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MICROFINANCE AND POVERTY ALLEVIATION

By

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Microfinance and Poverty Alleviation*

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Abstract

We use an RCT to analyze the impact of microcredit on poverty reduction. The study population consists of loan applicants to a large microfinance institution in Bosnia and Herzegovina who would have been rejected through regular screening. Access to credit allowed borrowers to start and expand small-scale businesses. There is little evidence that this led to net increases in household income. Households that already had a business and where the borrower had more education, ran down savings, presumably to complement the loan and achieve the minimum investment amount. In less-educated households, where assets were low consumption went down instead. For these households the labor supply of teenage children aged 16-19 increased, and their school attendance declined.

Keywords: Microfinance; liquidity constraints; human capital; randomized controlled trial

JEL Codes: O16, G21, D21, I32

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I. Introduction

A substantial part of the world's poor has limited, if any, access to formal sources of credit. Instead, they depend on informal credit from moneylenders, often unreliable and expensive (Collins et al., 2009), or have to borrow from family and friends. Such credit rationing may constrain entrepreneurship and keep people trapped in poverty. Microfinance, pioneered by the Bangladeshi Grameen Bank, aimed to deal with this issue in a sustainable fashion. A key research and policy question is whether the availability of credit for the more disadvantaged can reduce poverty.

We address this question by analyzing the results of an experiment where we randomly allocated loans to a subset of applicants considered too risky and “unreliable” to be offered credit as regular borrowers of a well-established microfinance institution (MFI) in Bosnia and Herzegovina. Our group is poorer and generally more disadvantaged than regular borrowers of the institution. What is particularly interesting is that they have applied for a loan and thus believe they have a profitable investment opportunity; however, they were turned down. This is exactly the group we need to analyze if we are to understand whether alleviating liquidity constraints can be an effective anti-poverty tool.

Our paper contributes to a small but expanding literature on the impact of microcredit on poverty alleviation. Following some initial work based on observational data,¹ important progress towards understanding the impact of microfinance has been made by a number of randomized controlled trials and by quasi-experimental evidence (Kaboski and Townsend, 2011, 2012). The focus of much of this literature is on the introduction of microcredit in contexts where no such formal financial institutions existed before. Our paper offers new evidence in two ways. First, we consider the impact of extending loans to poor individuals in a context where micro-lending is already well established for individuals with a solid background and good quality collateral. In this respect our design is similar to that of Karlan and Zinman (2010 and 2011) although the type of loans they considered was quite different, one being a four-month high-interest consumption loan and the other a four-month business

¹ An early observational study of microcredit is Pitt and Khandker (1998). Their results and analysis are critically discussed in Morduch (1998) and Morduch and Roodman (2009). See Ghatak and Guinnane (1999) for an early summary of the theoretical literature and Giné, Jakiela, Karlan, and Morduch (2010) for experimental evidence on the mechanisms through which joint liability affects repayment.

loan, both with a much higher interest rate than in our case.²

Many of our findings strengthen the evidence found in other contexts: the loans increased levels of business activity and self-employment. This did not translate into increased household income in the 14 months of our observation period. However, contrary to other papers we do find evidence that business profits increased. It may therefore be the case that income will increase later. Those without savings - mainly the less-educated - reduced consumption while those with a prior business and some savings ran down their savings. These facts are consistent with investments being lumpy and with the loans being too small in themselves to start or expand a business. It seems that households, in anticipation of future returns, used their own resources to top up the loan to reach an amount of funds that was sufficient to make an investment of a certain minimum size.

One of the outcome variables that our study focused on was the schooling and labor supply of children because this outcome can have long-term implications. A priori schooling may increase if the households are liquidity constrained and they value education for their children. On the other hand, if children are a source of labor that is cheaper than the labor market (because of regulatory or supervisory costs, say) participation in education may decrease. Indeed, we find a large decline in school participation and an increase in labor supply of children aged 16 to 19, the age at which Bosnian children need to decide whether to attend secondary school or not. The labor supply and schooling of children below 16, for whom schooling is mandatory, was not affected.

Finally, our experimental study came at a particularly difficult time, namely at the height of the 2008-09 financial crisis, which strongly affected Bosnia and Herzegovina.³ After years of rapid credit expansion, various Bosnian MFIs experienced an increase in non- and late repayment (Maurer and Pytkowska, 2011). Our paper is one of the first to study the impact of microcredit on borrowers during an economic downturn and amid widespread concerns about over-indebtedness. In this environment, we document a high number of

²In the Karlan and Zinman (2010) South African consumer loan study the interest rate was 200% APR; in the 2011 study in the Philippines the rate was 60%. This compares to 22% for our study.

³There have been some non-experimental studies in Bosnia and Herzegovina. Hartarska and Nadolnyak (2007) find that access to microcredit has alleviated Bosnian firms' financing constraints. Demirgüç-Kunt, Klapper, and Panos (2011) find similar results for financing constraints at the household level. Their findings suggest that households that received microcredit were more often able to make a successful switch from informal to viable, formal entrepreneurs over the period 2001-04.

defaults, substantially higher than those of the regular client pool at the same time. Indeed the program lead to an implicit subsidy of \$268 per borrower on average.

The paper proceeds as follows. In Section 2 we describe the loan program and our target population after which Section 3 sets out the experimental design. Sections 4 and 5 then discuss our main results and the financial sustainability of the program. Section 6 concludes.

II. The program

A. Target population

We conducted our field experiment with the collaboration of a large Bosnian MFI.⁴ As part of the experiment the loan officers of this MFI extended microcredit to a poorer, 'marginal' segment of the population that they would normally reject, but to whom they would consider lending if they were to accept slightly more risk. At the start of our study Bosnia and Herzegovina had an active market for microcredit and this begs the question as to why such credit was not available to this marginal segment before and what effects we can expect. Poorer households that cannot offer sufficient collateral may remain cut-off from credit due to informational externalities. For example, suppose there is asymmetric information with respect to the ability to carry out a successful business and repay the loan. In this case there may be a payoff to offering a "get-to-know-you" loan, with future client relationships depending on past performance and with interest rates set so that on average zero expected profits are achieved over time. Yet, in the presence of strong lender competition, performance signals about borrowers can become public and a lender may not recover the costs of initial experimentation from the better surviving clients: competition will ensure the good clients just pay the market rate.⁵ Such an informational externality, similar to the mechanism outlined by Acemoglu and Pischke (1999) for general skills training by firms, may indeed reduce the

⁴The MFI was established in the mid-nineties and had about 36,000 clients at the time of the baseline survey across both the Federation Bosnia i Hercegovina and the Republika Srpska.

⁵This point was suggested by Joe Altonji and draws from Altonji (2005). See also Petersen and Rajan (1995) on how market power may allow banks to forge long-term lending relationships in which they subsidize early loans by extracting rents from later ones. Poor households may suffer from lender competition in particular when some non-profit lenders are client-maximizers that rely on cross-subsidies within their borrower pool (McIntosh and Wydick, 2005).

scope for lending to clients that seem to be lower quality on the basis of their observables. A program that promotes loans to the poorer part of the population may then be socially desirable, correcting for an externality and not obviously provided by the private market.

Table A2 in the Online Appendix reports some characteristics of marginal clients as collected from a baseline questionnaire to loan officers. The average marginal applicant did not meet 2.6 out of the six main requirements of our MFI for regular loans: 77 percent did not possess sufficient collateral⁶ or did not meet one or more of the other requirements, which include an assessment of the applicant's character.⁷ About one in three marginal clients were judged to have a weak business proposal while loan officers worried about repayment capacity in about a quarter of the marginal applications (column 1).

We can also compare the average marginal client to the population of Bosnia and Herzegovina as a whole and to regular first-time clients of our MFI. We do this by using the 2010 data from the EBRD/World Bank Life in Transition Survey (LiTS) in which 1,000 Bosnian households were interviewed, a nationally representative sample. LiTS sampled two types of respondents. The first is the household head or another household member with sufficient knowledge about the household. The second (if different from the first) is the person aged 18 years and over who last had a birthday in the household. We compare our marginal clients to these latter, randomly sampled persons and constrain the sample to the same age range we observe for our marginal clients. We find that compared with this population, the average marginal client is younger and more likely to be male and married. Relatively many marginal clients completed at most primary education. Comparing the marginal client to regular first-time borrowers of our MFI shows that they are younger, less likely to be married, and have less education. Marginal clients are also less likely to be full-time employed.

⁶The fact that collateral is an important margin along which our MFI showed more leniency when identifying marginal loan applicants is in line with the model of Evans and Jovanovic (1989) in which poor potential entrepreneurs are excluded from credit because their low wealth prevents them from posting collateral.

⁷Of those who did provide collateral, the distribution of collateral types was as follows: house 7%; machinery 4%; own salary 19%; spouse's salary 3%; family member's salary/co-signer 62%; other 19%. More than one type of collateral could be pledged.

B. The loan

The loans offered as part of the experiment were similar to our MFI's regular loan product in terms of interest rate and maturity. The loans had an interest rate of 22% Annual Percentage Rate (APR) paid on the declining balance, so that the monthly payments were fixed over time with an increasing portion of the payment being capital. The rate for regular clients was 21% over the same time period. The amounts loaned varied depending on the business plan and ranged from BAM 300 to BAM 3,000 with a mean of 1,653 (~US\$ 1,012) and median of 1,500 (~US\$ 920).⁸ The maturity was also flexible and averaged 57 weeks. 77% of the loans ended up being collateralized. However, as we document in the last section of the paper, those who offered some collateral and despite that were still classified as marginal (and thus failed to be part of the regular client pool) were adversely selected and often ended up having an erratic repayment history.

