The miracle of microfinance? Evidence from a randomized evaluation*

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Abstract

This paper reports results from the randomized evaluation of a group lending microcredit program in Hyderabad, India. A lender worked in 52 randomly selected neighborhoods, leading to an 8.4 percentage point increase in takeup of microcredit. Small business investment and profits of pre-existing businesses increased, but consumption did not significantly increase. Durable goods expenditure increased, while "temptation goods" expenditure declined. We found no significant changes in health, education, or women's empowerment. Two years later, after control areas had gained access to microcredit but households in treatment area had borrowed for longer and in larger amounts, very few significant differences persist. JEL codes: O16, G21, D21

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1 Introduction

Microfinance institutions (MFIs) have expanded rapidly over the last 10 to 15 years: according to the Microcredit Summit Campaign (2012), the number of very poor families with a microloan has grown more than 18-fold from 7.6 million in 1997 to 137.5 million in 2010. Microcredit has generated considerable enthusiasm and hope for fast poverty alleviation, culminating in the Nobel Prize for Peace, awarded in 2006 to Mohammed Yunus and the Grameen Bank for their contribution to the reduction in world poverty. In the last several years, however, the enthusiasm for microcredit has been matched by an equally strong backlash. For instance, a November 2010 article in *The New York Times*, appearing in the wake of a rash of reported suicides linked to over-indebtedness, quotes Reddy Subrahmanyam, an official in Andhra Pradesh (the setting of this study), accusing MFIs of making "hyperprofits off the poor." He argues that "the industry [has] become no better than the widely despised village loan sharks it was intended to replace.... The money lender lives in the community. At least you can burn down his house. With these companies, it is loot and scoot"(Polgreen and Bajaj 2010).

What is striking about this debate is the relative paucity of evidence to inform it. Anecdotes about highly successful entrepreneurs or deeply indebted borrowers tell us nothing about the effect of microfinance on the average borrower, much less the effect of having access to it on the average household. Even representative data about microfinance clients and non-clients cannot identify the causal effect of microfinance access, because clients are self-selected and therefore not comparable to non-clients. Microfinance organizations also purposely choose some villages and not others. These issues make the evaluation of microcredit particularly difficult, and until recently there was little rigorous evidence to inform it.

This has changed in the last few years, as several studies evaluating microfinance have been conducted by different research teams with different partners in different settings: Morocco (Crépon et al., 2013), Bosnia-Herzegovina (Augsburg et al., 2013), Mexico (Angelucci et al., 2013), Mongolia (Attanasio et al., 2013) and Ethiopia (Tarozzi et al., 2013). In this paper we report on the oldest of these, the first randomized evaluation of the effect of the canonical group-lending microcredit model, which targets women who may not necessarily be entrepreneurs. This study also follows the households over the longest period of any evaluation (three to 3.5 years

after the introduction of the program in their areas), which is necessary since many impacts may be expected to surface only over the medium run.

The experiment, a collaborative project between the Center for Microfinance (CMF) at the Institute for Financial Management Research (IFMR) in Chennai and Spandana, one of India's fastest growing MFI at the time was conducted as follows. In 2005, 52 of 104 poor neighborhoods in Hyderabad were randomly selected for the opening of a Spandana branch, while the remainder were not.[1] Hyderabad is the fifth largest city in India, and the capital of Andhra Pradesh, the Indian state were microcredit has expanded the fastest and has recently been most controversial. Fifteen to 18 months after the introduction of microfinance in each area, a comprehensive household survey was conducted in an average of 65 households in each neighborhood, for a total of about 6,850 households. In the meantime, other MFIs had also started their operations in both treatment and comparison households, but the probability of receiving an MFI loan was still 8.4 percentage points (46%) higher in treatment areas than in comparison areas (26.7% borrowers in treated areas versus 18.3% borrowers in comparison areas). Two years after this first endline survey, the same households were surveyed once more. By that time, both Spandana and other organizations had started lending in the treatment and control groups, so the fraction of households borrowing from microcredit organizations was not dramatically different (38.5% in treatment and 33% in control). But households in treatment groups had larger loans and had been borrowing for a longer time period. This second survey thus gives us an opportunity to examine some of the longer-term impacts of microcredit access on households and businesses, although the setting is not perfect since we are comparing those who borrow for longer versus those who borrow for a shorter time, rather than those who do and those who do not borrow at all.

Since it is entirely possible that there are spillover or general equilibrium effects (as analyzed by Buera et al., 2011), and effects that operate through the *expectation* of being able to borrow when needed (such as reductions in precautionary savings, as documented in Thailand by Ka-

[1] An alternative way to measure the impact of borrowing is to randomize microcredit offers among applicants. This approach was pioneered by Karlan and Zinman (2010), which uses individual randomization of the "marginal" clients in a credit scoring model to evaluate the impact of consumer lending in South Africa, and finds that access to microcredit increases the probability of employment. The authors use the same approach to measure impact of microcredit among small businesses in Manila (Karlan and Zinman, 2011). It should be noted, however, that these two studies evaluate slightly different programs: consumer lending in the South Africa study, and "second generation" individual-liability loans to existing entrepreneurs in Manila.

boski and Townsend, 2011, and in India by Fulford, 2011, or through general-equilibrium effects on prices or wages (Giné and Townsend 2004)), we focus here on reduced-form/intent-to-treat estimates.

We examine the effect on borrowing from various sources, consumption, new business creation, business income, etc., as well as measures of other human development outcomes such as education, health and women's empowerment. At the first endline, while households do borrow more from microcredit institutions, the overall take up is reasonably low (only 26.4% of the eligible households borrow, not the 80% that Spandana expected), and some of the loans are substituting for informal loans. Informal borrowing declines, and we see no significant difference in overall borrowed amount (though the point estimate is positive). This is itself was a surprising result at the time, though it has been replicated in other studies: the demand for microcredit is less important than expected, and may not correspond to an important demand for extra credit. We see no significant difference in monthly per capita consumption and monthly non-durable consumption. We do see significant positive impacts on the purchase of durables. There is evidence that this is financed partly by an increase in labor supply and partly by cutting unnecessary consumption: households have reduced expenditures on what that they themselves describe as "temptation goods."

Thus, in our context, microfinance plays a role in helping some households make different intertemporal choices in consumption. This is not the only impact that is traditionally expected from microfinance, however. The primary engine of growth that it is supposed to fuel is business creation. This is typically true even for lenders that do not insist that households have a business to take a first loan (Spandana is one of them), but still hope and expect that the ability to borrow will eventually help households start or expand small businesses. (The description of Spandana's group-loan product is careful not to mention an automatic link between credit and self-employment activity but does state that "Loans are used for cash flow smoothening (sic.), predominantly for productive purposes."[2]) Fifteen to 18 months after gaining access, households are no more likely to be entrepreneurs (that is, have at least one business), but they invest more in the businesses they do have (or the ones they start). There is an increase in the average

[2]To give a sense of the prevalence of the purported link between microfinance and business creation, of the roughly 3.1 million Google search results for "microfinance," 1.35 million (44%) also contain the phrase "business creation" or "entrepreneurship" (retrieved November 2013).

profits of the businesses that were already in existence before microcredit, which is entirely due to very large increases in the upper tail of profitability. At every quantile between the 5th and the 95th percentile, there is no difference in the profits of the businesses. The median marginal new business is both less profitable and less likely to have even one employee in treatment than in control areas.

After three years, when microcredit is available both in treatment and control groups but treatment group households have had the opportunity to borrow for a longer time, businesses in the treatment groups have significantly more assets, and business profits are now larger for businesses above the 85th percentile of profitability. However, the average business is still small and not very profitable. In other words, perhaps contrary to most people's belief, to the extent microcredit helps businesses, it may help the most profitable businesses more. There is still no difference in average consumption.

We do not find any effect on any of the women's empowerment or human development outcomes either after 18 or 36 months. Furthermore, almost 70% of eligible households do not have an MFI loan, preferring instead to borrow from other sources, if they borrow (and most do).

A number of caveats must be kept in mind when interpreting and generalizing these results. First, the difference in microfinance take-up between treatment and control areas is low, even by the first endline, which raises two issues: it lowers power and precision (though we have a number of significant effects), and it means that the impact of microcredit we detect is driven by the marginal borrowers–those who do not borrow when the cost of doing so is high (because they have fewer MFIs to choose from or do not want to change neighborhoods), but do borrow when that cost is lower.

Second, the evaluation was run in a context of very high economic growth, which could have either decreased or increased the impact of microfinance. Third, this is the evaluation of a for-profit microfinance model, and not-for-profit microfinance lenders may have larger positive effects if their interest rates are kept low. Fourth, as the MFI we study does not provide any complementary services such as business training or sensitivity education, we are studying the pure impact of providing loans to women who may or may not use them for their own businesses (though Spandana does believe that this is what the money will be used for eventu-

ally), and we do find an expansion in women-owned businesses). Fifth, the study took place in "marginal" neighborhoods–those Spandana was indifferent about working with at the outset– and the impacts may have been different in the neighborhoods they chose to exclude from the randomization (Heckman, 1992).

Thus, it is an important reassurance that our results find a strong echo in the four other studies that look at similar programs in different contexts. This gives us confidence in the robustness and external validity of our findings. In short, microcredit is not for every household, or even most households, and it does not lead to the miraculous social transformation some proponents have claimed. Its principal impact seems to be, perhaps unsurprisingly, that it allows some households to sacrifice some instantaneous utility (temptation goods or leisure) in order to finance lumpy purchases, either for their home or in order to establish or expand a business. *Prima facie*, these marginal businesses do not appear to be highly productive or profitable, but more data and more time may be needed to fully establish their impacts on individuals, markets and communities.

2 The Spandana Microcredit product, and the context

2.1 Spandana and its microcredit product

Until the major crisis in Indian microfinance in 2010, Spandana was one of the largest and fastest-growing microfinance organizations in India, with 1.2 million active borrowers in March 2008, up from 520 borrowers in 1998-9, its first year of operation (MIX Market, 2009). It had expanded from its birthplace in Guntur, a dynamic city in Andhra Pradesh, across the state and into several others.

The basic Spandana product was the canonical group-loan product, first introduced by the Grameen Bank. A group is comprised of six to ten women, and 25-45 groups form a "center." Women are jointly responsible for the loans of their group. The first loan is Rs. 10,000, about $200 at market exchange rates, or $1,000 at 2007 purchasing power parity (PPP)-adjusted exchange rates (World Bank, 2007).[3] It takes 50 weeks to reimburse principal and interest; the

[3]In 2007 the PPP exchange rate was $1=Rs. 9.2, while the market exchange rate was $1≃Rs. 50. All following references to dollar amounts are in PPP terms unless noted otherwise.

interest rate is 12% (non-declining balance; equivalent to a 24% APR). If all members of a group repay their loans, they are eligible for second loans of Rs. 10,000-12,000. Loan amounts increase up to Rs. 20,000. During the course of the study, Spandana also introduced an individual product, for clients who had been successful with one or two group-loan cycles. The individual product was available in the treatment areas. Very few people in our sample ended up taking this loan, however, so the study is mainly an evaluation of a group-lending product.

Eligibility is determined using the following criteria: clients must (a) be female (b) be aged 18 to 59, (c) have resided in the same area for at least one year, (d) have valid identification and residential proof (ration card, voter card, or electricity bill), and (e) at least 80% of women in a group must own their home.[4] Groups are formed by women themselves, not by Spandana.

