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Human and Financial Capital for Microenterprise Development: Evidence from a Field and Lab Experiment

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Microenterprises constitute an important source of employment, and developing such enterprises is a key policy concern in most countries. But what is the most efficient tool for microenterprise development? We study this question in a developing country context (Tanzania), where microenterprises are the source of employment for more than half of the labor force, and we report from a field experiment that jointly investigated the importance of a human capital intervention (business training) and a financial capital intervention (business grant). Using data from three survey rounds, a lab experiment, and administrative records of the microfinance institution, we present evidence on business performance, management practices, happiness, business knowledge, and noncognitive abilities. Our study demonstrates strong effects of the combination of the two interventions on male entrepreneurs, while the effects on female entrepreneurs are much more muted. The results suggest that long-term finance is an important constraint for microfinance entrepreneurs, but that business training is essential to transform financial capital into productive investments. Our study also points to the need for more comprehensive measures to promote the businesses of female entrepreneurs.

Data, as supplemental material, are available at http://dx.doi.org/10.1287/mnsc.2014.1933.

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1. Introduction

Microenterprises are an important source of employment, and developing such enterprises is a key policy concern in most countries, and in particular in developing countries where they employ more than half of the labor force (de Mel et al. 2008, Hipple 2010). Lack of access to financial capital has received much attention among donors and practitioners, as witnessed by the rise of the microfinance movement, targeting developed and developing countries alike (de Aghion and Morduch 2010). But although there is a lot of optimism about the power of finance for small-scale business development, a growing literature shows that success cannot be taken for granted and may critically depend on the entrepreneur's gender, educational background, business skills, and noncognitive abilities.[1]

Partly as a result of the mixed evidence on the importance of financial capital, there has been an increased focus on other constraints to microenterprise development, in particular human capital, as evidenced by the nascent literature investigating the impact of business training on business performance.[2] The present paper merges these two perspectives by jointly exploring the human and financial capital constraints to microenterprise performance in a developing country context, Tanzania. In particular, we report from a randomized field experiment that introduced separate treatments of business training and a business grant as well as a combined treatment.[3] This design allows us to study the relative importance of the two constraints

[1] See Heckman et al. (2006), de Mel et al. (2008, 2009a), Karlan and Morduch (2009), Bruhn et al. (2010), Attanasio et al. (2011), Emran et al. (2011), Karlan and Zinman (2011), Blattman et al. (2014), Fafchamps et al. (2014), Banerjee et al. (2015), and Crépon et al. (2015).

[2] See Field et al. (2010), Karlan and Valdivia (2011), Klinger and Schündeln (2011), Bruhn and Zia (2013), de Mel et al. (2014), Drexler et al. (2014), and Giné and Mansuri (2014). For a recent survey of the literature, see McKenzie and Woodruff (2014).

[3] The intervention is a *natural* field experiment, in the sense that the participants did not know that they were part of an experiment and

and to address potential complementarities, which clearly is important from both a theoretical and a policy perspective.

The field experiment was carried out in collaboration with one of the leading microfinance institutions in the country, PRIDE Tanzania. They employ a modified Grameen Bank model, where group members are jointly responsible for each other's loans. To become a member of PRIDE, one must have an operating business and join a self-selected solidarity group of five members (called an enterprise group).

The business training intervention consisted of 21 sessions and a final graduation ceremony. The training was practically oriented and focused on basic business concepts, management practices, and noncognitive abilities. The business grant intervention targeted the need for long-term finance, where entrepreneurs were offered a grant to develop and strengthen their businesses. As members of a microfinance institution, the entrepreneurs have access to short-term loans, but these loans offer limited possibilities to finance long-term investments. The repayment schedule requires the first installment to be paid within weeks, which biases the use of such loans to activities that generate immediate income. The business grant thus represented a unique opportunity for the entrepreneurs to make long-term investments in their businesses.[4]

To study the mechanisms of change initiated by the business training in more detail, we also use the novel hybrid approach of combining the field experiment with a lab experiment where the entrepreneurs make incentivized choices (List 2004, 2006; Falk and Heckman 2009; Bauer et al. 2012; Jakiela et al. 2014). The lab was conducted with a subset of the participants, trained and untrained, around two months after the completion of the training program, but prior to the implementation of the business grant. This hybrid approach of combining field and lab data allows us to evaluate the immediate causal impact of the training on the microentrepreneurs' business knowledge (financial literacy, best business practices) and noncognitive abilities (willingness to compete, confidence, risk and time preferences).

Our main finding is that the combined human capital and financial capital intervention caused a substantial improvement for male entrepreneurs, both in the short term and in the long term, whereas business training or business grant alone had much more muted effects. For females, we find no impact of any of the interventions on business outcomes. These results are based on self-reported measures on business performance and living conditions, but administrative data from the microfinance institution confirms this pattern. We also provide evidence of the interventions generating changes in business structure and management practices, which suggests that the improved business performance for male entrepreneurs took place through an expansion of businesses in the more profitable sector and improved business practices. Finally, we provide experimental evidence on household constraints, business knowledge, and noncognitive abilities, which sheds light on why the treatment effects are weaker for female entrepreneurs.

Our paper relates to the growing literature using randomized field experiments to investigate financial and human capital constraints facing small-scale entrepreneurs (Giné and Mansuri 2014, de Mel et al. 2014, Karlan et al. 2012). Giné and Mansuri (2014) investigate the effects of business training, a microfinance loan, and the combination of the two, among microfinance clients in rural Pakistan. They find positive impacts on business practices, but only for male entrepreneurs. They do not, however, find any effect of the interventions on sales and profits. Their interventions differ in important ways from those in the present study, which may explain this difference in findings. First, they offered an intensive eight-day business training course, whereas our training intervention lasted for 21 weeks. Second, they offered a relatively large loan with the same repayment structure as the existing microfinance loans, whereas our business grant targeted the need for long-term finance, which is typically not available within a microfinance institution.

De Mel et al. (2014) analyze the effect of training, and the effect of training and a cash grant combined, on a representative sample of women in Sri Lanka, both with and without existing businesses. Impacts are documented through four rounds of follow-up studies over a two-year period. They find that for women who already had a business at the time of the interventions, training alone had no impact on business outcomes, while training and the grant combined had a large but short-lived effect on business outcomes. Training did, however, improve the profitability of the newly established businesses for women who did not have any business prior to the intervention. The fact that the interventions did not have any (long-term) effect on business outcomes for the female business owners harmonizes well with the findings from our study. An important difference to the present study is the fact that de Mel et al. (2014) includes only women, whereas our sample includes both men and women. Our study shows that gender differences are potentially of great importance because we find strong effects of the combined intervention only for male entrepreneurs.

were not told that their performance would be subject to evaluation. This approach is attractive because it places the participants in a natural context; see Harrison and List (2004).

[4] Note that since having a business is a pre-requisite for obtaining a loan in PRIDE, our study deals with business growth by established business owners rather than entry into entrepreneurship. Also, since these business owners recently had received a loan from PRIDE, we estimate the effect of a grant received on top of microcredit.

Karlan et al. (2012) consider the effect of consultancy services and a cash grant to small-scale tailors in Ghana. The consultancy service took place during the course of a year, with each entrepreneur visited at his or her place of work between one and four times per month, each visit lasting from 30 minutes to an hour. Eight months after the start of the consultancy, a subset of tailors from both the trained and nontrained group were offered a business grant, approximately equivalent to twice the average baseline income. The authors find positive but short-lived effects of consultancy on business knowledge, business practices, and record keeping, while the business grant led to a short-lived increase in investments. They do not, however, find any positive treatment effects on sales or profits; in fact, if anything, treatment effects are negative, an observation they attribute to entrepreneurs in the treatment group experimenting with new and risky business techniques, which most of them did not master.

A number of other studies have investigated the financial capital and human capital constraints separately.[5] A general lesson from this literature is that treatment effects of relaxing the financial capital or human capital constraint are conditioned on the social context and the capabilities of the entrepreneurs. Consistent with the findings from the present study, many of the related contributions suggest that improving business outcomes for women is more challenging than improving business outcomes for men.

