THE IMPACTS OF MICROCREDIT:
EVIDENCE FROM BOSNIA AND HERZEGOVINA

Britta Augsburg
Ralph De Haas
Heike Harmgart
Costas Meghir

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Britta Augsburg, Ralph De Haas, Heike Harmgart, and Costas Meghir
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ABSTRACT

We use an RCT to analyze the impacts of microcredit. The study population consists of loan applicants who were marginally rejected by an MFI in Bosnia. A random subset of these were offered a loan. We provide evidence of higher self-employment, increases in inventory, a reduction in the incidence of wage work and an increase in the labor supply of 16-19 year olds in the household's business. We also present some evidence of increases in profits and a reduction in consumption and savings. There is no evidence that the program increased overall household income.

Britta Augsburg
The Institute for Fiscal Studies
7 Ridgmount Street
London WC1E 7AE
britta_a@ifs.org.uk

Ralph De Haas
EBRD
One Exchange Square
EC2A 2JN London
United Kingdom
dehaasr@ebrd.com

Heike Harmgart
EBRD
One Exchange Square
EC2A 2JN London
United Kingdom
harmgarh@ebrd.com

Costas Meghir
Department of Economics
Yale University
37 Hillhouse Avenue
New Haven, CT 06511
and IZA
and also NBER
c.meghir@yale.edu

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 expensive moneylenders or have to borrow from family and friends (Collins et al. 2009). 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 (at the individual level) 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. They all applied for a loan but were subsequently turned down, as the loan officers deemed them of lesser quality than regular clients. This is an interesting group to analyze if we are to understand whether alleviating credit constraints can be an effective anti-poverty tool. Moreover, the fact that they are applicants implies that almost all individuals in the treatment comply (take-up the loan), which increases the power of the experiment. Indeed, only eight respondents (less than 1.5 percent) of those selected to receive a loan later refused it. However, the specific focus on marginal clients may also limit the external validity of our findings. In many cases it may be of interest to measure the impact of making microfinance available more generally, as in Banerjee et al. (2013).

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 (RCTs - see the introductory article to this Special Issue) 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 formal financial

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[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 et al. (2010) for experimental evidence on the mechanisms through which joint liability affects repayment.

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 (200% APR) in South Africa and the other a four-month business loan (60% APR) in the Philippines - in our case the loan is supposed to be for business (although this is not explicitly monitored), interest rate is 22% and the average maturity just over a year.

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 (possibly because borrowers seem to substitute out of wage labor). We also find evidence that business profits increased. 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 (see also Karlan, Osman, and Zinman, 2013).

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.[2] 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 defaults, substantially higher than those of the average regular client pool at the same time. Indeed the program led to an implicit subsidy of $268 per marginal borrower on average.

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[2]There 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. Demirgüc-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.

The paper proceeds as follows. In Section I we describe the loan program and our target population after which Section II sets out the experimental design. Sections III and IV then discuss our main results and the financial sustainability of the program. Section V concludes.

II. The program

A. Target population

We conducted our field experiment with the collaboration of a large Bosnian MFI established since in the mid-nineties and a 36,000 client base across the entire country at the time of the baseline survey. 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. Table A2 in the 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 collateral or did not meet one or more of the other requirements, which include an assessment of the applicant's character.[3] 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).

Overall, 28.2 percent of the total sample lived in urban areas, here defined as cities with more than 50,000 inhabitants. At baseline, 78 percent of all respondents had some income from self-employment. Of these, 27 percent was engaged in trade, 29 percent in the services sector, 38 percent in agriculture, and 6 percent in manufacturing.

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 the former 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

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

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. We also use data from the MFI's management information system to compare the marginal clients to regular first-time borrowers. This shows that marginal clients are younger, less likely to be married, and have less education. They are also less likely to be employed full-time .

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. They were individual-liability loans with monthly repayments and no grace period. The loans had an interest rate of 22 percent 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 percent 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 BAM 1,653 which at the prevailing exchange rate at baseline of US$ 1 to BAM 1.63 this amounts to an average loan of US$ 1,012and a similar median amount. Our MFI provides some flexibility in terms of the maturity and size of individual loans. The maturity averaged 57 weeks.

77 percent 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. The adverse selection is explainable based on the subjective evaluation of the loan officers.

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). Our MFI did not use an automated credit-scoring system, but an individualized screening by loan officers. During the training sessions loan officers were instructed on how to identify clients they would normally reject, but to whom they would consider lending if they were to accept slightly more risk. 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.[4] Loan officers were now asked to start identifying potential marginal clients from 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.

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

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[4]Figure A1 in the Appendix displays the geographical distribution of the branches and respondents.

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 (obviously 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. 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. The interview lasted around 60 minutes and was conducted by a professional survey company using computer-assisted telephone interviews (CATI). 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 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).[5] 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. The last interview and loan disbursal 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

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[5]The 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.

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.

While the design, implementation and evaluation of the experiment was done as carefully as possible there are inevitably certain issues that we need to keep in mind. First, the attrition rate is 17 percent with a ten percentage point difference between the control and the treatment group. We show, however, that the sample remains balanced post-attrition. Below, we provide an in depth analysis of attrition in our sample and its possible impact on the balanced nature of our dataset. Second, the participants in our RCT were all well aware that they were part of a study and that the MFI would normally have rejected them. This may raise some concerns about the external validity of our findings as well as about the possibility of Hawthorne and/or John Henry effects. While we cannot completely rule out such effects, we think they are unlikely to have introduced a strong bias as it was made clear ex ante that, depending on the results of the study, our partner institution would expand its lending to marginal borrowers in the future. Moreover, we limited possible reporting biases by undertaking the baseline survey before the randomization decision and by hiring a completely independent survey company that was not linked to our partner MFI. Before the interviews took place, it was also made clear to the respondents that their answers would in no way influence the probability of receiving credit now or in the future.

Third, the sample size should ideally have been larger as we test multiple hypotheses and the individual test sizes need to be adjusted for this.