Unlike some other microfinance organizations, Spandana does not require its clients to start a business (or pretend to) in order to borrow: the organization recognizes that money is fungible, and clients are left entirely free to choose the best use of the money, as long as they repay their loan. Spandana does not determine loan eligibility by the expected productivity of the investment, although selection into groups may screen out women who cannot convince fellow group-members that they are likely to repay. Also unlike other microlenders, most notably Grameen, Spandana does not explicitly insist on "transformation" in the household. There is no chanting of resolutions at group meetings, which are very short and focused on the repayment transaction. Spandana is primarily a lending organization, not directly involved in business training, financial literacy promotion, etc. It is however the belief of the management that the very fact of borrowing will lead to such transformation, and to business creation. Spandana was also a for-profit operator, charging interest rates sufficient to make profits, though all the profits were re-invested in the organization in the period we study. The organization obtained private capital and would probably have launched an IPO if it had not been caught in the middle of the Andhra Pradesh crisis. This makes it different from Grameen Bank (Mohammed Yunus has explicitly and vigorously criticized for-profit MFIs after the IPO of Compartamos, a large Mexican MFI). All these features are important to keep in mind when interpreting the results of this study: it is possible that the Grameen product would have different impacts. However, from

[4]The home ownership requirement is not because the house is used as collateral, but because home owners are more stable and less likely to migrate. Spandana does not require a formal property title, just a general agreement that this house belongs to this household (something that tends to be clear even in informal settlement)

an evaluation point of view, there are clear advantages to this product: in particular, any impact on business expansion can be attributed to credit alone, rather than to other services. Moreover, to the extent we find "positive" results in the study, they are unlikely to be attributable to social desirability bias. It is also worth noting that, in the period we study, the interest rates charged by Spandana were low by standard microfinance standards, even Grameen.

2.2 The context

Table 1A uses the baseline data to show a snapshot of households from the study area in 2005, before the Spandana product was launched. As we describe below, these numbers need to be viewed with some caution, as the households sampled at baseline were not necessarily representative of the area as a whole, and were not purposely resurveyed at endline. At baseline, the average household was a family of five, with monthly expenditure of just under Rs. 5,000, or $540 at PPP-adjusted exchange rates ($108 per capita) (World Bank, 2005).[5] There was almost no MFI borrowing in the sample areas at baseline. However, 68% of the households had at least one outstanding loan. The average amount outstanding was Rs. 38,000. Sixty-three percent of households had a loan from an informal source (moneylenders, friends or neighbors, family members or shopkeepers). Commercial bank loans were very rare (3.6%).

Although business investment was not commonly named as a motive for borrowing, businesses were common, with 32 businesses per 100 households, compared to an OECD-country average of 12% who say that they are self-employed. Less than half of all businesses were operated by women (14.5 woman-run businesses per 100 households.) Business owners and their families spent on average 58 hours per week working in the business.

Growth between 2005 and 2010

Table 1B shows some of the same key statistics for the endline 1 and endline 2 (EL1 and EL2) samples in the control group.

Comparing the control baseline sample (2005) with the control households in the EL1 (2008) and EL2 (2010) samples reveal very rapid secular growth in Hyderabad over 2005-2010.[6] Average

[5] Column 2 reports the control mean, and column 4 reports the treatment-control difference. None of these differences are significant (column 5).

[6] While the comparison may not be perfect since the baseline survey was not conducted on the same sample as

household consumption rose from Rs. 4,888 (2005) to Rs. 7,662 in 2007 and Rs. 11,497 in 2010 (all expressed in 2007 rupees). The fraction of households with at least one outstanding loan rose from 68% at baseline to 89% in EL1 and 90% in EL2.

The prevalence of businesses increased from 32 per hundred households at baseline to 44 at EL1 and 56 at EL2. In endline 1 37.8% and in endline 2 40.3% of the business were operated by women. However, the businesses remained very small, with on average .38 employees in EL1 and .18 in EL2.[7] As well as remaining very small in terms of employment, average sales remained fairly steady: Rs. 14,800 at EL1 and 14,100 at EL2. However, looking across all households (not just those with businesses), business revenues increased from around Rs. 4,800 to Rs. 5,800 (in constant 2007 rupees). At EL2, business owners reported business expenses (working capital) plus investment in assets of almost Rs. 15,000, up from about Rs. 13,000 at EL1. (These expense estimates do not account for the cost of the proprietors' time.)

This context of rapid growth in urban Andhra Pradesh is another important feature to keep in mind, and may color the results of this study (of all the randomized evaluations on microfinance, this is probably the most dynamic context). It is clearly an important example, as microfinance clients in India represents roughly 30% of all microfinance clients worldwide,[8] and microfinance has developed in many other rapidly growing environments (Bangladesh being probably the prime example). But the results may be different in contexts with much slower growth, or in recessions. Fortunately, the other RCT studies cover a wide variety of contexts, which will help to understand the extent to which results depend on context.

3 Experimental design

3.1 Experimental Design

At the time this study was started, microfinance had already taken hold in several districts in Andhra Pradesh, but most microfinance organizations had not yet started working in the

the endline, the growth between EL1 and EL2 is for the same set of households, using the same survey instruments, and thus gives us a good sense of the dynamism of this economy.

[7]The fall in average employment between EL1 and EL2 may reflect a compositional effect, with the marginal businesses being smaller.

[8]MIX Market reported 94 million borrowers worldwide in 2011, of whom 28 million are located in India (http://www.mixmarket.org/mfi/country/India).

capital, Hyderabad. Spandana initially selected 120 areas (identifiable neighborhoods, or *bastis*) in Hyderabad as places in which they were interested in opening branches but also willing not to. These areas were selected based on having no preexisting microfinance presence, and having residents who were desirable potential borrowers: poor, but not "the poorest of the poor." Areas with high concentrations of construction workers were avoided because they move frequently, which makes them undesirable as microfinance clients. While the selected areas are commonly referred to as "slums," these are permanent settlements with concrete houses and some public amenities (electricity, water, etc.). Conversely, the largest ones were not selected for the study, since Spandana was keen to start operations there: the large population in these slums allowed them to benefit from economies of scale and reach quickly a number of clients that justified expansion in the city. The population in the neighborhoods selected for the study ranges from 46 to 555 households. The slums chosen to be part of the study were typically not continuous to avoid spillovers across treatment and control slums.

In each area, CMF first hired a market research company to conduct a small baseline neighborhood survey in 2005, collecting information on household composition, education, employment, asset ownership, expenditure, borrowing, saving, and any businesses currently operated by the household or stopped within the last year. They surveyed a total of 2,800 households in order to obtain a rapid assessment of the baseline conditions of the neighborhoods. However, since there was no existing census, and the baseline survey had to be conducted very rapidly to gather some information necessary for stratification before Spandana began their operations, the households were not selected randomly from a household list: instead field officers were asked to map the area and select every n^{th} house, with n chosen to select 20 households per area. Unfortunately, this procedure was not followed very rigorously by the market research company, and we are not confident that the baseline is representative of the slum as a whole. Thus, the baseline survey was used solely as a basis for stratification, the descriptive analysis above, and to collect area-level characteristics that are used as control variables.[9] Beyond this, we do not use the baseline survey in the analysis that follows.

After the baseline survey, but prior to randomization, sixteen areas were dropped from the study because they were found to contain large numbers of migrant-worker households.

[9]However, omitting these controls makes no difference to the results.

Spandana (like other MFIs) has a rule that loans should only be made to households who have lived in the same community for at least one year because the organization believes that dynamic incentives (the promise of more credit in the future) are more important in motivating repayment for these households.[10] The remaining 104 areas were grouped into pairs of similar neighborhoods, based on average per capita consumption and per-household debt, and one of each pair was randomly assigned to the treatment group.[11] Figure 5 shows a timeline of data collection and randomization.

Table 1 uses the baseline sample to show that treatment and comparison areas did not differ in their baseline levels of demographic, financial, or entrepreneurship characteristics in the baseline survey. This is not surprising, since the sample was stratified according to per capita consumption and fraction of households with debt.

Spandana then progressively began operating in the 52 treatment areas between 2006 and 2007. The roll out happened at different date in different slums. Note that in the intervening periods, other MFIs also started their operations, both in treatment and comparison areas. We will show below that there is still a significant difference between MFI borrowing in treatment and comparison groups. Spandana credit officers also started lending in very few of the control slums, although this was stopped relatively rapidly. Furthermore, there was no rule against borrowing in another slum (if one could find a group to join), and some people did do so. Overall, 5% of households in control slums were borrowing from Spandana at the endline.

To create a proper sampling frame for the endline, CMF staff undertook a comprehensive census of each area in early 2007, and included a question on borrowing. The census revealed low rates of MFI borrowing even in treatment areas, so the endline sampling frame consisted of households whose characteristics suggested high likelihood of having borrowed: those that had resided in the area for at least three years and contained at least one woman aged 18 to 55. Spandana borrowers identified in the census were oversampled, because we believed that

[10] We can compare baseline characteristics in the 16 areas dropped to those in the 104 areas included in the randomization. The differences are consistent with Spandana's rationale for dropping the omitted areas: household size is smaller in these areas (due to migrant workers there without families or children); there is less business creation (presumably because migrants are unlikely to start a business) and there is less credit outstanding (likely because informal lenders are also reluctant to lend to these very mobile households). (Results available upon request.)

[11] Pairs were formed to minimize the sum across pairs A, B (area A avg loan balance – area B avg loan balance)^2 + (area A per capita consumption – area B per capita consumption)^2. Within each pair one neighborhood was randomly allocated into treatment.

heterogeneity in treatment effect would introduce more variance in outcomes among Spandana borrowers than among non borrowers, and oversampling borrowers would therefore give higher power. The results presented below weigh the observation to account for this oversampling so that the results are representative of the population as a whole. Since the sampling frame at baseline was not rigorous enough, baseline households were not purposely resurveyed in the follow-up. The first endline survey began in August 2007 and ended in April 2008, and the roll out of the endline followed the roll out of the program. In each area, this first endline survey was conducted at least 12 months after Spandana began disbursing loans in this particular area, and generally 15 to 18 months after (the survey followed the same calendar in the control slums, in order to ensure comparability between treatment and control). The overall sample size was 6,864 households.

Two years later, in 2009-2010, a second endline survey, following up on the same households, was undertaken. It included the same set of questions as in 2007-2008 to insure comparability. The re-contact rate was very high (90%). We discuss this attrition in more details below.

3.2 Potential threats to identification and caveats on interpretation

3.2.1 Attrition and selective migration

Since we don't have a proper baseline sample that was systematically followed, a potential worry is that the sample that is surveyed at endline may not be strictly comparable in treatment and control areas, if there was differential attrition in treatment and in control groups. For example, people could have moved into the area, or avoided moving out of the area, because Spandana had started their operations there. This does not seem highly likely, given that if someone really wanted to borrow, they had options to do so either from another MFI (we will see that a fair number of people did) or even from Spandana, by going to the next neighborhood. The treatment only made it marginally easier to borrow (as we will see in the next section). Nevertheless, in retrospect, it was a clear mistake not to attempt to systematically re-survey at least a fraction of the baseline sample, even though the baseline sampling frame was weak.

That said, we have a number of ways to assess the extent to which attrition is a problem. First of all, in Table A1, we verify that the households surveyed at endlines 1 and 2 are similar in treatment and control groups, in terms of a number of characteristics which are fixed over

time (the p-value on the joint difference of these characteristics across treatment arms is 0.980 at EL1 and 0.534 at EL2). This is a first indication that we have a comparable sample at baseline and at endline, even allowing for attrition.

Second, the sample at EL1 was drawn from a census that was conducted fairly soon after the introduction of microcredit (on average less than a year). Moreover, the sampling frame for EL1 was restricted to people who had lived in the area for at least three years before the census. This means that no one in the survey had migrated into the area because of Spandana: they were all residents of the area well before Spandana moved into the area (the vast majority had been there for years). This removes the most plausible channel for differential selection into the sample in treatment and control groups. There remains the possibility that fewer people (or different people) left the treatment areas between the launch of the product and the census due to the option to borrow more easily, but in less than a year, the migration rate out of Hyderabad is low, and given the ability to borrow if someone wants to, it seems far fetched that people would have been differentially likely to migrate out of the slums based on the ability to become a Spandana client.

We can then study attrition between census and EL1, and between EL1 and EL2.

