19434.3)	5419.697	0.278
Informal loan amount (Rs.)	1,213	28460.020	(65312.16)	1,218	27889.560	(65814.3)	570.460	0.830
Any loan amount (Rs.)	1,213	37892.000	(191291.6)	1,218	32013.450	(73222.3)	5878.555	0.317
Self-employement								
# of businesses	1,220	0.320	(0.682)	1,220	0.301	(0.623)	0.019	0.476
# of Female managed businesses	1,220	0.145	(0.4)	1,220	0.139	(0.392)	0.007	0.683
% of female-managed businesses	295	0.488	(0.482)	284	0.483	(0.479)	0.006	0.889
Businesses (all households)								
Business rev./mo (Rs.)	1,220	3866.590	(27146.79)	1,220	4770.239	(30046.9)	-903.649	0.436
Business exp./mo (Rs.)	1,220	874.703	(12932.56)	1,220	991.199	(9025.095)	-116.496	0.796
Business profit/mo (Rs.)	1,220	781.679	(12996.91)	1,220	898.273	(8649.073)	-116.595	0.794
Business inv./mo (Rs.)	1,220	93.025	(1559.052)	1,220	92.926	(1333.801)	0.098	0.999
# of business employees	1,220	0.041	(0.413)	1,220	0.098	(1.196)	-0.057	0.113
# of hours worked in business/week	1,220	18.453	(46.054)	1,220	16.639	(39.16)	1.815	0.295
Businesses								
Business rev./mo (Rs.)	295	15990.640	(53488.75)	284	20491.870	(59711.8)	-4501.229	0.339
Business exp./mo (Rs.)	295	3617.416	(26144.04)	284	4257.969	(18354.58)	-640.553	0.734
Business profit/mo (Rs.)	295	3232.704	(26314.15)	284	3858.779	(17628.35)	-626.074	0.738
Business inv./mo (Rs.)	295	384.712	(3156.815)	284	399.190	(2745.964)	-14.478	0.953
# of business employees	295	0.169	(0.828)	284	0.423	(2.455)	-0.253	0.095
# of hours worked in business/week	295	76.315	(66.054)	284	71.475	(51.691)	4.840	0.328
Consumption								
Total exp./mo(Rs.)	1,220	4888.431	(4074.372)	1,220	5158.114	(4605.977)	-269.683	0.126
Total exp. on non-durables/mo (Rs.)	1,220	4734.685	(3839.803)	1,220	4986.505	(4381.834)	-251.819	0.131
Total exp. on durables/mo (Rs.)	1,220	153.746	(584.594)	1,220	171.609	(556.234)	-17.863	0.440
Home durable index	1,220	1.941	(0.829)	1,220	1.968	(0.849)	-0.027	0.428

Table 1B: Summary Statistics of Household Characteristics and Dependent Variables at Endline 1