Finally, our design focuses on applicants that were originally rejected for a loan. While this has the advantage of excellent compliance rates and a focus on poorer individuals, it may limit external validity. . The rationale for this design was that there was already a well established microfinance system for higher quality borrowers in place in Bosnia at the time of the start of our RCT. The research question therefore focused on the impact of expanding this system to poorer people who did not have easy access to formal sources of credit. We try and give as much information as possible on our borrowers to facilitate comparisons with other contexts.

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, 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 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. The sample also appears balanced in terms of where respondents are located. The average distance to the nearest city is about 54 kilometers in both the treatment and control groups (see also Figure A1 in the Appendix).

Table 1: Summary statistics

	Obs	Control Group			Treatment - Control	
		Obs	Mean	St. Dev.	Coeff.	*p-value*
Panel A. Post-attrition household sample						
Household composition						
# members	995	444	3.45	1.48	0.16	*0.054*
# adults (>=16 years old)	995	444	2.54	1.05	0.14	*0.027*
# children (<16 years old)	995	444	0.84	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*
Access to credit:						
Any type of loan	995	444	0.583	0.494	-0.004	*0.901*
Number 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**	564	257	47.034	44.40	-0.482	*0.888*
Amount borrowed (in BAM):						
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*
Self-employment activities						
# of income sources	995	444	2.541	1.046	0.026	*0.665*
Total HH income (last year) (BAM)	995	444	18,000	15,001	-718	*0.392*
Income from self-employment (BAM)	995	444	7,453	13,007	-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*
Hrs worked by respondent, last week	987	440	49.2	28.2	-0.8	*0.599*
Hrs worked on business by respondent, last week	862	381	32.7	28.1	0.1	*0.933*
Consumption (in BAM)						
Food consumption	995	444	106	83	-2.53	*0.630*
Non-durables consumption	995	444	214	957	54.24	*0.430*
Durables consumption	989	443	2,491	5,108	-220	*0.430*
Location (in km)						
Distance to Sarajevo	981	440	131	286	1.090	*0.940*
Distance to nearest city	981	440	54	281	-0.710	*0.960*
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. Table A1 contains all variable definitions. **Average of three mains loans outstanding.

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.

C. Attrition

In total, 1,241 respondents were selected to participate. After refusals or lack of availability we were left with 1,196 individuals at baseline. Of these 995 were re-interviewed at follow-up, representing an attrition rate of 17 percent. Table A3 in the Appendix provides details on the targeted and actual number of interviews at baseline and follow-up. To reduce attrition, interviewers were trained to encourage participation and the survey company sent all participants a reminder letter at the start of the follow-up survey, also announcing a raffle for all who completed the survey in which a laptop and several iPods could be won. People who nevertheless initially declined were called back later by a senior interviewer, asked once more to participate, and also offered a EUR 10 phone card, corresponding to 54 percent of average daily earnings.

In the end, the response rate among the control group was about ten percentage points lower than in the treatment group (Table 1). 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. We also checked that pre-treatment characteristics are balanced across treatment and control groups in the sub-samples defined by business ownership at baseline, high versus low education level, and gender of the respondent. There is also no significant difference in repayment performance (loan default) between those who responded in the follow-up survey and those

who did not (p-value is 0.22). Appendix Table A4 presents regressions where an attrition dummy was regressed on treatment status, various standard respondent covariates, as well as 'soft' respondent characteristics (summarized in Appendix Table A9) as observed by the loan officer. A test of joint significance shows that these covariates are not jointly correlated with attrition status.

In Table A5 we re-estimate the regressions for our main impacts using the DiNardo, Fortin and Lemieux (1996) approach where we re-weigh 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.

Lastly, in Table A6 we check how those who dropped out of our sample and those reinterviewed compare along observable characteristics and whether the differences correlate with treatment status. This analysis shows that those who were lost from the sample are very similar to those who remain; this also holds in both the treatment group and the control group separately. We do find, however, that those lost from the sample have slightly more children younger than 16 and that the number of outstanding loans at baseline was somewhat higher among them (though only in the control group).

All in all, we conclude that attrition is unlikely to have undermined the balance between treatment and control and introduced bias in the reported results.

IV.   Estimation approach and inference

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). Baseline covariates included in all regressions are gender, age, marital status of the respondent (the marginal applicant), 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). When we also include week of randomization dummies (since randomization was stratified by week) all our results go through in terms of both economic and statistical significance. Appendix Table A1 contains all variable definitions.

We present standard errors that are robust to heteroskedasticity. Since we are testing

multiple hypotheses at once we compute levels of significance for each coefficient using the step-down approach of Romano and Wolf (2005). To quote Romano and Wolf (2005) "...*we account for data mining [by] (asymptotic) control of the familywise error rate (FWE). The FWE is defined as the probability of incorrectly identifying at least one*..." coefficient as significant. Thus our approach is to control for a FWE of 1, 5 and 10 percent and mark each coefficient that is significant at each of these rates. The standard errors allow for the construction of confidence intervals. These will often exclude zeros (at 95 or 90 percent confidence), while at the same time the step-down p-value will be higher than 10 percent. Testing too many hypotheses at once may reduce power to detect anything significant. We thus test multiple hypotheses in related groups rather than for all effects reported in the paper. Moreover, we report joint tests that *all* effects and groups of effects we look at are jointly significant, based on a χ^2-type test the distribution of which is simulated using the bootstrap.

V. Results

Below we present results on outcomes split in thematic parts. Based on the χ^2-type test, the effects we present are jointly significant with a p-value of zero. This is true even if we exclude from the test the impact of the experiment on loan availability. The experiment therefore did change the outcomes we focus on.

A. 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 and 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 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 2, 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 a 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 by other sources and/or given loans with a much shorter maturity. We conclude that the treatment group did indeed have significantly better access to liquidity than the control group.