There was some attrition between the census and EL1, especially since, as it customary in these types of surveys, census surveyors were given replacement lists in case they did not find the exact person they were looking for. However this attrition (roughly 25%) is almost exactly the same in treatment and in control areas: 27.6% in treatment and 25.2% in control (p-value of difference: 0.165; see Table A2, Panel A). Moreover, the attrition is totally uncorrelated with the months elapsed since Spandana entered the slum (Table A2, Panel B), which is not what we would expect if it were somehow related to the program (it would have had more time to play out if Spandana had entered a longer time before). The only characteristics that predict that someone is more likely to be found is that they are a Spandana borrower (4.2pp lower attrition; SE of 1.97pp), and living in a "non-pucca" (lower-quality) house (2.7pp lower attrition; SE of 1.4pp). The most likely reason for the former is that the Spandana officers helped the CMF field team to locate their clients. For example, surveyors could attend weekly meetings to collect addresses and find directions to people's homes. The latter likely reflects greater mobility among wealthier households. In all of the analysis that follows, we correct for this by adjusting the

sampling weights for the ratio between the probability to find a non-Spandana borrower and the probability to find a Spandana borrower (0.948).

Appendix Table 3, Panel A shows that the re-contact rate at endline 2 for households initially interviewed at endline 1 was very high (much higher than in most randomized controlled trials, in the US or in developing countries). It was also similar in the treatment and the control group, at 89.9% and 90.2%, respectively (the p-value of the difference is 0.248). Panel B shows average characteristics of the re-contacted versus attrited households. The samples do not differ significantly along most dimensions. However, those who attrited had slightly higher per capita expenditure at endline 1, with a Rs. 1000 increase in expenditure associated with a 0.0098 increase in likelihood of attrition (column 1: the standard error is 0.0032). Having a Spandana loan at endline 1 was associated with 3.3 percentage points lower attrition (column 5: the standard error is 1pp); having any MFI loan is associated with 2.7 percentage points lower attrition (column 6: the standard error is 0.8pp), driven by the effect of Spandana loans. Again, the explanation for this is that the credit officers helped the field team find the clients, if they had moved within their slum. Panel C of Table A3 shows shows that between treatment and control, attrition was not differentially correlated with characteristics.

This data suggests that there is no evidence that migration or attrition patterns were driven by the treatment, except through the mechanical effect that Spandana credit officers helped surveyors locate their clients, which we correct for.

Nevertheless, to systematically address the concern that attrition may affect the results, we have re-estimated all the regressions below with a correction for sample selection inspired by Dinardo, Fortin and Lemieux (2010), where we re-weight the data using the inverse of the propensity to be observed at endline 2, so that the distribution of observable characteristics (at endline 1) among households observed at endline 2 resembles that in the entire endline 1 sample. We then apply the same weights to endline 1 data (implicitly assuming a similar selection process between the onset of microfinance and endline 1). The results, presented for key outcomes in Table A5, are very similar to what we present here. (Full results available on request.) Note that this procedure only corrects for differential attrition by observables, not by unobservable variables.

Interpreting the results

The experimental design and the implementation raise a number of issues worth keeping in mind to interpret the results that follow.

First, given the sampling frame, ours will be an intent-to-treat (ITT) analysis on a sample of "likely borrowers". This is thus neither the effect on those who borrow nor the average effect on the neighborhood. Rather, it is the average effect of easier access to microfinance on those who are primary targets. Second, microfinance was available in both treatment and control areas, though access was easier in treatment areas. Microfinance take-up is indeed higher in treatment areas, which generates experimental variation, but the marginal clients may be different from the first clients to borrow in an area. This also affects power: the initial power calculations were performed when Spandana thought that 80% of eligible households would become clients very rapidly after the launch. In fact the data shows that the proportion reached only 18% in 18 months (and this stayed at 18% after two and a half years). This is low, and also gave other MFIs, which were behind Spandana in terms of penetration in Hyderabad, time to catch up. Overall, take-up of microfinance from any organization was only 33% by EL2. This is an important result in its own right, and very surprising at the time, but it implies that, with the benefits of hindsight, more areas would have been needed. This is not something that could be addressed ex-post. Fortunately, subsequent evaluations of microfinance programs were able to do so, and find a very similar set of results (and non-results) suggesting that these outcomes are not the artifact of samples that are too small, or of a very non-representative set of clients.

4 Results

To estimate the impact of microfinance becoming available in an area on likely clients, we focus on intent-to-treat (ITT) estimates; that is, simple comparisons of averages in treatment and comparison areas, averaged over borrowers and non-borrowers. We present ITT estimates of the effect of microfinance on businesses operated by the household; for those who own businesses, we examine business profits, revenue, business inputs, and the number of workers employed by the business. (The construction of these variables is described in Appendix 1.) Each column of

each table reports the results of a regression of the form

$$y_{ia} = \alpha + \beta \times Treat_{ia} + X_a^{'}\gamma + \varepsilon_{ia}$$

where y_{ia} is an outcome for household i in area a, $Treat_{ia}$ is an indicator for living in a treated area, and β is the intent-to-treat effect. $X_a^{'}$ is a vector of control variables, calculated as area-level baseline values: area population, total businesses, average per capita expenditure, fraction of household heads who are literate, and fraction of all adults who are literate. Standard errors are adjusted for clustering at the area level and all regressions are weighted to correct for oversampling of Spandana borrowers and for higher probability of tracking them. We estimated two sets of regressions with a different specification: no control whatsoever, and control for strata rather than for the average characteristics in the control slums. The results (not reported here, but available on request) are qualitatively unchanged. Controlling for strata somewhat increases the precision in this case, so some results that are almost significant here become significant with strata controls (this is particularly true for the grouped outcomes).

In any study of this kind, where there are many possible outcomes without a single possible causal pathways, there is a danger of overinterpreting any single significant result (or even discerning a pattern of results when there is none). We take a number of steps to avoid this problem. First, we report the outcome following the template that all papers in this issue follow, insuring no selection of outcomes based on what is significant or not. Second, for each table (which corresponds to a "family" of outcomes) we report an index (a la Katz, Kling and Liebman 2007) of all the outcomes in the family taken together.[12] Finally, for each of these outcomes, we report both the standard p-value and the p-value adjusted for multiple hypotheses testing across all the indices. The adjusted p-values are calculated using the step-down procedure of Hochberg (1988), which controls the family-wise error rate for all the indices. See Appendix A.4 for details.

[12]The variables are signed such at that a positive treatment effect is a "good" outcome. They are then normalized by subtracting the mean in the control group and dividing by the standard deviation in the control group. The index is the simple average of the normalized variables.

4.1 Borrowing from Spandana and other MFIs

Treatment communities were randomly selected to receive Spandana branches, but other MFIs also started operating both in treatment and comparison areas. We are interested in testing the impact of access to *microcredit*, not only of borrowing from Spandana. Table 2 Panel A shows that, by the first endline, MFI borrowing was indeed higher in treatment than in control slums, although borrowing from other MFIs made up for part of the difference in Spandana borrowing. Households in treatment areas are 12.7 percentage points more likely to report being Spandana borrowers–17.8% versus 5.1% (Table 2 Panel A, column 1). The difference in the percentage of households saying that they borrow from any MFI is 8.4 points (Table 2 Panel A, column 3), so some households who ended up borrowing from Spandana in treatment areas would have borrowed from another MFI in the absence of the intervention. While the absolute level of total MFI borrowing is not very high, it is about 50% higher in treatment than in comparison areas. Columns 1 and 3 show that treatment households also report significantly more borrowing from MFIs (and from Spandana in particular) than comparison households. Averaged over borrowers and non-borrowers, treatment households report Rs. 1,334 more borrowing from Spandana than do control households, and Rs. 1,286 more from all MFIs (both significant at the 1% level).

While both the absolute take-up rate and the implicit "first stage" are relatively small, this appears to be similar to what was found in most other evaluations of the impact of access to microfinance, despite the different contexts. In rural Morocco, Crépon et al. (2013) find that the probability of having any loan from the MFI Al Amana in areas which got access to it is 10 percentage points, whereas it is essentially zero in control, and moreover, since there is no other MFI, this represents the total increase in microfinance borrowing. In Mexico, Angelucci, Karlan and Zinman (2013) find an increase of 10 percentage points in the probability of borrowing from the MFI Compartamos in areas that got access to the lender, relative to a base of five percentage points in the control. In Ethiopia, Tarozzi et al. (2013) find a larger impact of microcredit introduction: 36%.

The fairly low take-up rate in these different contexts is in itself a striking result, given the high levels of informal borrowing in these communities and the purported benefits of microcredit over these alternative forms of borrowing. In all cases, except when the randomization was among those who had already expressed explicit interest in microcredit, only a minority of

"likely borrowers" end up borrowing.

Table 2 also displays the impact of microfinance access on other forms of borrowing. A sizable fraction of the clients report repaying a more expensive debt as a reason to borrow from Spandana, and we do indeed see some action on this margin. The share of households who have some informal borrowing–defined as borrowing from family, friends, moneylenders and goods purchased on credit extended by the seller–goes down by 5.2 percentage points in treatment areas (column 5), but bank borrowing is unaffected (column 4). The point estimate of the amount borrowed from informal sources is also negative, suggesting substitution of expensive borrowing with cheaper MFI borrowing (an explicit objective of Spandana), and the point estimate, though insignificant, is quite similar in absolute value to the increase in MFI borrowing (column 5). However, given the high level of informal borrowing, this corresponds to a decline of only 2.6%: When we examine the distribution of endline 1 informal borrowing, in Figure 1, informal borrowing is significantly lower in treatment areas from the 30th to 65th percentiles. Overall, treatment affects the index of borrowing outcomes, and the p-value is small even when accounting for multiple hypothesis testing across families (column 9).

After the end of the first endline, following our initial agreement with Spandana, Spandana started to expand in these areas. Other MFIs also continued their expansion. However, two years later a significant difference still remained between Spandana slums and others: Table 2 Panel B shows that 17% of the households in the treatment slums borrowed from Spandana, against 11% in the control slums. Other MFIs continued to expand both in the former treatment and control slums, and MFI lending overall was almost the same in the treatment and the control group. By the second endline survey, 33.1% of households had borrowed from an MFI in the former control slums, and 33.3% in the treatment slums. Since lending started later in the control group, however, households in the treatment group had on average been borrowing for longer than those in the control group, which is reflected in the fact that they had completed more loan cycles. On average, there was a difference of 0.085 loan cycles between the treatment and the control households at endline 2 (column 8), which is almost unchanged from endline 1.[13] The primary difference between treatment and control group at endline 2 is thus the length

[13]This difference is no longer significant at EL2, possibly owing to recall error and to the fact that we only collected information on the maximum number of cycles borrowed from any MFI, so this figure does not distinguish, e.g., a household that borrowed three cycles each from two lenders versus three cycles from one lender.

of access to microfinance. Since microfinance loans grow with each cycle, treatment households also had larger loans. Among those who borrow, there was by endline 2 a significant difference of about Rs. 2,300 (or 14%) in the size of the loans (not reported). Since about one third of households borrow, this translates into an (insignificant) difference of about Rs. 800 in average borrowing (column 3).

4.2 New businesses and business outcomes

Panel A in Table 3 presents the results from the first endline on business outcomes. Column 8 indicates that the probability that a household starts a business is in fact not significantly different in treatment and control areas. In comparison areas, 4.7% of households opened at least one business in the year prior to the survey, compared to 5.6% in treated areas (column 8). However, treatment households were *somewhat more likely to have opened more than one business* in the past year, and column 10 shows that more new businesses were created in treatment areas overall: 6.8 per 100 households, versus 5.3 per 100 households in control areas. The 90% confidence interval on new business creation ranges from an additional 0.3pp to 2.6pp additional new businesses. Overall treatment households are no more likely to have a business and they don't have significantly more businesses (columns 6 and 7).

