

BUSINESS TRAINING PLUS FOR FEMALE ENTREPRENEURSHIP? EVIDENCE FROM A FIELD EXPERIMENT IN PERU¹

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Abstract

Management capital is increasingly seen as a key constraint for female entrepreneurship, besides financial capital, but business training interventions have seldom shown growth effects for these firms. This study evaluates the early impacts of a business development services program serving female microentrepreneurs in Lima using an experimental design, that included two treatment groups: One received only general training (GT) while the other received in addition technical assistance (TA). Results show the existence of room for efficiency gains and growth, as all treated showed gains in the self-reported productivity residual, but only those that received the full intervention (GT+TA) also show differentiated self-reported adoption of recommended business practices and increased sales revenues. Thus, our results suggest technical assistance may be necessary to promote growth of microfirms, although low take up of the training may suggest some space to improve recruitment and delivery of good general business practices.

Keywords: entrepreneurship, business training, gender equity

JEL Codes: C93, D1, D22, J24, O12

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1) Introduction

Can we make a microentrepreneur out of a small trader/producer? This question is increasingly important as it becomes more evident that microfinance alone is not enough to consolidate the growth of microbusinesses and take microentrepreneurs out of poverty (Banerjee, et. al., 2009; Karlan and Zinman, 2010). Microentrepreneurs may be neoclassical, but the financial constraint may not always be the most relevant, with lack of managerial capital likely to be relevant for many to make their business grow (Bruhn, Karlan and Schoar, 2010), as many start a business after being expelled from many formal jobs, or for perceiving they would be excluded from such job opportunities (Perry, et. al., 2007). Indeed, de Mel, McKenzie and Woodruff (2009), with the help of a randomized experiment in Sri Lanka, find that many microentrepreneurs earn negative returns to capital, especially women. Furthermore, they find that the group of poor, high-ability, female microentrepreneurs that could benefit from expanded access to credit is rather small. The gender equity connotation of the distribution of entrepreneurial traits is also a major concern as most of the progress in the participation of females in the labor market has occurred through self-employment, and also because female-run microenterprises tend to be smaller, less productive and less profitable, at least in Latin America (Banco Mundial, 2010).

The question is whether we can improve the likelihood of business success by teaching entrepreneurial skills. In principle, more managerial capital may imply increased

marginal productivity of labor or physical capital but also improved the quality and quantity of such other inputs (Bruhn, Karlan and Schoar, 2010). However, the goal of helping microentrepreneurs become successful may be complicated. If business success is not guaranteed by the mere replication of recognized “best business practices”, but rather depends on the microentrepreneur’s intuition to identify business opportunities and the timing and perseverance with which she implements her business plan. Although there are many programs around the world implementing business training modules for microentrepreneurs, we still know little about their true impact². In general, self-selection into these programs has complicated these studies in the past. Recently, Karlan and Valdivia (2011) and Bruhn and Zia (2011) have presented experimental evidence related to business training programs that focus on transferring to microentrepreneurs business practices that are recognized as leading to success in survival and growth. The first one corresponded to a business training applied to female microfinance clients in Peru while the second one focused on young entrepreneurs in Bosnia-Herzegovina. Both studies are not encouraging about this type of business training. They both find that the training led to many adjustments in business practices consistent with the messages of the training, but weak or no effects on business performance.

Other recent studies have explored the impacts of complementing business training with capital transfers. Giné and Mansuri (2011) find that business training does indeed lead

² Freedom from Hunger (FFH) and the International Labor Organization (ILO) are worldwide leaders in the implementation of such training programs. Other important agencies are Promujer in Latin America and BRAC in Bangladesh (see Dunford, 2002).