	Control Areas			***Treatment Areas***			***Control-Treatment***	
Variables	***Obs***	***Mean***	***SD***	***Obs***	***Mean***	***SD***	***Diff.***	***p-value***
Household characteristics								
# of members	3,101	5.936	(2.343)	3,398	5.894	(2.382)	0.042	0.473
# of adults (16 or above)	3,101	3.955	(1.82)	3,398	3.955	(1.790)	0.000	0.998
# of children (below 16)	3,101	1.755	(1.299)	3,398	1.733	(1.33)	0.022	0.492
Head is male	3,098	0.853	(0.354)	3,391	0.869	(0.338)	-0.016	0.069
Age of head	3,096	41.700	(10.084)	3,390	41.490	(10.338)	0.211	0.407
Education of head=0	3,095	0.305	(0.461)	3,389	0.296	(0.456)	0.010	0.396
Lending								
Has loan from Spandan	3,264	0.074	(0.262)	3,599	0.187	(0.39)	-0.113	0.000
Has loan from another MFI	3,264	0.192	(0.394)	3,599	0.178	(0.382)	0.015	0.113
Has loan form commercial bank	3,264	0.239	(0.426)	3,599	0.303	(0.46)	-0.064	0.000
Has loan from informal source	3,264	0.073	(0.260)	3,599	0.074	(0.262)	-0.001	0.837
Has any kind of loan	3,264	0.846	(0.361)	3,599	0.829	(0.377)	0.017	0.056
Spandana loan amount (Rs.)	3,094	1033.950	(4439.514)	3,380	2450.868	(5799.17)	-1416.918	0.000
Other MFI loan amount (Rs.)	3,070	3355.156	(9239.806)	3,353	3234.406	(10166.19)	120.750	0.620
Commerical bank loan amount (Rs.)	3,094	8539.822	(104370.6)	3,380	7158.963	(49254.83)	1380.859	0.490
Informal loan amount (Rs.)	3,094	37172.410	(77074.27)	3,380	36035.330	(80112.11)	1137.080	0.561
Any loan amount (Rs.)	3,101	75114.840	(156270.2)	3,398	78864.470	(188546.5)	-3749.630	0.385
Self-employement								
# of businesses	3,084	0.532	(0.806)	3,386	0.556	(0.818)	-0.024	0.236
# of Female managed businesses	3,066	0.215	(0.505)	3,375	0.214	(0.516)	0.001	0.957
% of female-managed businesses	1,168	0.401	(0.454)	1,344	0.376	(0.453)	0.026	0.154
Businesses (all households)								
Business rev./mo (Rs.)	3,264	5521.742	(33331.5)	3,599	5646.337	(26985.93)	-124.595	0.864
Business exp./mo (Rs.)	3,264	4824.494	(32220.71)	3,599	4370.603	(23733.59)	453.891	0.504
Business profit/mo (Rs.)	3,264	4276.008	(32422.27)	3,599	3611.911	(24612.58)	664.096	0.337
Business inv./mo (Rs.)	3,264	570.601	(6015.128)	3,599	776.806	(8310.595)	-206.205	0.243
# of business employees	3,264	0.182	(1.424)	3,599	0.146	(0.975)	0.036	0.213
# of hours worked in business/week	3,264	33.387	(59.262)	3,599	35.802	(60.063)	-2.416	0.094
Businesses								
Business rev./mo (Rs.)	1,366	13193.970	(50541.98)	1,568	12959.930	(39714.91)	234.044	0.889
Business exp./mo (Rs.)	1,366	11527.930	(49034.66)	1,568	10031.760	(35164.34)	1496.166	0.338
Business profit/mo (Rs.)	1,366	10233.690	(49515.18)	1,568	8369.993	(36736.16)	1863.700	0.243
Business inv./mo (Rs.)	1,366	1347.076	(9241.954)	1,568	1703.346	(12482.62)	-356.270	0.386
# of business employees	1,366	0.435	(2.177)	1,568	0.334	(1.456)	0.101	0.137
# of hours worked in business/week	1,366	79.776	(68.497)	1,568	82.176	(66.859)	-2.400	0.338
Consumption								
Total exp./mo(Rs.)	3,091	7396.700	(5585.67)	3,389	7591.969	(5724.699)	-195.270	0.165
Total exp. on non-durables/mo (Rs.)	3,083	6782.072	(4940.287)	3,373	6923.988	(5110.36)	-141.916	0.258
Total exp. on durables/mo (Rs.)	3,082	616.405	(1451.873)	3,373	683.857	(1793.37)	-67.452	0.099
Home durable index	3,095	2.514	(0.856)	3,393	2.511	(0.868)	0.003	0.906

Table 1C: Summary Statistics of Household Characteristics and Dependent Variables at Endline 2