Consistent with the fact that Spandana lends only to women, and with the stated goals of microfinance institutions, the marginal businesses tend to be female-operated: column 11 shows that when we look at creation of businesses that are owned by women[14] (column 11), we find that almost all of the differential business creation in treatment areas is in female-operated businesses–there are 0.014 percentage points more female-owned businesses in treatment than in control areas, an increase of 55%. Households in treated areas were no more likely to report closing a business, an event reported by 3.9% of households in treatment areas and 3.7% of the households in comparison areas (column 9).[15]

Treatment households invest more in durables for their businesses. Since only a third of

[14]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. Only 72 out of 2674 businesses have more than one owner. Classifying a business as owned by a woman if any person named as the owner is female does not change the result.

[15]It is possible that households not represented in our sample, such as households that had not lived in the area for three years, may have been differentially likely to close businesses in treated areas. However, the relatively small amount of new business creation makes general-equilibrium effects on existing businesses rather unlikely.

households have a business, and most businesses use no assets whatsoever, the point estimate is small in absolute value (Rs. 391 over the last year, or a bit less than a third of the increase in average MFI borrowing in treatment households) but the increment in treatment is more than the total value of business durables purchased in the last year by comparison households (Rs. 280), and is statistically significant.

The rest of the columns in the Panel A of Table 3 report on current business status and last month's revenues, inputs costs, and profits (exclusive of interest payments). In these regressions, we assign a zero to those households that do not have a business, so these results give us the overall impact of credit on business activities, including both the extensive and intensive margins. Treatment households have more business assets (although the t-statistic on the asset stock is only 1.56). The treatment effects on revenues and inputs are both positive but insignificant.

Finally, there is an insignificant increase in business profits (column 5). Since this data includes zeros for households that do not have a business, this answers the question of whether microcredit, as it is often believed, increases poor households' income by expanding their business opportunities. The point estimate, at Rs. 354 per month, corresponds to a roughly 50% increase relative to the profits received by the average comparison household. This is thus large in proportion to profits, but it represents only a very small increase in disposable income for an average household–recall that the average total consumption of these households is about Rs. 7,000 per month and an increase of Rs. 354 per month in business revenues is certainly not going to change the life of the average person who gets access to microcredit.

Looking at all businesses outcomes taken together, we find a 0.037 standard deviation increase in the standardized index of business outcomes, which is significant with conventional standard errors but not (p-value of 0.17) once the multiple hypothesis testing across different families of outcomes is taken into account.[16]

This is the ITT estimate, and part of the reason it is low is that few households took advantage of microcredit in the treatment groups (and some did in the control as well). The marginal borrower in the treatment group may also have fewer opportunities than someone who was interested enough to borrow in the control group. This does not rule out that the businesses of some specific groups could have benefited from the loan. To look at this in more

[16]It is significant even with this correction when we control for strata dummies

detail, we focus on businesses that were already in existence before microcredit started. We do this in Table 3B.[17] For businesses that existed before Spandana expanded, we find an expansion in businesses (sales, inputs and investment), and the overall business index is significant and positive, even after correcting for multiple inference (0.09 standard deviation, with a p value of 0.057 after the correction). We find an average increase in profits of Rs. 2,206 in treatment areas, which is statistically significant and represents more than doubling, relative to the control mean of Rs. 2,000. This increase is not due to a few outliers; however, it is worth nothing it is concentrated in the upper tail (quantiles 95 and above), as shown in Figure 2. At every other quantile, there is very little difference between the profits of existing businesses in treatment and control areas. There are 75 businesses above the 95th percentiles, so it is not a handful, but the 95th percentile of monthly profit of existing businesses is Rs. 14,600 (or $1590 at PPP), which makes them quite large and profitable businesses in this setting. The vast majority of the small businesses make very little profit to start with, and microcredit does nothing to help them. The finding that microcredit is most effective in helping already-profitable businesses is contrary both to much of the rhetoric of microcredit and the view of microcredit skeptics.

Finally, we have seen that the treatment led to some more business creation, particularly female-owned businesses. In Figure 3, and Tables 3C and A4, we show more data on the characteristics of these new businesses. The quantile regressions in Figure 3 (profits for businesses that did not exist at baseline) show that all businesses between the 35th and 65th percentiles have significantly lower profits in treatment areas. Table 4, column 5 shows that the mean profit is not significantly different across treatment and control due to the noisy data, but the median new business in treatment areas has Rs. 1,250 lower profits, significant at the 5% level (not reported in tables, but shown in the figure). The average new business is also significantly less likely to have employees in the treatment areas: the number of employees per new business 0.29 to only 0.11 (column 6). For new businesses, the index across all outcomes is negative (0.081 standard deviations) and significant with conventional levels but not after correcting for multiple inference (p value, 0.028).

These results could in principle be a combination of a treatment effect and a selection effect,

[17] In Table 3, we show that households are no more or less likely to close a business in the last year, thus there is no sample selection induced by microfinance.

but since the effect on existing businesses suggests a treatment effect which is close to zero for most businesses (and the point estimate is positive), the effect for new businesses is likely due to selection–the marginal business that gets started in treatment areas is less profitable than the marginal business in the control areas. The hypothesis that the marginal business that gets started is different in the treatment group gains some additional support in Appendix Table 4, which shows a comparison of the industries of old businesses and new businesses, across treatment and comparison areas.[18] Industry is a proxy for the average scale and capital intensity of a business, which is likely to be measured with less error than actual scale or asset use. The industry composition of new businesses do differ. In particular, the fraction of food businesses (tea/coffee stands, food vendors, kirana/small grocery stores, and agriculture) is 8.5 percentage points (about 45%) higher among new businesses in treatment areas than among new businesses in comparison areas, and the fraction of rickshaw/driving businesses among new businesses in treatment areas is 5.4 (more than 50%) percentage points lower. Both these differences are significant at the 10% level. Food businesses are the least capital-intensive businesses in these areas, with assets worth an average of just Rs. 930 (mainly dosa tawas, pots and pans, etc.). Rickshaw/driving businesses, which require renting or owning a vehicle, are the most capital-intensive businesses, with assets worth an average of Rs. 12,697 (the bulk of which is the cost of the vehicle).

Microcredit would be expected to lower the profitability threshold to start a business, if interest rates are lower than those of other sources of lending available to the households. Another explanation for both results could be that, due to the fact that Spandana lends to women, the marginal businesses are more likely to be female owned, and are thus started in sectors in which women are active. Furthermore, businesses operated by women generally tend to be less profitable, perhaps because of social constraints on what they can do and how much effort they can devote to an enterprise.[19]

Panel B of Table 3 shows the results for the business performance variables at the time of the second endline. As remarked already, by this time treatment and control households are equally likely to have a microcredit loan, but the loan in treatment areas is bigger and borrowers

[18]Respondents could classify their businesses into 22 different types, which we grouped into the following: food, clothing/sewing, rickshaw/driving, repair/construction, crafts vendor, and "other."

[19]This is true in this data, and also found for example in Sri Lanka by de Mel et al. (2009).

have been borrowing for a longer time. The results follow a clear pattern, consistent with the idea that control households now borrow at the same rate. We find no significant difference in business creation in treatment and control areas: the point estimate is virtually zero (the 90% confidence interval ranges from 2pp fewer new businesses, to 2.5pp more). The new businesses are in the same industries in treatment and control areas, and the negative effects for new businesses at the median have disappeared (results omitted). For the contemporaneous flow investment outcomes such as new business creation, business assets acquired in the previous year, etc. (columns 8 through 11) the point estimate is very close to zero (however the standard errors are large). On the other hand, businesses in treatment areas have significantly larger asset stock (column 1), which reflects the cumulative effect of the past years during which they had a chance to borrow and expand. Despite this, their profits are still not significantly larger, though the point estimate is around 60% of the sample mean (with a t-statistic of around 1.5). As shown in Figure 4, the positive increase is once again concentrated in the top and bottom tails, although it starts being positive a little earlier, at the 85th percentile.

Overall, microfinance is indeed associated with (some) business creation: in the first year, it does lead to an increase in the number of new businesses created, particularly by women (though not in the number of households that start a business). However, these marginal businesses are even smaller and less profitable than the average business in the area (the vast majority of which are already small and unprofitable). It does also lead to a greater investment in existing businesses, and an improvement in the profits for the most profitable of those businesses. For everyone else, business profits do not increase, and on average microfinance does not help the businesses to grow in any significant way. Even after three years, there is no increase in the number of employees of businesses that existed before Spandana started its operation.

4.3 Labor supply

Access to credit can lead to an increase in labor supply to finance an investment or the purchase of durable goods which were out of reach before due to savings and borrowing constraints. This is an area where different evaluations of microcredit have very different results, ranging from a worrying increase in labor supply for teenagers in Augsburg et al. (2013) to steep decreases for everyone in Crépon et al. (2013). Table 5 shows the impact of the program on labor supply. In

endline 1, the household head and spouse in treatment households increase their overall labor supply by an average of 3.18 hours (90% CI: 0.84, 5.5). The increase occurs entirely in the households' own businesses, and there is no increase in number of hours worked for wages: those hours may be much less elastic, if the households do not fully choose them. However, we do not find the increase in teenagers' labor supply that is sometimes feared to be a potential downside of microfinance and that was found in the Bosnia study (as the adolescents are drawn into the business by their parents); indeed teenage girls work about two hours less per week in treatment than control areas, and this difference is significant. Given that there is an increase among adults and a decrease among teens, the overall index is, not surprisingly, close to zero and insignificant. By endline 2, as control households have started borrowing, the difference between treatment and control disappears.

4.4 Consumption

Table 6 gives intent-to-treat estimates of the effect of microfinance on household spending. Columns 1 and 3 of Panel A shows that there is no significant difference in total household expenditures–either total or non-durable–per adult equivalent, between treatment and comparison households. The point estimate is essentially zero in both cases and we can reject at the 5% level the null hypothesis that there was a Rs. 85 per month increase in total consumption per adult equivalent and Rs. 56 in non-durable consumption (about 6% of the average in control for consumption, and 4% for non-durable consumption) increase.[20] Hence, enhanced microcredit access does not appear to be associated with any meaningful increase in consumption after 15 to 18 months. Of course, this may partly be due to the fact that relatively few people borrow, and that some in the control group borrow from another MFI.[21]

While there are no significant impacts on average consumption and non-durable consumption, there are shifts in the composition of expenditure: column 2 shows that households in treatment areas spent a statistically significant Rs. 17.08 more per capita per month[22], or Rs. 205 per

[20]The 90% CIs are (-51, 71) for total consumption and (-59, 46) for non-durable consumption.

[21]For total consumption, the implied treatment on the treated (TOT) or IV estimate is a Rs. 119 (10/.084), or 5%, increase, and for non-durable consumption it is a Rs. 75 (4%) decrease. However, the 90% confidence interval on the TOT estimate is wide, ranging from an increase of Rs 840 (or 60%) to a decrease of Rs. 600 (or 43%). The width of the TOT confidence intervals stems, of course, from the low first stage.

[22]The 90% CI is (1, 33).

capita over the last year, on durables than did households in comparison areas. Note that this is probably an underestimate of the total effect of loans on durable purchases, since our measure would miss anyone who borrowed more than a year before the survey (the survey was 15 to 18 months after the centers opened) and immediately bought a durable with the loan. The most commonly purchased durables include gold and silver, motorcycles, sarees (purchased in bulk, presumably mainly for weddings or as stock for a business), color TVs, refrigerators, rickshaws, computers and cellphones.

Columns 7 and 8 show that while there was no detectable change in non-durable spending otherwise; the increase in durable spending by treatment households was essentially offset by reduced spending on "temptation goods" and festivals. Temptation goods are goods that households in our baseline survey said that they would like spend less on (this is thus the same list of goods for all households). They include in this case alcohol, tobacco, betel leaves, gambling, and food consumed outside the home. Spending on temptation goods is reduced by about Rs. 9 per capita per month (column 7). We also see in column 8 a large fall in festival spending per capita in the previous year (Rs. 12 or 20% of the control level, significant at the 10% level). Together, the average drop in consumption in temptation goods and festivals is Rs. 21 per capita per month. The decrease in festival expenditures does not come from large changes in large, very expensive ceremonies such as weddings (we see very few of them in the data) but rather appears to come from declines at all levels of the distribution of spending on festivals.