Table 2: Credit outstanding at endline

	(1) Any loan outstanding	(2) Nr of loans outstanding	(3) At least one loan outstanding from an MFI	(4) At least one loan outstanding from a bank
Treated	0.193	0.429	0.439	-0.0556
	(0.0258)+++	(0.0650)+++	(0.0289)+++	(0.0166)+++
Observations	994	994	994	994
Control mean	0.694	1.068	0.324	0.0946

Notes: +++, ++, + indicate significance at 1, 5, and 10 percent when correcting for multiple-hypothesis testing. All variables presented in this table were tested jointly. 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. BAM: Bosnia and Herzegovina convertible mark. The exchange rate at baseline was USD 1 to BAM 1.634.

B.   Impact on self-employment and income

Table 3 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, 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 percent 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.[6] Individually

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[6]In the control group at follow-up, inventory is held by 58 percent of the small-scale businesses in trade, 14

these effects are significant at either the 5 or the 10 percent level. However, once we allow for multiple testing for the set of results reported in this table the only significant effect (at 10%) is ownership of inventory. We also found no significant differences between those who had high versus low education at baseline, or those who did and did not own a business at baseline.

The table does not show any significant impact on profits (by any criterion). An issue is whether 14 months is too soon after the loan disbursement to see any outcomes on profits. So in a survey of loan officers that we undertook in 2013 we asked: "*When people start a new business, it may take some time before they generate revenues and make a profit. How long do you think it takes your first-time borrowers on average to start generating revenues*". The median answers for varying sectors were well within our observation period: agriculture 5.5 months; trade 2 months; manufacturing 3 months. Looking further into this result, 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) as shown in Table A7 in the Appendix.[7] In that table we also present the results of quantile regressions which confirm that for the higher quantiles there are individually significant positive impacts of access to credit on firm profitability.

The loans were intended for business use but our MFI did not apply sanctions of any sort if the loans were used for consumption (in part or in full). So it is interesting to measure the impact on profits for those declaring an intention at baseline to use them for business. Of course, as Karlan, Osman and Zinman (2013) point out, using survey data to measure (intended) loan use can be problematic due to biases resulting from strategic reporting. This caveat apart, for those with an intended business use the overall effect on profits is 1,113 (se 581.4). For this subsample trimming has little effect on the coefficient estimate, but it does make it more precise (1,137 with a standard error of 430.5 - see Table A7 for details).

In Table 4 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).

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percent in services, 12 percent in agriculture, and 40 percent in production.

[7]In Table A10 in the Appendix, we also provide trimmed results for all other monetary variable outcomes as an additional robustness test.

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Table 3: Self-employment activities: revenues, assets and profits

	(1) Asset value (BAM)	(2) Ownership of inventory [Yes=1]	(3) Main business of respondent	(4)	(5)	(6) Any self-
			Revenue (BAM)	Expenses (BAM)	Profit (BAM)	empl. income (HH) [Yes=1]
Treated	-414.5	0.0513	1,384	601.4	671.9	0.0602
	(5,390)	(0.020)+	(981.4)	(592.9)	(541.3)	(0.0293)
Observations	967	994	994	994	994	994
Control mean	93,294	0.0923	4,391	1,664	2,896	0.669

	(7) Business ownership [Yes=1]	(8) Business in services [Yes=1]	(9) Business in agriculture [Yes=1]	(10) Has started a business in last 14 months	(11) Has closed a business in last 14 months
Treated	0.0584	0.0312	0.0350	0.0210	-0.0168
	(0.031)	(0.025)	(0.028)	(0.022)	(0.027)
Observations	994	994	994	994	994
Control mean	0.507	0.169	0.239	0.124	0.230

Notes:+++, ++, + indicate significance at 1, 5, and 10 percent when correcting for multiple-hypothesis testing within this table. Covariates included. Data source: Endline household survey. Observation unit: respondent except Income from self-employment (household). BAM: Bosnia and Herzegovina convertible mark. The exchange rate at baseline was USD 1 to BAM 1.634.

The incidence of any self-employment income for the household increases by 6 percentage points, while the incidence of wage income declines by 8 pp, both effects being individually significant (but only the latter is significant at the 5 percent level once we allow for multiple hypothesis testing). These results therefore suggest a change in activity towards self-employment and away from wage work.[8] Indeed, in the next sub-section we describe an equivalent shift in hours worked away from "Other activities" (which includes wage labor) and towards work in the own household business.

The resulting magnitude of the changes in these income sources is not precisely estimated. The amount of welfare benefits declines by 167 BAM, which may reflect that those borrowers who set up profitable businesses may no longer be eligible for means-tested benefits. However, once we allow for multiple-hypothesis testing this effect is no longer significant at conventional levels.[9]

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[8]Crepon et al. (2014) find a similar effect in their Moroccan experiment.

[9] The main social transfers in Bosnia relate to child-care allowance, social assistance, and veterans-related benefits. Only the latter category is not means tested.

Table 4: Income

	(1a) Self-employment	(1b)	(2a) Wages	(2b)	(3a) Remittances	(3b)	(4a) Government benefits	(4b)
	Likelihood	Amount (BAM)	Likelihood	Amount (BAM)	Likelihood	Amount (BAM)	Likelihood	Amount (BAM)
Treated	0.0602 (0.0293)	74.50 (614.9)	-0.0798 (0.0288)++	322.9 (569.7)	-0.0231 (0.0263)	-1.761 (135.2)	-0.0582 (0.0280)	-167.3 (78.93)
Observations	994	994	994	994	994	994	994	994
Control mean	0.669	6,111	0.694	6,881	0.225	590.9	0.329	630.9

Notes:+++, ++, + indicate significance at 1, 5, and 10 percent when correcting for multiple-hypothesis testing. Covariates included. Data source: Endline household survey. Covariates included. The amount of profit from self-employment differs from business profit in Table 3: 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. The exchange rate at baseline was USD 1 to BAM 1.634.

C. Impact on hours worked

Table 5 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 worked in the business increased by 3.8 (s.e. 3) and the hours spent on other activities decreased by 4.3 hours (se 2.5). Perhaps the most interesting result in this table is that the labor supply of teens (16-19) on the business increases significantly overall and is larger 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). When adjusting for multiple hypothesis testing the impact on working in the business for 16-19 year olds is significant at the 10 percent level. Note however, that the overall labor supply of 16-19 year olds does not seem to have increased significantly.