Our paper adds to the existing literature by investigating the impact of both business training and a business grant; by having a sample of both males and females; by investigating short- and long-term impacts; by collecting information on a broad set of outcome variables, including happiness; and by using a laboratory experiment in addition to the field intervention to study mechanisms. In this way, our paper addresses the most important shortcomings in the literature, as highlighted by McKenzie and Woodruff (2014).

2. Randomization, Participants and Interventions

2.1. Randomization Procedure

We faced two constraints when designing the randomization procedure for the training intervention. First, to minimize costs both for the institution and for the clients it was decided that training should take place at the branch in connection with the weekly loan meeting. This reflected the ambition to evaluate a training program that subsequently could be adopted by the microfinance institution itself.[6] Second, to reduce the risk of contamination of the control group, it was decided that the training and control group would be selected from different loan meeting days.[7]

Accordingly, we selected two branches of PRIDE in Dar es Salaam, each with approximately 7,500 clients and located in poor neighborhoods of the city (Magomeni and Buguruni). We then randomly selected one day in each of the two branches for business training, and for logistical reasons considered only loan groups with loan meetings at 09:00, 10:00, 12:00 and 13:00. Finally, we considered only clients with intermediate PRIDE loans, motivated by the fact that there are very high dropout rates among clients with smaller loans and also because we wanted to avoid a too-heterogeneous target group.

There were 1,164 PRIDE clients with intermediate loan levels who satisfied these criteria, out of which we included 644 clients in our baseline sample, representing 379 loan groups, based on accessibility by phone. Group members who were not offered training, either because their loans were small or too large to qualify or because they were not accessible by phone, are not part of the baseline sample. The participants were surveyed during June–July 2008 at their business locations, with the objective of the survey framed as "to identify strategies to improve the functioning of microcredit institutions in Tanzania." Hence, clients were not informed about the prospective business training or business grant.

Business training was offered to the 319 clients with loan-group meeting time on Tuesday (Magomeni) and Thursday (Buguruni), while the business grant was offered to the 252 clients with loan-group meeting time at 12:00 on Monday–Thursday (Magomeni and Buguruni) and at 09:00 on Wednesday and Thursday (Buguruni).[8] Some of the entrepreneurs, 126, received both treatments, whereas 193 were offered business

[5] See de Mel et al. (2008, 2009a, 2012), Field et al. (2010), Attanasio et al. (2011), Karlan and Valdivia (2011), Karlan and Zinman (2011), Bruhn et al. (2012), Angelucci et al. (2013), Bloom et al. (2013), Bruhn and Zia (2013), Drexler et al. (2014), Fafchamps et al. (2014), Fairlie et al. (2014), Banerjee et al. (2015), Crépon et al. (2015).

[6] For an evaluation of the ability of the microfinance institution to implement the training program, see Berge et al. (2012).

[7] In fact, only 3% of the clients in our sample report that they know someone with a loan meeting on the other day, which suggests limited spillovers across days. This also makes it unlikely that control-group respondents would know about the training and change behavior or answers strategically, in anticipation of future interventions. Regarding the business grant intervention, there is greater reason to believe that it was known to the other participants in the sample, since the control-group respondents had their loan meeting on the same day as treatment-group respondents. However, the treatment effects in our study are complex and cannot easily be ascribed to strategic behavior or strategic responses.

[8] An additional 10 males were offered the business grant to ensure gender balance in this treatment arm. These males were randomly selected among the male clients in our baseline sample with loan-meeting time later than 09:00 on Wednesday and Thursday. Of the 252 clients receiving the business grant, 126 clients belonged to

Table 1 Treatment-Control Balance

	(1) Control	(2) Training	(3) Grant	(4) Training + Grant	(5) Equality of means *p*-value
Sales	2,775.518	2,131.797	2,420.065	2,653.731	0.812
Profit	596.048	507.994	543.760	605.872	0.506
Businesses	1.518	1.580	1.460	1.595	0.220
Commerce	0.698	0.741	0.683	0.651	0.411
Service	0.347	0.394	0.373	0.405	0.722
Manufacturing	0.166	0.155	0.119	0.167	0.622
Employees	1.116	1.119	0.921	1.143	0.587
PRIDE loan	785.930	748.187	769.048	780.952	0.480
Investments	207.606	187.927	222.563	178.717	0.918
Net borrower	0.462	0.513	0.484	0.492	0.765
Record keeping	0.698	0.679	0.595	0.651	0.320
License	0.201	0.155	0.151	0.230	0.248
Marketing	0.526	0.461	0.511	0.455	0.116
Business knowledge	0.698	0.709	0.703	0.706	0.898
Work hours	58.874	66.834	60.214	63.317	0.043
Age	37.975	36.352	38.317	38.762	0.057
Education	8.060	7.870	8.063	7.706	0.499
Muslim	0.668	0.736	0.579	0.619	0.040
Observations	199	193	126	126	

Notes. This table reports average values from the baseline survey in 2008 by treatment arm for all entrepreneurs in the survey (644 observations). Column (5) presents the *p*-value for an *F*-test of the equality of means across all four groups, after regressing each variable on the three treatment dummies, using clustered standard errors. *Sales*: monthly sales, in thousand Tanzanian shillings (TZS) (in logs for the *F*-test). *Profit*: monthly profit, in thousand TZS (in logs for the *F*-test). *Businesses*: number of businesses. *Commerce*, *Service*, and *Manufacturing*: share of clients involved in each of these sectors. *Employees*: number of employees. *PRIDE loan*: size of loan in PRIDE, in thousand TZS. *Investments*: business investments during the last year, excluding additions to stocks, in thousand TZS. *Net borrower*: indicator variable taking the value one if the sum of all loans is larger than all savings. *Record keeping*: indicator variable taking the value one if the entrepreneur reports keeping records. *License*: indicator variable taking the value one if at least one of the businesses is licensed. *Marketing*: an index of marketing initiatives during the last year, from zero (no initiatives) to one (initiatives on three dimensions). *Business knowledge*: test of business skills, share of correct answers. *Work hours*: work hours per week. *Age*: the age of the entrepreneur, in number of years. *Education*: number of years of schooling. *Muslim*: indicator variable taking the value one if the entrepreneur is Muslim.

training only and 126 were offered the business grant only. The control group consists of 199 individuals. Table 1 shows that most baseline characteristics of the entrepreneurs are not significantly correlated with the treatment status, with the exception of work hours, age, and the indicator variable for whether the entrepreneur is Muslim.[9]

Even though practical constraints implied that we had to randomize on day and time of loan meeting, our working assumption is that the loan group is *effectively* the unit of randomization. In practice, the assignment of loan meeting time for a loan group in PRIDE is random across hour and day. The procedure is to offer new loan groups a loan meeting time on the basis of availability, which is determined by the exit of old loan groups. There is no evidence of certain days or hours being particularly prone to turbulence, which suggests that the process of exit and entry of new clients does not create systematic differences between loan groups across day and hour. Moreover, there is no difference across loan group meeting time on clients dropping out of PRIDE. Finally, the PRIDE management informed us that they had no perception of loan groups differing in their underlying motivation or behavior across day and time. This evidence is in line with what we observe in Tables A3 and A4 in Online Appendix A, where the day and hour are not predictive of sales, profits, sector, and membership, as well as the treatment-control balance shown in Table 1.

2.2. The Participants

Table 2 provides a description of the entrepreneurs in our sample by gender, based on the baseline data. The average entrepreneur is about 38 years old, has completed eight years of schooling, and runs a small business, typically hiring only one worker. Commerce is the most common sector, involving approximately 70% of the entrepreneurs, while 38% of the entrepreneurs have a business in the service sector, and 15% in the manufacturing sector.[10] Running a kiosk or selling

the training group and 126 clients belonged to the nontraining group. The grant was collected by 247 of the 252 entrepreneurs. In our follow-up surveys, we were not able to track down and interview four of the entrepreneurs who did not collect the business grant.

[9] The corresponding tables by gender are reported in Online Appendix A, Tables A1 and A2 (online appendix available at http://blogg.nhh.no/thechoicelab/).