The absolute magnitude of these changes is relatively small: for instance, the Rs. 17 of increased durables spending per capita per month at endline 1 is approximately $1.75 at 2007 PPP exchange rates. However, this represents an increase of about 17% relative to total spending on durable goods in comparison areas. Furthermore, this figure averages over non-borrowers and borrowers, and would be larger if it was attributed to borrowers alone.

Panel B of Table 6 reports on the impact effects at the time of the second endline, when both treatment and control households have access to the microfinance program. The effects on both total per capita spending and total per capita non-durable spending (columns 1 and 3) are negative with t-statistics around 1. Spending on temptation goods is still lower by about Rs. 10 per month (column 7), similar to endline 1, though the effect is now insignificant. The effect on festivals is now positive but insignificant. There is also no difference on average in durable

goods spending in endline 2 (column 2). Given that the main difference between treatment and control households at endline 2 is that treatment households have been borrowing for longer, this suggests that, in the second cycle, households in the treatment seem to just repeat the first cycle with another durable (of roughly the same size), while households in the control group also acquire a durable.

4.5 Microfinance as social revolution: education, child labor, and women's empowerment?

The evidence so far suggests a different picture from the standard description of the role of microfinance in the life of the poor: the pent-up demand for it is not overwhelming; many households use their loan to acquire a household durable, reducing avoidable consumption to finance it; some invest in their businesses, but this does not lead to significant growth in the profitability of most businesses. Another staple of the microfinance literature is that because the loans are given to women and give them a chance to start their own businesses, this would lead to a more general empowerment of women in the households, and this empowerment would in turn translate in better outcomes for everyone, including education, health, etc. (e.g. CGAP, 2009). Indeed, we see a significant increase in the number of businesses managed by women in endline 1 (Table 7, column 9).[23] To examine whether this increase in women's entrepreneurship translates into increased bargaining power for women, Table 7 examines the effects of access to microfinance on measures of women's decision-making and children's education and labor supply.

A finding of many studies of household decision-making is that an increase in women's bargaining power leads to an increase in investments in children's human capital (see Thomas, 1990 and Duflo, 2003). However, we find that there is no change in the probability that children or teenagers are enrolled in school (Table 7, columns 1, 2, 5 and 6), although we do see a reduction in teenage girls' labor supply (Table 5, column 5). There is no difference in private school fees, or in private school versus public school enrollment (results not reported to save space). There is also no difference in the number of hours worked by girls or boys aged 5 to 15

[23]There is no difference in the number of women-run businesses between treatment and control in endline 2, which is unsurprising since all areas have access to microfinance at that point.

(columns 3 and 4).

Because there are many possible proxies for women's empowerment, and many "social" outcomes we use the approach of Kling et al. (2007) to test the null hypothesis of no effect of microcredit on "social outcomes" against the alternative that microcredit improves social outcomes. We construct an equally weighted average of z-scores for the 16 social outcomes; this method gives us maximal power to detect an effect on social outcomes, if such an effect is present.[24] Column 7 shows that there is no effect on the index of social outcomes (point estimate .007 standard deviations) and we can rule out an increase of more than one twentieth of a standard deviation with 95% confidence.[25]

This suggests that there is no *prima facie* evidence that microcredit leads to important changes in household decision-making or in social outcomes. Furthermore, this appears to be not only because we observe this only in the short run. Nothing major changes by endline 2: the effect of microfinance access on the index of women empowerment is still very small (indeed, slightly negative) and insignificant, and anything but a small effect can still be ruled out. Recall that we are comparing households who, by EL2, are equally likely to borrow: the main difference by EL2 is that households in the treatment group have had greater access to microfinance for the first 18 months; this may limit power to detect differences in the social outcomes at the community level.

5 Conclusion

This study–the first and longest running evaluation of the standard group-lending loan product that has made microfinance known worldwide–yields a number of results that may prompt a rethinking of the role of microfinance.

The first result is that, in contrast to the claims sometimes made by MFIs and others (including our partner), demand for microloans is far from universal. By the end of our three-

[24]The 16 outcomes we use are: 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 enrollment; and counts of female children under one year and one to two years old. We selected these outcomes because they would likely be affected by changes in women's bargaining power within the household.

[25]The 95% CI is (-.04, .05). The units are standard deviations.

year study period, only 38% of households borrow from an MFI[26], and this is among households selected based on their relatively high propensity to take up microcredit. This does not appear to be an anomaly: two other randomized interventions that have a similar design (in Morocco and in Mexico) also find relatively low take-up, while another study in rural South India that focuses specifically on take-up of microfinance also finds it to be low (Banerjee et al. 2013). Perhaps despite evidence of high marginal rates of return among microbusinesses, e.g. de Mel et al. (2008), most households either do not have a project with a rate of return of at least 24%, the APR on a Spandana loan, or simply prefer to borrow from friends, relatives, or moneylenders due to the greater flexibility those sources provide, despite costs such as higher interest (from moneylenders) or embarrassment (when borrowing from friends or relatives) (Collins et. al 2009).

For those who choose to borrow, while microcredit "succeeds" in leading some of them to expand their businesses (or choose to start a female-owned business), it does not appear to fuel an escape from poverty based on those small businesses. Monthly consumption, a good indicator of overall welfare, does not increase for those who had early access to microfinance, neither in the short run (when we may have foreseen that it would not increase, or perhaps even expected it to *decrease*, as borrowers finance the acquisition of household or business durable goods), nor in the longer run, after this crop of households have access to microcredit for a while, and those in the former control group should be the ones tightening their belts. Business profit does not increase for the vast majority of businesses, although there are significant increases in the upper tail of profitability. This study took place in a dynamic urban environment, in a context of very high growth. Microcredit seems to have played very little part in it but may have had different impacts in other settings.

Furthermore, in the Hyderabadi context, we find that access to microcredit appears to have no discernible effect on education, health, or women's empowerment in the short run. In the longer run (when borrowing rates are the same, but households in the treatment groups have on average borrowed for longer), there is still no impact on women's empowerment or other social outcomes. The results differ from study to study on these outcomes, but as a whole they don't paint a picture of dramatic changes in basic development outcomes for poor families.

[26]The take-up rate is 42% in treatment areas and 33% percent in control areas.

Microcredit therefore may not be the "miracle" that it is sometimes claimed to be, although it does allow some households to invest in their small businesses. One reason may be that the average business run by this target group is tiny (almost none of them have an employee), not particularly profitable, and difficult to expand, even in a high-growth context, given the skill sets of the entrepreneurs and their life situations. And the marginal businesses that get created thanks to microcredit are probably even less profitable and dynamic: we find that the average new business in a microcredit treatment area is less likely to have an employee than the new business in the control areas, and the median new business is even less profitable in treatment versus control areas.

Nevertheless, microcredit does affect the structure of household consumption. We see households invest in home durable goods and restrict their consumption of temptation goods and expenditures on festivals and parties. They continue to do so several years later, and this decrease is not due to a few particularly virtuous households, but seems to be spread across the sample. Similar declines in these types of expenses are also found in all the other studies. Altered consumption thus does not seem to be tied to the ideology of a particular MFI.

Microfinance affects labor supply choices as well: here we find that households that have access to loans seem to work harder on their own businesses; in other settings they are found to cut arduous labor elsewhere. Thus, microcredit plays its role as a financial product in an environment where access is limited, not only to credit but also to saving opportunities. It expands households' abilities to make different intertemporal choices, including business investment. The only mistake that the microcredit enthusiasts may have made is to overestimate the potential of businesses for the poor, both as a source of revenue and as a means of empowerment for their female owners.

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A Appendix 1: Variable definitions

Go to http://www.centre-for-microfinance.org/publications/data/ to download the El1 and EL2 survey instruments (both in English and in Telugu).

A.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 months 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 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.

A.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.

A.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.

A.4 Multiple inference correction of index variables

For each table (which corresponds to a "family" of outcomes) we report an index (a la Katz, Kling and Liebman 2007) of all the outcomes in the family taken together. One index is computed for EL1 and a separate index for EL2. The variables are signed such at that a positive treatment effect is a "good" outcome. They are then normalized by subtracting the mean in the control group and dividing by the standard deviation in the control group. The index is the simple average of the normalized variables.

To control the FWER across the indices of dependent variables in each table, we adjust their respective p-values as follows, following Hochberg (1988). First, we rank, in increasing order, the p-values for the coefficients of the treatment indicator in each of the regressions for the indices. We then multiply each original p-value by (m + 1 – k), where m is the number of indices (8 for endline 1 outcomes, 7 for endline 2 outcomes[27]) and k is the rank of the original p-value. If the resulting value is greater than 1, we assign an adjusted p-value of ">.999."

[27]There are only 7 indices for EL2 because Table 3C (self-employment outcomes for new EL1 businesses) does not include El2 outcomes.

Table 1A. Baseline summary statistics

	(1)	(2)	(3)	(4)	(5)
	Control Group			Treatment - Control	
	Obs	Mean	St. Dev.	Coeff.	*p-value*
Household composition					
# members	1,220	5.038	(1.666)	0.095	0.303
# adults (>=16 years old)	1,220	3.439	(1.466)	-0.011	0.873
# children (<16 years old)	1,220	1.599	(1.228)	0.107	0.092
Male head	1,216	0.907	(0.290)	-0.013	0.353
Head's age	1,216	41.150	(10.839)	-0.260	0.656
Head with no education	1,216	0.370	(0.483)	-0.008	0.779
Access to credit:					
Loan from Spandana	1,213	0.000	(0.000)	0.007	0.195
Loan from other MFI	1,213	0.011	(0.103)	0.007	0.453
Loan from a Bank	1,213	0.036	(0.187)	0.001	0.859
Informal loan	1,213	0.632	(0.482)	0.002	0.958
Any type of loan	1,213	0.680	(0.467)	0.002	0.942
Amount borrowed from (in Rs):					
Spandana	1,212	0	(0.000)	69	0.192
Other MFI	1,212	201	(2,743)	170	0.569
Bank	1,212	7,444	(173,339)	-5,426	0.278
Informal loan	1,212	28,477	(65,336)	-587	0.852
Total	1,212	37,917	(191,369)	-5,903	0.341
Self-employment activities					
# of activities	1,220	0.320	(0.682)	-0.019	0.579
# of activities managed by women	1,220	0.145	(0.400)	-0.007	0.750
share of HH activities managed by women	295	0.488	(0.482)	-0.006	0.904
Businesses					
Sales/month (Rs)	295	15,991	(53,489)	4,501	0.539
Expenses/month (Rs)	295	3,617	(26,144)	641	0.751
Investment/month (Rs)	295	385	(3,157)	14	0.959
Employment (employees)	292	0.156	(0.799)	0.157	0.176
Self-employment (hours per week)	287	57.957	(34.456)	-0.452	0.902
Businesses (all households)					
Sales/month (Rs)	1,220	3,867	(27,147)	904	0.626
Expenses/month (Rs)	1,220	875	(12,933)	116	0.812
Investment/month (Rs)	1,220	109	(1,618)	23	0.772
Employment (employees)	1,220	0.037	(0.396)	0.033	0.215
Self-employment (hours per week)	1,220	14.014	(30.044)	-0.675	0.674
Consumption (per household per month)					
Total consumption (Rs)	1,220	4,888	(4,074)	270	0.232
Non-durables consumption (Rs)	1,220	4,735	(3,840)	252	0.235
Durables consumption (Rs)	1,220	154	(585)	18	0.531
Asset Index	1,220	1.941	(0.829)	0.027	0.669

Notes: Data source: Baseline household survey. Unit of observation: household. Standard errors of differences, clustered at the area level, in parentheses. Sample includes all households surveyed at baseline. Informal lender includes moneylenders, loans from friends/family, and buying goods/services on credit from seller. Asset index is calculated on a list of 40 home durable goods. 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.