	Control Areas			*Treatment Areas*			*Control-Treatment*	
Variables	***Obs***	***Mean***	***SD***	***Obs***	***Mean***	***SD***	***Diff.***	***p-value***
Household characteristics								
# of members	3,106	5.946	(2.393)	3,399	5.932	(2.377)	0.013	0.823
# of adults (16 or above)	3,106	3.963	(1.782)	3,399	3.957	(1.795)	0.006	0.894
# of children (below 16)	3,106	1.745	(1.331)	3,399	1.738	(1.323)	0.007	0.828
Head is male	3,101	0.857	(0.350)	3,392	0.861	(0.346)	-0.004	0.641
Age of head	3,101	41.650	(10.323)	3,384	41.499	(10.329)	0.151	0.556
Education of head=0	3,101	0.299	(0.458)	3,385	0.297	(0.457)	0.002	0.878
Lending								
Has loan from Spandan	3,264	0.077	(0.266)	3,599	0.184	(0.388)	-0.107	0.000
Has loan from another MFI	3,264	0.195	(0.396)	3,599	0.167	(0.373)	0.028	0.003
Has loan form commercial bank	3,264	0.242	(0.428)	3,599	0.292	(0.455)	-0.050	0.000
Has loan from informal source	3,264	0.072	(0.259)	3,599	0.075	(0.264)	-0.003	0.601
Has any kind of loan	3,264	0.837	(0.370)	3,599	0.825	(0.38)	0.011	0.206
Spandana loan amount (Rs.)	3,096	1082.516	(4431.926)	3,383	2516.630	(6918.021)	-1434.114	0.000
Other MFI loan amount (Rs.)	3,073	3101.840	(8119.166)	3,354	3028.661	(8608.746)	73.178	0.727
Commercial bank loan amount (Rs.)	3,096	6122.668	(39489.31)	3,383	7380.372	(49130.67)	-1257.704	0.259
Informal loan amount (Rs.)	3,096	36655.080	(77972.73)	3,383	37366.110	(98029.96)	-711.030	0.748
Any loan amount (Rs.)	3,106	71866.340	(120959)	3,399	76558.780	(175953.7)	-4692.442	0.214
Self-employement								
# of businesses	3,095	0.529	(0.840)	3,387	0.567	(0.845)	-0.038	0.068
# of Female managed businesses	3,086	0.203	(0.502)	3,377	0.214	(0.521)	-0.011	0.379
% of female-managed businesses	1,166	0.378	(0.452)	1,333	0.364	(0.443)	0.014	0.427
Businesses (all households)								
Business rev./mo (Rs.)	3,264	4406.315	(14197.77)	3,599	5072.139	(21874.84)	-665.824	0.139
Business exp./mo (Rs.)	3,264	3812.899	(15741.88)	3,599	3904.751	(19115.64)	-91.852	0.829
Business profit/mo (Rs.)	3,264	3216.949	(17049.51)	3,599	3234.020	(20543.75)	-17.070	0.970
Business inv./mo (Rs.)	3,264	614.886	(7983.29)	3,599	687.206	(8828.596)	-72.319	0.723
# of business employees	3,264	0.159	(1.499)	3,599	0.141	(0.973)	0.018	0.548
# of hours worked in business/week	3,264	33.781	(59.826)	3,599	35.318	(59.454)	-1.537	0.286
Businesses								
Business rev./mo (Rs.)	1,344	10701.050	(20551.08)	1,555	11739.310	(32087.07)	-1038.200	0.308
Business exp./mo (Rs.)	1,344	9259.898	(23486.24)	1,555	9037.428	(28277.51)	222.470	0.819
Business profit/mo (Rs.)	1,344	7881.280	(25799.16)	1,555	7505.656	(30740.29)	375.624	0.724
Business inv./mo (Rs.)	1,344	1424.606	(12250.78)	1,555	1569.900	(13380.49)	-145.294	0.762
# of business employees	1,344	0.387	(2.318)	1,555	0.327	(1.46)	0.060	0.397
# of hours worked in business/week	1,344	82.039	(68.804)	1,555	81.741	(66.234)	0.298	0.906
Consumption								
Total exp./mo(Rs.)	3,100	7646.428	(6137.901)	3,389	7396.250	(5711.516)	250.178	0.089
Total exp. on non-durables/mo (Rs.)	3,090	6996.275	(5333.563)	3,377	6706.519	(4778.456)	289.757	0.021
Total exp. on durables/mo (Rs.)	3,089	646.319	(1707.097)	3,377	701.840	(2352.395)	-55.521	0.281
Home durable index	3,102	2.505	(0.86)	3,393	2.507	(0.859)	-0.002	0.922

Table 2A1: Effects of Spandana Access on the Evolution of Lending Before and After Treatment (EL1)

Variables	*(1)* *Has loan from Spandana*	*(2)* *Has loan from other MFI*	*(3)* *Has loan from commercial bank*	*(4)* *Has loan from informal source*	*(5)* *Has any loan*	*(6)* *Amount borrowed from Spandana*	*(7)* *Amount borrowed from another MFI*	*(8)* *Amount borrowed from a commercial bank*	*(9)* *Amount borrowed from an informal course*	*(10)* *Amount borrowed in total*
Treatment	0.0112***	0.00966*	0.00580	0.00919	0.0139	131.4***	256.4	-4258.9	-557.0	-4354.5
	(0.00275)	(0.00494)	(0.00777)	(0.0195)	(0.0188)	(36.60)	(209.2)	(3606.6)	(2664.9)	(4630.5)
Year=2007	0.0731***	0.177***	0.198***	-0.559***	0.162***	1008.5***	3022.9***	2157.0	9192.5***	38429.5***
	(0.00474)	(0.00760)	(0.00927)	(0.0146)	(0.0148)	(80.27)	(190.6)	(5338.1)	(2366.4)	(6175.1)
Treatment Effect	0.105***	-0.0215**	0.0616***	-0.00348	-0.0241	1343.7***	-290.9	3640.9	-789.8	9105.6
	(0.00835)	(0.0105)	(0.0132)	(0.0205)	(0.0207)	(133.2)	(313.3)	(5219.7)	(3283.7)	(7110.4)
Constant	0.0469	0.138***	0.138***	0.696***	0.944***	1048.8*	2698.2***	-32197.8**	23945.6***	1785.0
	(0.0299)	(0.0361)	(0.0419)	(0.0378)	(0.0422)	(547.5)	(1037.1)	(14803.9)	(8003.9)	(19394.2)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level
(3) All monetary values in Rs.