D. Impact on consumption and savings

Consumption is a particularly interesting outcome to consider. While in the long run consumption should go up if access to microcredit successfully improves standards of living, in the shorter run it can go either way. If the loan and the opportunity for entrepreneurial activity increases permanent income, consumption can increase within the observation window if the household can borrow sufficiently 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/or accumulated savings if the loan amount

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Table 5: Time worked by household members

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		\multicolumn{6}{}{Hours worked per household member in a typical week$:}						Number of staff working on the business (full-time, part-time, or temporary)	
			all adults and teens			teens (16-19yrs)				
			of which:			of which:				
		total	on business	other activities	total	on business	other activities	Outsiders	HH members
Overall household	Treated	-0.501	3.759	-4.260	0.427	0.533	-0.105	0.287	1.157
		(3.520)	(2.996)	(2.494)	(0.358)	(0.227)+	(0.269)	(1.307)	(0.583)
	Observations	994	994	994	994	994	994	994	994
	Control mean	77.83	38.51	39.32	0.556	0.182	0.374	1.446	0.019
Per HH member	Treated	-0.409	1.986	-2.395	0.341	0.500	-0.159		
		(1.289)	(1.175)	(1.022)	(0.348)	(0.225)	(0.259)		
	Observations	994	994	994	994	994	994		
	Control mean	31.77	15.74	16.03	0.556	0.182	0.374		

Notes: +++, ++, + indicate significance at 1, 5, and 10 percent when correcting for multiple-hypothesis testing. Specifically, we tested variables (2), (3), (5) and (6) jointly. Covariates included. Data source: Endline household survey. Observation unit: household. $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.

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.

It is not straightforward to check whether the actual investments were lumpy. We know that 24 percent of loans were used for purchasing livestock. Another 14 percent of the clients used the loan mainly for other agricultural investments such as buying seed and fertilizer (which clearly is not lumpy). However, based on intended use at baseline, 28 percent of the clients planned to invest in a new business, which may well require minimum amounts for viability. On average these applicants planned to invest more than 90 per cent of the loan amount into that business. Three out of four respondents even stated that they would invest at least the full loan amount. This indicates that many of the investments may have been lumpy. For more details see Appendix Table A8.

Households that still do not invest (but do take up the loan) or who are able to make only marginal investments will increase their consumption. Such a 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.

Table 6 summarizes the estimated impacts on consumption and savings and a home durable goods index. The first column shows that annual per capita consumption was BAM 648 lower in the treatment compared to the control group, which amounts to 15 percent of the follow-up consumption of the controls. This measure includes food (inside and outside of the home), 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).[10] For individual commodities we find that food consumption declined among the lower-educated (not shown) by approximately BAM 18 (US$ 13) a week, which equals 15 percent of the household's food consumption at followup. This negative impact differs significantly from the equivalent effect on the higher educated (p-value: 0.02). We find no

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[10]Food 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.

significant effects on consumption for the higher educated households.

As in Banerjee et al. (2013) and Banerjee and Mullainathan (2010) there is a reduction in the consumption of temptation goods, which is individually significant at the 10 percent level: at baseline the expenditure for these goods was 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 reduce the amount of their financial savings compared with the control group. This 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 as evident from column 8.

Many of these effects have t-statistics above 1.96 (5 percent significance) or above 1.6 (10 percent significance) but none of them is significant at the 10 percent level if we account for multiple-hypothesis testing using the step-down procedure. However, based on a joint χ^2-type test, the total set of treatment effects reported in this table has a p-value of 1.6 percent. Separately, the change in consumption, durables and savings (which are also included in the main set of effects for the purposes of testing) are jointly significant with a p-value of 0.1 percent.

In interpreting these point estimates we may be concerned they reflect difficulties with loan servicing for investments that did not work out. 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. This suggests that the effects on non-durable consumption were most likely not only due to loan servicing (unless struggling borrowers took out follow-up loans to repay initial loans). Carrying out a simple back of

the envelope calculation (suggested by a referee) we see that loan servicing corresponds to approximately the income raised by the program. Specifically, suppose we take the loans outstanding at the time of the follow-up interview (1.487 for the treatment and 1.068 for the control) when consumption and savings are measured. With an average loan amount of BAM 1,653 and a 22 percent annual interest rate, this corresponds roughly to an annual amount that the treated and the controls had to repay of BAM 3,019 and BAM 2,154, respectively. The difference (BAM 865) is very close to the additional income generated by the businesses of the treated (BAM 859 in our preferred, trimmed specification).

Moreover, from a simple descriptive analysis it seems that the decline in consumption is not only driven by households who had difficulties repaying. In particular, when we estimate the effect on consumption by excluding households who had payment difficulties, the estimated coefficients and their standard errors only change marginally. Of course this is far from conclusive because this is a highly selected group based on post-randomization realizations. Thus it seems 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. This interpretation of our findings is also backed up by more anecdotal evidence based on a survey that we carried out in 2013 among the loan officers of our partner MFI. These data show that loan officers estimate that loans to first-time borrowers cover the full intended investment in only 65 per cent of the cases. According to the officers, additional resources are typically drawn from own savings, followed by loans from other institutions.

E. Social impacts

Turning to Table 7 we now consider the effect of the program on schooling of children and stress levels. We also look at whether the proportion of 16-19 year olds living in the household was affected by the program, since this could lead to composition effects in the impact of schooling for this group.

The loan could encourage schooling by alleviating liquidity constraints. Alternatively, it may lead to less schooling if the family prefers family labor to hiring external labor (say because of monitoring or regulatory costs) and the returns to schooling are not perceived as

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	-647.9	18.93	-16.24	-4.103	-85.44	-2.427	-4.260	-0.0718	-422.5
	(327.6)	(366.1)	(15.43)	(5.821)	(79.36)	(1.333)	(14.59)	(0.0281)	(174.5)
Observations	994	994	993	994	994	994	994	994	994
Control mean	4,165	2,216	196.0	117.3	448	15.19	48.51	0.491	1,190

Notes: +++, ++, + indicate significance at 1, 5, and 10 percent when correcting for multiple-hypothesis testing. Specifically, we tested variables (2)-(9) jointly. Covariates included. Data source: Endline household survey. Observation unit: household. Coefficients and robust standard errors (in parentheses). 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.

high enough. We find no impact on the schooling of children below 16, when schooling is compulsory and an 8.9 pp point decline (se 5.4 pp) for the 16-19 year olds.[11] While this decline is individually significant at the 10% level it is not significant when adjusting for multiple hypotheses testing. Finally, we find no impact on the number of 16-19 year olds living in the household, which could have caused a composition effect, distorting the impact of microfinance on schooling.