Table 1B. Endline 1 and 2 summary statistics (control group)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	EL1 Control Group			EL2 Control Group			EL2-EL1	
	Obs	Mean	St. Dev.	Obs	Mean	St. Dev.	Coeff.	p-value
Household composition								
# members	3,264	5.645	(2.152)	2,943	6.269	(2.548)	0.624	0.000
# adults (>=16 years old)	3,264	3.887	(1.754)	2,943	4.039	(1.848)	0.152	0.000
# children (<16 years old)	3,264	1.738	(1.310)	2,943	1.764	(1.321)	0.026	0.247
Male head	3,261	0.894	(0.308)	2,939	0.810	(0.392)	-0.083	0.000
Head's age	3,257	41.143	(10.223)	2,939	42.260	(10.155)	1.117	0.000
Head with no education	3,256	0.311	(0.463)	2,939	0.292	(0.455)	-0.019	0.022
Access to credit:								
Loan from Spandana	3,247	0.051	(0.219)	2,943	0.111	(0.315)	0.061	0.000
Loan from other MFI	3,183	0.149	(0.356)	2,943	0.268	(0.443)	0.120	0.000
Loan from a Bank	3,247	0.079	(0.270)	2,943	0.073	(0.260)	-0.006	0.480
Informal loan	3,247	0.761	(0.427)	2,943	0.603	(0.489)	-0.158	0.000
Any type of loan	3,264	0.887	(0.317)	2,943	0.905	(0.293)	0.018	0.036
Amount borrowed from (in Rs):								
Spandana	3,247	597	(2,907)	2,943	1,567	(5,618)	969	0.000
Other MFI	3,200	1,806	(5,918)	2,943	4,775	(10,736)	2,969	0.000
Bank	3,247	8,422	(101,953)	2,943	6,127	(40,307)	-2,296	0.221
Informal loan	3,247	41,045	(78,033)	2,943	32,356	(76,704)	-8,689	0.000
Total	3,264	59,836	(133,693)	3,264	88,631	(144,634)	28,795	0.000
Self-employment activities								
# of activities	3,234	0.436	(0.718)	2,943	0.561	(0.787)	0.125	0.000
# activities mnged by women	3,174	0.160	(0.435)	2,943	0.234	(0.520)	0.074	0.000
share activities mnged by women	1,043	0.378	(0 .462)	1,231	0.403	(0.454)	0.024	0.159
Businesses								
Sales (Rs)	1,019	14,845	(56,820)	1,218	14,066	(23,713)	-780	0.671
Expenses (Rs)	1,051	12,175	(51,996)	1,218	12,568	(30,483)	394	0.832
Investment (Rs)	1,104	802	(6,876)	1,231	2,331	(14,645)	1,529	0.002
Employment (employees)	1,080	0.383	(1.657)	1,231	0.565	(2.938)	0.181	0.066
Self-employment (hrs/wk)	1,080	45.369	(62.033)	1,231	52.182	(51.826)	6.814	0.231
Businesses (all households)								
Sales/month (Rs)	3,145	4,856	(33,108)	2,930	5,847	(16,784)	991	0.105
Expenses/month (Rs)	3,177	4,055	(30,446)	2,930	5,225	(20,603)	1,169	0.088
Investment/month (Rs)	3,231	280	(4,038)	2,943	1,007	(9,623)	727	0.001
Employment (employees)	3,207	0.131	(0.981)	2,943	0.236	(1.920)	0.106	0.011
Self-employment (hrs/wk)	3,207	15.512	(42.130)	2,943	21.827	(42.258)	6.315	0.003
Consumption (per household per month)								
Consumption	3,248	6,375	(4,906)	2,943	8,787	(6547)	2,412	0.000
Non-durables consumption	3,230	5,831	(4,212)	2,943	8,050	(5,780)	2,219	0.000
Durables consumption	3,230	551	(1,623)	2,941	720	(1,536)	169	0.000
Asset Index	3,254	2.287	(0.869)	2,943	2.662	(0.828)	0.375	0.000

Notes: Summary statistics for comparison areas only. Standard errors of differences, clustered at the area level, in parentheses (col 3). All monetary amounts in 2007 Rs. Asset index is calculated on a list of 40 home durable goods. 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.

Table 2. Credit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Spandana	Other MFI	Any MFI	Other Bank	Informal	Total	Ever late on payment?	Number of cycles borrowed from an MFI	Index of dependent variables
Panel A: Endline 1									
Credit access									
Treated area	0.127***	-0.012	0.084***	0.003	-0.052**	-0.023	0.052***	0.084**	0.0881
	(0.020)	(0.024)	(0.027)	(0.012)	(0.021)	(0.014)	(0.018)	(0.041)	(0.0289)
Observations	6,811	6,657	6,811	6,811	6,811	6,862	6,475	6,811	6,862
Control mean	0.051	0.149	0.183	0.079	0.761	0.867	0.433	0.330	0.000
Hochberg-corrected p-value									0.003
Loan amounts (in Rupees)									
Treated area	1334***	-94	1286***	75	-1069	2856			
	(230)	(336)	(439)	(2163)	(2520)	(4548)			
Observations	6,811	6,708	6811	6,811	6,811	6,862			
Control mean	597	1,806	2374	8,422	41,045	59,836			
Panel B: Endline 2									
Credit access									
Treated area	0.063***	-0.039	0.002	0.001	0.002	0.000	0.007	0.085	0.0288
	(0.019)	(0.026)	(0.029)	(0.009)	(0.018)	(0.010)	(0.021)	(0.067)	(0.0253)
Observations	6,142	6,142	6,142	6,142	6,142	6,142	6,142	5,926	6,142
Control mean	0.111	0.268	0.331	0.073	0.603	0.904	0.598	0.724	0.000
Hochberg-corrected p-value									0.256
Loan amounts (in Rupees)									
Treated area	979***	-217	799	-1181	158	2554			
	(287)	(628)	(669)	(1086)	(2940)	(6156)			
Observations	6,142	6,142	6142	6,142	6,142	6,142			
Control mean	1,567	4,775	5544	6,127	32,356	88,632			

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers. Cols 1-6 under "Credit access" report the probability of having at least one loan from the source listed. The corresponding columns under "Loan amounts" report the loan amount (zero for non-borrowers).

(2) "Informal lender" includes moneylenders, loans from friends/family, and buying goods/services on credit. Number of loan cycles from an MFI is the maximum number of loan cycles borrowed with a single MFI, including the current loan (if any); number of cycles is zero for MFI never-borrowers.

(3) All monetary amounts in 2007 Rs.

(4) 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 (including both credit access and loan amounts) for each round following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(5) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 3. Self-employment activities: revenues, assets and profits (all households)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Assets (stock)	Investmt in last 12 months	Revenue	Expenses	Profit	Has a self-employment activity	Number of self-employmt activities	Has started a business in the last 12 months	Has closed a business in the last 12 months	New businesses	Female-run new businesses	Index of dependent variables
Panel A: endine 1												
Treated area	598	391*	927	255	354	0.009	0.021	0.009	0.002	0.015**	0.0143***	0.0365
	(384)	(213)	(1183)	(1056)	(314)	(0.022)	(0.033)	(0.006)	(0.008)	(0.007)	(0.00533)	(0.0188)
Observations	6,800	6,800	6,608	6,685	6,239	6,805	6,805	6,757	2,352	6,757	6,757	6,810
Control mean	2,498	280	4,856	4,055	745	0.342	0.436	0.047	0.037	0.053	0.026	0.000
Hochberg-corrected p-value												0.164
Panel B: endine 2												
Treated area	1261**	-134	266	-530	542	0.023	0.045	-0.000	-0.000	0.00283	-0.0047	0.0151
	(530)	(207)	(527)	(547)	(372)	(0.023)	(0.040)	(0.010)	(0.006)	(0.0135)	(0.00622)	(0.0186)
Observations	6,142	6,142	6,116	6,116	6,090	6,142	6,142	6,142	6,142	6,142	6,142	6,142
Control mean	5,003	1,007	5,847	5,225	953	0.418	0.561	0.083	0.053	0.093	0.0472	0.000
Hochberg-corrected p-value												>0.999

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.

(2) The outcome variables are set to zero when the household does not have a business.

(3) Business outcomes are aggregated at the household level when the households have more than one business.

(4) Information on closing a business in the year prior to the endline 1 survey was only collected for those who had a business as of endline 1.

(5) Observations with missing or inconsistent itemized sales or revenues are dropped in columns 3 to 5.

(6) See Appendix 1 for description of the construction of the profits, sales, and inputs variables.

(7) All monetary amounts in 2007 Rs.

(8) A new business is one started in the year prior to the survey. A female-run new business is such a business managed by a woman. Col 8 shows results for starting any new business; cols 10 and 11 show results for the number of such businesses started (equal to zero if none).

(9) Column 12 presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns 1-11 for each round following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(10) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 3B. Self-employment activities: revenues, assets and profits (households with old businesses)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Assets (stock)	Investment in last 12 months	Revenue	Expenses	Profit	Employees	Index of dependent variables
Panel A: endine 1							
Treated area	851	1,129	5,417	1,680	2206*	-0.05	0.0915
	(1083)	(713)	(3763)	(3291)	(1112)	(0.0843)	(0.0412)
Observations	2,054	2,054	1,929	1,994	1,598	2,054	2,054
Control mean	6,862	689	14,578	12,417	2,000	0.42	0.00
Hochberg-corrected p-value							0.057
Panel B: endine 2							
Treated area	1,715	-1,203	-15	-3589.2**	950	-0.16	-0.0162
	(1752)	(739)	(1502)	(1724)	(1160)	(0.120)	(0.0297)
Observations	1,559	1,559	1,540	1,543	1,525	1,559	1,559
Control mean	12,405	2,793	15,386	15,199	2,392	0.57	0.00
Hochberg-corrected p-value							>0.999

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.

(2) The outcome variables are set to missing when the household does not have an old business (i.e., one started more than a year prior to the survey).

(3) Business outcomes are aggregated at the household level when households have more than one business.

(4) Observations with missing or inconsistent itemized sales or revenues are dropped in columns 3 to 5.

(5) See Appendix 1 for description of the construction of the profits, sales, and inputs variables.

(6) All monetary amounts in 2007 Rs.

(7) Column 7 presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns 1-6 for each round following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(8) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 3C. Self-employment activities: revenues, assets and profits (households with new businesses, EL1 only)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Assets (stock)	Investment in last 12 months	Revenue	Expenses	Profit	Employees	Index of dependent variables
Treated area	-873	-706	-8,167	-5,013	-3,548	-0.195*	-0.0815
	(2201)	(1324)	(7314)	(4049)	(3813)	(0.112)	(0.0445)
Observations	356	356	332	339	270	356	356
Control mean	8,411	2,418	17,423	12,114	6,081	0.29	0.00
Hochberg-corrected p-value							0.280

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.

(2) The outcome variables are set to missing when the household does not have an new business (i.e., one started less than a year prior to the EL1 survey).

(3) Business outcomes are aggregated at the household level when the households have more than one business.

(4) Observations with missing or inconsistent itemized sales or revenues are dropped in columns 3 to 5.

(5) See Appendix 1 for description of the construction of the profits, sales, and inputs variables.

(6) All monetary amounts in 2007 Rs.

(7) Column 7 presents the coefficient of a "treatment" dummy in a regression on treatment of an index of z-scores of the outcome variables in columns 1-6 following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(8) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 4. Income

	(1) Self employment (profit)	(2) Daily labor/salaried	(3) Index of dependent variables
Panel A: endine 1			
Treated area	354	-526	-0.0501
	(314)	(358)	(0.0459)
Observations	6,239	6,827	6,832
Control mean	745	2,988	0.000
Hochberg-corrected p-value			>0.999
Panel B: endine 2			
Treated area	542	-141	0.0114
	(372)	(212)	(0.0261)
Observations	6,090	6,142	6,142
Control mean	953	5,514	0.000
Hochberg-corrected p-value			>0.999

Notes:

(1): The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with control variables listed in the text). Cluster-robust standard errors in parentheses. Results are weighted to account for oversampling of Spandana borrowers.