to increased business knowledge and better business practices, but not on business sales or profits, and only for male clients in rural Pakistan, a result similar to the one reported by Berge et. al. (2011), for microfinance clients in Tanzania. Women do improve business knowledge but show no adjustments in their business practices and profitability. G&M op. cit. argue that social norms that restrict women's labor supply and their participation in family business decisions may explain the differentiated outcome by gender. Both studies included a complementary capital transfer, but they do not find any business effects, which can be interpreted as evidence that the beneficiaries were not credit constrained. De Mel, McKenzie and Woodruff (2012), on the other hand, do find that the cash grant makes a difference, although only in the short run as the increased profitability vanished in the second year after the treatment. Despite lack of business effects of the loan lottery, G&M finds the intervention to be profitable to the lender as they increased the number of larger loans issued to the beneficiaries without an increase in default rates or officer's workload, a result consistent with the one reported in Karlan and Valdivia (2011), although in that case benefits to the lender came not from larger loans, but from reduced default and increased retention.

These results could be interpreted as evidence that the lack of management skills is not the main constraint faced by microentrepreneurs, but an alternative interpretation is that the lack of effects is evidence that this kind of business training cannot transfer the management skills required to make the targeted microentrepreneurs be successful. Besides learning about general best business practices, they may need some more specific

advice about what are the key problems of their businesses or where to start to define the line of a new business, something that is closer to what is called technical assistance. Indeed, improving the management capital available to microbusinesses can be done through technical assistance, that is, through a detailed diagnosis of the strengths and weaknesses of the microbusiness, the identification of required changes/improvements, and the support in the implementation of such changes/improvements.

This study aims to contribute to this debate about whether lack of managerial capital is the main constraint for microbusiness growth in developing countries, and whether transmitting general best practices can be enough to guide our female microentrepreneurs to adjust their practices and innovate for business growth, or it is necessary to complement such training with a more personalized approach in the form of technical assistance. I report here the early results of a randomized control trial associated to a business development services (BDS) program applied to female microentrepreneurs in four districts of Metropolitan Lima, Peru. The study design first identified a sample of eligible female microentrepreneurs, and then randomly assigned them to two treatment groups and a control group. Both treatment groups received a general business training (GT) module that was delivered over a 3-month period with three three-hour sessions a week. For one of the treatment groups, the training was complemented with an offer of technical assistance (TA), also over a three-month period, and combining the consultant's visits to the beneficiaries' businesses with group sessions to discuss common problems and alternative business strategies. To my knowledge, there is no previous study that analyzes

the importance of complementing business training with TA to improve business performance in developing countries with an experimental design. Bruhn, Karlan and Schoar (2010) do report positive short run and long run results of an intervention that subsidizes management consultancy services for SMEs in Puebla, Mexico. They find consultancy services to improve productivity 1-4 months after the end of the intervention (12-16 months from the beginning) and increases employment and payroll up to three years after the end of the intervention. The processes most affected by the intervention were those related to formal accounts and marketing efforts, although the authors hypothesize that heterogeneity across firms might explain the lack of other significant effects of individual business practices. That study, however, differs from the one reported here on the nature of treatment and the beneficiaries, as the intervention does not include a training component and it is not exclusively targeted to micro firms but includes small and medium firms as beneficiaries.

Our findings, based on intention-to-treat (ITT) estimates, indicate that all those that received the treatments experimented a productivity residual increase, but only those that received the full treatment (GT+TA) adopted recommended business practices and experimented sizable increases in business sales. Those GT treated also saw some increases in their sales revenues, but they are not significant and smaller than those observed on average in the GT+TA group, if we slightly relax the threshold under which a p-value indicates the rejection of the null hypothesis. We interpret these results first, as evidence that management capital is a binding constraint for business growth for

microfirms in Lima. Second, our results suggest that previous studies finding no performance effects of business training were not evidence against the existence of room for efficiency gains, but rather question the way to transfer relevant management skills to female microentrepreneurs, suggesting that a more personalized support may be required to help family businesses grow, taking their families out of poverty.