III. The experiment

A. Experimental design

The experiment started with the research team conducting training sessions with all loan officers in all branches of our collaborating MFI (which operates across all of Bosnia and Herzegovina). During these sessions officers were instructed how to identify clients they would normally reject, but to whom they would consider lending if they were to accept slightly more risk.⁹ For example, it was explained that a loan applicant could possess insufficient collateral, be less educated or poorer than average, or be perceived as somewhat more risky for other reasons. The training stressed that marginal clients were not applicants with a poor credit history, that were over-indebted, or that were expected to be fraudulent.

Once all officers were trained, and following a pilot in November 2008 in two branches in Gradačac and Bijeljina, the experiment was rolled out two months later to all 14 branches of our MFI.¹⁰ Loan officers were now asked to start identifying potential marginal clients from

⁸The exchange rate at baseline was US\$ 1 to BAM 1.63 approximately.

⁹Our MFI did not use an automated credit-scoring system.

¹⁰Figure A1 in the Appendix displays the geographical distribution of the branches and respondents.

the population of loan applicants over a period of several months, until the desired sample size was achieved. The loan officers receive a monthly bonus depending on the performance of their portfolio. To counteract this disincentive for taking additional risk and to reward the additional effort needed to identify marginal clients, loan officers received a fee of 10 BAM (~US\$6) for each marginal client to whom a loan was disbursed. While one may be concerned that loan officers would divert regular clients to the marginal group, this concern is mitigated by the fact that they would not want to take the 50 percent risk of having to turn down a solid (and possibly repeat) client due to the randomization process. After loan disbursement loan officers were instructed to monitor regular and marginal clients in the same way and to the same extent. Importantly, the loan performance influenced their bonus in the same way, irrespective of the type of client.¹¹

Once a loan officer identified a potential marginal client, and following a short vetting process by the loan committee, the potential client was told that although he or she would normally not qualify for a loan, our MFI was reviewing its policies and as a result could offer a 50 percent chance of a loan provided that the applicant would agree to participate in a survey now and in a year's time.¹² The loan officer also explained that the MFI would use the results of the study to decide how best to expand lending to this new client group on a permanent basis, meaning that marginal clients could continue to borrow as regular ones. Our MFI indeed continued to lend to many marginal clients that repaid on time during the experiment. Of all marginal clients 24.4 percent received one or more repeat loans and this percentage is substantially higher than among the regular clients that received their first loan during the same period (16.3 per cent).

This process continued until a total of 1,241 marginal applications were submitted to the loan committee. In total 1,196 of these marginal loan applicants were approved and interviewed.¹³ This baseline survey was conducted *after* the individual was judged to be eligible for participation in the program but *before* the randomization. This ensured that

¹¹Of course loan officers would choose themselves how to allocate their time, presumably placing more emphasis on clients with the highest return to their efforts.

¹²Obviously this conditionality would and could not be enforced for the second round of data collection. The clients were not asked to sign an explicit agreement.

¹³ The interview lasted around 60 minutes and was conducted by a professional survey company using computer-assisted telephone interviews (CATI).

responses were not correlated with the randomization outcome. We ensured that respondents were aware that their answers would in no way influence the probability of receiving a loan.

At the end of each week, the research team in London would use a random number generator to allocate newly interviewed applicants with a 50 percent probability to either the treatment (receiving a loan) or the control group (no loan).¹⁴ Successful applicants received the loan within a week. Applicants allocated to the control group did not receive a loan from our MFI for the duration of the study.¹⁵ The last interview and loan disbursement took place in May 2009. During February-July 2010, 14 months after the baseline survey, all RCT participants - both those who received a loan and those who did not - were called back and invited to be re-interviewed. We returned to those who declined and offered them an incentive (a mobile phone SIM card). This further improved the final response rate.

B. Treatment-control balance

We collected detailed data during the baseline and follow-up interview rounds on the applicant's household structure, entrepreneurial activities and other sources of income, income expectations, household consumption and savings, asset ownership, outstanding debt, exposure to shocks, and stress levels. As the allocation of marginal applicants into the treatment and the control group was random, we expect no systematic differences between both groups at the time of the baseline survey. To check whether this is indeed the case, Table 1 presents summary statistics for the main characteristics of the marginal clients and their households. For each variable we present the baseline mean for the control group (in the post-attrition

¹⁴The chance of obtaining a loan was slightly higher than 50 per cent (ex post 52.8 percent) as we allocated randomly to the treatment group either half of each weekly batch containing an even number of applicants ($N/2$) or $(N+1)/2$ in all odd-numbered batches. For example, if at the time of a weekly randomization round 11 marginal clients had been interviewed, six would be randomly allocated to the treatment group and the rest to the control group. Alternatively, we could have just applied a 50 percent chance on each applicant, but we wanted to avoid occasional batches with too many rejections.

¹⁵Similar to Karlan and Zinman (2010), we thus first asked loan officers to distinguish between “egregiously uncreditworthy” and “marginally uncreditworthy” loan applicants. In a second step, we then randomly divided the marginal applicants into a treatment and control group. We demanded full compliance from loan officers in terms of respecting our randomization decision, thus boosting the statistical power of our analysis. Karlan and Zinman (2010) encouraged but did not require loan officers to follow treatment assignment. As a result, only 53 per cent of those that were randomly assigned to treatment actually received a loan and the authors therefore conduct an intention-to-treat analysis. In Karlan and Zinman (2011) marginal applicants were identified by a credit-scoring algorithm rather than by loan officers. Here compliance with the subsequent randomization was not complete either.

Table 1: Summary statistics

		Control Group			Treatm.-Control	
	Obs	Obs	Mean	St. Dev.	Coeff.	p-value
Panel A. Post-attrition household sample						
<i>Household composition</i>						
Nr of members	995	444	3.45	1.48	0.16	0.054
Nr of adults (>=16 years old)	995	444	0.84	1.02	0.05	0.414
Nr of children (<16 years old)	995	444	11.16	1.02	-0.05	0.414
Male respondent	995	444	0.595	0.492	-0.016	0.581
Respondent age	994	443	37.10	11.97	0.58	0.412
Respondent with at most primary education	995	444	0.315	0.465	0.032	0.244
<i>Access to credit</i>						
Any type of loan	995	444	0.583	0.494	-0.004	0.901
Nr of outstanding loans	995	444	0.802	0.864	0.000	0.997
% with loan outstanding from an MFI	570	259	0.610	0.489	-0.048	0.213
% with loan outstanding from a bank	570	259	0.514	0.501	0.006	0.879
% of loans used for business investment (average of three mains loans outstanding)	564	257	47.034	44.400	-0.482	0.888
<i>Amount borrowed (in BAM)</i>						
Total amount (three main outstanding loans)	995	444	4,125	8,610	-669	0.140
Average amount borrowed from MFI	991	443	1,238	3,341	-311	0.085
Average amount borrowed from bank	991	444	2,890	8,000	-343	0.416
<i>Self-employment activities</i>						
Nr of of income sources	995	444	3.00	1.00	0	0.665
Total HH income (last year) (BAM)	995	444	18,000	15,000	-718	0.392
Income from self-employment (BAM)	995	444	7,453	13,000	-833	0.251
Income from agriculture (BAM)	995	444	369	1,505	-30	0.695
Nr of HH members unemployed	995	444	0.685	0.884	-0.026	0.619
Nr of HH members retired	995	444	0.313	0.515	-0.015	0.625
Nr of hours worked by respondent, last week	987	440	49.2	28.2	-0.8	0.599
Nr of hours worked on business by respondent, last week	862	381	32.7	28.1	0.1	0.933
<i>Consumption (in BAM)</i>						
Food consumption	995	444	106	83	-3	0.630
Non-durables consumption	995	444	214	957	54	0.430
Durables consumption	989	443	2,491	5,108	-220	0.430
Panel B. Attrition						
Not surveyed at endline	1,196	568	0.218	0.413	-0.097	0.000

Notes: Data source: Baseline household survey. Unit of observation: household. Panel A: sample includes only households also surveyed at endline. Panel B: sample includes all households surveyed at baseline.

sample) as well as the difference in means between the control and treatment group (with a p-value for a t-test of equality of these means in the last column).

Table 1 indicates that there are no statistically significant differences between the two

groups except a small (0.16) difference in the number of household members. When we conduct a joint significance test for treatment-control balance based on a large set of variables together we find a p-value of 62 percent. Thus there is no systematic overall difference between the two groups and no evidence of imbalance. Unreported Kolmogorov-Smirnov (KS) tests to compare the baseline distribution of continuous variables in the treatment with those in the control group also suggest orthogonality between observable variables and treatment status.

Almost 60 percent of the (potential) marginal clients are male and their average age is 37 years. The average respondent worked 49 hours a week, of which 33 hours were spent in a small-scale business. A third of the marginal clients only attended primary school while five percent of the sample went to university. We also show information on household income of the marginal clients. The average income was BAM 18,000 (US\$ 11,006) in the year prior to the baseline survey, of which on average 7,453 (US\$ 4,031) was earned through self-employment and BAM 369 (US\$ 182) as wages from agricultural activities.

Table 1 also gives information on the debt that marginal clients had outstanding at the time of the baseline survey. On average marginal clients had fewer than one loan outstanding (43 percent had no loan outstanding and 42 percent one loan). While this indicates that our sample had not been completely cut-off from borrowing in the past, we note that in comparison to the typical microfinance borrower in Bosnia and Herzegovina the number of loans is very low. Maurer and Pytkowska (2010) in a random sample of 887 microcredit borrowers in Bosnia and Herzegovina at the same time as our study found that 58 percent had more than one active credit contract, the average was 2.021 per client, and the maximum number of loans was 14.¹⁶

C. Attrition

A total of 1,196 individuals were interviewed before the program and 995 of these were re-interviewed as part of the follow-up survey representing an attrition rate of 17% or a

¹⁶As the survey will be biased towards more loans due to stock sampling this comparison is just indicative.

response rate of 83 per cent.¹⁷ Among other efforts to reinterview,¹⁸ people who initially declined were called back later by a senior interviewer, asked once more to participate, and also offered a EUR 10 phone card.¹⁹

In the end, the response rate among the control group was about ten percent lower than in the treatment group. Importantly, however, when we analyze the observed baseline characteristics of only those who were surveyed at follow-up, we find that these characteristics are still balanced between the treatment and control group.²⁰ Thus, this differential non-response is not correlated with any of the observable characteristics we consider. To reinforce this, we regress the indicator variable of whether the marginal client was re-interviewed at follow-up on ‘soft’ characteristics as provided by the loan officers. The results are presented in Appendix Table A4 and show that these characteristics are not jointly significant in determining attrition and this is true independently of whether we account for other covariates or not (more information on these soft characteristics can be found in the on-line Appendix). There is also no significant difference in repayment performance (loan default) between the attritors and non-attritors in the treatment group (p-value is 0.22).²¹ We conclude that it is unlikely that attrition undermined the balanced nature of the treatment and control samples and introduced bias in the reported results.