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 (column 3).[12] 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 significant 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. Results not shown). 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 (unreported).

Table 7: Social

	Share of kids aged 6-15 in school	Share of kids aged 16-19 in school	Stress index	Having kids in the age range 16-19	No. kids the age range 16-19
Treated	-0.00203	-0.0892	0.127	0.0185	0.041
	(0.016)	(0.054)	(0.317)	(0.021)	-0.0261
Observations	508	235	994	994	994
Control mean	0.967	0.821	19.02	0.162	0.180

Notes: Data source: Endline household survey. Observation unit: household. Coefficients and robust standard errors (in parentheses). Covariates included.

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[11]We note for the benefit of future research that when we consider the sample of low educated borrowers we find a decline in schooling for 16-19 year olds of 0.19 (se 0.084). This effect although individually significant is no longer so when we adjust for multiple hypotheses testing.

[12]For 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").

VI. Subsidized lending or sustainable expansion of loans?

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 8. One should keep in mind that 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 (the IRR is always negative regardless of the discount rate that we apply).[13] Thus, despite a 22 percent annual interest rate charged on these loans, the lending program was not profitable.

Table 8: 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.

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

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[13]Our 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.

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 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 9 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 weak but positive association 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 *positive* correlation suggests that 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 own 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

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loan officers had good reason to classify our target population as marginal. It also raises the issue of whether formal 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).

Table 9: Late payment and default among marginal borrowers

	Ever late		Loan default	
Sufficient collateral	0.139*	0.103	0.027	0.003
	(0.078)	(0.080)	(0.061)	(0.060)
Sufficient repayment capacity	-0.103	-0.063	-0.093	-0.067
	(0.072)	(0.078)	(0.062)	(0.066)
The applicant appears				
competent		-0.168**		-0.108*
		(0.073)		(0.063)
clever		0.063		0.108*
		(0.078)		(0.059)
trustworthy		-0.132*		-0.116*
		(0.073)		(0.063)
aggressive		0.030		0.160
		(0.153)		(0.143)
Disbursement timing	0.001	0.001	0.001	0.001
	-0.001	-0.001	-0.001	-0.001
Loan maturity	0.269***	0.266***	0.020	0.025
	(0.0560)	(0.0585)	(0.0408)	(0.0425)
Loan size	0.0829**	0.0865**	0.134***	0.133***
	(0.040)	(0.041)	(0.031)	(0.032)
Covariates	Yes	Yes	Yes	Yes
Branch fixed effects	Yes	Yes	Yes	Yes
Observations	403	389	403	389
Pseudo R2	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% without adjusting for multiple testing.

VII.   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 and relatively poor population could benefit from access to loans by exploiting profitable business opportunities.

The results show an increase in self-employment activity, business ownership, inventories and a shift away from wage work. 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. We note, however, that we cannot rule out that part of the reduction in savings and consumption is driven by households that are still repaying their debt. Finally, we observe a significant increase in the labor supply of 16-19 year olds who work more in the household business.

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 with the much better performance of loans extended to non-marginal clients of the same MFI over the same time period. Indeed such an implicit subsidy may distort the selection into self-employment and away from other potentially more productivity activities.

References

Banerjee, Abhijit, Esther Duflo, Rachel Glennerster, and Cynthia Kinnan. 2013. "The Miracle of Microfinance? Evidence from a Randomized Evaluation." MIT Working Paper No. 13-09.

Banerjee, Abhijit, and Sendhil Mullainathan. 2010. "The Shape of Temptation: Implications for the Economic Lives of the Poor." NBER Working Paper No. 15973.

Beegle, Kathleen, Rajeev H. Dehejia, and Roberta Gatti. 2006. "Child Labour and Agri-

cultural Shocks". *Journal of Development Economics* 81(1): 80-96.

Berger, Allen N., and Gregory F. Udell. 1995. "Relationship Lending and Lines of Credit in Small Business Finance." *Journal of Business* 68: 351-382.

Bruhn, Miriam, Dean Karlan, and Antoinette Schoar. 2010. "What Capital is Missing in Developing Countries?" *American Economic Review Papers & Proceedings*: 629-633.

Collins, Daryl, Jonathan Morduch, Stuart Rutherford, and Orlanda Ruthven. 2009. *"Portfolios of the Poor: How the World's Poor Live on $2 a Day."* New Jersey: Princeton University Press.

De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2009. "Measuring Microenterprise Profits: Must We Ask How the Sausage is Made?" *Journal of Development Economics* 88(1): 19-31.

Demirgüç-Kunt, Asli, Leora F. Klapper, and Giorgios A. Panos. 2011. "Entrepreneurship in Post-Conflict Transition – The Role of Informality and Access to Finance." *Economics of Transition* 19(1): 27-78.

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach." *Econometrica* 64(5): 1001-44.

European Commission. 2010. *Bosnia and Herzegovina 2010 Progress Report*, Brussels.

Ghatak, Maithreesh and Timothy W. Guinnane. 1999. "The Economics of Lending with Joint Liability: A Review of Theory and Practice." *Journal of Development Economics* 60: 195-228.

Giné, Xavier, Pamela Jakiela, Dean Karlan, and Jonathan Morduch. 2010. "Microfinance Games." *American Economic Journal: Applied Economics* 2: 60-95.

Hartarska, Valentina and Denis Nadolnyak. 2007. "An Impact Analysis of Microfinance in Bosnia and Herzegovina." William Davidson Institute Working Paper No. 915, University of Michigan.