Table 2A2: Effects of Spandana Access on the Evolution of Lending Before and After Treatment (EL2)

Variables	*(1)* *Has loan from Spandana*	*(2)* *Has loan from other MFI*	*(3)* *Has loan from commercial bank*	*(4)* *Has loan from informal source*	*(5)* *Has any loan*	*(6)* *Amount borrowed from Spandana*	*(7)* *Amount borrowed from another MFI*	*(8)* *Amount borrowed from a commercial bank*	*(9)* *Amount borrowed from an informal course*	*(10)* *Amount borrowed in total*
Treatment	0.0106***	0.00955*	0.00557	0.00812	0.0145	119.6***	245.7	-4602.7	284.4	-4671.5
	(0.00265)	(0.00493)	(0.00776)	(0.0195)	(0.0188)	(37.50)	(208.0)	(3605.7)	(2680.6)	(4652.9)
Year=2009	0.0762***	0.178***	0.200***	-0.559***	0.153***	1042.5***	2759.8***	-674.2	8073.3***	34465.7***
	(0.00486)	(0.00761)	(0.00931)	(0.0146)	(0.0148)	(85.80)	(163.4)	(4809.1)	(2371.2)	(5703.8)
Treatment Effect	0.0995***	-0.0337***	0.0482***	-0.00103	-0.0174	1350.7***	-245.0	6482.3	1056.6	10363.9
	(0.00832)	(0.0105)	(0.0131)	(0.0205)	(0.0208)	(149.0)	(284.3)	(4895.4)	(3399.4)	(6779.2)
Constant	0.0674**	0.0715**	0.146***	0.690***	0.972***	1037.7**	2058.3**	-25608.1*	32835.7***	18779.1
	(0.0293)	(0.0357)	(0.0415)	(0.0379)	(0.0423)	(487.6)	(930.0)	(13332.8)	(8984.4)	(18333.5)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.

Table 2B1: Effects of Spandana Access on the Evolution of Household Businesses Before and After Treatment (EL1)

Variables	(1) *Number of businesses*	(2) *Number of female-owned businesses*	(3) *Business revenue per month*	(4) *Business expenses per month*	(5) *Business profits per month*	(6) *Business investment per month*	(7) *Number of business employees*	(8) *Number of hours worked in the family business per week*
Treatment	-0.00371	-0.00136	4749.4	610.6	653.4	-43.16	0.253*	-4.576
	(0.0263)	(0.0161)	(4756.6)	(1818.0)	(1805.7)	(247.2)	(0.152)	(4.944)
Year=2007	0.220***	0.0739***	-1751.7	8475.3***	7732.4***	818.6**	0.224***	4.719
	(0.0242)	(0.0147)	(3446.1)	(2203.7)	(2221.1)	(330.7)	(0.0751)	(4.373)
Treatment Effect	0.0430	0.00635	-4612.2	-2408.0	-2765.8	343.5	-0.351**	7.582
	(0.0330)	(0.0204)	(4876.0)	(2480.5)	(2492.1)	(479.8)	(0.167)	(5.550)
Constant	0.451***	0.120**	-13746.7	-10462.8	-12519.5*	1765.3	0.231	73.00***
	(0.0866)	(0.0521)	(11694.6)	(7135.9)	(7177.7)	(1478.7)	(0.290)	(11.61)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.

Table 2B2: Effects of Spandana Access on the Evolution of Household Businesses Before and After Treatment (EL2)

Variables	(1) *Number of businesses*	(2) *Number of female-owned businesses*	(3) *Business revenue per month*	(4) *Business expenses per month*	(5) *Business profits per month*	(6) *Business investment per month*	(7) *Number of business employees*	(8) *Number of hours worked in the family business per week*
Treatment	-0.00179	-0.000728	920.6	133.5	-3.795	137.9	0.0659*	-0.856
	(0.0263)	(0.0161)	(1232.1)	(398.0)	(66.21)	(396.6)	(0.0390)	(1.746)
Year=2009	0.220***	0.0644***	7110.2***	8577.0***	1313.2***	7300.3***	0.342***	64.37***
	(0.0247)	(0.0146)	(934.0)	(766.4)	(332.8)	(821.1)	(0.0640)	(2.316)
Treatment Effect	0.0549	0.0157	128.0	-321.8	151.2	-478.8	-0.108	1.289
	(0.0335)	(0.0204)	(1515.0)	(1070.7)	(487.7)	(1152.3)	(0.0804)	(3.054)
Constant	0.490***	0.128**	-8633.3***	-6083.4*	788.3	-6642.8*	-0.429*	14.48*
	(0.0870)	(0.0504)	(3044.3)	(3224.5)	(1859.8)	(3640.6)	(0.250)	(7.615)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.