This report is organized in seven sections including this introduction. Section 2 describes the two interventions and discusses the expected effects. Section 3 explains the experimental design and its implementation, and briefly describes the statistical methods used to establish causal effects of the training on a wide variety of outcomes. Section 4 uses the baseline survey to describe the sample of the study in terms of key variables such as socio-economic characteristics of the women and their businesses, access to credit, previous experience on business training, use of family time, among others. We also explore other characteristics of the microentrepreneurs such as their attitudes towards risk, leadership abilities and disposition to work in groups, etc. Next, section 5 presents the level of compliance associated to the intention to treat, based on the women's participation in the training activities. Section 6 presents the results on key business practices and results and Section 7 closes with a discussion of results and policy implications.

2) The intervention and the expected effects

The intervention under study was supported by the World Bank and UNIFEM as part of a joint effort to promote the economic empowerment of women in developing countries. In the Peruvian case, we worked with a consortium formed by three organizations with vast experience on the provision of business training for adults for the development of the training materials and the implementation of the training³. The training was organized in two components: a general training component (GT) and a technical assistance component (TA). The first component included 36 three-hour group sessions delivered three times a week. 24 groups were formed based on geographical proximity⁴. The content of the general training component consisted of the identification and explanation of best practices associated to successful microentrepreneurs, and was organized in three modules: personal development, business development and management and productivity improvements. The first module focused on the strengthening of women's self-esteem, social skills and tools for life planning. The second module focused on tools to plan new businesses, or process innovations in the current ones, as well as marketing and sales strategies, and costing. The third module provided tools to improve treatment of clients,

³ The three organizations are the following: Centro de Servicios para la Capacitación Laboral y el Desarrollo (CAPLAB), Centro Latinoamericano de Trabajo Social (CELATS), and Instituto de Promoción del Desarrollo Solidario (INPET). CAPLAB was the coordinator, and was in charge of the business development and management module. CELATS was in charge of the personal development module while INPET run the productivity improvements module.

⁴ The Project selected beneficiaries from 34 *zonas* of four of the largest districts in Lima: Comas e Independencia in the northern cone, and Villa El Salvador and San Juan de Miraflores in the southern cone.

safety and hygiene of production processes as well as production workshops on food processing industries, tailoring and dressmaking, and cosmetology.

The TA component also included the same three modules of the first component, but the support was more specific, based on the characteristics of the women's businesses and their needs. It combined individual sessions/visits with group sessions among similar businesses over a three-month period. In the personal development module, individual counseling was included to deal with personal issues, but also self-help groups were encouraged and supported. In addition, a short module on digital literacy was included in the group sessions. In the second module, individual and group sessions helped examine the strengths and weaknesses of the women's businesses, and discuss adjustments/innovations. Also, the formation of investment groups among firms in the same lines of work was encouraged and supported, so that they could coordinate certain common business activities.

The main goal of the BDS program is to transfer entrepreneurial skills. The training aims to improve basic business practices such as keeping records of sales and withdrawals, how to treat clients, where to sell, the use of special discounts, credit sales, and the goods and services produced. Some of these improvements may require more credit for the business, and should lead to increased productivity, sales, workers, and could eventually provide incentives to join the formal sector. However, if the entrepreneurial "spirit" is more about personality than skills, teaching an individual to engage in activities similar to those used by successful microentrepreneurs may not be enough for low-educated

microentrepreneurs to properly identify their businesses' weaknesses and implement fixes that can eventually lead to improved business outcomes. An extra push from an expert's specific technical advice or the support and social pressure from peers in the same association of microentrepreneurs may help female entrepreneurs act on flaws or implement innovations. Still, such effort may not be enough to guarantee sustainability of the changes or the ultimate desired outcomes if a market for technical assistance for microbusinesses does not exist or has sizable informational asymmetries.

3) Experimental design and estimation methods

In this section I describe the randomized control trial implemented and the statistical methods used to establish the causal effects of the training intervention.