Kaboski, Joseph P. and Robert M. Townsend. 2011. "A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative", *Econometrica* 79(5): 1357-1406.

Kaboski, Joseph P. and Robert M. Townsend. 2012. "The Impact of Credit on Village Economies", *American Economic Journal: Applied Economics* 4(2): 98-133.

Karlan, Dean, Adam Osman, and Jonathan Zinman. 2013. "Follow the Money: Methods for Identifying Consumption and Investment Responses to a Liquidity Shock", Discussion Paper No. 1034, Economic Growth Center, Yale University.

Karlan, Dean and Jonathan Zinman. 2010. "Expanding Credit Access: Using Randomized Supply Decisions to Estimate the Impacts", *Review of Financial Studies* 23(1): 433-464.

Karlan, Dean and Jonathan Zinman. 2011. "Microcredit in Theory and Practice: Using Randomized Credit Scoring for Impact Evaluation", *Science* 332(June): 1278-1284.

Maurer, Klaus and Justyna Pytkowska. 2011. "Indebtedness of Microfinance Clients in Bosnia and Herzegovina. Results from a Comprehensive Field Study." European Fund for Southeast Europe Development Facility, mimeo.

Morduch, Jonathan. 1998. "Does Microfinance Really Help the Poor? New Evidence on Flagship Programs in Bangladesh." Princeton University Working Paper.

Morduch, Jonathan and David Roodman. 2009. "The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence." Center for Global Development Working Paper No. 174 (revised in December 2011).

Pitt, Mark M. and Shahidur R. Khandker. 1998. The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter?" *Journal of Political Economy* 106(5): 958-98.

Romano, Joseph P., and Michael Wolf. 2005. "Stepwise Multiple Testing as Formalized Data Snooping." *Econometrica* 73: 1237-82.

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 A9 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 9 we show that these two traits were in fact important predictors of loan default.

Appendix - Figures
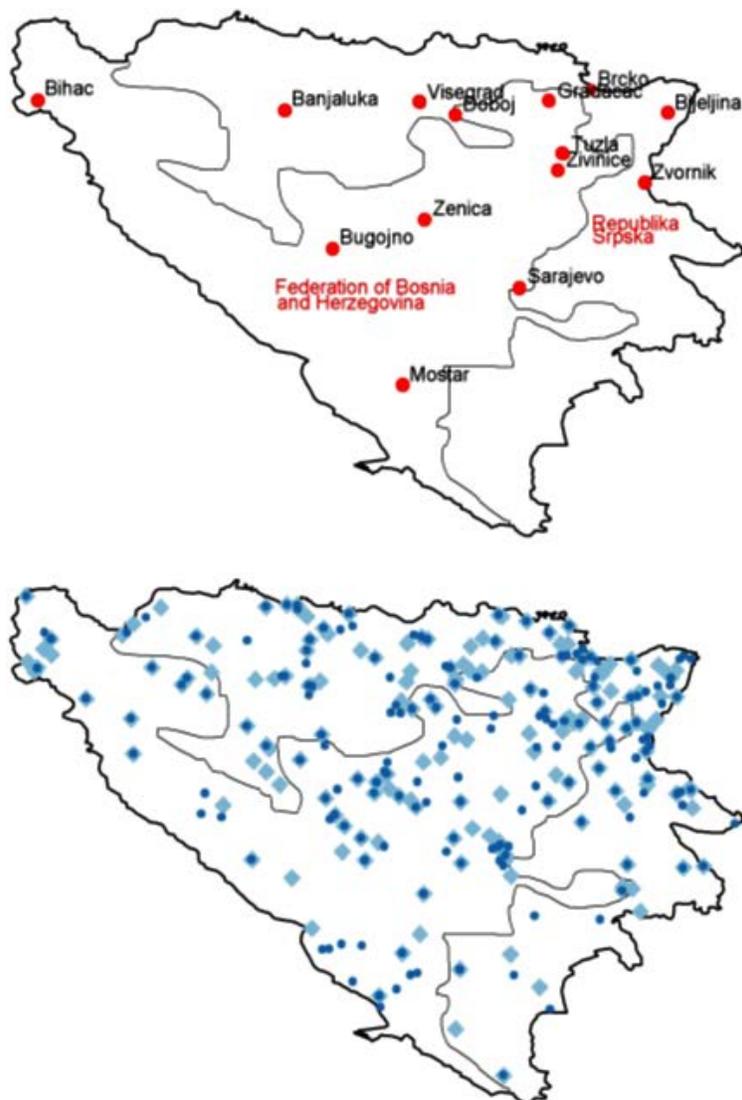

Figure A1: Geographical location of participating branches (top) and treatment and control households (bottom)

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	# attending school	No of HH members attending school	x
members	# 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		Dummy variable (=1) if the highest grade completed by the respondent is...	
	Primary	...Grade IX or lower	x
	Secondary	...between Grade X and Grade XIII including	x
	University	...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

Variable		Definition	
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		
Requirements:			*Most*	*Least*
				worrisome
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 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
	Double count	1
	Incomplete	1
	Total interviewed and eligible for follow-up	*1,196*
Follow-up	Refused	100
	Invalid contact information/no answer	88
	Working abroad/moved	7
	Incomplete interview	3
	Hospitalized or dead	3
	Full response	*995*