Table 2C1: Effects of Spandana Access on the Evolution of Household Consumption Before and After Treatment (EL1)

	(1)	(2)	(3)	(4)
Variables	***Total expenditure per month***	***Total expenditure on non-durables per month***	***Total expenditure on durables per month***	***Home durable index***
Treatment	163.3	156.0	9.839	-0.00122
	(173.5)	(164.7)	(22.84)	(0.0332)
Year=2007	2622.3***	2148.9***	476.9***	0.606***
	(154.1)	(141.6)	(31.88)	(0.0278)
Treatment Effect	-44.22	-80.93	49.54	-0.0258
	(223.8)	(207.3)	(46.36)	(0.0393)
Constant	339.1	513.7	-158.4	0.552***
	(600.1)	(551.0)	(151.5)	(0.0904)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014). Column 4 calculated on a list of 40 home durable goods (stock, not flow). Each asset is given a weight using the coefficients of the first factor of a principal component analysis. The index, for a household I is calculated as the weighted sum of standardized dummies equal to 1 if the household owns the durable good, 0 otherwise.

Table 2C2: Effects of Spandana Access on the Evolution of Household Consumption Before and After Treatment (EL2)

Variables	(1) *Total expenditure per month*	(2) *Total expenditure on non-durables per month*	(3) *Total expenditure on durables per month*	(4) *Home durable index*
Treatment	175.5	159.8	15.06	-0.00144
	(173.0)	(164.1)	(22.99)	(0.0332)
Year=2009	2863.7***	2366.1***	492.2***	0.600***
	(161.1)	(146.7)	(34.81)	(0.0277)
Treatment Effect	-513.2**	-533.2**	37.55	-0.0202
	(228.9)	(208.2)	(56.66)	(0.0393)
Constant	849.4	874.1*	-99.19	0.611***
	(584.2)	(516.2)	(156.1)	(0.0902)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014). Column 4 calculated on a list of 40 home durable goods (stock, not flow). Each asset is given a weight using the coefficients of the first factor of a principal component analysis. The index, for a household i, is calculated as the weighted sum of standardized dummies equal to 1 if the household owns the durable good, 0 otherwise.

Table 3A1 and 3A2: Effects of Borrowing from Spandana on Household Businesses at Endlines 1 and 2

Variables	*(1) Total amount of business assets (Rs.)*	*(2) Business investment per month (Rs.)*	*(3) Business revenue per month (Rs.)*	*(4) Business expenses per month (Rs.)*	*(5)) Business profit per month (Rs.)*	*(6) Total number of business employees*
Has Spandana loan	5107.2**	2379.9*	8511.5	4077.8	2277.0	-0.175
	(2198.8)	(1426.4)	(5752.6)	(5027.6)	(2224.5)	(0.155)
Constant	12623.3	-65983.6	-16907106.7***	-15829214.5***	-4108474.6*	-1.093
	(2402472.0)	(1558541.5)	(6216173.9)	(5428240.9)	(2364109.5)	(168.3)

Variables	*(1) Total amount of business assets (Rs.)*	*(2) Business investment per month (Rs.)*	*(3) Business revenue per month (Rs.)*	*(4) Business expenses per month (Rs.)*	*(5) Business profit per month (Rs.)*	*(6) Total number of business employees*
Has Spandana loan	14846.2***	-1760.9	3865.9	-7519.6	8723.3**	-0.563
	(5722.7)	(2708.4)	(5523.8)	(6406.6)	(3621.1)	(0.539)
Constant	-206951.8	-776271.6	-10041880.8***	-2483866.7	-8627192.8***	-76.24
	(3361079.8)	(1590736.2)	(3297156.0)	(3815347.9)	(2163599.8)	(316.6)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.