¹⁷In total, 1,241 respondents were selected by EKI to participate. Some respondents refused (33) to be interviewed and some were unavailable (22), thus the total number of interviews conducted was 1,206. One of these interviews was incomplete, one was counted double and eight of those selected to receive a loan later refused the loan, thus reducing the final sample to 1,196 (when we keep these eight and run an intention-to-treat analysis none of our results change). Table A5 in the Appendix provides details on the targeted and actual number of interviews at baseline and follow-up.

¹⁸Interviewers were trained to encourage participation and the survey company sent all participants a reminder letter at the start of the follow-up survey. This letter also announced a raffle for all who completed the survey in which a laptop and several iPods could be won.

¹⁹The average annual income of potential marginal clients was BAM 13,381 at baseline. EUR 10 (BAM 19) therefore corresponds to 54 percent of average daily earnings.

²⁰We also checked that pre-treatment characteristics are balanced across treatment and control groups in the following sub-samples: business ownership at baseline or not, high versus low education level, and gender of the respondent. Finally, we ran a regression in which the attrition dummy was regressed on treatment status, a set of baseline characteristics, and the interaction terms between treatment status and the baseline covariates. These interaction terms are jointly not statistically significant from zero.

²¹In addition, we re-estimate all our regressions using the DiNardo, Fortin and Lemieux (1996) approach where we re-weight the data using the inverse of the propensity to be included in the follow-up survey. The statistical and economic significance of all results remains unchanged (results available upon request).

D. Estimation approach

We estimate overall treatment effects as well as separate treatment effects according to whether the household had a business at baseline or not and according to the level of education of the borrower. For the latter, we define “low education” as having obtained primary education at most and “high education” as any grade completed above primary education. Borrowers with higher human capital may face less uncertainty and learn faster about market conditions and ways to adjust capacity, thereby reducing the probability of an exit from entrepreneurship (Jovanovic, 1982). We estimate the treatment effects of the program by regressing the outcome variables on the treatment indicator and baseline characteristics (so as to improve precision). Standard errors are robust to heteroskedasticity.

For all continuous outcomes we also perform (unreported) Kolmogorov-Smirnov (KS) tests to non-parametrically test for significant differences between the outcome distributions at follow-up. We mention these results in the text where relevant. Whenever we report significant impacts for the high versus low educated respondents separately, these impacts also differ significantly between both groups at the very least at the 10 percent significance level, unless reported otherwise.

IV. Results

A. Choice of outcome variables

Our primary outcome variables include measures of business start-up, various sources of household income, consumption, assets and savings. Given the type of self-employment activities that our population engages in (e.g. agriculture and services) we expect income to respond fast and certainly within our observation period. Hence, given our interest in poverty alleviation these are natural outcomes to measure. We will also consider education and labor supply of children, which reflect some of the intergenerational impacts of the intervention. We discuss these outcomes in turn below.

Consumption is a particularly interesting outcome to consider. While in the long run consumption should go up if microfinance successfully improve standards of living, in the

shorter run it can go either way. Consumption will increase if part of the loan is consumed rather than invested. Moreover, if the loan and the opportunity for entrepreneurial activity increases permanent income, consumption can also increase within the observation window if the household can borrow or if the returns accrue fast enough. However, this argument is no longer necessarily valid for households who decide to invest the entire amount and who are facing minimum investment amounts (such as start-up costs). These households may need to reduce consumption and accumulated savings if the loan amount is insufficient to cover the required capital and they are liquidity constrained. In other words, the household will crowd-in resources by running down other assets and/or reducing consumption to take advantage of a now feasible investment opportunity. Households that still do not invest (and take up the loan) or who are able to make marginal investments will increase their consumption. This mechanism is in line with a structural model of household decisions proposed by Kaboski and Townsend (2011) where households face borrowing constraints, income uncertainty, and high-yield indivisible investment opportunities.²²

Finally, we also consider the effect of the loan on child schooling and labor supply to get at some of the longer run and possibly unintended effects of the program. The most interesting group consists of teenagers aged 16-19 who do not face compulsory schooling. One possibility is that the alleviation of liquidity constraints encourages school attendance. An alternative possibility is that the loan offers new employment opportunities for young people. Moreover, a combination of liquidity constraints and a wedge (due to regulatory and supervisory costs) between the cost of employing family members versus the market wage may encourage parents to employ their children to the detriment of their schooling. This may be particularly so if the returns to education are perceived to be low. Such a reduction in schooling may be inefficient because it may be induced by this price distortion (the wedge) and the liquidity constraints.

Table 2: P-values for joint tests for multiple outcomes

	Joint test	Difference of coefficients	
		by education	by business at BL ⁽²⁾
Main outcomes ⁽¹⁾	0%	56%	57%
Main outcomes, excluding loan	0%	60%	87%

⁽¹⁾Outstanding loan; Value of assets; Ownership of inventory; Profits; Owns a business; Has income (0/1) and how much from each of: Self-employment, wage income, remittances, welfare; Hours worked 16-64; Total consumption; Durables; Savings; School attendance 16-19. ⁽²⁾BL stands for Baseline

B. Joint significance of outcomes

There are clearly many outcomes and they are likely to be highly correlated both because they are generated by the same individuals and because many of them measure similar underlying outcomes. We thus constructed a chi-squared test that all our main outcomes are jointly zero. The p-values are shown in Table 2. All outcomes together are highly significant with a p-value of zero. One of the outcomes included is whether the treatment group has an outstanding loan at follow-up, which may include the original loan or any further loans they managed to obtain. If we exclude this outcome, which reflects differential credit availability between treatment and control the overall p-value is still zero. In the next two columns we also report the results relating to heterogeneity of impacts for the same outcome variables by the level of education of the borrower (more than primary or less than or equal to primary) and by whether the borrower owned a business at baseline. According to this evidence the differences across these groups are not significant. In what follows we examine the outcomes in more detail.

C. The intervention and access to liquidity

As we show in Table 1 the loan applicants did have access to some finance before we interviewed them at baseline. Applicants had on average 0.8 loans outstanding with an average value of BAM 4,125 in the control group. This compares to two or more loans for the average microborrower. As a result of the intervention all applicants who were randomized in

²²Predictions of this model help them explain the puzzling findings in their companion paper Kaboski and Townsend (2010).

Table 3: Credit outstanding at endline

		(1)	(2)	(3)	(4)
		Any loan outstanding	Nr of loans outstanding	At least one loan outstanding from an MFI	At least one loan outstanding from a bank
Treated		0.193*** (0.0258)	0.492*** (0.0650)	0.439*** (0.0289)	-0.0556*** (0.0166)
Observations		994	994	994	994
Control mean		0.694	1.068	0.324	0.0946
By education	Low	0.242*** (0.0457)	0.535*** (0.107)	0.417*** (0.0517)	-0.0281 (0.0274)
	High	0.173*** (0.0313)	0.383*** (0.0812)	0.453*** (0.0349)	-0.0686*** (0.0203)
By business at BL	Yes	0.238*** (0.0327)	0.424*** (0.0838)	0.477*** (0.0358)	-0.0192 (0.0173)
	No	0.120*** (0.0418)	0.434*** (0.103)	0.375*** (0.0487)	-0.113*** (0.0320)

Notes: Administrative data from our MFI show that all respondents in the treatment group received at least one loan from our MFI (1.1 loan on average) while none of those in the control group received any loans from our MFI. Source of results in table: Endline household survey. Observation unit: respondent. The first four rows provide the average treatment effect on the treated (coefficient and robust standard errors in parentheses), the number of observations, and the mean of the control at baseline. The rows below provide heterogeneous impacts by the education level of the respondent (Low indicating at most primary education) and by whether the household had a business at baseline or not. Baseline covariates included in all regressions: gender, age, marital status of the respondent, and information on the household composition (number of children in the age range 0-5, 6-10, 11-16, number of household members that are: female, employed, in school, retired). Appendix Table A1 contains all variable definitions. BAM: Bosnia and Herzegovina convertible mark. The exchange rate at baseline was USD 1 to BAM 1.634. ***, **, * indicate significance at 1, 5, and 10%.

obtained a loan with an average maturity of 57 weeks. The median and average loan amount were BAM 1,500 and BAM 1,653, respectively.

Those randomized out were excluded from borrowing from our MFI, but could apply elsewhere. The data does not contain a complete history of loan activity. However, as can be seen in Table 3, at follow up the treatment group was 20 percentage points (pp) more likely to have an outstanding loan (st. error 2.6 pp) and 44 pp more likely to have loan outstanding from an MFI (st. error 2.9 pp). The excess outstanding loans for the treatment group is an indicator of better access to liquidity and can arise because the treatment group would have been able to raise more funding and/or for longer maturities. These results are consistent

with the controls having less access to finance, because they were turned down from other sources and/or given loans with much lower maturity.²³ We conclude that the treatment group did indeed have significantly better access to liquidity than the control group.