[10] Many entrepreneurs have more than one business and may hence be involved in more than one sector. There is a fourth sector, agriculture, which includes poultry and farming. Only 5% of the entrepreneurs in our sample are involved in this sector, however, and it is therefore not shown in this and later tables.

Table 2 Baseline Values by Gender

	Means Female (1)	Male (2)	*p*-values Female = Male (3)
Sales	2,187.640	3,062.518	0.01
Profit	531.436	618.217	0.03
Businesses	1.547	1.527	0.70
Commerce	0.697	0.703	0.88
Service	0.441	0.257	0.00
Manufacturing	0.111	0.234	0.00
Employees	1.033	1.180	0.28
PRIDE loan	772.275	766.667	0.78
Investments	172.177	249.937	0.11
Net borrower	0.488	0.486	0.97
Record keeping	0.661	0.667	0.89
License	0.171	0.207	0.29
Marketing	0.485	0.498	0.57
Business knowledge	0.694	0.722	0.04
Work hours	59.483	67.919	0.00
Age	37.924	37.302	0.40
Education	8.040	7.734	0.07
Muslim	0.626	0.730	0.01

Notes. This table reports average values from the baseline survey in 2008 for all entrepreneurs in the survey (644 observations), by gender. *p*-Value is from a two-sided *t*-test of equality. All variables are defined in Table 1.

textiles or coal are typical businesses in commerce, small restaurants and repair shops are common in services, whereas furniture and brick making are examples of manufacturing businesses. Average monthly operating profits in 2008 were TZS (Tanzanian shillings) 568,497, equivalent to approximately USD 480, and average sales were TZS 2,489,228.

Approximately 70% of the clients in our sample are females, whereas 75% of the loan groups have both female and male members.[11] We observe that there are important baseline differences between the male and female entrepreneurs. The male entrepreneurs operate on a larger scale than females, with approximately 50% higher sales, 20% higher profits, and 35% higher investments. They also have a higher score on a baseline test of business skills (described in detail in §5.1) and self-report working more hours in their business. Female entrepreneurs, on the other hand, have somewhat more education, measured as number of years of schooling, and are less likely than males to be Muslim.

2.3. The Interventions

The business training consisted of 21 sessions, each lasting 45 minutes, starting directly after the clients' weekly loan meetings at the PRIDE premises. The course was developed by the University of Dar es Salaam Entrepreneurship Centre (UDEC) and tailored to microentrepreneurs, with the aim of unleashing entrepreneurship and creating business growth. The course was piloted extensively in the spring of 2008, with trial sessions offered to microcredit clients in a PRIDE branch in Dar es Salaam not part of our study, to credit officers in PRIDE working on a daily basis with the entrepreneurs, and to local researchers working on microenterprise development in Tanzania. The implemented training program, which ran on a weekly basis from August 2008 to January 2009, covered a range of topics particularly relevant for microentrepreneurs in Tanzania, including "entrepreneurship and entrepreneurial character," "improving customer service," "managing people in your business," and "marketing strategies." A full list of topics is given in Online Appendix B-1. The lectures, given by UDEC staff in Kiswahili, were practically oriented, and topics were often illustrated by the use of case studies and role play. Frequently, the clients were given homework to prepare for the next class. There was neither a course fee nor any seating allowances. Entry control was strictly enforced, and only clients assigned to training were allowed to enter the classroom.[12]

A graduation ceremony was held at the end of January 2009, where clients who had attended 10 sessions or more were awarded a diploma. The minimum attendance requirement for the diploma was announced at an early stage in order to motivate clients to attend the sessions. Attendance was monitored closely by teachers and credit officers, and absent clients were contacted either at the branch or by phone. The average attendance rate per session was 70%, while 83% of the clients qualified for the diploma.[13]

A business grant of TZS 100,000 was offered in March 2009, six weeks after the graduation ceremony. The grant was given in cash and framed as support to improve the entrepreneur's business. Since the grant was not to be repaid, it represented a unique opportunity for the entrepreneurs to make long-term investments in their businesses. To most of the clients in our study, TZS 100,000 is a substantial grant, corresponding to approximately 50% of average investments in the businesses in 2008; see Table 2. The recipients of the grant were asked to keep records of how it was spent, to be presented to us on a later visit.[14]

The size of the business grant was roughly equal to the cost of providing the business training. The two

[11] This is in line with the overall gender composition of clients in PRIDE; in 2011, 62% of the clients were females (http://reports.mixmarket.org/mfi/pride-tza, accessed August 16, 2014).

[12] See Berge (2011) for an analysis of spillovers from treated clients to clients in the same loan group not receiving treatment (and not being part of our sample).

[13] The distribution of attendance is reported in Figure A1 in Online Appendix A. For an analysis of attendance in the training program, see Bjorvatn and Tungodden (2010).

[14] The letter accompanying the business grant can be found in Online Appendix B-2.

interventions are therefore directly comparable from a cost perspective, whereas the treatment combining the training and the grant is twice as costly.

3. Data and Estimation Methods

3.1. Lab, Survey, and Administrative Data

The immediate impact of the business training was evaluated in a lab experiment conducted in March 2009, after the training but before the business grant was offered. The lab experiment investigated business knowledge and different aspects of noncognitive abilities related to the business training program, including confidence, willingness to compete, and risk and time preferences. A randomly selected subset of the sample, 126 clients from the training group and 126 clients from the nontraining group, were invited to take part in the lab experiment; of these, 211 clients attended the lab: 107 from the training group (40 male, 67 female) and 104 from the nontraining group (34 male, 70 female).[15]

Field outcomes were evaluated in a short-term follow-up survey conducted in June–August 2009 and a long-term follow-up survey conducted in June–September 2011.[16] The follow-up surveys were slight modifications of the baseline survey and contained detailed questions about the respondents' businesses, their financial position, and management practices. We also surveyed how they had spent the business grant (short-term follow-up survey, business grant group only) and how they perceived the training program (long-term follow-up survey, trained group only). In the long-term follow-up, we also asked the entrepreneurs about how happy they were as entrepreneurs and about their present living conditions, the idea being that such subjective evaluations, beyond being of independent interest, may serve as indicators of business performance alongside self-reported profit.[17] Finally, we conducted a lottery experiment to explore intrahousehold dynamics (long-term follow-up survey).[18] In the short-term follow-up survey, we reached 530 of the 644 clients; in the long-term follow-up survey, we reached 563 clients. Combining the two surveys, we have follow-up information on 94.5% of the clients (608 of 644), which implies a very low attrition rate.[19]

In 2010 we also collected data from the administrative records of PRIDE on membership status and loan size in the microfinance institution for all 644 participants.

3.2. Empirical Strategy

We estimate the intention to treat estimators (ITT) for each individual outcome Y_i.[20] Informed by the literature, we anticipated gender to be a crucial dimension in our analysis, and we therefore include in our basic specification gender interaction terms to capture differences in treatment effects between males and females:[21]

$$Y_i = \alpha + \beta_1 T_i + \beta_2 T_i \cdot Female_i + \beta_3 Female_i + \beta_4 X_i + \beta_5 X_i \cdot Female_i + \varepsilon_i,$$

where Y_i is the outcome variable for individual i, including business outcomes (sales, profits, happiness as entrepreneur, living conditions), business structure (choice of sector), and management and business practices (marketing, record keeping, etc.), from both the short-run and long-run surveys; T_i is a vector of indicators of treatment status; $Female_i$ is an indicator of the gender of the individual; $T_i \cdot Female_i$ is a vector of interaction variables between treatment and gender; X_i is a vector of covariates from the baseline characteristics of the entrepreneurs and their businesses, including the baseline value of the outcome variable, when available; and $X_i \cdot Female_i$ is a vector of interaction variables between the background variables and gender, which allows for the possibility of the background variables working differently for males and females.[22] The unbiased estimated effects of the treatments on the male entrepreneurs are given by the vector β_1, whereas the effects on female entrepreneurs are given by $(\beta_1 + \beta_2)$. In the analysis, we report treatment effects by gender and do not highlight the interaction coefficient β_2.