Table 3A3 and 3A4: Effects of Borrowing from Spandana on Household Businesses at Endlines 1 and 2

Variables	*(1) Has a business*	*(2) Total number of busiensses*	*(3) Has a new business*	*(4) Total number of new businesses*	*(5) Had to shut down a business*	*(6) Has a female-managed business*	*(7) Total number of female-managed businesses*	*(8) Business index*
Has Spandana loan	0.126	0.283**	0.0493	0.0976**	-0.00332	0.160*	0.101***	0.269***
	(0.0772)	(0.139)	(0.0376)	(0.0471)	(0.0394)	(0.0849)	(0.0348)	(0.0878)
Constant	-248.5***	-572.1***	7.944	-9.020	-39.45	-181.5**	-34.00	-234.1**
	(84.54)	(151.7)	(40.89)	(51.24)	(60.09)	(92.40)	(37.90)	(96.11)

Variables	*(1) Has a business*	*(2) Total number of busiensses*	*(3) Has a new business*	*(4) Total number of new businesses*	*(5) Had to shut down a business*	*(6) Has a female-managed business*	*(7) Total number of female-managed businesses*	*(8) Business index*
Has Spandana loan	0.389**	0.764***	0.0632	0.108	-0.0252	-0.0617	-0.0549	0.264
	(0.163)	(0.263)	(0.0921)	(0.112)	(0.0783)	(0.169)	(0.0757)	(0.163)
Constant	-295.6***	-590.3***	-133.7**	-162.1**	79.95*	-69.18	-4.223	-301.1***
	(95.99)	(154.4)	(54.10)	(65.77)	(46.00)	(99.08)	(44.43)	(95.50)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014), column (8) presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns (1)-(4) and (6) in tables 3A1 and 3A2 and in columns (1)-(7) in tables 3A3 and 3A4 for each round following Kling, Liebman, and Katz (2007).

Table 3B1 and 3B2: Effects of Borrowing from Spandana on Household Income at Endlines 1 and 2

Variables	*(1)* *Self-employment income*	*(2)* *Labor income*	*(3)* *Total Income*	*(3)* *Income index*
Has Spandana loan	2277.0	-3299.5***	-810.6	-0.321***
	(2224.5)	(651.4)	(2302.3)	(0.121)
Constant	-4108474.6*	1699704.1**	-2652707.4	42.16
	(2364109.5)	(710727.5)	(2446816.3)	(132.1)

Variables	*(1)* *Self-employment income*	*(2)* *Labor income*	**(3)** *Total Income*	*(3)* *Income index*
Has Spandana loan	8723.3**	-1535.8	-920.4	0.255
	(3621.1)	(1793.9)	(3600.9)	(0.218)
Constant	-8627192.8***	-2996125.9***	-4693584.4**	-644.5***
	(2163599.8)	(1053601.4)	(2230941.5)	(127.8)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014), column (3) presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns (1)-(2) for each round following Kling, Liebman, and Katz (2007).

Table 3C1 and 3C2: Effects of Borrowing from Spandana on Labor Supply at Endlines 1 and 2

Variables	*(1) Hours /week (adults and teens)*	*(2) Hours/week, household business (adults and teens)*	*(3) Hours/week, outside household business (adults and teens)*	*(4) Hours/week (teens)*	*(5) Hours/week (teen girls)*	*(6) Hours/week (teen boys)*	*(7) Hours/week (head, spouse)l*	*(8) Hours/week, household business (head, spouse)*	*(9) Hours/week, outside household business (head, spouse)*	*(10) Labor index*
Has Spandana loan	6.538	22.41**	-17.72*	-10.93	-11.16**	-2.360	20.67***	15.61***	5.064	0.0540
	(8.228)	(10.03)	(9.491)	(7.942)	(5.396)	(10.86)	(5.505)	(5.878)	(4.956)	(0.0666)
Constant	28993.7***	-16213.0	47385.4***	29406.3***	20663.9***	21530.4*	14000.8**	9234.7	4766.1	288.5***
	(8977.4)	(10920.7)	(10334.6)	(9183.9)	(6366.2)	(12901.6)	(6005.8)	(6413.7)	(5407.0)	(72.63)

Variables	*(1) Hours /week (adults and teens)*	*(2) Hours/week, household business (adults and teens)*	*(3) Hours/week, outside household business (adults and teens)*	*(4) Hours/week (teens)*	*(5) Hours/week (teen girls)*	*(6) Hours/week (teen boys)*	*(7) Hours/week (head, spouse)l*	*(8) Hours/week, household business (head, spouse)*	*(9) Hours/week, outside household business (head, spouse)*	*(10) Labor index*
Has Spandana loan	-15.15	30.81	-45.96**	-11.39	-0.319	-40.63	9.897	20.70*	-10.80	-0.0977
	(16.64)	(18.93)	(18.16)	(17.34)	(10.27)	(39.03)	(11.18)	(11.13)	(9.018)	(0.144)
Constant	957.7	-22892.7**	23850.3**	6029.4	-1311.3	11518.5	-2051.8	3124.9	-5176.7	5.441
	(9773.5)	(11118.0)	(10666.1)	(8203.3)	(6058.4)	(11915.3)	(6563.6)	(6534.2)	(5296.5)	(84.62)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014), column 10 presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns (1)-(2) for each round following Kling, Liebman, and Katz (2007).