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 A4. Attrition

Dependent variable: Respondent attrited between baseline and endline survey					
Loan officer thought the applicant was...	(1)	(2)	(3)	(4)	(5)
...competent	0.004	0.004	-0.010	-0.011	-0.011
	(0.037)	(0.037)	(0.037)	(0.037)	(0.041)
...reliable	-0.043	-0.037	-0.052	-0.046	-0.034
	(0.044)	(0.043)	(0.043)	(0.043)	(0.046)
...trustworthy	0.005	-0.007	0.005	-0.006	-0.022
	(0.042)	(0.042)	(0.042)	(0.042)	(0.046)
...knowledgeable	0.039	0.049	0.046	0.055	0.049
	(0.034)	(0.034)	(0.033)	(0.034)	(0.036)
...experienced	-0.028	-0.030	-0.032	-0.033	-0.026
	(0.037)	(0.037)	(0.036)	(0.037)	(0.040)
...well-integrated into society	0.029	0.033	0.033	0.036	0.044
	(0.036)	(0.035)	(0.035)	(0.035)	(0.037)
...clever	0.038	0.039	0.047	0.046	0.059*
	(0.033)	(0.033)	(0.033)	(0.033)	(0.036)
...a risk-taker	0.018	0.013	0.025	0.021	0.015
	(0.034)	(0.034)	(0.034)	(0.034)	(0.035)
...a fighter	-0.008	-0.002	-0.010	-0.005	-0.028
	(0.035)	(0.035)	(0.034)	(0.034)	(0.038)
...aggressive	0.004	-0.010	-0.018	-0.030	-0.008
	(0.056)	(0.054)	(0.055)	(0.053)	(0.061)
...stable	0.001	-0.007	0.000	-0.006	-0.001
	(0.037)	(0.037)	(0.037)	(0.037)	(0.042)
...insecure	0.027	0.031	0.019	0.023	0.039
	(0.056)	(0.055)	(0.056)	(0.054)	(0.062)
Treatment			-0.140***	-0.134***	-0.121***
			(0.033)	(0.032)	(0.036)
Covariates (HH composition)	No	Yes	No	Yes	Yes
Covariates (other)	No	No	No	No	Yes
Observations	681	681	681	681	594
R-squared	0.011	0.027	0.042	0.056	0.087
F-Stat - incl treatment			2.05	2.12	1.76
Prob>F			0.015	0.004	0.006
F-Stat - excl treatment	0.64	1.28	0.87	1.32	1.4
Prob>F	0.813	0.196	0.579	0.171	0.075

Notes: This table presents the results of joint significance tests to determine whether attrition status was systematically related to standard respondent covariates as well as soft baseline characteristics of the respondents as judged by the loan officer. The unreported covariates are those marked x in Table A1. Data source: Baseline household survey. Unit of observation: household. Coefficients and robust standard errors (in parentheses) from a linear regression where the dependent variable is an indicator of whether the household attrited or not. F-stats at the bottom of the table ar test of joint significance.

Table TA5. Attrition: DiNardo, Fortin and Lemieux (1996) reweighted results for selected outcomes

	(1) Any loan outstanding	(2) Nr of loans outstanding	(3) At least one loan outst. from an MFI	(4) At least one loan outst. from a bank	(5) Ownership of inventory [Yes=1]	(6) Any income self-employment (HH) [Yes=1]	(7) Business ownership [Yes=1]
Treated	0.195***	0.435***	0.441***	-0.0552***	0.0502**	0.0599**	0.0568*
	(0.0259)	(0.0644)	(0.0288)	(0.0166)	(0.0200)	(0.0294)	(0.0312)
Obs	994	994	994	994	994	994	994
C mean	0.089	0.085	0.218	0.029	0.025	0.037	0.073

	(8) Wages (likelihood)	(9) Benefits (likelihood)	(10) Total cons. per capita (BAM)	(11) Home durable good index	(12) Savings (BAM)	(13) Hrs worked on business (16-19 yr old)	(14) Share of kids aged 16-19 in school
Treated	-0.0800***	-0.0563**	-638.2*	-0.0698**	-418.4**	0.536**	-0.0900*
	(0.0287)	(0.0278)	(329.6)	(0.0283)	(174.5)	(0.229)	(0.0538)
Obs	994	994	994	994	994	994	235
C mean	0.118	0.100	0.096	0.080	0.050	0.050	0.154

Notes: This table shows, for selected outcomes, reweighted impacts following DiNardo, Fortin and Lemieux (1996). The propensity to be observed is estimated based on the covariates also used in the baseline impact regressions.

Table A6. Attrition: Stayers versus attritors

			Stayers group		Treated Stayers - Attritors		Control Stayers - Attritors	
	Obs	Obs	Mean	St. Dev.	Coeff.	*p-value*	Coeff.	*p-value*
Panel A. Post-attrition household sample								
Household composition								
# members	1,196	995	3.55	1.50	-0.30	*0.098*	-0.10	*0.436*
# adults (>=16 years old)	1,196	995	2.62	1.08	0.04	*0.789*	0.07	*0.515*
# children (<16 years old)	1,196	995	0.87	1.04	-0.33	*0.001*	-0.19	*0.038*
Male respondent	1,196	995	0.590	0.492	0.050	*0.394*	0.061	*0.206*
Respondent age	1,196	994	37.81	12.03	-3.95	*0.010*	1.01	*0.451*
Respondent with at most primary education	1,196	995	0.333	0.471	-0.061	*0.272*	-0.035	*0.442*
Access to credit:								
Any type of loan	1,196	995	0.573	0.495	-0.032	*0.599*	-0.087	*0.085*
Number of outstanding loans	1,196	995	0.785	0.869	-0.087	*0.403*	-0.186	*0.015*
% with loan outstanding from an MFI	673	570	0.572	0.495	0.010	*0.907*	-0.110	*0.120*
% with loan outstanding from a bank	673	570	0.528	0.500	-0.015	*0.857*	0.099	*0.153*
% of loans used for business investment++	666	564	46.321	43.901	7.481	*0.304*	0.009	*0.999*
Amount borrowed (in BAM):								
Total amount (three main outstanding loans)	1,196	995	3,622	7,762	364	*0.710*	-896	*0.247*
Average amount borrowed from MFI	1,196	991	1,070	2,647	-174	*0.340*	-65	*0.900*
Average amount borrowed from bank	1,196	991	2,563	7,383	598	*0.555*	-817	*0.155*
Self-employment activities								
# of income sources	1,196	995	2.553	1.039	0.022	*0.867*	-0.005	*0.964*
Total HH income (last year) (BAM)	1,196	995	17,000	13,000	2,944	*0.129*	2,213	*0.222*
Income from self-employment (BAM)	1,196	995	7,122	11,000	3,047	*0.077*	2,760	*0.122*
Income from agriculture (BAM)	1,196	995	327	1,366	45	*0.754*	-177	*0.136*
Nr of HH members unemployed	1,196	995	0.696	0.900	-0.135	*0.196*	0.139	*0.133*
Nr of HH members retired	1,196	995	0.313	0.540	-0.117	*0.022*	-0.001	*0.985*
Nr of hrs worked by respondent, last week	1,196	987	48.3	27.4	5.0	*0.083*	-0.5	*0.848*
Nr of hrs worked on business by resp., last week	1,196	862	33.2	27.8	1.6	*0.661*	3.5	*0.223*
Consumption (in BAM)								
Food consumption	1,196	995	106	85	13	*0.280*	19	*0.110*
Non-durables consumption	1,196	995	257	1,188	-7	*0.960*	105	*0.390*
Durables consumption	1,196	989	2,339	4,856	27	*0.970*	-240	*0.580*