The incentivized lab sessions were conducted after the business training but before the business grant was disbursed. In all estimations, we cluster the error term on the loan group because there may be important interdependencies within this group structure. Members of a loan group have joint liability of loans and interact closely, which makes it likely that their

[15] The lab instructions are included in Online Appendix B-3.

[16] The research assistants conducting the lab experiment or follow-up surveys were not involved in the training of the clients.

[17] On the difficulties of measuring profits, see de Mel et al. (2014). Karlan and Valdivia (2011), for instance, rely on sales as a key measure of business outcome, reporting that many respondents were either unable or unwilling to state profits even when restricting attention to the main product only.

[18] The text of the lottery experiment is included in Online Appendix B-4.

[19] Table A5 in Online Appendix A shows that attrition is not predicted by the business training or the business grant. For 6 of the 608 clients, we know only that they are dead.

[20] When log transforming outcome variables (which may take the value zero), we add the smallest positive value observed to all observations and log transform this number.

[21] In Table A6 in Online Appendix A, we report estimates for the model without the gender interaction terms.

[22] Given that the treatment dummies are uncorrelated with unobserved explanatory factors, there is no need to include a covariate matrix to obtain unbiased ITT estimates, but including control variables makes the estimation more precise. In line with Bruhn and McKenzie (2009), we include control variables that strongly correlate with the outcome variables in the baseline data. Table A7 in Online Appendix A shows business outcomes without covariates.

business outcomes are correlated. In Tables A8 and A9 in Online Appendix A, we also show that our main results are robust to clustering on the day or time of the loan meeting, although one should be careful when interpreting these results given the small number of clusters (4 and 16, respectively) involved in this robustness analysis.[23]

4. Results

In this section, we study the treatment effects of the interventions on business performance, business structure, and management practices, using data from the three survey rounds.

4.1. Business Outcomes

We first study the extent to which the interventions have improved the business performance of the entrepreneurs in terms of sales and profits, their satisfaction with the situation as an entrepreneur, and their present living conditions.

Table 3 reports a very consistent pattern across outcome variables and over time: The combination of business training and a business grant has had a positive effect for the male entrepreneurs, but no significant effect on the female entrepreneurs, whereas the business training or the business grant offered separately has had very little effect on the performance of either male or female entrepreneurs.[24] The estimated effect of the combined treatment effect can be seen as consisting of three parts: a direct effect from business training, a direct effect from business grant, and an interaction effect between business training and business grant. The estimated interaction effect is highly significant for long-term sales and profits, which suggests that business training and business grant are complementary factors in improving business performance.

The point estimates suggest that the combined intervention caused increases in sales and profits for the male entrepreneurs by 45%–75%, with the largest effects being in the long-term data.[25] Sales and profits refer to normal months. We also have data on sales in best and worst months, where the pattern of treatment effects is exactly as for sales in a normal month (see Table A11 in Online Appendix A). The subjective evaluations are also very much in line with the treatment estimates for sales and profits; the entrepreneurs report being happier with their situation and report better living conditions, with increases of 0.48 and 0.45 standard deviations, respectively.[26]

The combination of business training and the business grant did not, however, cause any statistically significant changes for the female entrepreneurs. In fact, the subjective evaluations suggest a negative impact on the self-reported happiness and living conditions, which potentially can be explained by this intervention raising hopes that were not fulfilled. The point estimates for long-term sales and profits are positive but close to zero (and significantly different from the treatment effect on males). Thus, our data provide strong support for a gender specific effect of the combined intervention, with significant gains only for the male entrepreneurs. We return to a further discussion of this issue in §4.3.

Business training (without the business grant) caused a substantial and statistically significantly increase in reported happiness for male entrepreneurs. The point estimates for sales average, profits average, and living conditions are also positive, but none of these changes is statistically significant. For the female entrepreneurs, we observe that the point estimates of all the long-term outcome variables, except for living conditions, are positive for business training, although not statistically significant.

The business grant (without business training) did not cause any statistically significant changes in the outcome variables. For the male entrepreneurs, we observe that the point estimates are negative for sales and living conditions, but positive for profits and happiness. For the female entrepreneurs, we observe that the point estimates are positive for all outcome variables, except for short-term sales and profits.

One potential concern is that the importance of the business training (together with the business grant) stems not from the course itself but from higher attendance at the loan meeting. We do not have data on the loan meeting attendance during the training program, but we find it very unlikely that increased loan attendance could explain much of the observed treatment effect, since no training takes place at these meetings. We also note that the participants in the long-term follow-up survey reported that the course was very beneficial. We asked them: "How much have you benefited from the course?" On a scale from 1–10, where 1 was "not at all" and 10 was "a lot," the average score was 9.

[23] As suggested by Cameron et al. (2008), we use the "wild cluster" procedure, where we have benefited from the dofile of Doug Miller, published on his homepage, http://old.econ.ucdavis.edu/faculty/dlmiller/statafiles/ (accessed August 16, 2014).

[24] As shown in Table A10 in Online Appendix A, which focuses on sales average, these effects are robust to a bounds analysis taking into account the level of attrition in the sample, using bootstrapped standard errors.

[25] Because there is different attrition in the short- and long-term follow-up samples, the dynamics should be interpreted with some caution.

[26] Potentially, the growth in sales and profits in the treated groups could stem from the crowding out of sales from control group businesses, as discussed in Drexler et al. (2014). However, the fact that only 3% of the trained entrepreneurs know nontrained entrepreneurs, suggests that it is unlikely that treatment and control businesses are direct competitors, thus reducing the likelihood of significant business stealing effects.

Table 3 Main Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sales			*Profit*				
	Short term	Long term	Average	Short term	Long term	Average	*Happy as entrepreneur*	*Living conditions*
Male								
Training	0.080	−0.074	0.122	0.189	−0.157	0.128	0.427***	0.119
	(0.160)	(0.250)	(0.161)	(0.147)	(0.224)	(0.147)	(0.161)	(0.175)
Grant	−0.162	−0.205	−0.234	0.151	0.070	0.080	0.228	−0.020
	(0.182)	(0.255)	(0.152)	(0.175)	(0.240)	(0.140)	(0.207)	(0.191)
Training + Grant	0.376**	0.555**	0.524***	0.456**	0.477**	0.501***	0.481***	0.445**
	(0.189)	(0.281)	(0.194)	(0.194)	(0.238)	(0.168)	(0.156)	(0.217)
Mean control group	14.267	14.017	14.197	12.899	12.830	12.895	2.470	3.192
p-value interaction	0.048	0.009	0.004	0.593	0.057	0.118	0.448	0.181
Female								
Training	−0.170	0.077	−0.005	−0.126	0.148	0.035	0.089	−0.210
	(0.120)	(0.170)	(0.126)	(0.111)	(0.173)	(0.121)	(0.104)	(0.143)
Grant	−0.123	0.128	0.025	−0.080	0.130	0.072	0.012	0.052
	(0.123)	(0.192)	(0.136)	(0.119)	(0.191)	(0.132)	(0.109)	(0.152)
Training + Grant	−0.042	0.030	0.054	−0.117	0.103	0.059	−0.088	−0.094
	(0.132)	(0.177)	(0.132)	(0.140)	(0.172)	(0.132)	(0.130)	(0.170)
Mean control group	14.092	13.658	13.969	12.877	12.439	12.745	2.789	3.239
p-value interaction	0.153	0.514	0.864	0.615	0.616	0.804	0.270	0.784
Observations	530	563	602	530	563	602	525	563

Notes. This table reports ITT regressions where the outcome variable is regressed on treatment status and the following covariates from the baseline survey: sales, the square of sales, operating profits, number of businesses, an indicator variable for whether the entrepreneur is involved in commerce, number of employees, PRIDE loan size, amount of investments, indicator variables for whether the entrepreneur has a business license, keeps business records, whether the business is registered, owns a house, owns a television, an index of marketing initiatives, number of business contacts on mobile phone, an indicator variable for net borrowing, number of hours per week worked in the business(es), indicator for PRIDE branch, the age of the entrepreneur, how many times per week he or she eats meat, and the lagged outcome variable (except for columns (7) and (8) for which we have only long-term data). All entrepreneurs interviewed in the follow-up surveys are included. All *Sales* and *Profit* variables (columns (1)–(6)) are in logs. The *Average* variables are the average values from the short- and long-term follow-up surveys (or the observed value in the cases where we have only one follow-up observation), adjusted for inflation. Both *Happy as entrepreneur* (column (7)) and *Living conditions* (column (8)) are self-reported on a 1–5 scale, where a higher number indicates that the client is happier and experiences better living conditions (measured in standard deviations). *p*-Value interaction is from a test of whether the sum of the two single treatments (*Training*, *Grant*) is different from the combined treatment (*Training + Grant*). Cluster-robust standard errors in parentheses.