(2): Self-employment income equals profit of a self-employment activity (summed across activities if multiple in the household). Equal to zero for households with no self-employment activity.

(3): Daily labor/salaried income is income from employment other than self employment, summed across working

(4) See Appendix 1 for description of the construction of the profit variable.

(5) 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). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(6) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 5. Time worked by household members

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Hours worked over the past 7 days, by age group:									
	All adults and teens			**Teens**			**Household head and spouse**			Index of dependent variables
	total	*of which:*		total			total	*of which:*		
		self-employment	*outside activities*	*all*	*girls*	*boys*		*self-employment*	*outside activities*	
Panel A: endine 1										
Treated area	0.739	2.801	-2.368	-1.629	-2.076**	-0.026	3.176**	2.710*	0.466	0.00667
	(2.245)	(2.343)	(2.742)	(1.432)	(1.046)	(2.065)	(1.421)	(1.474)	(1.418)	(0.0178)
Observations	6,827	6,762	6,762	3,194	2,174	1,866	6827	6827	6827	6,849
Control mean	92.38	33.54	58.84	20.18	7.94	25.12	57.79	25.83	31.96	0.000
Hochberg-corrected p-value										>0.999
Panel B: endine 2										
Treated area	-1.238	1.713	-2.951	-0.358	0.440	-1.387	0.991	1.703	-0.712	-0.00555
	(1.544)	(2.162)	(2.490)	(1.226)	(0.948)	(1.521)	(1.176)	(1.583)	(1.488)	(0.0130)
Observations	6,142	6,142	6,142	2,762	1,789	1,665	6,142	6,142	6,142	6,142
Control mean	83.34	37.00	46.34	16.29	5.83	20.95	51.31	25.38	25.93	0.000
Hochberg-corrected p-value										>0.999

Notes:

(1) Teens are household members aged 16 to 20. Adults are household members aged 21 and above.

(2) Total hours includes hours worked in self-employment and in outside activities. It does not include time spent in housework.

(3) See Appendix 1 for description of the construction of the self-employment variable.

(4) 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 1-9 for each round following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

(5) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 6. Consumption (per capita per month)

	(1) Total	(2) Durables	(3) Non durable	(4) Food	(5) Health	(6) Education	(7) Temptation goods	(8) Festivals and celebrations	(9) Home durable good index
Panel A: endine 1									
Treated area	10.24	17.08*	-6.50	-9.34	-2.86	-0.78	-8.817*	-11.76*	-0.051
	(37.22)	(9.90)	(31.81)	(10.18)	(9.74)	(8.59)	(4.89)	(6.80)	(0.057)
Observations	6827	6781	6781	6827	6827	5415	6863	6827	6841
Control mean	1419	99	1305	438	116	140	84	58	2.37
Hochberg-corrected p-value	>0.999								
Panel B: endine 2									
Treated area	-48.83	1.25	-45.45	-11.20	-21.01	10.40	-10.07	5.62	-0.013
	(51.53)	(8.579)	(46.92)	(17.88)	(14.95)	(12.74)	(6.61)	(3.52)	(0.043)
Observations	6142	6140	6142	6142	6141	4910	6142	6103	6142
Control mean	1,914	131	1,755	687	187	206	118	90	2.66
Hochberg-corrected p-value	0.692								

Notes:

(1) Columns 1-8: Monthly per capita household expenditures. Temptation goods include alcohol, tobacco, betel leaves, gambling, and food consumed outside the home.

(2) Column 9 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.

(3) See Appendix 1 for description of the construction of the consumption variables.

(4) P-values for the regression in column 1 (total consumption) reported using Hochberg's step-up method to control the FWER across all outcomes. See text for details.

(5) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table 7. Social effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Share of children aged 5-15 in school		Hours worked per child aged 5-15 over the past 7 days:		Share of teenagers (aged 16-20) in school		Index of women's independence/ empowerment	% self-employ. activities managed by women (biz owners only)	Number new self-employ. activities managed by women (all HHs)	Index of dependent variables
	Girls	Boys	Girls	Boys	Girls	Boys				
Panel A: endine 1										
Treated area	-0.021	0.008	0.000	-0.004	-0.012	0.006	0.007	-0.003	0.0143***	0.01
	(0.027)	(0.021)	(0.003)	(0.003)	(0.010)	(0.012)	(0.023)	(0.024)	(0.005)	(0.0108)
Observations	6862	6862	6862	6862	6862	6862	6862	2368	6762	6862
Control mean	0.577	0.557	0.009	0.018	0.134	0.142	-0.001	0.377	0.026	0.000
Hochberg-corrected p-value										>0.999
Panel B: endine 2										
Treated area	0.019	0.006	0.001	-0.005	0.008	0.004	-0.011	-0.0436**	-0.005	-0.0057
	(0.025)	(0.021)	(0.002)	(0.003)	(0.011)	(0.012)	(0.021)	(0.022)	(0.006)	(0.00982)
Observations	6142	6142	6142	6142	6142	6142	6142	2644	6142	6142
Control mean	0.574	0.555	0.005	0.018	0.122	0.152	-0.003	0.403	0.047	0.000
Hochberg-corrected p-value										>0.999

Notes:

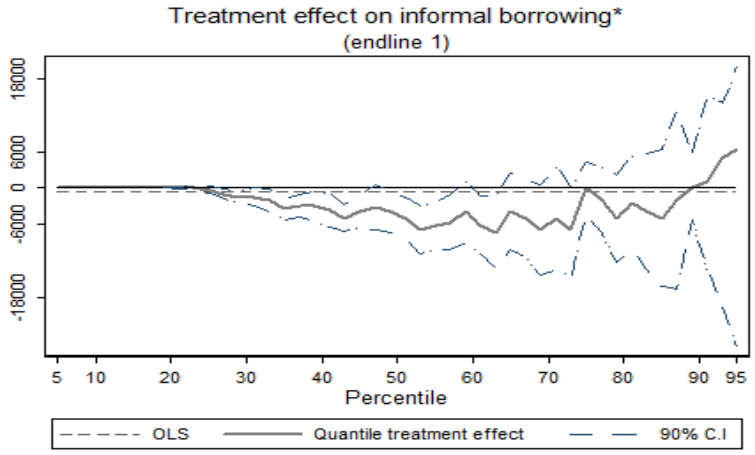
(1) In columns 1-4 the sample is restricted to households with children between the age of 5 and 15. In columns 5-6 the sample is restricted to households with teens between the age of 16 and 20.

(2) 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 enrollment; and counts of female children under one year and one to two years old.

(3) 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 1-9 for each round following Kling, Liebman, and Katz (2007). P-values for this regression are reported using Hochberg's step-up method to control the FWER across all index outcomes. See text for details.

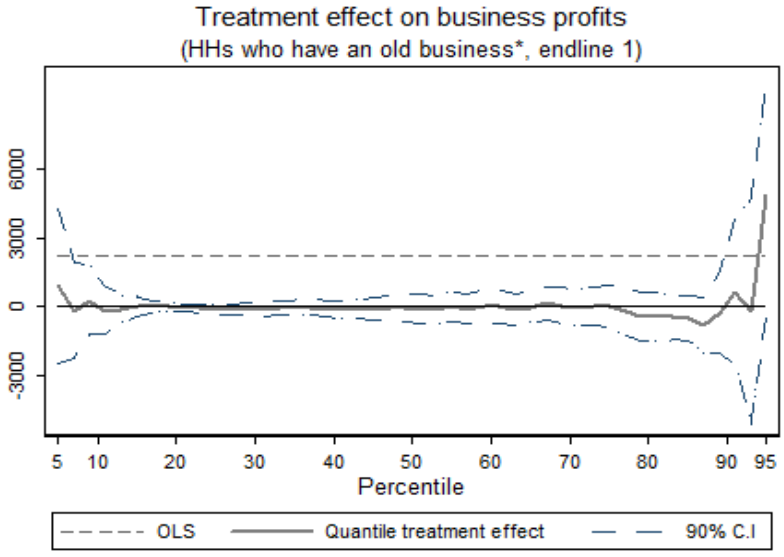
(4) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Figure 1:



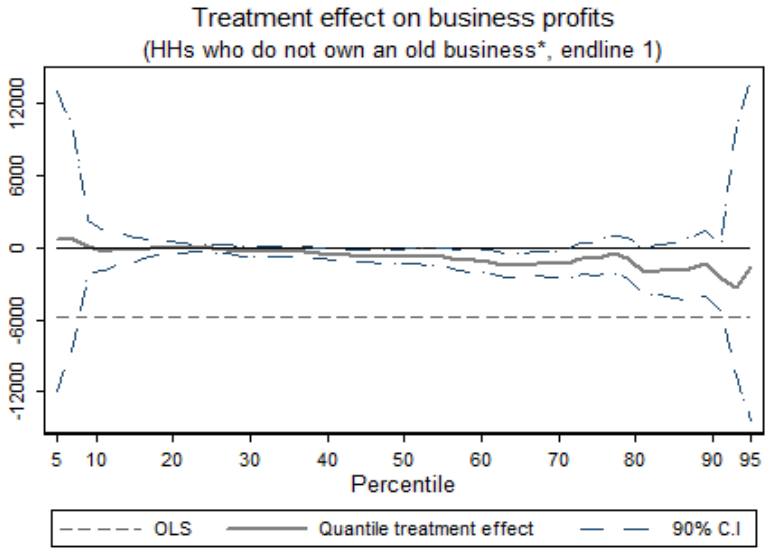
Informal borrowing: borrowing from moneylenders, friends and family, and buying goods on credit.
Confidence intervals are cluster-bootstrapped at the neighborhood level. For quantiles .05 to .20, confidence intervals are not reported because the quantile does not vary sufficiently across neighborhoods to bootstrap standard errors. The point estimates are zero for these quantiles.

Figure 2:



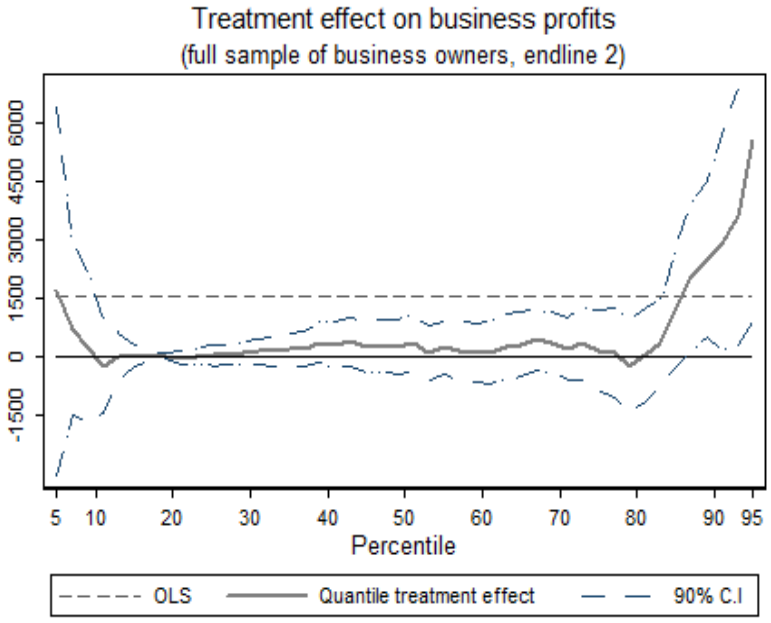
Old business: business started at least one year before the survey.

Figure 3:



Old business: business started at least one year before the survey.