The randomized control trial

We evaluate the impacts of business training using a randomized control trial in which eligible female microentrepreneurs were randomly assigned to control and treatment groups. Eligibility was defined based on women having a family business, a titled plot, and expressing interest in participating in the training program. Eligible women were recruited in four of the largest districts of Lima (Comas, Independencia, Villa El Salvador and San Juan de Miraflores) by the training institutions with help from local government officials. Recruitment strategies started using local radio and newspaper ads and brochures to be later complemented with personalized visits to the women's businesses, especially at local

markets. Eligible women signed a commitment sheet but were informed during recruitment that it was not going to be possible for the training to be delivered to all eligible women in this pilot stage, and that initial beneficiaries were going to be selected randomly, and only half of them were going to receive the complete package⁵.

The project started in the northern cone of Lima, districts of Comas and Independencia. However, once we noticed compliance was very low, the project decided to expand adding two districts in the southern cone: Villa El Salvador y San Juan de Miraflores. Thus, recruitment was implemented in two rounds. The first round took place in February of 2009 in the northern cone, while the second round took place in September in the southern cone. We recruited and surveyed at baseline a total of 1,979 eligible women, which were randomly distributed in the three groups⁶:

Treatment 1:	711
Treatment 2:	703
Control:	565

Women in Treatment 1 (T1) group were selected to receive only the general training component while those in the Treatment 2 (T2) group were selected to receive both

⁵ The commitment sheet also included basic information that was used to stratify randomization.

⁶We consider the following stratification variables for the randomization: age and schooling of the woman, if she had a titled plot, if she received business training previously, if she runs the business and age of the business, and the zone (34) in which her business is located. They were obtained from the original sheet in which female microentrepreneurs expressed their interest in participating in the BDS program. We run 100 repetitions of the randomization and chose the first one that showed no statistically significant t-statistic from the set of regressions of the stratification variables against treatment, which it happened to be the second one.

components: the general training component first, followed by the technical assistance (TA) component. However, we did not disclose which beneficiary women belonged to which treatment group until about 2 weeks before the end of the first component, to avoid the risk that beneficiaries in the T1 group lose a positive attitude during training, out of disappointment, and/or facilitators engage in a compensating effort in favor of the T1 group.

We applied a baseline survey to all eligible women identified during recruitment (1,979) before randomization results were announced to the consortium⁷. For both rounds, the process was organized over one month with a team of 14 experienced surveyors. The questionnaire included questions about socio-demographic characteristics of the eligible women and her family, economic activities by all family members, characteristics of the eligible women's businesses as well as business practices and results. We also asked the women about their business knowledge, attitudes and perceptions as well as their involvement in key business and family decisions.

Randomization was partially announced right after the end of the baseline survey. Then, the consortium proceeded to contact those women selected into treatment (1,414) and invited them to start training sessions. 692 (49%) of the invited women declined participating in the training despite having expressed interest and availability at recruitment. The 722 that started the training were organized in 24 groups of 30 members

⁷ The baseline survey was applied in February for the first round of recruitments in the northern cone, and in September for the second round in the southern cone.

each for the first training component. For the delivery of the training, the first recruited group was divided in two cohorts. For the first cohort, the intervention started in March 2009, and lasted until October including the TA component, while for the second cohort the intervention went from June to December. For the second round of recruitments in the southern cone, training went from October 2009 to March 2010.

Monitoring of the intervention and the experimental design included periodic reports of attendance by selected beneficiaries, progress in the curricula by the different groups, as well as discussions with facilitators about what they perceive to be key changes generated by the intervention. The follow up survey started about 10 months after the end of the general training component. For those in the T2 group, the accompanying continued for three more months, but this TA component could already implied helping female microentrepreneurs identify problems with their businesses and implement innovations. Small businesses may see ultimate results (sales, profits, workers) materialize this fast, but it may still occur that this time (7-10 months) is too short for some of them. But even if that is the case, we should be able to capture changes in business processes such as the inclusion of new sales lines or more use of credit, etc. Follow-up surveys went from March to November of 2010. Instead of organizing a large team of surveyors for a one-month period for each round of interventions, as for the baseline survey, we worked the follow up survey with a smaller team of just 5 surveyors working continuously over 9 months, in such a way that all cohorts had the same time between the beginning of the intervention and the follow-up survey. We were able to re-interview a total of 1,624 women, which implies

an attrition rate of 18%, although attrition was slightly higher for the control group (21%). Data processing followed a double-entry system to minimize the incidence of typing errors.