D. Impact on self-employment and income

Table 4 summarizes the impacts of credit on business creation and operation. Here the main outcomes are asset value, ownership of inventory, profit of the respondent's main business, and whether the person owns a business and whether the household receives income from any self-employment activities. The entire set of outcomes reported in this table have a joint p-value of 0.7% making them jointly significant.

Households offered a loan are 6 pp more likely to receive income from self-employment and 6 pp more likely to own a business - business ownership at baseline was 51 per cent. The incidence of inventory holding goes up by a similar percentage: at follow-up treated respondents are 5 pp more likely to hold inventory compared to the control group. The point estimates also suggest interesting differences between those with higher and lower education. The lower educated individuals are more likely to own inventory and to own an agricultural business. The higher educated individuals are more likely to have income from self-employment, to own a business and for the business to be in services. However, the p-value for the test that all outcomes in this table are the same across education groups is 28% percent, implying that the difference between the effects are not jointly significant. And neither are the differences across those with a business at baseline and those without: the p-value for equality of all outcomes between these two groups is 78%.

We found that six outlying observations had a very large impact on our estimates of the effects of the program on profit from the main business of the respondent. So when we trim the top 1 percent of profits the effect becomes 858.9 (st. error 405.3). We then also considered the impact of the program on the distribution of profits. These are plotted in Figure 1. The distribution is not significantly different between treatment and control: the

²³Table 3 shows that at endline the control group had a 5.6 pp (se 1.7) higher probability of having a loan outstanding with a bank than at baseline, indicating that some control households were indeed able to access funding elsewhere. As expected this effect is concentrated among the relatively highly educated.

Table 4: Self-employment activities: revenues, assets and profits

	(1) Asset value (BAM)	(2) Ownership of inventory [Yes=1]	(3) Main business of respondent		(4) Expenses		(5) Profit		(6) Any income (HH) from self- employment [Yes=1]	(7) Business ownership [Yes=1]	(8) Business in agriculture [Yes=1]	(9) Business in services [Yes=1]	(10) Has started a business in last 14 months	(11) Has closed a business in last 14 months
			Revenue (BAM)	Expenses (BAM)	Profit (BAM)	Profit (BAM)	Profit (BAM)	Profit (BAM)						
Treated	-414.5 (5,390)	0.0513** (0.020)	1,384 (981.4)	601.4 (592.9)	671.9 (541.3)	671.9 (541.3)	671.9 (541.3)	671.9 (541.3)	0.060** (0.029)	0.058* (0.031)	0.031 (0.025)	0.035 (0.028)	0.021 (0.022)	-0.017 (0.027)
Observations	967	994	994	994	994	994	994	994	994	994	994	994	994	994
Control mean	93,294	0.0923	4,391	1,664	2,896	2,896	2,896	2,896	0.669	0.507	0.169	0.239	0.124	0.230
By education	Low	0.073** (0.032)	498.9 (1,296)	-23.26 (529.8)	234.0 (979.1)	234.0 (979.1)	234.0 (979.1)	234.0 (979.1)	0.048 (0.050)	0.037 (0.055)	-0.052 (0.042)	0.094* (0.053)	0.008 (0.041)	0.003 (0.044)
	High	0.041 (0.026)	1,780 (1,298)	863.9 (811.1)	893.1 (667.2)	893.1 (667.2)	893.1 (667.2)	893.1 (667.2)	0.0665* (0.036)	0.0691* (0.038)	0.0713** (0.030)	0.00754 (0.032)	0.0275 (0.026)	-0.0265 (0.033)

Notes: Data source: Endline household survey. Observation unit: respondent except Income from self-employment (household). Coefficients and robust standard errors (in parentheses) are taken from an OLS regression of the variable on a treated individual dummy, controlling for covariates as in Table 3. By education provides heterogeneous impacts by the education level of the marginal client (Low indicating at most primary education). BAM: Bosnia and Herzegovina convertible mark. The exchange rate at baseline was USD 1 to BAM 1.634. ***, **, * indicate significance at 1, 5, and 10%.

Table 5: Household income

	(1a) Self-employment		(1b) Amount (BAM)		(2a) Wages		(2b) Amount (BAM)		(3a) Remittances		(3b) Amount (BAM)		(4a) Government benefits		(4b) Amount (BAM)	
	Likelihood		Likelihood		Likelihood		Amount (BAM)		Likelihood		Amount (BAM)		Likelihood		Amount (BAM)	
Treated	0.0602**		74.50		-0.0798***		322.9		-0.0231		-1.761		-0.0582**		-167.3**	
Observations	(0.0293)		(614.9)		(0.0288)		(569.7)		(0.0263)		(135.2)		(0.0280)		(78.93)	
Control mean	0.669		6111		0.694		6881		0.225		590.9		0.329		630.9	
By education																
Low	0.0484		-37.23		-0.108**		219.8		0.00548		341.0		-0.0486		-206.5	
	(0.0502)		(978.4)		(0.0520)		(1,019)		(0.0463)		(257.9)		(0.0530)		(155.3)	
High	0.0665*		134.0		-0.0658*		349.1		-0.0358		-169.1		-0.0634*		-148.3*	
	(0.0361)		(761.5)		(0.0346)		(679.6)		(0.0320)		(169.4)		(0.0329)		(89.23)	
By business at baseline																
Yes	0.0394		-341.1		-0.0616		341.9		0.00747		181.0		-0.0540		-150.6	
	(0.0335)		(886.6)		(0.0380)		(670.3)		(0.0343)		(163.5)		(0.0363)		(102.7)	
No	0.0823		544.5		-0.103**		371.9		-0.0760*		-307.1		-0.0680		-201.0*	
	(0.0515)		(605.0)		(0.0432)		(1,008)		(0.0401)		(243.0)		(0.0443)		(119.9)	

Notes: Data source: Endline household survey. The amount of profit from self-employment differs from business profit in Table 4: the former refers to the household and the latter to the respondent level of observation. Wages includes wages from salaried agricultural work; salaried work in a shop or market, bank or other financial institution, or other private business; or from salaried work for the government. Government benefits include social assistance, child benefits, assistance from development or welfare programs, and subsidies. Observation unit: household. Coefficients and robust standard errors (in parentheses) from an OLS regression of the variable on a treated individual dummy, and controls as described in Table 3. BAM: Bosnia and Herzegovina convertible mark. The exchange rate at baseline was USD 1 to BAM 1.634. ***, **, * indicate significance at 1, 5, and 10%.

p-value for this difference is 0.204. However there seems to be a drop of the incidence of zero profits and a shift at the top of the distribution, which is consistent with the results from quantile regressions (not reported) showing significant effects above the 70th percentile of profits.

Figure 1: Distribution of profits

The graph shows the distribution of profits for the main business of the respondents, separate for treatment and control. Zero profits are excluded in the graph and the distribution is trimmed at the 99th percentile. The Kolmogorov-Smirnoff test is calculated on the full distribution.

We then split the sample between respondents who at baseline indicated that they would use the loan partially for consumption and those who planned to use the full loan amount for a business investment.²⁴ For those with an intended business use, the overall effect on profits is indeed positive, reasonably large and has a p-value of 5.6 percent. On the trimmed sample the coefficient estimate remains almost unchanged but becomes more precise (1,137 with a standard error of 430.5).

In Table 5 we consider the impact on various sources of income - whether such sources are present and how they were affected by the loan (with zeros if they are not present). The incidence of any self-employment income for the household increases by 6 percentage

²⁴Note that although the loans were intended as business loans our MFI would not apply sanctions of any sort if the loans were (partially) used for consumption.

points, while the incidence of wage income declines by 8 pp, both effects being significant. Thus these results indicate a change in activity towards self-employment and away from wage work. The resulting magnitude of the changes in these income sources is not precisely estimated. However, the incidence of welfare benefits also declines significantly by 167 BAM. The effects in this table are jointly significant with a p-value of 0.4%. The differences between education groups and by business at baseline are not significant.

E. Impact on consumption and savings

Table 6 summarizes the estimated impacts on consumption and savings and a home durable goods index. The first column shows the effect on the household's overall consumption expenditures, which includes food (inside and outside of the house), other non-durables (such as rent, bills, clothes, and recreation) and durables (large, infrequent purchases which here include educational expenses, the purchase of vehicles, and vacations).²⁵

We find that annual per capita consumption was BAM 651 lower in the treatment compared to the control group, which amounts to 15 percent of the endline consumption of the controls. Among the lower-educated food consumption declined by approximately BAM 18 (US\$ 13) a week, which amounts to 15 percent of the household's food consumption at endline.²⁶ We find no significant effects of consumption for the higher educated households. These results are consistent with investments being lumpy so that households have to use their own resources to complement the loan.²⁷ We may also have expected an increase in

²⁵Food expenditures were collected over a recall period of a week, other non-durables over a month, and durables over a year. To calculate aggregate spending we assume that the week and month about which the household was asked were representative for the year. This assumption does not introduce bias to the impact analysis (as we compare treatment and control groups over the same period) but does play a role when we put the value of expenditures in context, for instance by comparing them to income.

²⁶This negative impact differs significantly from the equivalent effect on the higher educated (p-value: 0.02).

²⁷Appendix Table A3 summarizes the kind of investments borrowers made with the loans, based on data from our follow-up survey. A large number of loans were used for purchasing livestock - 24 percent of all clients report this use (columns 1 and 2). Another 14 percent of the clients used the loan mainly for other agricultural investments such as buying seed and fertilizer. The right-hand side of Table A3 gives information on the stated loan purpose at the time of the baseline survey. This shows that 72 (28) percent of the clients planned to invest in an existing (new) enterprise. On average these applicants planned to invest more than 90 per cent of the loan amount into that business (column 4). Three out of four respondents even stated that they would invest at least the full loan amount (column 6). This indicates that many of the investments may have been lumpy: a substantial amount of money, potentially exceeding the loan amount, was needed in order to realize them.