Table 3D1 and 3D2: Effects of Borrowing from Spandana on Household Consumption at Endlines 1 and 2

Variables	*(1) Total expenditure/mo/ca*	*(2) Durables expenditure/mo/ca*	*(3) Nondurables expenditure/mo/ca*	*(4) Education expenditure/mo/ca*	*(5) Healthcare expenditure/mo/ca*	*(6) Temptation goods expenditure/mo/ca*	*(7) Fesival expenditure/mo/ca*	*(8) Consumption index*
Has Spandana loan	160.7	138.9**	39.83	2.883	39.65	-43.75**	-61.74***	-0.0680
	(167.0)	(66.99)	(143.4)	(43.98)	(68.65)	(21.60)	(16.89)	(0.0939)
Constant	-771455.5***	-69470.9	-689274.6***	-55291.2	-196397.6***	-91233.3***	-16490.8	-500.9***
	(182228.9)	(73309.3)	(156933.0)	(49661.5)	(74897.5)	(23567.1)	(18422.8)	(102.5)

Variables	*(1) Total expenditure/mo/ca*	*(2) Durables expenditure/mo/ca*	*(3) Nondurables expenditure/mo/ca*	*(4) Education expenditure/mo/ca*	*(5) Healthcare expenditure/mo/ca*	*(6) Temptation goods expenditure/mo/ca*	*(7) Fesival expenditure/mo/ca*	*(8) Consumption index*
Has Spandana loan	-839.3*	-38.19	-759.9*	106.0	-376.1**	-138.1**	78.78*	-0.281
	(435.4)	(112.6)	(388.8)	(134.0)	(191.6)	(63.24)	(46.64)	(0.193)
Constant	120936.7	47459.6	111490.0	-107847.5	449776.1***	-81707.3**	-54867.4**	-14.04
	(255746.6)	(66336.7)	(228369.3)	(82638.5)	(112480.9)	(37143.7)	(27142.5)	(113.2)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(4) As described by Banerjee et al. (2014), Column 8 presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns (1)-(7) for each round following Kling, Liebman, and Katz (2007).

Table 3E1 and 3E2: Effects of Borrowing from Spandana on Social Progress at Endlines 1 and 2