Estimation methods

For the estimation of impacts, we use the treatment-control (T-C) differences based on the randomly allocated intention to treat (ITT). The comparison between treatment (T1) and control groups allows the estimation of the ITT effects of traditional business training, allowing us to test whether the transmission of general best practices associated to successful microentrepreneurs is enough to generate adjustments in the businesses practices followed by our entitled beneficiaries and ultimately increase sales and profits. In turn, comparing the two treatment groups allows for the estimation of the marginal contribution of the technical assistance component, allowing us to test whether such more personalized approach is necessary or cost efficient to help entitled women's beneficiaries improve their businesses and escape from poverty. Formally, the preferred specification for the ITT effects will be obtained with the following regression⁸:

$$Y_{ij1} = \alpha + \beta_1 T1_{ij} + \beta_2 T2_{ij} + \beta_3 Y_{ij0} + \beta_4 X_{ij0} + \delta_j + \varepsilon_{ij} \quad (1)$$

where Y_{ij1} denotes an outcome variable for a woman i in zone j at time 1 (follow up), $T1_{ij}$ is a dummy variable that takes the value one if the eligible woman was selected to receive

⁸The results section also presents the diff-in-diff estimates with fixed effects, for some aggregate indexes, as a robustness check.

only the general training, and $T2_{ij}$ is also a dummy variable that takes the value one if the eligible woman was selected to receive both components of the training. Y_{ij0} denotes the value of the outcome variable at baseline, X_{ij0} is the vector of stratifiers used in the randomization⁹, δ_j is the zone fixed effects and ε_{ij} is the error term. Thus, β_1 is the effect of basic training, while $(\beta_2 - \beta_1)$ would represent the marginal contribution of the TA component. The error term is assumed to be uncorrelated across geographical zones but not within them¹⁰.

We evaluate the impact of this intervention upon a large number of indicators related to business practices and business results¹¹. However, testing multiple outcomes using (1) independently increases the probability of rejecting a true null hypothesis for at least one outcome above the significance level used for each test (Duflo, Glennester and Kremer, 2007). We need to adjust the estimated p-values if we want to test whether business training has an impact on the family of outcomes associated to business practices/knowledge, business results or institutional outcomes. A summary measure that captures such idea is the mean standardized treatment effect. Following Kling, Liebman and Katz (2007), we implement that by defining a summary measure Y^* as the unweighted average of all standardized outcomes of a family. That is, we get $Y^* = \sum_k Y_k^* / k$, where

⁹ See footnote 6 for the full list of stratifiers. Also, see Bruhn and McKenzie (2009) for a discussion of the need to control for the stratifiers in the estimation of treatment effects.

¹⁰ The sample is distributed in 34 zones in the four districts, 2 cones of Lima.

¹¹ Table A. 1 presents the definition used to construct all variables used in the analysis.

$Y_k^* = (Y_k - \mu_k) / \sigma_k$. Y_k denotes the outcome variables within each family and were re-defined in some cases so that a larger value is always better for the business or household. Standardization is done using mean and variance for the control group at baseline. Thus, the mean and standard deviation of β in (1) for Y^* allows us to test whether treatment had an overall positive effect on the corresponding family of outcomes.

We also use the summary measure Y^* to test whether the training generates heterogeneous treatment effects for each family of outcomes along key individual characteristics. We use the following model:

$$Y_{ij1} = \alpha + \delta X_{ij0} + \beta_1 T1_{ij} + \gamma_1 T1 \cdot X_{ij0} + \beta_2 T2_{ij} + \gamma_2 T2 \cdot X_{ij0} + \beta_3 Y_{ji0} + \delta_j + \varepsilon_{ij} \quad (2)$$

where x_0 is a binary variable that denotes the characteristic of interest prior to the intervention. In this case, β_1 is the estimator of the treatment effect for those individuals in T1 that have characteristic $x = 0$ and $(\beta_1 + \gamma_1)$ measures the impact for those individuals that have characteristic $x = 1$.