Table 6: Consumption and savings

	(1) Total consumption per capita (BAM)	(2) Durables (BAM)	(3) Non durable (BAM)	(4) Food (BAM)	(5) Education (BAM)	(6) Cigarettes and alcohol (BAM)	(7) Recreation (BAM)	(8) Home durable good index	(9) Savings (BAM)
Treated	-650.9** (329.7)	18.93 (366.1)	-16.24 (15.43)	-4.103 (5.821)	-85.44 (79.36)	-2.427* (1.333)	-4.260 (14.59)	-0.0718** (0.0281)	-422.5** (174.5)
Observations	982	994	993	994	994	994	994	994	994
Control mean	4,213	2,216	196.0	117.3	448	15.19	48.51	0.491	1,190
By education									
Low	-554.5** (265.2)	103.7 (329.5)	-21.46 (24.64)	-17.54** (8.792)	-41.66 (52.27)	-1.710 (1.613)	-9.416 (23.36)	-0.099** (0.048)	144.4 (230.0)
High	-710.3 (474.7)	-52.82 (515.8)	-13.94 (19.33)	2.219 (7.407)	-117.9 (121.4)	-2.765 (1.779)	-3.072 (18.26)	-0.059* (0.035)	-698.2*** (233.3)
By business at BL									
Yes	-709.8 (493.8)	88.44 (536.2)	-18.18 (20.29)	0.0423 (6.767)	-102.3 (115.5)	-3.460* (1.910)	7.262 (21.37)	-0.070** (0.035)	-639.3** (256.7)
No	-551.8 (384.7)	-111.5 (428.5)	-13.17 (23.30)	-10.52 (10.11)	-57.44 (103.0)	-0.750 (1.539)	-24.02 (15.37)	-0.0706 (0.046)	-106.0 (181.4)

Notes: Data source: Endline household survey. Observation unit: household. Coefficients and robust standard errors (in parentheses) from an OLS regression of the variable on a treated individual dummy, controlling for covariates as in Table 3. ***, **, * indicate significance at 1, 5, and 10%. Total per capita: Total yearly expenditures of the household per household member. Durables: Expenditures on durable items in the last 12 months. Nondurable, Education, Recreation: Monthly household expenditures. Food: Expenditures on food inside and outside the house in the last week. Home durable goods index: Index calculated for a list of 18 home durables goods (stock, not flow variable). 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. Savings: Total savings of the household. Savings data were collected in ranges and to calculate average savings we allocated the midpoint of indicated ranges to the households.

consumption for those who already had a business; however the difference between the two groups (by ownership of business at baseline) were small and insignificant.

Another interesting finding in Table 6 is that treated households significantly reduce their alcohol and cigarette consumption -typical “temptation goods” (Banerjee et al., 2013 and Banerjee and Mullainathan, 2010)- compared with the control group. The expenditures at baseline for these goods were on average 9 percent of total consumption expenditures. At the time of the follow-up survey, treated marginal clients spent about 16 percent less on alcohol and cigarettes than the control group due to the loan.

If investments are lumpy, households may be saving up towards a required amount for investment and appear not to be liquidity constrained. When a loan becomes available, a profitable investment may become feasible when the loan is combined with household savings. Hence, exactly as with consumption we may also observe a decline in savings as a result of the loan availability. In line with this, we find that households of marginal clients who already had a business at baseline as well as those with higher education reduce the amount of their savings significantly compared with the control group.²⁸ The table shows also that the effect on savings is concentrated among those with businesses and higher education at baseline, who had the highest savings to begin with (difference in impacts significant at the 1 percent level). On average, borrowers at the time of the follow-up survey had savings that were 36 percent lower than those of the control group. We similarly find that households reduce their home durable goods significantly as evident from column 8.

In interpreting these results we may be concerned that households had to service their loans. In fact most households had paid-off the initial MFI loan by the time of the second interview and the measure of non-durable consumption covered the month before the interview. So most likely the effects on non nondurable consumption was unaffected by loan servicing. Hence loan servicing cannot explain the reduction in “temptation goods” discussed above. Only durable purchases could relate to the period during which loan repayments took place. Moreover, from simple descriptive analysis it seems that the decline in consumption is not driven by households who had difficulties repaying.²⁹

²⁸This decline in savings is confirmed by a non-parametric KS test.

²⁹When we estimate the effect on consumption by excluding households who had payment difficulties the estimated coefficients and its standard error only change marginally. Of course this is far from conclusive

The findings on consumption and savings combined with the earlier results on the shift towards self-employment activities suggest that while the loan relaxed liquidity constraints, households still had to find additional resources to be able to invest the minimum amount of capital that was needed. Those households that already had a business and those with higher education could do so by running down their savings as well as reduce their consumption (although the latter effect is not significant). In contrast, low-educated households did not have enough savings and for them we only see a reduction in consumption, which is significant. Finally, the total set of treatment effects reported in this table have a p-value of 1.6 percent. The decline in consumption, durables and savings (which are included in the main set of effects are jointly significant with a p-value of 0.1 percent.

F. Impact on hours worked and schooling

Table 7 displays the estimated impact on labor supply. Columns 1-3 look at hours worked by all household members aged 16-64 while columns 4-6 focus on teens aged 16-19. The upper part of the table shows impacts at the aggregate household level, while the lower panel gives impacts on the average number of hours worked by household members of the specified age range. At baseline (not shown in the table) a household member of working age worked on average 37 hours per week of which 19 were spent on the household business. All outcome measures include zeros for households that have no household members of the specified age range as well as zero working hours for those who do not work.

We find no overall effect on hours worked (column 1), possibly because starting up a business substituted for other work activities. Indeed the hours of work in the business increased by 3.7 hours (s.e. 3) and on other activities decreased by 4.3 hours which is significant at the 10 percent level. The decline in hours in other activities is larger for those with low education, but the difference is not significant.

Perhaps the most interesting result in this table is that the labor supply of teens (16-19) on the business increases significantly and particularly for the children of lower education borrowers, where the increase is 1.1 hours (se 0.52). Conditioning on households with children in that age group we get about 4 hours extra per week (not in the table). The effects are because this is a highly selected group based on post-randomization realizations.

Table 7: Labor supply

		(1)	(2)	(3)	(4)	(5)	(6)
		Hours worked per household member in a typical week ^x :					
		all adults age 16-64			children 16-19		
		total	<i>of which:</i>		total	<i>of which:</i>	
			<i>on business</i>	<i>other activities</i>		<i>on business</i>	<i>other activities</i>
Overall HH	Treated	-0.501 (3.520)	3.759 (2.996)	-4.260* (2.494)	0.427 (0.358)	0.533** (0.227)	-0.105 (0.269)
	Observations	994	994	994	994	994	994
	Control mean	77.83	38.51	39.32	0.556	0.182	0.374
	By education						
	Low	-1.034 (6.332)	4.838 (5.598)	-5.872 (3.864)	0.831 (0.683)	1.096** (0.520)	-0.264 (0.393)
	High	-0.175 (4.265)	3.254 (3.540)	-3.429 (3.223)	0.239 (0.413)	0.257 (0.219)	-0.0181 (0.340)
Per HH member	Treated	-0.409 (1.289)	1.986* (1.175)	-2.395** (1.022)	0.341 (0.348)	0.500** (0.225)	-0.159 (0.259)
	Observations	994	994	994	994	994	994
	Control mean	31.77	15.74	16.03	0.556	0.182	0.374
	By education						
	Low	-1.935 (2.056)	1.734 (1.971)	-3.669** (1.554)	0.634 (0.629)	0.987** (0.503)	-0.353 (0.363)
	High	0.278 (1.619)	2.076 (1.437)	-1.798 (1.307)	0.206 (0.399)	0.261 (0.218)	-0.0553 (0.327)

Notes: Data source: Endline household survey. Observation unit: household. Coefficients and robust standard errors (in parentheses) from an OLS regression of the variable on a treated individual dummy, controlling for covariates as in Table 3. ***, **, * indicate significance at 1, 5, and 10%. ^x Includes hours worked on average per adult member on their own business and on other activities. These other activities do not include time spent in housework. Households were asked at endline survey about the # of hours worked by each HH member in a typical week.

about twice as large for the low-educated and the difference between the two is significant at the 8.2 percent level when conditioning on households with children in that age group, at 13.7 percent if we do not condition.³⁰ The effects in this table have a joint p-value of 11.3%.

Turning to Table 8 we now consider the effect of the program on schooling. Our original hypothesis, which led us to collect this data, was that the availability of the loan may encourage schooling by alleviating family liquidity constraints. What we find is quite the opposite.³¹ As before, we split the children into the 16-19 year olds (when schooling is no

³⁰When analyzing the labor supply behaviour of all teenagers aged 13-19, findings are in line. We find an increase in hours worked on the business of 0.577 (s.e. 0.279) for all teenagers and an increase of 1.277 (s.e. 0.63) for the low educated.

³¹In Bosnia and Herzegovina education is compulsory when a pupil turns seven until he or she reaches the

longer compulsory) and the younger children. The increase in hours of work for teenagers we documented above is reflected in a substantial decline in schooling of 16-19 year old children of 8.9 pp (significant at the 10% level). At the same time there is no change in the schooling of younger children for whom school attendance is mandatory.³² In terms of point estimates the effect is driven by a 19.3pp decline in the participation of teenage children of low-educated borrowers. The difference from the effect on the high-educated group, although large, has a p-value of 12.4 percent.