Figure 4:



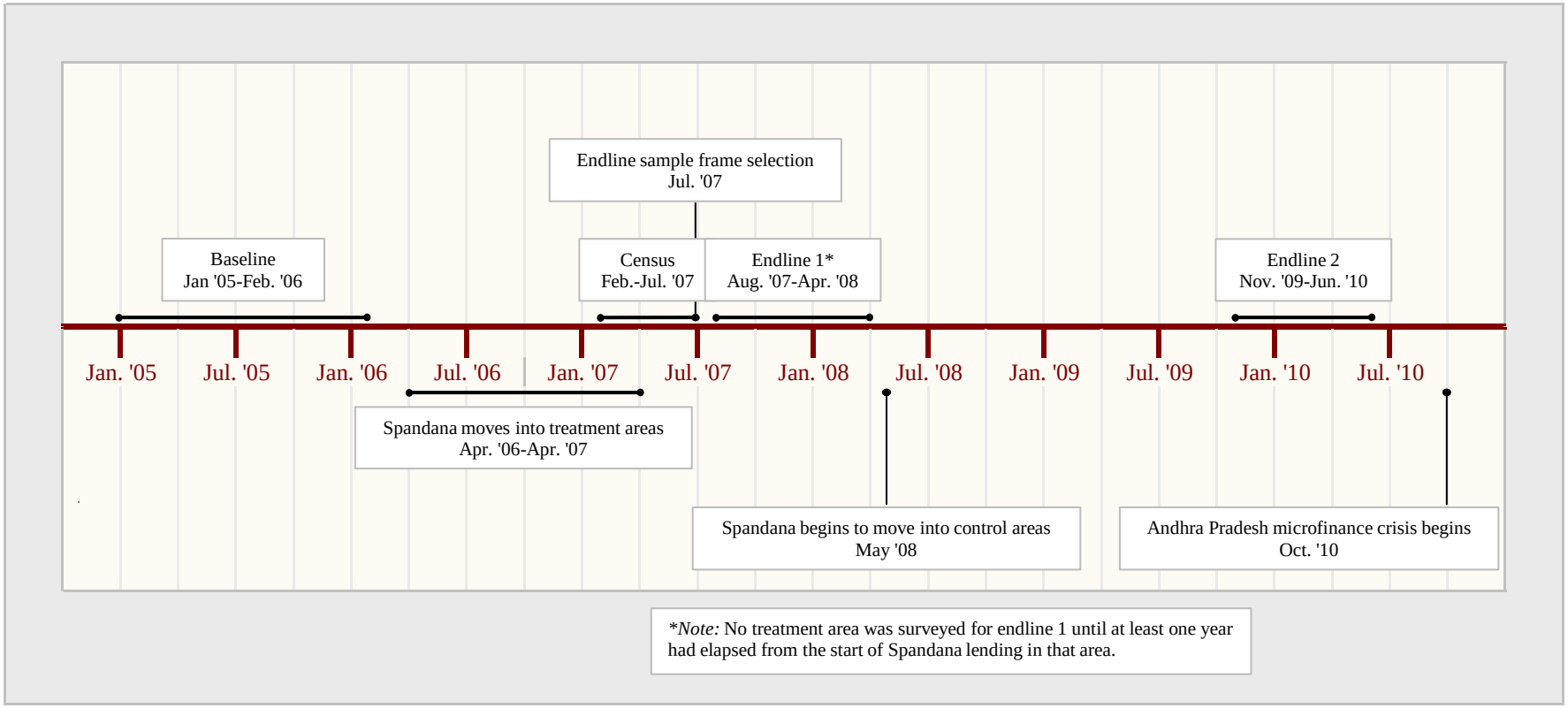


Figure 5: Timeline of intervention and data collection

Table A1: Treatment-Control balance in fixed characteristics

	Spouse is literate	Spouse works for a wage	Household size	Prime-aged women (18-45)	Any teen (13-18) in HH	Old businesses owned	Own land, Hyderabad	Own land, village
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Endline 1								
Treatment	-0.0015	-0.013	-0.031	-0.022	0.016	0.0011	-0.002	0.0045
	(0.0267)	(0.0257)	(0.0829)	(0.0282)	(0.0157)	(0.0301)	(0.00718)	(0.0284)
Control Mean	0.54	0.23	5.64	1.46	0.45	0.38	0.06	0.20
Control Std Dev	0.50	0.42	2.15	0.82	0.50	0.67	0.24	0.40
Obs	6139	6229	6827	6862	6862	6762	6830	6819
F-stat (joint significance on treatment):					0.249			
P(F>f)					0.980			
Panel B: Endline 2								
Treatment	0.018	-0.0044	-0.030	-0.015	0.0069	0.0085	0.018	0.025
	(0.0261)	(0.0295)	(0.101)	(0.0284)	(0.0168)	(0.0313)	(0.0135)	(0.0318)
Control Mean	0.56	0.26	6.27	1.48	0.46	0.38	0.09	0.24
Control Std Dev	0.50	0.44	2.55	0.85	0.50	0.67	0.29	0.42
Obs	6022	6016	6142	6142	6142	6059	6132	6127
F-stat (joint significance on treatment):					0.883			
P(F>f)					0.534			

Note: The table presents the coefficient of a "treatment" dummy in a regression of each variable on treatment (with no control variables). Cluster-robust standard errors in brackets. F-statistics (and corresponding p-values) are from a joint test of significance in a regression of treatment on all eight variables in each round. Results are weighted to account for oversampling of Spandana borrowers. "Spouse" is the wife of the household head, if the head is male, or the household head if female. Household size is the total number of household members (not adult equivalents). An old business is a business started at least 1 year before the endline 1 survey. * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table A2: Endline 1 attrition

Panel A: Endline 1 attrition in treatment vs. control

Found in endline 1, in treatment	0.724
Found in endline 1, in control	0.748
p-value of difference	*0.165*

	(1)	(2)	(3)	(4)
Panel B: Endline 1 attrition, by household characteristics (measured in census)				
Treatment	0.0243	0.0173		
	(0.0249)	(0.0256)		
Spandana borrower		-0.0422**		
		(0.0197)		
Pucca house		0.0266*		
		(0.0140)		
Months in slum		-0.000385		
		(0.000495)		
Woman's occupation: business		-0.0223		
		(0.0209)		
Woman's occupation: salaried		0.0223		
		(0.0201)		
Husband's occupation: business		0.00877		
		(0.0185)		
Husband's occupation: salaried		-0.0116		
		(0.0155)		
First Spandana loan date			-0.000297	
(treatment only)			(0.00072)	
10th pctile Spandana loan date				-0.000133
(treatment only)				(0.000208)
Constant	0.252***	0.257***	0.781	2.558
	(0.0183)	(0.0250)	(1.234)	(3.542)
Observations	7,341	7,291	3,831	3,431

Notes:

(1): Panel A reports the percentage of households contact for endline 1, among those on listing sheets based on the 2007 census.

(2): Panel B presents the coefficient from regressing a dummy for "not found at endline 1" on the census characteristics shown.

(3) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table A3: Endline 2 attrition

Panel A: Attrition in treatment vs. control

Found in endline 2, in treatment	0.8889
Found in endline 2, in control	0.9017
p-value of difference	*0.248*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)
	Exp per capita	Temptation goods	Durables	Festival spending	Has Spandana loans	Has any MFI loans	New business	Old business	Business profit
Panel B: Attrition, by household characteristics (endline 1)									
	0.0098***	-0.0005	0.00024	0.0005	-0.033***	-0.027***	-0.016	-0.0031	0.0005
	(0.0032)	(0.0066)	(0.00019)	(0.00053)	(0.010)	(0.0080)	(0.0099)	(0.0065)	(0.0053)
Constant	0.090***	0.10***	0.10***	0.10***	0.11***	0.11***	0.11***	0.10***	0.10***
	(0.0070)	(0.0063)	(0.0057)	(0.0061)	(0.0058)	(0.0063)	(0.0056)	(0.0057)	(0.0054)
Obs	6827	6827	6781	6827	6775	6621	6752	6757	6234
Panel C: Attrition and household characteristics (endline 1) in treatment vs. control									
Characteristic	-0.0052	0.012	-0.00023	-0.00021	-0.0041	-0.018	0.0098	-0.024	0.00046
X treatment	(0.0065)	(0.013)	(0.00038)	(0.0010)	(0.025)	(0.014)	(0.020)	(0.019)	(0.00085)
Constant	0.080***	0.10***	0.096***	0.096***	0.10***	0.11***	0.099***	0.096***	0.095***
	(0.010)	(0.0076)	(0.0069)	(0.0070)	(0.0064)	(0.0063)	(0.0068)	(0.0064)	(0.0063)
Obs	6827	6827	6781	6827	6811	6775	6762	6757	6239

Notes:

(1): Panel B presents the coefficient from regressing a dummy for "attrited between endline 1 and endline 2" on the endline 1 characteristic shown.
(2): Panel C investigates whether the characteristics of the attritors are different in treatment and control. The regression controls for the main effects of the characteristic and of treatment (coefficients not reported).
(3) All monetary amounts in 2007 Rs.
(4) * significant at the 10% level, ** at the 5% level, *** at the 1% level.

Table A4: Industries of old and new businesses (endline 1)

	Old business, treatment	Old business, control	Treatment-control difference	New business, treatment	New business, control	Treatment-control difference
	(1)	(2)	(3)	(4)	(5)	(6)
Food/agriculture	0.227	0.243	-0.017	0.299	0.214	0.085*
			[0.028]			[0.044]
Clothing/sewing	0.210	0.186	0.024	0.135	0.185	-0.050
			[0.020]			[0.033]
Rickshaw/driving	0.103	0.103	0.000	0.056	0.110	-0.054*
			[0.021]			[0.028]
Repair/construction	0.042	0.052	-0.010	0.016	0.035	-0.019
			[0.010]			[0.015]
Crafts/vendor	0.020	0.029	-0.010	0.024	0.040	-0.017
			[0.008]			[0.017]
Other	0.397	0.380	0.018	0.470	0.416	0.054
			[0.042]			[0.056]
Nobs	1424	1261		251	173	

Notes:

Old (new) businesses are those started more (less) than 1 year before the survey. Cluster-robust standard errors in brackets. Results are weighted to account for oversampling of Spandana borrowers. * significant at the 10%

Table A5: Attrition-corrected results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Total exp per capita per month	Temptation goods exp per capita per month	Durables exp per capita per month	Has MFI loans	New business	Female businesses	Business profit	Head and spouse self-employmt hours	Women's empowermt index
Panel A: Endline 1									
Treated area	28.04	-6.81	18.40*	0.077***	0.016**	0.014***	462	2.663*	0.008
	(39.90)	(4.91)	(10.66)	(0.027)	(0.007)	(0.005)	(384)	(1.475)	(0.023)
Observations	6827	6863	6781	6,811	6,757	6762	6,239	6827	6862
Control mean	1419	84	99	0.183	0.053	0.026	745	25.830	-0.001
Panel B: Endline 2									
Treated area	-47.47	-9.73	1.45	-0.001	0.002	-0.005	541	1.641	-0.011
	(51.80)	(6.61)	(8.72)	(0.029)	(0.013)	(0.006)	(372)	(1.580)	(0.021)
Observations	6142	6142	6140	6,142	6,142	6142	6,090	6142	6142
Control mean	1,914	118	131	0.331	0.093	0.047	953	25.380	-0.003

Notes:

(1): Results shown re-weight the data using the inverse of the propensity to be observed at endline 2, so that the distribution of observable characteristics (at endline 1) among households observed at endline 2 resembles that in the entire endline 1 sample.

(2): Propensity to be observed at endline 2 is estimated as a function of total exp, temptation goods exp, durables exp, festival exp, 1(MFI borrower), MFI borrowing amt, counts of new businesses (created in the year prior to EL1) and old businesses (created more than 1 year before EL1), and business profits (set to zero for non-entrepreneurs).

(3) All monetary amounts in 2007 Rs.

(4) * significant at the 10% level, ** at the 5% level, *** at the 1% level.