4) The sample

A total of 2400 women filled the commitment sheets during the two rounds of recruitment, 1200 in each cone. However, we were able to interview only 1979 (83%) of them at baseline, as the rest were not found or refused the interview¹². In Table 1 and

¹² Randomization was done upon the eligible women that were reached for the baseline survey.

Table 2, we present key characteristics of the sample of eligible women, their families, and their businesses. First, those tables show that the sample is fairly well balanced, in the sense that almost none of the analyzed variables show significant differences between the treatment and control groups. In terms of socio-demographic characteristics, the eligible woman for this project is 43 years old, has 10 years of schooling, has a partner under marriage or a common-law arrangement, and lives in a household with 4-5 members on a titled dwelling (see Table 1). However, 30% of them live without a partner, and about the same proportion play the role of household head.

With respect to her business activities, the families of the eligible woman have an average of 1.2 businesses, but the woman herself runs only one of them (see Table 1). 68% of the businesses run by the program's beneficiaries dedicate to commerce, and half of them sell fresh food or groceries. Moreover, within manufacturing businesses, we include food processing which mainly refers to small restaurants. In terms of the size of the businesses, they are very small, selling on average 510 soles a week, which represent approximately US\$ 200, although one out of four businesses sell less than US \$ 40 a week¹³. One out of two of the women had a credit transaction in the 12 months prior to the baseline survey, mainly for their businesses (see Table 2). Consumption credit is low, and mostly in households that already had a business loan. On the other hand, only 16% of the eligible women had received business training before. Thus, it is not surprising that they report very high interest in training, even if we indicate a charge of US\$ 4 per session.

¹³ At the exchange rate prevalent by March 2013.

However, as we see in the following section, compliance was low and dropout rate was high throughout the training.

The participation of family members in the women's business is high. 26% of the other adults still report working in the business, while 15% of the children in the family report working in the business, especially girls above 14 years old. In general, Appendix Table B. 1 shows that the eligible population reproduces traditional gender patterns in time use. On average, the eligible woman reports dedicating 75 hours of her time to productive activities¹⁴. They dedicate 48 hours a week to work on her business but another 22 are dedicated to household chores. Adult males, on the other hand, work 34 hours a week on jobs outside the household, 12 hours in a family business, but only dedicate 5 hours a week to household chores. In appendix Table B. 2, we report some key personality characteristics of our sample of eligible women such as risk proneness and impatience as well as self-reported attitudes that are usually positively associated with entrepreneurial success: drive, persistence, innovator and independence¹⁵. None show to be statistically different between treatment and control groups.

¹⁴ The complement of these activities would be leisure and rest.

¹⁵ See Costa and McRae (1992) and Caliendo et al., (2011) for a discussion of the connection between some personality characteristics that are associated to the likelihood to become self-employed and to be successful at it.

5) Implementation: The low compliance problem

In the previous section, we already indicated that we lost 17% of those originally recruited as they were not found or refused the interview at baseline. Thus, as indicated in section 3, we randomly allocated 1,979 female microentrepreneurs across treatment and control groups, and 1,414 women were invited to join the program. However, only 722 (51%) accepted and started the training (see Table 3). This figure would seem low considering that recruitment included an explicit signed declaration of interest by the entrepreneur, although McKenzie and Woodruff (2012) show that such low take up is not rare in this kind of training interventions, even for such samples.

Furthermore, attendance records to the general training sessions show that dropout was also high, which is not surprising considering the length and intensity of the training. Only 42% of those that started the training completed at least 20 sessions (50%) while only 28% reached at least 30 sessions (75%). The take up and retention rates for this GT component were similar across treatment groups, which is not surprising since the beneficiaries of the GT+TA (T2) treatment were not disclosed until the week before the end of the GT. Only those women in T2 that started the general training (373) were invited to that second component regardless of their attendance record to the training sessions. Only 173 (46%) female entrepreneurs attended at least one of the group sessions of the second component, but the dropout rate was much lower, as ninety five percent of those that started the group sessions attended half of the programmed sessions for the TA module and 53% (92 microentrepreneurs) reached 75% of the sessions.