The result on teen labor supply and schooling is consistent with the presence of liquidity constraints, with a preference for family labor, and with a perception by parents or the children themselves that the returns to education are low. It is also consistent with the decline in savings and consumption. Specifically, if the loan offers the possibility of new business opportunities, households may have to match it with their own resources. This may lead to the declines in asset and consumption we observe; it may also lead to increased use of child labor if this alleviates the liquidity constraint (as they do not need not be paid upfront) and will be reinforced if it is more expensive to hire external labor (due to regulations and supervisory costs).³³ Whether this is efficient or not will depend on the returns to education for this group. However, the effect is large and in all likelihood one would expect future returns to education to be quite high for many of these children in an economy with a high potential for growth and catch-up with the rest of Europe.³⁴ The fact they did not work in the absence of a household business may be a reflection of the terrible youth labor market conditions in Bosnia at the time.³⁵

age of fifteen. Secondary schooling, both vocational schools and gymnasiums, is voluntary, consists of three and four-year programs and targets pupils aged 16-19. See www.edufile.info for more information on the Bosnian schooling system.

³²Recent observational studies have also presented evidence of such behavior in other countries (see Menon (2005) for Pakistan, Nelson (2011) for Thailand and also Jacoby (1994) and Wydick (1999)). Jacoby and Skoufias (1997) show that seasonal fluctuations in school attendance act as a form of self-insurance in rural India. Likewise, Beegle, Dehejia, and Gatti (2006) study household enterprises in rural Tanzania and find that credit-constrained households use child labor to smooth income.

³³See Wydick (1999) for example.

³⁴Interestingly, Atkin (2012) finds increased dropout rates at age 16 when low-skilled manufacturing opportunities increase in Mexico. This mechanism is driven by an increase in the opportunity cost of schooling, which could be a possible driving force in our setting as well, as the new business improves the labor market opportunities at a crucial age for educational choice.

³⁵The share of the Bosnian labor force younger than 25 that was unemployed was 48.7 per cent in 2009 (European Commission, 2010, p.63).

Table 8: Schooling

	(1)	(2)
	Share of kids aged 6-15 in school	Share of kids aged 16-19 in school
Treated	-0.00203 (0.0158)	-0.0892* (0.0535)
Observations	508	235
Control mean	0.967	0.821
By education		
Low	-0.0110 (0.0248)	-0.193** (0.0840)
High	0.00366 (0.0210)	-0.0277 (0.0674)

Notes: Data source: Endline household survey. Observation unit: household. Coefficients and robust standard errors (in parentheses) from an OLS regression of the variable on a treated individual dummy, controlling for covariates as in Table 3. ***, **, * indicate significance at 1, 5 and 10%. (1)-(2): =1 if child/teenager in indicated age-range attended school at the time of the endline, 0 otherwise.

V. Subsidized lending or sustainable expansion of loans?

Our intervention consisted of extending loans to poorer individuals who would otherwise have limited access to finance as private institutions such as MFIs and commercial banks mostly considered it too risky to lend to them. In this section we show that in fact lending to this group was loss-making and involved a large subsidy towards the program participants. As we argued earlier, if the quality signal from repayment activity remained private the MFI could use such a subsidy to discover the better clients and possibly recoup the costs of experimentation from the surviving clients. However, it is hard to believe that such a signal can remain private.

To assess the profitability of the marginal lending program we compare all loans disbursed to marginal clients between December 2008 and May 2009 and due by June 2012 to those of regular borrowers over the same period in Table 9. One should keep in mind that

Table 9: Repayment

	(1) No. of loans	(2) Average loan size (BAM)	(3) Average interest rate	(4) Late payment	(5) Written off	(6) Repaid	(7) Internal rate of return
Regular borrowers 1st time & repeat	14,318	3,238	21%	29%	9%	89%	12.8%
Regular borrowers 1st time only	7,350	3,114	21%	31%	9%	89%	13.7%
Marginal borrowers	578	1,653	22%	46%	26%	71%	-11.1%

Notes: This table compares the marginal borrowers with all regular borrowers of our partner MFI during the same lending period. Column 4 shows the percentage of borrowers that was at least once late with repayments. Column 5 shows the percentage of loans that were not repaid and had to be written off. Column 6 shows the percentage of repaid loans. Column 7 gives the internal rate of return (IRR) on lending to the three groups. The IRR is the discount rate at which the net present value of all negative cash flows (disbursed loans) equals the NPV of the positive cash flows (repayments plus interest and fees). BAM: Bosnia and Herzegovina convertible mark. Exchange rate at baseline: USD 1 to BAM 1.634.

Bosnia and Herzegovina went through an economic crisis at the time of the experiment and it is therefore important to compare the profitability of our experimental borrowers with the benchmark of regular clients of our MFI. Since the results are almost identical for men and women (an interesting result in itself) we only list the totals.

It becomes clear that the new marginal client group performed significantly worse than either first-time or all regular clients of our MFI. In particular, late payment (column 4) is 1.5 times as high among marginal clients compared with regular first-time clients (46 versus 31 percent). In the end non-repayment (column 5) among the marginal clients is even three times as high compared with regular clients (26 versus 9 percent). The last column reports the internal rate of return: while for regular borrowers this is 13-14 percent, for the marginal borrowers it is minus 11 percent implying losses for the MFI (regardless of the discount rate that we apply).³⁶ Thus, despite a 22 percent annual interest rate charged on these loans, the lending program was not profitable.

If we add up the total amount of loans never paid back by the marginal borrowers, as well as the foregone interest on these loans, and then divide this amount by the total number of marginal borrowers, we arrive at an implicit subsidy by our MFI to the average marginal borrower of 387 BAM (US\$ 268). This corresponds to approximately one fourth of the average loan amount extended to marginal borrowers. Whether a subsidy of this magnitude

³⁶Our MFI receives concessional funding from various NGOs and development institutions. The average concessional funding rate is just under 40 percent of the costs of its commercial funding.

can be recovered by future loans to the clients who were revealed to be high quality is an important question that only follow up data can reveal (the data so far suggest that repeat lending is indeed higher among the well-behaved marginal borrowers compared to regular borrowers). This would complete the answer as to whether such a loss-making intervention can be sustained without public-sector funding.

To get a better understanding of *why* marginal borrowers perform worse, we ran a set of probit regressions on a sample that contains both the regular and marginal clients. The dependent variable is a *Default* indicator. The key finding is that the excess default rate of marginal borrowers (at about 16-17 pp) cannot be explained away by observable characteristics such as age, gender, marital and economic status.

In Table 10 we explore the correlation of two measures of default ('ever late' with a repayment and actual loan default) with observable characteristics and the information collected and assessed by the loan officer. This is all within the sample of the marginal borrowers. In columns 1 and 3 we only include regressors that indicate whether a loan officer thought that an applicant satisfied our MFI's standard requirements in terms of collateral and repayment capacity while in columns 2 and 4 we also add loan officers' judgments of various character traits of the marginal clients. All four specifications also control for the timing of the loan disbursement (the number of days between the start of the experiment and disbursement); loan maturity; loan size; and a set of standard covariates and branch fixed effects.

We find a positive correlation between compliance with our MFI's collateral requirement and late payment though not with actual default. The coefficient declines once we add the various soft client characteristics. The fact that we find a *positive* correlation between collateral and late payments is an interesting indication of adverse selection: to be a marginal client despite having collateral reveals other strong negative characteristics relating to repayment capacity. However, the loan officers seem to understand the actual quality of the applicant since the effect is explained away by their assessment. In particular, those loan applicants that were rated highly by loan officers on competency and trustworthiness show significantly lower rates of late payment and even default. All this suggests that the loan officers had good reason to classify our target population as marginal. It also raises the issue of whether formal

Table 10: Default

	(1)	(2)	(3)	(4)
	Ever late		Loan default	
Sufficient collateral	0.139*	0.103	0.0273	0.00342
	(0.0776)	(0.0802)	(0.0610)	(0.0603)
Sufficient repayment capacity	-0.103	-0.0628	-0.0934	-0.0672
	(0.0718)	(0.0778)	(0.0617)	(0.0663)
The applicant appears...				
...competent		-0.168**		-0.108*
		(0.0732)		(0.0631)
...clever		0.0633		0.108*
		(0.0778)		(0.0587)
...trustworthy		-0.132*		-0.116*
		(0.0732)		(0.0625)
...aggressive		0.0302		0.160
		(0.153)		(0.143)
Disbursement timing	0.000847	0.000906	0.000956	0.000931
	(0.00120)	(0.00128)	(0.000963)	(0.00104)
Loan maturity	0.269***	0.266***	0.0200	0.0252
	(0.0560)	(0.0585)	(0.0408)	(0.0425)
Loan size	0.0829**	0.0865**	0.134***	0.133***
	(0.0400)	(0.0413)	(0.0311)	(0.0321)
Covariates	Yes	Yes	Yes	Yes
Branch fixed effects	Yes	Yes	Yes	Yes
Observations	403	389	403	389
Pseudo R ²	0.203	0.213	0.161	0.182

Notes: This table shows probit regressions to explain the probability that marginal borrowers were at least once late with repaying the loan (columns 1-2) or defaulted (columns 3-4). The regressors reflect loan officers' views about clients at the time of the baseline survey. Robust standard errors in parentheses. Table A1 in the Appendix contains all variable definitions. ***, **, * indicate significance at 1, 5 and 10%.

and simple credit scoring can get round adverse selection as effectively as the loan officers were able to (given the incentive structure they face, where their remuneration depends on the performance of their portfolio).

Finally, we also estimate the impact of access to credit on a summary measure of perceived stress which is based on the Perceived Stress Scale (PSS), a set of ten questions that capture how unpredictable, uncontrollable, and overloaded respondents find their lives.³⁷ Our measure of stress aggregates the answers to the ten questions and this measure ranges between zero ("Not stressed") and 40 ("Extremely stressed"). Interestingly, we find no sig-

³⁷For example, one question is "In the last month, how often have you been upset because of something that happened unexpectedly?". Answers to each question range between zero ("Never") and four ("Very often").

nificant impact of access to credit on stress levels notwithstanding the high levels of non-repayment (this also holds for sub-samples of higher and lower-educated respondents). We also looked at two further measures of “discomfort”. We ask the respondent whether (s)he agrees, disagrees, or is neutral to the statements “*I am in control of my business and it does not control me*” and “*I think it would be easier for me to be an employee of another business*”. We find again no effect of access to credit on the probability of agreeing to either of these two statements.