$^{**}p < 0.05$; $^{***}p < 0.01$.

This, together with the high attendance rates at the training program (which was voluntary and unpaid), suggests that the training was not an "empty shell."

4.2. Business Structure and Management Practices

To explore the mechanisms of change more closely, we turn to an analysis of changes in business structure and management practices.

Tables 4 and 5 provide an overview of how the interventions changed the business structure and management practices of the entrepreneurs, both in the short term and the long term. Overall, we observe that the combined intervention had a much larger impact than the two separate interventions for the male entrepreneurs, which is consistent with the observed effects on business performance.

Table 4 shows how the interventions affected the entrepreneur's number of businesses, involvement in different sectors, and level of diversification. We observe that the combined intervention caused a statistically significant increase in the number of businesses of the male entrepreneur, whereas the business training and the business grant offered separately did not generate a similar effect, particularly in the long run. This suggests that the improved business performance of the male entrepreneurs receiving the combined treatment took place through an expansion of their business activity.[27] For the female entrepreneurs, consistent with our findings on business performance, none of the treatments caused an increase in the number of businesses in the long run.

The male entrepreneurs receiving the combined treatment have mainly expanded into commerce and service, whereas we observe reduced involvement in the manufacturing sector. We observe the same pattern for the male entrepreneurs who received only business training, but none of the point estimates is

[27] This does not imply that increasing the number of businesses is the only, or indeed the most profitable, strategy available to the entrepreneur. As pointed out by a referee, exploiting economies of scale by growing the inventory and product line in a unique business could potentially be even more profitable.

Table 4 Business Structure: Choice of Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Businesses		*Commerce*		*Services*		*Manufacturing*		*Diversification*	
	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term
Male										
Training	0.179	−0.021	0.155	0.043	0.125	0.047	−0.097	−0.032	0.070	0.180**
	(0.147)	(0.123)	(0.103)	(0.124)	(0.106)	(0.099)	(0.073)	(0.067)	(0.098)	(0.090)
Grant	0.297	0.008	0.035	−0.199	0.238*	0.240*	−0.016	−0.047	0.150	0.317***
	(0.187)	(0.153)	(0.143)	(0.146)	(0.134)	(0.123)	(0.064)	(0.072)	(0.123)	(0.108)
Training + Grant	0.462**	0.563***	0.250*	0.369**	0.275**	0.343***	−0.083	−0.121*	0.184*	0.567***
	(0.185)	(0.151)	(0.133)	(0.143)	(0.118)	(0.110)	(0.066)	(0.073)	(0.102)	(0.118)
Mean control group	1.488	1.348	0.721	0.652	0.111	0.214	0.142	0.112	1.279	1.022
p-value interaction	0.955	0.002	0.737	0.003	0.595	0.723	0.734	0.608	0.816	0.622
Female										
Training	0.222*	0.096	0.162*	0.126	0.066	0.004	−0.052	−0.095***	0.172**	0.053
	(0.119)	(0.132)	(0.095)	(0.104)	(0.086)	(0.101)	(0.039)	(0.034)	(0.080)	(0.088)
Grant	−0.096	−0.125	−0.067	−0.150	−0.040	−0.024	−0.024	0.054	−0.098	−0.031
	(0.113)	(0.155)	(0.096)	(0.120)	(0.091)	(0.111)	(0.033)	(0.052)	(0.081)	(0.101)
Training + Grant	−0.206	0.040	−0.139	0.003	−0.067	−0.006	−0.039	0.003	−0.108	0.090
	(0.130)	(0.125)	(0.092)	(0.119)	(0.098)	(0.090)	(0.045)	(0.037)	(0.085)	(0.089)
Mean control group	1.822	1.607	0.991	0.855	0.570	0.607	0.159	0.103	1.458	1.248
p-value interaction	0.054	0.740	0.080	0.875	0.472	0.927	0.511	0.502	0.125	0.628
Observations	530	563	530	563	530	563	530	563	530	563

Notes. This table reports ITT regressions where the outcome variable is regressed on treatment status and the standard set of covariates (defined in Table 3). All entrepreneurs for whom we have detailed business information from the follow-up surveys are included. *Businesses* is the total number of businesses of an entrepreneur, *Commerce/Services/Manufacturing* is the number of businesses in this particular sector, and *Diversification* is the number of sectors that an entrepreneur is involved in. *p*-Value interaction is from a test of whether the sum of the two single treatments (*Training*, *Grant*) is different from the combined treatment (*Training + Grant*). Cluster-robust standard errors in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

statistically significant for this group. For the male entrepreneurs who received only the business grant, however, we observe an increase in their involvement in services but no increase in commerce. Thus, only the trained male entrepreneurs, and in particular those who received both training and finance, expand in commerce. We observe both from the baseline and the follow-up surveys that entrepreneurs operating in commerce have significantly higher sales and profits than other entrepreneurs. This may suggest that the trained male entrepreneurs make better choices of sector than the nontrained entrepreneurs when establishing a new business, plausibly driven by their deeper understanding of key business concepts such as profits.[28] This is consistent with the observation that the business training also caused increased involvement in commerce among female entrepreneurs. The overall picture is less clear among the females, however. For the female entrepreneurs who received only training, we observe increased activity in commerce and reduced activity in manufacturing, but we do not observe a similar pattern for the combined intervention. The combined treatment and the business grant treatment did not cause any significant changes in business sector among the female entrepreneurs. Finally, we observe that all the interventions caused an increase in the level of diversification among the male entrepreneurs, again with the strongest effect being for the combined intervention, and there being no effect on the female entrepreneurs.

Table 5 reports treatment effects on management and business practices, where we observe that the business training, both for males and females, initiated a wide range of short-term changes in management practices. In particular, we observe that the training made the entrepreneurs more active in their record keeping, marketing, and employee relations, which are topics that were covered in depth in the lectures. The business grant intervention did not cause any significant changes in management practices (except for the number of fired employees for females), which is in line with what we should expect, since this intervention

[28] Clearly, improved business skills can be applied also to other sectors, and thus our argument is consistent with the observation that trained entrepreneurs also establish new businesses in the service sector. Furthermore, it is interesting to note that in the baseline data, we find a positive correlation between profits and business skills only for entrepreneurs involved in commerce, while investment only positively correlates with a presence in services. This provides suggestive evidence of human capital being a greater constraint in commerce and financial capital being a greater constraint in services, which is in line with the observed treatment effects.