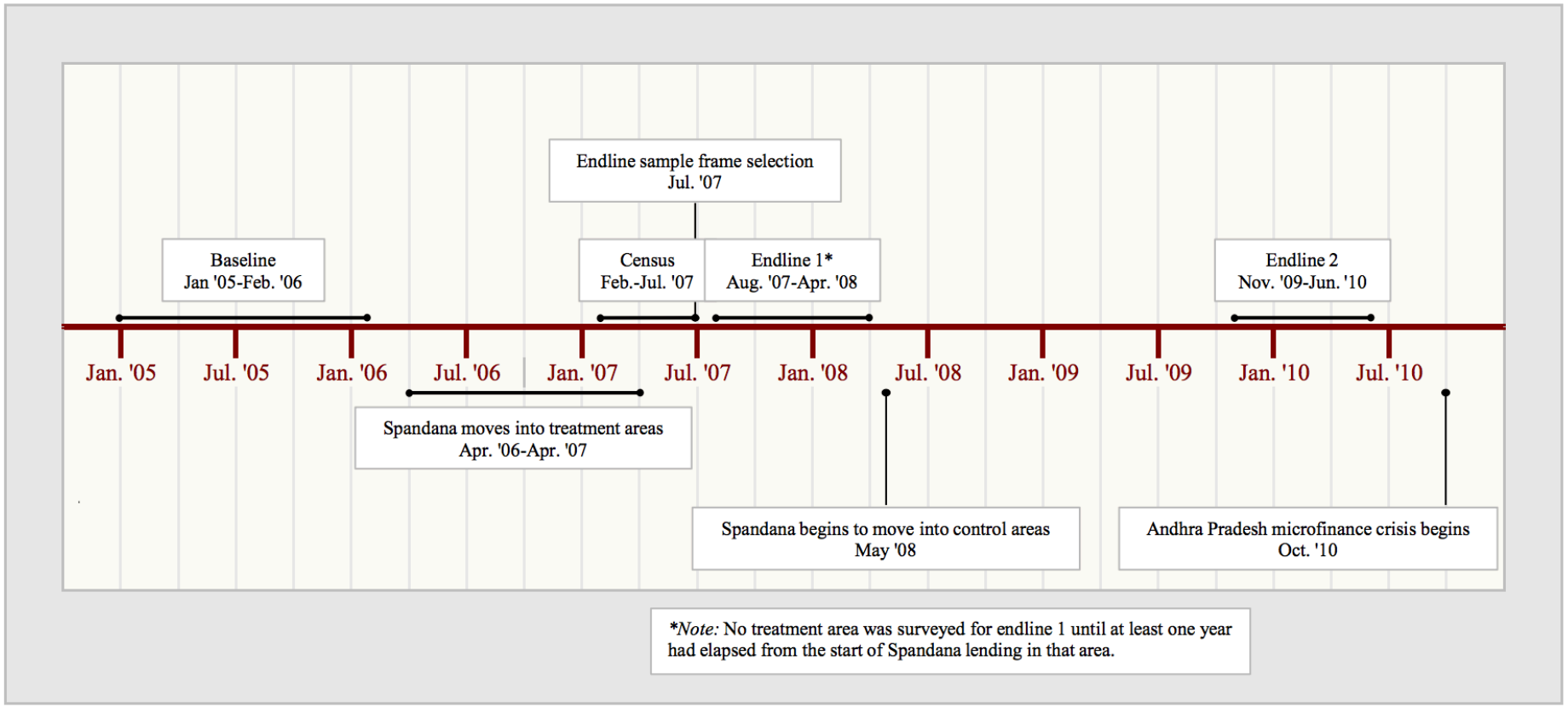
Variables	*(1) Rate of children in school (girls)*	*(2) Rate of children in school (boys)*	*(3) Rate of child labor (girls)*	*(4) Rate of child labor (boys)*	*(5) Rate of teens in school (girls)*	*(6) Rate of teens in school (boys)*	*(7) Women's empowerment index*	*(8) Percent of woman-managed businesses*	*(9) Social index*
Has Spandana loan	0.153	0.0866	0.723	-4.222	0.156	-0.292	-0.200	-0.372**	0.0299
	(0.109)	(0.0927)	(1.682)	(2.855)	(0.273)	(0.547)	(0.146)	(0.178)	(0.0910)
Constant	13.42	38.22	1030.7	-2376.0	-29.97	-147.8	588.3***	236.4	151.0***
	(72.32)	(66.07)	(1120.6)	(2033.9)	(161.1)	(166.9)	(85.76)	(145.9)	(53.43)

Variables	*(1) Rate of children in school (girls)*	*(2) Rate of children in school (boys)*	*(3) Rate of child labor (girls)*	*(4) Rate of child labor (boys)*	*(5) Rate of teens in school (girls)*	*(6) Rate of teens in school (boys)*	*(7) Women's empowerment index*	*(8) Percent of woman-managed businesses*	*(9) Social index*
Has Spandana loan	-0.0275	-0.0648	-0.489	4.265	-0.363***	-0.0164	0.121*	-0.00556	-0.0107
	(0.0594)	(0.0613)	(1.079)	(4.882)	(0.130)	(0.143)	(0.0673)	(0.0898)	(0.0474)
Constant	-187.8**	-144.3**	-220.7	-4869.8	288.8*	-214.2	110.4	99.92	-23.38
	(73.24)	(70.81)	(1331.5)	(5641.3)	(153.8)	(170.1)	(73.46)	(138.4)	(51.71)

(1) Standard errors in parentheses.
(2) * significant at the 10% level, ** at the 5% level, *** at the 1% level.
(3) All monetary values in Rs.
(5) Column (9) presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns (1)-(8) and the share of female-managed businesses for each round following Kling, Liebman, and Katz (2007).
(6) As described by Banerjee et al. (2014), Col (7) is the effect on an equally weighted average of z-scores for the 16 social outcomes: indicators for women making decisions on each of food, clothing, health, home purchase and repair, education, durable goods, gold and silver, investment; levels of spending on school tuition, fees, and other education expenses; medical expenditure; teenage girls' and teenage boys' school enrolment; and counts of female children under one year and one to two years old.

Appendix 3: Figures

Figure 1: Experiment Timeline[27]



[27] Figure retrieved from Banerjee et al. (2014).