VI. Discussion and conclusion

We designed an experiment to evaluate the impact of extending microfinance to marginally rejected individuals in Bosnia, where microfinance loans were already well established. The key hypothesis we intended to test is whether this excluded population, which is poorer, could benefit from access to loans by developing businesses.

The results show an increase in self-employment activity and business ownership and a shift away from wage work and from welfare dependency. The results on business profits are mixed. In the whole sample the effect of profits is not significant. But once we trim out the top 1 percent of observations the impact is positive and significant. Furthermore, using quantile regression we find that the effect is driven by impacts at the top of the distribution of profits.

Our evidence also shows a decline in consumption and of savings (including household durables). We interpret this as implying that households need to make lumpy investments and that they use their own funds to match those available from the loan to achieve their goal. Interestingly, the consumption of alcohol and tobacco also declines as observed elsewhere in the literature.

The differences between those with higher versus those with lower education are not very precisely estimated and overall are not significant. However, the overall direction of the results seems to indicate that those with higher levels of education did better: business ownership increased primarily among those with higher education. As a result of the experiment the higher educated also mainly increased their business activity in services, while the lower

educated did so in agriculture - a typically low-return activity. Of course, even the higher educated individuals are not particularly well off, but the loans do not seem to be as helpful for the poorest: without much human capital it may be hard to put loans to good use.

More generally, liquidity constraints may not be the only impediment to income growth. Training that allows better identification of business opportunities and possibly better management may also be crucial elements of a policy that encourages the poor into successful self-employment (see Bruhn, Karlan, and Schoar (2010) for a discussion). This point is underscored by the fact that the microloan program for this group was loss making and led to an implicit subsidy of \$268 per household. This contrasts to the much better performance of loans extended to non-marginal clients of the same MFI over the same time period.

We also document marginally significant increases in the labor supply and decreases in school attendance by children aged 16-19. No such effect was recorded for younger children - at the age when schooling is still compulsory. Whether this is inefficient from the perspective of the child cannot be established here. However, such an unintended effect could lead to negative impacts in the long run if no corrective policy is put in place.³⁸ For example to the extent that such a loan program was linked to government policy, the offer of a loan could be packaged with a conditional cash transfer (CCT) to counteract the incentive to take children out of school and into the household business.

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³⁸Although individuals may also gain in knowledge and experience while working at home ("training on the job") we think it is unlikely that these benefits would exceed those of another three or four years of secondary or vocational training.

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Appendix for Online Publication

Appendix - Characteristics of marginal clients

When identifying marginal clients loan officers followed our MFI's regular screening procedures as closely as possible. Since the decision on whether a loan applicant was marginal or not was not based on a credit-scoring system but on the loan officers' judgment, we asked loan officers to fill in a questionnaire about each marginal client. This questionnaire elicited a number of both objective and subjective assessments in order to help us better understand the composition of our population.

First, loan officers had to indicate whether they thought that the client conformed with our MFI's requirements regarding the amount of available collateral, repayment capacity (based on estimated cash flows), the client's overall creditworthiness, his or her business capacity, and finally the client's credit history (if any). We find that the average marginal applicant did not meet 2.6 out of six main requirements of our MFI. Table A2 shows that most marginal credit applicants were considered marginal because they did not possess sufficient collateral (77 percent) or did not meet one or more of the 'other' requirements, which include an assessment of the applicant's character. About one in three marginal clients were judged to have a weak business proposal while loan officers worried about repayment capacity in about a quarter of the marginal applications. Loan officers were also asked which aspects of a potential marginal client they thought were most and least worrisome. The last two columns of Table A2 show that (a lack of) collateral was seen as most worrisome. On the other hand, loan officers report to be least concerned about credit history, which is less relevant for first-time borrowers, or the client's repayment and business capacity.

Second, because the loan officer's view of the applicant's character also feeds into the decision to provide a loan or not, we asked loan officers to rate a number of personality traits on a scale of 1 to 5 (1 representing total agreement and 5 total disagreement). These traits included whether they perceived the marginal client to be competent, reliable, aggressive, trustworthy, etc. Table A6 shows descriptive statistics for a summary indicator where agreement ('totally agree' and 'agree') is coded as one and disagreement ('somewhat agree', 'disagree', and 'totally disagree') as zero. The biggest 'gaps' are perceived to be in the

applicants' knowledge (almost 50 percent are not perceived as knowledgeable) and their integration into society (more than 50 percent are not seen as well integrated).

We also asked loan officers whether each of these character traits would influence the prospective client's business success. Column 2 indicates, for instance, that if a marginal client was perceived to be insecure, loan officers typically believed this insecurity would have an impact on the client's business. Likewise, if a client was characterized as a risk-taker, then loan officers thought in about 70 percent of the cases that this trait would influence the success of the business. Interestingly, however, loan officers thought that their own ex ante judgment of an applicant's 'competence' and 'trustworthiness' would not matter much for subsequent business risk. Yet, in Table 10 we show that these two traits were in fact important predictors of loan default.

Appendix - Figures

Figure A1: Geographical location of participating branches (top) and treatment and control households (bottom)

Notes: The first map shows the location and names of the 14 branches that participated in the experiment (the partner MFI operates 14 branches in total). The second map shows the localities with one or more treatment (dark blue dots) or control (light blue squares) households.

Appendix - Tables

Table A1 Variable Definitions

Activity of household members	# attending school	No of HH members attending school	x
	# employed	No of HH members whose economic status is "employed"	x
	# unemployed	No of HH members whose economic status is "unemployed"	x
	# retired	No of HH members whose economic status is "retired"	x
Age		Age of the respondent in years	x
Age2		Square of the age of the respondent in years	
Amount borrowed		The total original loan amount of the outstanding loans at endline (in BAM)	
Amount borrowed from bank		The original loan amount of the outstanding loans to any bank at endline (in BAM)	
Amount borrowed from MFI		The original loan amount of the outstanding loans to any MFI at endline (in BAM)	
Any loan outstanding		Dummy variable (=1) if HH had one or more loans outstanding at endline	
Applicant is perceived as...	...competent	Dummy variable (=1) if loan officer at baseline perceived marginal applicant to be	
	...clever	Dummy variable (=1) if loan officer at baseline perceived marginal applicant to be clever	
	...trustworthy	Dummy variable (=1) if loan officer at baseline perceived marginal applicant to be	
	...aggressive	Dummy variable (=1) if loan officer at baseline perceived marginal applicant to be	
Assets		Log of total value (BAM) of all assets owned by the HH	
Asset value		Current market value of the household's assets (in BAM)	
At least one loan outstanding to an MFI		Dummy variable (=1) if the HH has at least one loan outstanding to any MFI at endline	
At least one loan outstanding to a bank		Dummy variable (=1) if the HH has at least one loan outstanding to a bank at endline	
Av. % of main three loans used for business investments		Average percentage that households had used of their three main outstanding loans for business investment	
Business expenses		Amount (BAM) of expenses made by the respondent's main business	
Business in agriculture		Dummy variable (=1) if the respondent's main business is in agriculture	
Business in services		Dummy variable (=1) if the respondent's main business is in services	
Business ownership		Dummy variable (=1) if the respondent owns a business	x
Business profit		Amount (BAM) of profits from the respondent's main business	
Business revenue		Amount (BAM) of revenues from the respondent's business	
Consumption	Cigarettes and alcohol	Amount (BAM) spent on cigarettes and alcohol by the HH in the last week	
	Durables	Amount (BAM) spent on non-durable items by the HH in the last year (education expenses, furniture, carpets, textiles, repairs, HH appliances, purchase of vehicles,	
	Food	Amount (BAM) spent on food (inside and outside the house) by the HH in the last week	
	Food, inside	Amount (BAM) spent on food consumed by the HH at home in the last week	
	Food, outside	Amount (BAM) spent on food consumed by the HH outside the home in the last week	
	Other non-durables	Amount (BAM) spent on non-durable items by the HH in the last month (rent, combustibles, transport services, clothes/shoes, recreation, magazines, newspaper,	
	Total	Amount (BAM) spent on durable and non-durable consumption in the last year	
Disbursement timing		Time (in days) between start of the experiment and loan disbursement	
Dwelling house		Dummy variable (=1) if the HH's main dwelling is a house	
Dwelling owned		Dummy variable (=1) if the HH owns its dwelling	
Employed		Dummy variable (=1) if the respondent is employed	x
Ever late		Dummy variable (=1) if the respondent was at least once late with repaying the loan	
Female		Dummy variable (=1) if the respondent is female	x
Has started a business in the last 14 months		Dummy variable (=1) if the HH started a business since the baseline survey	
Has closed a business in the last 14 months		Dummy variable (=1) if the HH closed a business since the baseline survey	
Highest education	Primary	Dummy variable (=1) if the highest grade completed by the respondent is...	
	Secondary	...Grade IX or lower	x
	University	...between Grade X and Grade XIII including	x
		...at least one year at university	x
Hours worked	Household level	Number of hours worked by all HH members in the last week	
Household, working age	Household level	Number of hours worked by all HH members age 16-64 years (in the last week)	
Hours worked, per member	Household level	Number of hours worked by all HH members/the number of HH members (in the last	
Household, per member of working age	Household level	Number of hours worked by all HH members age 16-64 years (in the last week)/the number of HH members of the same age	
Hours worked	Individual level	Number of hours worked by a particular HH member in the last week	
Hours worked on business	Household level	Number of hours worked on the business by all HH members in the last week	
Hours worked on business, per member	Household level	Number of hours worked on the business by all HH members/the number of HH members (in last week)	
Hours worked on business	Individual level	Number of hours worked on the business by a particular HH member in the last week	
Household composition	# male	Number of male HH members	x
	# female	Number of female HH members	x
	# kids aged 0-5	Number of children aged 0-5 years living in the HH	x
	# kids aged 6-10	Number of children aged 6-10 years living in the HH	x
	# kids aged 11-15	Number of children aged 11-15 years living in the HH	x
	# kids aged 16-19	Number of children aged 16-19 years living in the HH	x
	# elderly (>64)	Number of elderly aged 64 years and above living in the HH	x