Notes: Data source: Baseline household survey. Unit of observation: household. Sample includes all households surveyed at baseline. ++Average of three mains loans outstanding

Table A7. Business growth: Heterogeneous impacts

		(1) Business revenues (BAM)	(2) Business revenues<99th perc (BAM)	(3) Business profit (BAM)	(4) Business profit<99th perc (BAM)
Treated		1,384	1,539**	671.9	858.9**
		(981.4)	(639.1)	(541.3)	(405.3)
Quantile regressions	q=0.1	0	0	0	0
		(134.1)	(100.8)	(101.1)	(94.17)
	q=0.2	0	0	0	0
		(130.2)	(97.76)	(98.30)	(91.46)
	q=0.3	0	0	0	0
		(127.7)	(95.73)	(96.48)	(89.66)
	q=0.4	351.2**	240.0**	502.9***	109.4
		(146.0)	(116.4)	(177.9)	(103.2)
	q=0.5	1,095**	1,089**	662.2*	743.9**
		(484.1)	(481.9)	(355.2)	(345.2)
	q=0.6	922.1	890.1	870.4**	856.3**
		(644.4)	(616.3)	(441.3)	(433.5)
	q=0.7	1,372*	1,284*	1,017**	1,109**
		(748.4)	(725.1)	(494.0)	(484.9)
	q=0.8	1,990**	1,771**	1,221	1,433**
		(1,011)	(875.5)	(796.6)	(709.8)
	q=0.9	2,850**	3,042**	1,738*	1,637*
		(1,444)	(1,441)	(979.2)	(940.2)
	q=1.0	7,910**	10,219**	3,382	7,430***
		(3,674)	(5,151)	(2,132)	(1,635)
Intended loan use:	Consume all	-1,005	-160.6	-1,455	-521.0
		(3,412)	(828.0)	(1,376)	(1,015)
	Some or all for business	1,898**	1,821**	1,113*	1,137***
		(917.2)	(750.7)	(581.4)	(430.5)

Notes: Data source: Endline household survey. Coefficients and robust standard errors (in parentheses) from an OLS regression of the variable on a treatment dummy, controlling for covariates as in Table 2. The table shows the estimated impact on business revenues, expenses, and profits (in BAM) for the full sample (Panel A) and for a sample where values higher than the 99th percentile are trimmed (Panel B). Panel A also shows coefficient estimates for the 70th, 80th, and 90th quantile regression. Both panels also show separate results for borrowers that indicated at baseline that they would use credit partly for consumption and those that intended to use the full loan amount for business purposes. Table A1 in the Appendix 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%.

Table TA8. 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%	- *Main*	734	93%	562	77%
Purchase of engine, tools, etc.	73	12.4%	- *Secondary*	88	72%	25	28%
Investment in developing own work	55	9.3%	New enterprise	325	91%	227	70%
Purchase of goods	50	8.5%	*Total*	*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%					
Total	*590*	*100%*					

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 A9. Loan officers' judgment of loan applicant characteristics

Loan officer perceives applicant to be...	Proportion	Impacts business risk?
	(1)	(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.

Table A10. Comparison of impacts based on full and trimmed datasets (all variables expressed in BAM)

		Asset value	Main business of respondent			Income		
			Business expenses	Business revenues	Business profit	Wages	Remittances	Benefits
Baseline results		-4,388	601.4	1,384	671.9	322.9	-1.761	-167.3**
		(8,346)	(592.9)	(981.4)	(541.3)	(569.7)	(135.2)	(78.93)
Trimmed	1%	2,265	552.7**	1,539**	858.9**	-235.5	-41.27	-94.58
		(6,326)	(249.8)	(639.1)	(405.3)	(446.3)	(84.73)	(64.61)
	2%	-2,451	323.4**	1,032**	896.7**	-236.6	18.85	-54.03
		(5,878)	(159.2)	(470.7)	(351.2)	(409.6)	(65.64)	(58.61)
	3%	-414.5	260.8**	744.1*	648.0**	-346.7	18.85	-45.11
		(5,390)	(129.4)	(403.1)	(301.5)	(395.0)	(65.64)	(52.42)

		Consumption						
		Total per capita	Durables	Non-durable	Food	Education	Cigarettes and alcohol	Recreation
Baseline results		-647.9**	18.93	-16.24	-4.103	-85.44	-2.427*	-4.260
		(327.6)	(366.1)	(15.43)	(5.821)	(79.36)	(1.333)	(14.59)
Trimmed	1%	-379.4**	-225.5	-12.38	-3.465	-37.49	-0.697	-10.28
		(190.2)	(216.3)	(13.02)	(5.091)	(64.18)	(1.005)	(8.687)
	2%	-307.4*	-333.5*	-9.036	-3.187	-30.26	-0.715	0.256
		(166.7)	(180.7)	(11.83)	(4.803)	(42.77)	(0.863)	(6.018)
	3%	-394.3**	-209.0	-5.111	-2.503	-27.40	-0.572	0.256
		(156.0)	(157.8)	(10.83)	(4.586)	(35.85)	(0.808)	(6.018)

Notes: Source: follow-up survey. This table provides trimmed results for all other BAM-amount outcomes as an additional robustness test.