Table 5 Management and Business Practices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Investments		*Total loans*		*Record keeping*		*Marketing*		*Bonus*		*Fired*	
	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term
Male												
Training	0.577	−0.471	0.647	0.627	0.267***	0.002	0.161***	−0.046	0.270	−0.032	0.260**	0.224
	(0.568)	(0.512)	(0.423)	(0.383)	(0.088)	(0.085)	(0.056)	(0.073)	(0.195)	(0.214)	(0.122)	(0.193)
Grant	0.923	0.099	0.087	0.391	0.044	−0.073	0.041	0.019	−0.126	−0.104	−0.069	−0.030
	(0.578)	(0.629)	(0.558)	(0.522)	(0.110)	(0.110)	(0.071)	(0.087)	(0.230)	(0.282)	(0.118)	(0.201)
Training + *Grant*	1.566***	0.542	0.478	0.864**	0.239***	0.009	0.149***	0.130	0.088	0.007	0.123	0.109
	(0.585)	(0.633)	(0.478)	(0.438)	(0.091)	(0.095)	(0.057)	(0.080)	(0.191)	(0.229)	(0.111)	(0.232)
Mean control group	9.885	10.782	11.568	11.101	0.581	0.674	0.473	0.435	0.512	0.848	0.140	0.435
p-value interaction	0.934	0.249	0.704	0.793	0.596	0.534	0.550	0.154	0.837	0.661	0.714	0.749
Female												
Training	−0.112	−0.211	−0.141	−0.253	0.138**	−0.009	0.073*	−0.030	0.176*	−0.002	0.012	−0.098
	(0.391)	(0.404)	(0.285)	(0.266)	(0.067)	(0.063)	(0.040)	(0.046)	(0.098)	(0.154)	(0.054)	(0.131)
Grant	−0.108	−0.164	−0.084	−0.185	0.003	−0.035	0.022	−0.016	0.160	−0.083	0.146*	0.393***
	(0.455)	(0.423)	(0.299)	(0.315)	(0.078)	(0.074)	(0.042)	(0.048)	(0.098)	(0.135)	(0.085)	(0.150)
Training + *Grant*	1.099***	0.330	0.304	−0.241	0.259***	−0.062	0.079*	0.004	0.252**	0.020	0.268**	−0.040
	(0.388)	(0.465)	(0.325)	(0.306)	(0.066)	(0.074)	(0.047)	(0.047)	(0.099)	(0.141)	(0.111)	(0.120)
Mean control group	9.959	10.507	11.869	11.194	0.570	0.684	0.492	0.419	0.271	0.701	0.084	0.333
p-value interaction	0.030	0.268	0.224	0.657	0.230	0.865	0.809	0.452	0.569	0.621	0.408	0.081
Observations	530	563	530	563	530	563	530	563	530	563	530	563

Notes. This table reports ITT regressions where the outcome variable is regressed on treatment status and the standard set of covariates (defined in Table 3). The lagged outcome variable is not available in columns (11) and (12). All entrepreneurs for whom we have detailed business information from the follow-up surveys are included. *Investments* is investments in the business, in logs. *Total loans* is total loans, in logs, both from the microfinance institution and other sources. *Record keeping* is an indicator variable taking the value one if the entrepreneur reports keeping records. *Marketing* is an index (0-1) of three marketing initiatives. *Bonus* is the number of employees given a bonus during the last year. *Fired* is the number of fired employees during the last year. *p*-Value interaction is from a test of whether the sum of the two single treatments (*Training*, *Grant*) is different from the combined treatment (*Training* + *Grant*). Cluster-robust standard errors in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

did not target these dimensions. We observe, however, that the business grant had a positive short-term effect on investments for male entrepreneurs, even though the point estimate is not statistically significant at a 10% level ($p = 0.11$). The combined treatment caused a large and statistically significant increase in short-term investments for both male and female entrepreneurs, and also almost the same changes in business practices as observed for the group receiving only training.[29] Overall, our findings on management and business practices for the male entrepreneurs are largely consistent with our findings on business performance; we find the strongest effects for the combined intervention and no effect from the business grant offered separately. Comparing the effects on the group that received only training to the combined group suggests that a change in business practices is not sufficient to improve business performance; long-term investments are also needed. For the female entrepreneurs, we observe that the combined treatment also caused a significant increase in short-term investments and changes in business practices, but as we have seen, these changes did not improve business performance. This may reflect that the investments for this group were not done in the most profitable activities, in line with what we observed for sector choices in Table 4. We shortly return to a discussion of possible constraints that may limit the investment opportunities of the female entrepreneurs.

We also observe that the effects on most of the business and management practices are more muted in the long term, but the interpretation of this finding is not entirely clear. It may reflect that lessons learned from the business training have evaporated over time, but in some cases it may also reflect a natural dynamic of the

[29] When we surveyed the entrepreneurs in 2009, we asked the business grant recipients how they had spent the grant. On average, 95% was reported spent on the business, and hence only a minor share on other categories, such as household and savings. The entrepreneurs reported to have invested the grant in a number of business related assets, mostly in merchandise for stock or immediate sale (including fabric, beer and cold drinks for the kiosk, flour, fish, charcoal, and mobile phones), but also in more durable assets (like a bicycle for transportation, a fridge, a sewing machine, a hand drier for the hair salon, renovation of a chicken house, a fruit stand, building materials for a new business premise, etc.). Of the business grant recipients, 60% had the business grant records available for inspection at the time of the interview.

businesses. For instance, once new customer relation initiatives have been put in place, as documented in the short run, the value added of additional customer relation initiatives may go down.

4.3. Exploring Heterogeneity in Treatment Effects

In this section, highlighting the combined treatment where we find strong positive effects on business performance for the males but no significant effects for the females, we address the question of whether it is *really* gender that matters. Are there other factors that correlate with gender, such as sector and baseline level of sales, which can explain the observed gender difference in treatment effects? To address this question, we add the term $(Training + Grant)_i \cdot Z_i$ to the regression equation, where Z_i is a contingent factor from the baseline (also included in X_i) for which males and females differ significantly. If the gender effect of the combined intervention works through any of these contingent factors, then the gender interaction term for the combined treatment should become insignificant when adding $(Training + Grant)_i \cdot Z_i$.

To illustrate, suppose that the combined intervention worked for entrepreneurs who in the baseline had high sales. This might explain the gender interaction term, since in the baseline female entrepreneurs had lower sales than male entrepreneurs. Introducing a separate interaction term for baseline sales and studying whether this weakens the gender interaction term allows us to shed light on this question. We limit our study to the impact on average sales, but the reported pattern is the same for the other business outcome variables.

Table 6 reports the regression results, where the main variables of interest are the gender interaction term for the combined treatment and the new interaction term. The regression underlying column (1) in Table 6 is identical to the regression underlying column (3) in Table 3, where the estimated coefficient on the combined treatment for females in the former case can be found by summarizing the two coefficients in column (1).

We observe that the interaction terms for baseline sales, profits, and investments are statistically significant, which shows that the combined intervention had a stronger effect for entrepreneurs with lower initial sales, profits, and investments. The estimated gender interaction term, however, is also highly robust to the inclusion of other interaction terms; the point estimates

Table 6 Heterogeneity in Impact of Training

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Training + Grant	0.524***	0.530***	0.539***	0.538***	0.518***	0.531***	0.496***	0.515***	0.527***	0.525***	0.506***
	(0.194)	(0.192)	(0.191)	(0.196)	(0.197)	(0.195)	(0.191)	(0.192)	(0.195)	(0.194)	(0.189)
Interacted with:											
Female	−0.470**	−0.531**	−0.507**	−0.515**	−0.485**	−0.505**	−0.469**	−0.471*	−0.484**	−0.488**	−0.504**
	(0.239)	(0.240)	(0.238)	(0.246)	(0.247)	(0.240)	(0.237)	(0.240)	(0.241)	(0.239)	(0.249)
Sales		−0.070***									−0.023
		(0.026)									(0.039)
Profit			−0.529***								−0.434*
			(0.163)								(0.249)
Manufacturing				−0.076							0.029
				(0.255)							(0.255)
Services					0.020						0.126
					(0.191)						(0.208)
Workers						−0.073					−0.017
						(0.075)					(0.081)
Investments							−0.283**				−0.193
							(0.143)				(0.145)
Knowledge								0.717			0.378
								(0.575)			(0.570)
Education									0.014		−0.005
									(0.034)		(0.036)
Age										−0.004	−0.002
										(0.009)	(0.009)
Observations	602	602	602	602	602	602	602	602	602	602	602

Notes. This table reports ITT regressions with the *Sales* average (log) as the outcome variable, and with the standard set of covariates (defined in Table 3). All entrepreneurs for whom we have detailed business information from the follow-up surveys are included. The combined treatment is interacted with the following variables: *Female* (column (1)), *Sales* (column (2)), *Profit* (column (3)), *Manufacturing* (column (4)), *Services* (column (5)), *Workers* (column (6)), *Investments* (column (7)), *Knowledge* (column (8)), *Education* (column (9)), and *Age* (column (10)). Column (11) includes all interactions in one regression. All interaction variables are centered and from the baseline survey. Cluster-robust standard errors in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

are almost the same in all specifications and are always statistically significant. Thus, clearly, gender matters for understanding the effect of the combined treatment.