Household income	Total	Total income (BAM) of HH in previous year (wages from self-employment, agricultural work, shop/market work, financial services, manufacturing, tourism, other private business, government, migration/remittances, government benefits, pensions, rental	
	Agriculture	Amount (BAM) HH earned in the previous year from agricultural work	
	Self-employment	Amount (BAM) HH earned in the previous year through self-employment	
Household income sources		Dummy variable (=1) if the respondent gets income from...	
	Self-employment	...self-employment	
	Agriculture	...agriculture	
	Shop	...shop/market	
	Manufacturing	...manufacturing	
	Private business	...other private business	
	Government	...government employment	
	Remittances	...remittances	
	Benefits	...social benefits	
	Pension	...pension	
	Rent	...rent	
Household has savings		Dummy variable (=1) if the HH has any savings	
Household contributes weekly		Dummy variable (=1) if the HH adds to savings on a weekly basis	
Household saves for education		Dummy variable (=1) if the HH saves for education	
Interest rate		Interest rate (%) charged by our partner MFI	
Late payment		Dummy variable (=1) if loans where at least one of the monthly installments was paid	
Loan default		Dummy variable (=1) if borrower defaulted on its loan	
Loan maturity		Maturity of the loan in years	
Loan size		Size of loan in '000s of BAM	
Marginal borrower		Dummy (=1) if the borrower is a marginal borrower (=0 for regular borrowers)	
Married	Marital status	Dummy variable (=1) if the respondent is married	x
MFI requirements met...	...sufficient collateral	Dummy variable (=1) if the respondent met our MFI's collateral requirement	
	...repayment capacity	Dummy variable (=1) if the respondent met repayment capacity based on the estimated	
	...creditworthiness	Dummy variable (=1) if the respondent is creditworthy	
	...business capacity	Dummy variable (=1) if the respondent's suggested business met the quality requirements of our MFI	
	...credit history	Dummy variable (=1) if the respondent's credit history is in line with our MFI's	
No. loans outstanding		Number of loans HH had outstanding at the time of the baseline survey	
Ownership of inventory		Dummy variable (=1) if the HH owns inventory	
Rate of return	Internal	Discount rate that makes the net present value (NPV) of the credit program equal to zero	
	Overall	NPV calculated by the overall weighted discount rate, divided by the total amount of loans	
	Commercial	NPV calculated by the weighted commercial discount rate, divided by the total amount of	
	Concessional	NPV calculated by the weighted concessional discount rate, divided by the total amount of	
Repaid		Percentage of loans that were repaid	
Savings		Amount (BAM) of HH savings. Amounts were reported in bands (<1,000BAM; 1,000-2,000 BAM; 2,001-4,000 BAM; 4,001-10,000 BAM; > 10,000 BAM) and the mid-point was chosen	
Self-employment		Dummy variable (=1) if at least one HH member is self-employed	
School attendance		Dummy variable (=1) if a HH member...	
	Aged 7-19	...aged 7-19 years attends school	
	Aged 7-15	...aged 7-15 years attends school	
	Aged 16-19	...aged 16-19 years attends school	
Shocks experienced		Dummy variable (=1) if the HH experienced...	
	Job loss	... a job loss in the previous year	
	Bad harvest	...a bad harvest in the previous year	
	Illness, earning	...an illness of an earning HH member in the previous year	
	Illness, non-earning	...an illness of a non-earning HH member in the previous year	
	Death, earning	...death of an earning HH member in the previous year	
	Death, non-earning	...death of a non-earning HH member in the previous year	
	Employee left	...an employee left in the previous year	
	Crime	...a crime in the previous year	
	Competition	...increased competition in the previous year	
	Other loss	...some other significant loss in the previous year	
	Other gain	...some other significant gain in the previous year	
Sufficient collateral		Loan officer indicated at baseline that respondent could pledge sufficient collateral	
Sufficient repayment capacity		Loan officer indicated at baseline that respondent was expected to have sufficient	
Type of business		Dummy variable (=1) if the respondent's business is in...	
	Trade	...trade	
	Services	...services	
	Agriculture	...agriculture	
	Production	...production and manufacturing	
Unemployed		Dummy variable (=1) if the respondent is unemployed	
Unemployment		Dummy variable (=1) if at least one HH member is unemployed	
Value three main loans		Total value in BAM of the three largest loans of the HH at the time of the baseline survey	
Written off		Percentage of loans that were written off	

Notes: This table provides variable definitions in alphabetical order. The last column indicates whether the variable is one of the standard covariates in the regression estimates. HH: household. BAM: Bosnia and Herzegovina convertible mark.

Table A2 Marginal applicants: Unmet requirements

	Mean	Std.Dev.	Mean	
	(1)	(2)	(3a)	(3b)
Number of requirements not met:	2.55	1.24		
<i>Requirements:</i>			<i>Most</i>	<i>Least</i>
			<i>worrisome</i>	
Sufficient collateral	0.766	0.424	0.632	0.072
Repayment capacity	0.244	0.430	0.130	0.203
Creditworthiness	0.196	0.397	0.164	0.086
Business capacity	0.377	0.485	0.174	0.177
Credit history	0.141	0.348	0.026	0.445
Other (incl. characteristics)	0.838	0.369	0.022	0.017

Notes: The first line of this table shows the mean and standard deviation of the number of lending requirements that the marginal loan applicants did not meet according to their loan officer at the time of the baseline survey. For each requirement the table then shows the proportion of clients that did not meet it (column 1) and the proportion of cases where the loan officer judged this deficiency to be either the most (3a) or the least (3b) worrisome.

Table A3 Loan use

Type of investment			Lumpiness of investment				
	Obs.	% of borrowers		Obs.	Mean %	Obs. for which 100%	% for which 100%
	(1)	(2)		(3)	(4)	(5)	(6)
Purchase of livestock	139	23.6%	Existing enterprise				
Investment in seed, fertilizer, etc.	85	14.4%	- <i>Main</i>	734	93%	562	77%
Purchase of engine, tools, etc.	73	12.4%	- <i>Secondary</i>	88	72%	25	28%
Investment in developing own work	55	9.3%	New enterprise	325	91%	227	70%
Purchase of goods	50	8.5%	<i>Total</i>	1,147	91%	814	75%
Private purpose	50	8.5%					
Investment in real estate	15	2.5%					
Buying and maintaining cars/fuel	14	2.4%					
Other	109	18.5%					
<i>Total</i>	<i>590</i>	<i>100%</i>					

Notes: Columns 1-2 summarize the main types of investment made by the treatment group. Source: follow-up survey. Columns 3-6 show for the full sample the number of respondents that planned to invest in an existing or new business (column 3); the average percentage of the loan amount they indicated to invest in this business (column 4); and the number and percentage of respondents that indicated they would put the full loan amount towards a business (columns 5-6). Source: baseline survey.

Table A4 Attrition status and 'soft' baseline characteristics

Loan officer thought the applicant was...	(1)	(2)
...competent	0.013 (0.142)	-0.024 (0.151)
...reliable	0.216 (0.172)	0.215 (0.176)
...trustworthy	-0.019 (0.165)	0.017 (0.171)
...knowledgeable	-0.131 (0.134)	-0.238 (0.140)
...experienced	0.141 (0.139)	0.142 (0.147)
...well-integrated into society	-0.106 (0.140)	-0.099 (0.145)
...clever	-0.108 (0.135)	-0.114 (0.142)
...a risk-taker	-0.029 (0.132)	-0.053 (0.135)
...a fighter	0.066 (0.137)	0.044 (0.147)
...aggressive	-0.021 (0.217)	0.077 (0.222)
...stable	-0.046 (0.155)	-0.063 (0.169)
...insecure	-0.046 (0.210)	-0.121 (0.214)
Constant	0.935 (0.060)	1.801 (1.014)
Covariates	No	Yes
Chi2	6.26	55.70
Prob > Chi2	0.902	0.411

Notes: This table presents the results of a joint significance test to determine whether attrition status was systematically related to soft baseline characteristics of the respondents as judged by the loan officer. The unreported covariates are those marked 'x' in Table A1.

Table A5 Baseline and follow-up interviews

Survey	Interview status	#
Baseline	Submitted by implementing agency	1,241
	Refused	33
	Unavailable	2
	Total interviewed	1,206
	Eliminated after interview	8
	<i>Total interviewed and eligible for follow-up</i>	<i>1,198</i>
Follow-up	Refused	100
	Invalid contact information/no answer	88
	Working abroad/moved	7
	Incomplete interview	13
	Hospitalized or dead	3
	Other	5
	<i>Full response</i>	<i>982</i>

Notes: This table provides information on the number of interviews during the baseline and follow-up surveys and the reasons why certain potential respondents were not (re-)interviewed.

Table A6. Loan officers' judgment of loan applicant characteristics

Loan officer perceives applicant to be...	Proportion (1)	Impacts business risk? (2)
...reliable	0.70	0.03
...a fighter	0.70	0.03
...competent	0.68	0.03
...trustworthy	0.66	0.05
...clever	0.65	0.01
...stable	0.64	0.03
...experienced	0.64	0.14
...knowledgeable	0.51	0.09
...well-integrated into society	0.48	0.27
...a risk-taker	0.44	0.70
...insecure	0.09	1.00
...aggressive	0.07	0.01

Notes: Column 1 shows the proportion of marginal loan applicants that according to their loan officer displayed a particular personality trait at the time of the baseline survey. Column 2 shows, conditional on having this characteristic, whether the loan officer believed that it would influence business risk.