In what follows of this section, we use a multivariate model to identify the observable characteristics featured by those that accepted to start the training and continue it, in search of adjustments in recruitment, the curricula, which could help improve take up and retention for these programs.

Which women fulfill their commitment to attend the training and which ones dropped during the course of the training? Table 4 shows that those eligible women selected to treatment that accepted to start the training tended to be older and, of course, expressed the highest interest in the training at baseline. Education does not seem to be a significant determinant of take-up, although the ones with secondary education are indeed more likely to stick with the training longer: they are 7.5 percentage points more likely to reach 75% of the general training sessions¹⁶.

Something similar occurs with the childbearing situation and distance from the place where sessions were given to the women's residence, suggesting the importance of the time constraint to explain the high dropout rate. Take-up of the general training does not seem to be reduced when the woman has a child younger than five years old. However, it does reduce (11 percentage points) the likelihood that she stays until the end. Similarly, the fact that training meetings took place in a zone different from the one where the woman resides did not affect take-up but it did increase dropout in 11.5 percentage points.

¹⁶ Notice that the regressions on attendance are run over the sample of beneficiaries from T1 and T2 that started the corresponding component.

Finally, self-reported personal characteristics and the importance of the business for family income do not seem to matter for either enrollment or retention.

Table 4 also analyzes the determinants of take up and retention for the TA component. For that component, we see that level of interest in training and individual attitudes matter. Those with expressed more interest in training at baseline tended to accept the offer to receive specific advice. Also, those identified as risk prone, innovating and driven individuals were more likely to continue with the group meetings organized by the advisor/facilitator. On the other hand, those that were identified as impatient, independent and persistent tended to drop the program before the end of the intervention.

This multivariate analysis provides only suggestive evidence of the factors that may be behind low take-up and high dropout rate, but they should be considered more seriously in future studies of the impacts of business training. Day-care facilities and a more efficient use of time during the sessions may help improve retention, which may lead to larger average effects of this type of interventions, or reach more effectively those in highest need. Still, further research is needed to learn about who to recruit and how to improve the effective exposure to treatment.

6) Estimated impacts

As already mentioned in section 3, we have been able to re-interview about 82% of those interviewed at baseline (1624 of 1979). We present here our estimates of the intention-to-

treat effects (ITT) of the BDS program on key measures of business results and practices. Column (4) in Table 5 and Table 6 presents the estimates of the ITT effects of treatment when controlling for the variables used for the stratification of the randomization¹⁷. Column (5) presents the estimates of the ITT effects for those treated only with the general training (GT) component while column (6) shows the estimated impacts for the group that received the regular training plus a technical assistance (TA) component. Finally, column (7) reports the p-value of the test associated to the null hypothesis that both treatment effects are not statistically different from each other.

Table 5 reports effects on self-reported sales and productivity measures, but not one on self-reported profits, a measure that has been common in many previous studies, because of the difficulties to measure it with the kind of surveys we use here. Indeed, McKenzie and Woodruff (2012) report that such difficulties have made many recent studies stop collecting profit data, or collecting it but not using it in the analysis due to excessive noise. A related argument is that training tends to emphasize on registering revenues and costs, so that increased profits may result from better accounting rather than increased profitability, and such bias tend to be higher for profits than for sales or revenues. In terms of business sales, we find in all cases positive and significant differences in favor of those female microentrepreneurs that received treatment, with and without controls, with the exception of sales in an excellent month. In the case of sales in a normal month, for

¹⁷Columns (1) and (2) present the average value of the outcome variable for the control and treatment groups, and column (3) reports the unadjusted differences between the two groups.

instance, we find a large average effect; those treated sell now 15% more than the control group under the preferred specification. When looking at differences by treatment group, we see that those sales increases are only statistically significant for those for whom the treatment included GT+TA. In a normal month, those treated with GT+TA sell now 20% more than their control counterparts. The women that received only GT treatment also increased their average sales by 10%, but the variance is so high that they are not statistically different from the control group. However, the p-values reported in column (7) indicate that the GT+TA treatment effect is not statistically different from that of the GT treatment group at regular levels of confidence, although it does fall within the 0.2 level of confidence.