5. What Explains the Gender Effect?

The identification of profitable business opportunities requires knowledge, including an understanding of profits, whereas the decision to implement new business ideas requires the opportunity to do so and noncognitive abilities that are conducive to business growth. In this way, differences in the effect of the combined treatment on male and female entrepreneurs could stem from gender differences in business knowledge, noncognitive abilities, and household constraints. In this section, using data from the lab experiment and survey data, we study in more detail the extent to which there are such gender differences in our sample and whether they can shed light on our main findings.

5.1. Business Knowledge and Noncognitive Abilities

The lab experiment investigated business knowledge and different aspects of noncognitive abilities related to the business training program, including confidence, willingness to compete, and risk and time preferences.

Business knowledge was measured by an incentivized test, where the participants answered 10 questions on different topics covered in the course. The clients were paid a fixed amount of TZS 250 for each correct answer. As shown in column (1) in Table 7, there is no gender difference in the treatment effect on this test, with training leading to a gain of almost 0.3 standard deviation for both males and females. If we run a regression without separate treatment dummies for males and females, we also find that the effect of training is highly statistically significant ($p = 0.044$). Thus, the evidence suggests that training provided both male and female entrepreneurs with more business knowledge. In line with what we observed in the baseline data (as reported in Table 2), we also observe that the female entrepreneurs in the control group have a lower score on the test in the lab than the male entrepreneurs.

We studied confidence and willingness to compete in a game where the clients answered a set of questions on five topics that were unrelated to the training (sports, math, politics, health, and geography). The clients were paid a fixed amount of TZS 250 for each correct answer, and, as expected, the trained and the nontrained group performed equally well (t-test of equality, $p = 0.581$). The participants were then asked about their expectations about own performance ("Are you better than, equal to, or worse than a typical microfinance client at answering questions on topic X"), which gives us a measure of confidence, and then for each of the five topics, they had to choose whether to compete or not in a subsequent round of similar questions. If they decided to compete and performed better than the average participant, they were paid TZS 750 per correct answer; if they performed worse, on the other hand, they were paid nothing. If they decided not to compete, they would work for the fixed rate of TZS 250. The number of times they entered the competition gives us a measure of their willingness to compete. From columns (2) and (3), we observe that the training has made the female entrepreneurs more confident and almost closed the gender gap that we observe in the control group; to a greater extent than control group females, the trained female entrepreneurs believe they are at least as good as a typical microfinance client on the given tasks. At the same time, we also note that the training did not affect the female entrepreneurs' willingness to enter into a competitive environment; females, both trained and untrained, are more competition averse than males.[30] This observation is in line with the literature on gender and competitiveness (Niederle and Vesterlund 2007, Croson and Gneezy 2009, Fletschner et al. 2010).

To study risk preferences, the participants were presented with four situations where they could choose between a risky alternative with two equally likely outcomes, a payment of TZS 6,000 or nothing, and a safe alternative. The value of the safe alternative varied across situations, taking the values TZS 1,000, TZS 1,500, TZS 2,000, and TZS 2,500. Risk preferences are measured by the number of times the participant chose the risky alternative.[31] From column (4), we observe that the training did indeed close the gender gap in risk preferences, but in this case by reducing the willingness to take risks by the male entrepreneurs.[32]

Finally, at the end of the experiment, we studied time preferences by giving the participants the choice of when to pick up their participation fee one week after the lab and receive TZS 15,000; three weeks after the lab and receive TZS 20,000; or five weeks after the lab and receive TZS 25,000. Hence, by waiting four weeks their participation fee would increase by 67%. In column (5), we measure time preference by a dummy, which takes the value one if the participant chose the five-week option. We observe that the training

[30] Gender differences and treatment impacts on confidence and willingness to compete remain if we adjust for knowledge in the first lab-round, prior to the confidence response and competition choices.

[31] Because choosing the risky alternative implies losing money, our measure of risk aversion can also be seen as a measure of loss aversion.

[32] The fact that training has led to a reduction in the willingness of males to take risk must be seen in light of the high level of risk taking among males in the control group; 15 of the 34 males chose the risky alternative in all four situations, only 9 of 70 females did so.

Table 7 Lab Outcomes

	(1) *Business know*	(2) *Confidence*	(3) *Will to compete*	(4) *Risk attitude*	(5) *Time preference*
Training	0.292	−0.518	0.203	−0.801**	−0.004
	(0.205)	(0.417)	(0.410)	(0.323)	(0.117)
Training × Female	−0.019	1.168**	−0.213	1.030**	0.172
	(0.275)	(0.514)	(0.538)	(0.399)	(0.139)
Female	−0.370*	−1.589***	−0.876**	−0.905***	−0.129
	(0.220)	(0.330)	(0.412)	(0.266)	(0.095)
Sum train. female	0.273	0.651**	−0.010	0.229	0.167**
	(0.190)	(0.317)	(0.349)	(0.229)	(0.082)
Mean control group male	2.613	0.118	3.647	2.676	0.529
Mean control group female	2.243	−1.471	2.771	1.771	0.400
Observations	211	211	211	211	211

Notes. This table reports ITT regressions where the outcome variable is regressed on treatment status and treatment status interacted with gender, without any covariates. All entrepreneurs who took part in the lab are included. *Sum train. female* is the sum of *Training* and *Training × Female*. *Business know* (column (1)) is the number of correct answers (0–10) on a multiple-choice test on business facts and practices; *Confidence* (column (2)) is measured on a scale from −5 (worse than others) to 5 (better than others); *Will to compete* (column (3)) is measured as the number of times the entrepreneur decides to compete (0–5); *Risk attitude* (column (4)) is measured as the number of times the entrepreneur chooses the risky alternative (0–4); *Time preference* (column (5)) is an indicator variable taking the value one if the entrepreneur decides to wait with the payment for five weeks. Cluster-robust standard errors in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

again closed the gender gap, by making the female entrepreneurs more patient.

Overall, we observe that the business training made the female entrepreneurs more knowledgeable, confident and patient and actually eliminated a number of initial gender differences. In the trained group, there are no statistically significant differences between males and females when it comes to confidence or risk and time preferences (*t*-test of equality; $p = 0.289$, $p = 0.676$, $p = 0.678$). Still, we observe that even the trained female entrepreneurs are less willing to compete than the males, which provides suggestive evidence of them not having a sufficiently competitive mind-set to actually implement the strategies necessary for business growth. We find a positive correlation between the willingness to compete in the lab and sales and profits, suggesting that willingness to compete is in fact a relevant entrepreneurial trait.[33]

5.2. Household Dynamics

In Tanzania, as in most other countries, females face more binding external constraints on their activities than males. For instance, females typically have the main responsibility for the running of the household. One indication of this in our data is the fact that females on average spend 10 hours less per week than men in their businesses. We also know that females more often operate their businesses in or close to their home, which suggests domestic commitments.[34]

Moreover, females may in some cases have a lesser say in decisions that are important for the household, including business decisions. One indication of this from our surveys is the fact that females are less informed about their husbands' income than vice versa. In the short-term follow-up survey, we asked the married clients whether they knew what their spouse's income was in a normal month: 79% of the male entrepreneurs responded positively, whereas only 45% of the female entrepreneurs reported to have this information. In the follow-up surveys we also gathered anecdotal evidence suggesting that husbands in some cases are in charge of the female PRIDE members' businesses.

To further explore household dynamics, we introduced the following incentivized lottery experiment in the long-term follow-up survey:

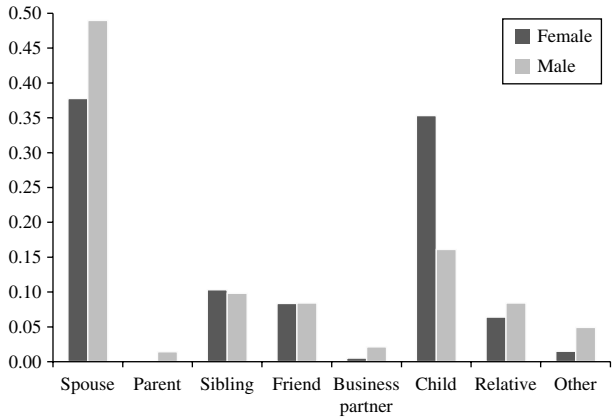
> To show our appreciation of your participation in this survey, the sponsors of this research program are organizing a lottery where you can win money. Each participant in the survey receives automatically one ticket in the lottery. The sponsors will randomly pick five tickets, and the owners of these tickets will receive a prize of 100,000 Tanzanian shillings. The winners will be selected and contacted by phone later this year.
>
> If you wish, you may also sign up another person for this lottery. If you do so, then you and the other person get together two tickets in the lottery. Both of you will be contacted by phone if one of the tickets is picked as a winner, and we will come personally to your business and pay out the prize.

Our hypothesis is that if women are concerned that their husbands may confiscate their money, they would be less inclined to sign up their spouse for the extra ticket. Not surprisingly, almost everyone (97%) chose to sign up for the extra ticket. Interestingly,

[33] We explore the correlation between willingness to compete in the lab and field choices and outcomes in a separate paper; see Berge et al. (2014). Zhang (2012) and Buser et al. (2014) find a similar association between competitiveness and educational choices.

[34] In our long-term follow-up survey we asked about distance between the main business and home, and more than twice as many females as males reported this distance to be zero (35% versus 16%).

Figure 1 Recipient of Lottery Ticket



Notes. This figure shows to whom married entrepreneurs decided to give their free lottery ticket in the lottery experiment. The height of the bars shows the share of tickets going to the various groups.

however, as shown in Figure 1, and in line with our hypothesis, among the married respondents significantly fewer women chose to sign up their spouse (38% for females, 49% for males, t-test of equality, $p = 0.037$), and instead typically chose to sign up one of their children. Although this could be explained by differences in the preference for children's welfare between husband and wife, our results are in line with other experimental studies that more explicitly focus on the fear of confiscation; in a study from the Philippines, Ashraf (2009) demonstrates that spouses with weak control over household financial decisions hide income from their partners. In line with this, we also find that there is a negative, though not statistically significant, association between sales and profits and the "fear of confiscation"; married females who do not sign up their husbands have lower sales and profits than females who sign up their husbands.

Finally, another interesting piece of evidence on household dynamics comes from the long-term follow-up survey where we ask the respondents about other sources of income, including employment, remittances and other support from family, and support from the spouse. Focusing on support from the spouse, we find that female entrepreneurs, as we should expect, receive more from their husbands than male entrepreneurs receive from their wives. However, we find evidence of a crowding-out effect for females who have received training and/or a business grant; treated female entrepreneurs report receiving on average approximately TZS 33,000 less from their husbands than control group females (t-test of equality, $p = 0.017$).[35] Note that these responses apply to the situation more than two years after the completion of the training and the distribution of grants.

[35] Only 7 of 160 married males report receiving support from the spouse, while 136 of the 226 females do so.

It seems reasonable to assume that domestic obligations, lack of influence over business decisions, and crowding-out effects make the female entrepreneurs less able to implement business knowledge from the training program or benefit from long-term credit. Moreover, we find no indication of business training empowering the female entrepreneurs or easing the external constraints that limit their business growth.

6. Consequences for the Microfinance Institution

The main focus of the present field experiment was on how to improve the businesses of the small-scale entrepreneurs, but it is also interesting to look at how the interventions affected other outcome variables of importance for the microfinance institution. In this section, using administrative data from the microfinance institution from 2010, we study treatment effects on membership and loan size in the microfinance institution.

From Table 8, we observe, consistent with the other findings, that there are significant gender differences in the observed treatment effects on membership and loan size in the microfinance institution. For the

Table 8 Microfinance Institution Outcomes

	(1) *PRIDE member*	(2) *PRIDE loan*
Male		
Training	0.127	0.574
	(0.089)	(0.448)
Grant	0.302**	1.537**
	(0.120)	(0.608)
Training + *Grant*	0.228**	1.089**
	(0.102)	(0.508)
Mean control group	0.508	11.290
p-value interaction	0.160	0.159
Female		
Training	−0.076	−0.402
	(0.062)	(0.316)
Grant	−0.088	−0.543
	(0.070)	(0.356)
Training + *Grant*	−0.013	−0.050
	(0.080)	(0.409)
Mean control group	0.565	11.551
p-value interaction	0.148	0.094
Observations	644	644

Notes. This table reports ITT regressions where the outcome variable is regressed on treatment status and with the standard set of covariates (defined in Table 3). All entrepreneurs who took part in our survey are included. *PRIDE member* (column (1)) is a dummy taking the value one if the entrepreneur in 2010 was still a member of PRIDE, and *PRIDE loan* (column (2)) is the size of the loan in PRIDE that year in logs. p-Value interaction is from a test of whether the sum of the two single treatments (*Training*, *Grant*) is different from the combined treatment (*Training* + *Grant*). Cluster-robust standard errors in parentheses.

**$p < 0.05$.

male entrepreneurs, we observe that each intervention increased the probability of membership and loan size in the microfinance institution, the effects being statistically significant for the business grant intervention and the combined intervention. In contrast, for the female entrepreneurs, there are no statistically significant effects and, in fact, all the point estimates are negative.

It is interesting to note the similarity in the findings reported in Table 8 with the findings on business performance, structure, and practices reported in Tables 3–5, since the former relies on administrative records and the latter on self-reported data. In both cases, there is a strong effect on the male entrepreneurs receiving the combined treatment and no effect from any of the treatments on the female entrepreneurs. The administrative data also show a strong positive effect of the business grant for male entrepreneurs, which does not map directly to the findings for the self-reported data. But the picture is not very different, since for the business grant treatment we find that the males self-report being happier as entrepreneurs and making changes in the business structure.

In sum, therefore, the administrative data strengthen our main findings on how the interventions affected the businesses of the entrepreneurs.[36] This analysis also shows that the combined treatment had positive long-term effects for the microfinance institution in terms of membership and loan size. The administrative data, however, do not allow us to conduct a more detailed cost benefit analysis, and it should be noted that such an analysis is complicated by the fact that the combined treatment involved a grant that was not to be repaid, which may undermine the culture of repayment among the members of the microfinance institution.

7. Concluding Remarks

Our study shows that the combined intervention of business training and a business grant has had a powerful effect on business performance of small-scale entrepreneurs, in both the short term and the long term. In contrast, an infusion of only business training or only a business grant had a much weaker effect on business performance. The evidence thus points to long-term finance being an important constraint for microfinance entrepreneurs, but also to business training being essential to transform financial capital into productive investments. We further provide evidence showing that the improved business performance took place through an expansion of the business activities and improved management practices. In particular, our data suggest that business training enabled the entrepreneurs to better identify profitable business opportunities, leading to changes in business practices and ultimately to higher sales, profits and happiness. In contrast, investments created by the business grant, but not guided by knowledge from the training program, did not generate any measurable returns.

The positive effect of the combined treatment, however, is contingent on gender. Even though the female entrepreneurs benefited from the training in terms of business knowledge, we do not find a positive effect on their business outcomes. Deeper factors than lack of business knowledge thus seem to constrain the development of female owned microenterprises. We report evidence of female and male entrepreneurs differing fundamentally in terms of both noncognitive abilities and household constraints, which may indicate that more comprehensive measures are necessary in order to promote development among female entrepreneurs, paying greater attention to their motivation for being involved in business activities and to external constraints that may limit their opportunities.

[36] The similarity in our findings for administrative data and self-reported data also makes it less likely that our results are driven by male entrepreneurs misreporting to please the enumerators.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/mnsc.2014.1933.

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