We also find positive effects on the residual-based productivity measure, and they are statistically significant for the two treatment groups. In the case of the productivity index based on sales in a normal month, the GT+TA group increased their productivity in 0.12 SD. This effect is smaller than the 0.25 SD found in Bruhn, Karlan and Schoar (2012), but not so different considering that in that study in Mexico, larger firms (SMEs) were treated and they received only consultancy services but for a whole year. The average treatment effect for the GT group was 0.09, and not statistically different from the one estimated for the GT+TA group. On the other hand, we find no significant capital or employment effects for any of the treatment groups. Interestingly, the estimated average employments effects are negative, although highly variable. In contrast, we find positive capital stock effects, but also not statistically significant.

The next question is whether sales increases can be associated to changes in business practices closely connected to the messages provided with the training delivered. Table 6 reports the effects on self-reported variables such as the formality of the business, management of household and business accounts, registry of key business movements and planning or execution of major changes/innovations in the entrepreneurial activity of women in treated and control groups. For the most part, we find no statistically significant adjustments in business practices on average. But the detected adjustments vary a lot with the type of treatment received. GT+TA treated women were 4.4 percentage points more likely to keep records of their sales, and 7.5 percentage points more likely to participate in business-related associations. This latter finding is very relevant considering that the value of associating with business peers and how to make them work was one of the most important messages in the TA component of the BDS intervention, although it is important to notice that increased associativity is also observed among those GT trained, albeit at a lower scale. We also find that GT treated women were more likely to close their old business lines (4.5 percentage points). In turn, those that received GT+TA were more prone to plan and implement innovations in their current business (about 3.8 percentage points). Strictly speaking, the latter effect is not significant at the 10% confidence level, but the p-values is below 0.11, so that I would argue that there is a sizable movement in that direction, which is consistent with the fact that technical assistance may work by helping our female microentrepreneurs act on the ailments identified during the regular training. Again, column (7) shows that effects by treatment group are not statistically different from

each other at standard levels, but the null hypothesis could be rejected at around 0.2 confidence level for the two most relevant effects.

We next look at the aggregate measures of business productivity, sales and associativity¹⁸. Two reasons are behind this analysis. On the one hand, analyzing too many individual variables increases the likelihood of finding a false impact (Duflo, Glennester and Kremer, 2007). On the other hand, the intervention may generate different adjustments in heterogeneous firms, so that one particular recommended business practice may be adopted only by a few, but all firms adopt some of the recommended business practices, which can be captured by the standardized index. In Table 7, we also take advantage of the reduction on the number of variables under analysis to explore the presence of heterogeneous impacts, across education and entrepreneurial attitude of the woman and business size. For each aggregate index, we also report the p-values associated to the null hypotheses that effects by treatment group are no different.

The business productivity index shows a positive treatment effect for both treatment groups (0.07 s.d. and 0.1 s.d.), with no statistically significant difference between the two. However, the distribution of the effect within the GT+TA group clearly accrues among the more educated. The index on business sales also shows a positive effect, but only for those GT+TA treated (0.13 s.d.). We cannot reject the null hypothesis that this effect is not larger than the one observed on the GT group at standard confidence levels, although the p-value

¹⁸ See methodological discussion in section 3 for a description of the aggregation method.

for such test is 0.161. Furthermore, when looking at the heterogeneity of effects, we find that business sales effects clearly accrue among those run by women with lower self-reported entrepreneurial attitude, regardless of the type of treatment received¹⁹. For those GT treated with initial low entrepreneurial attitude, the sales effect is indeed 0.15 s.d. and statistically significant, while it is -0.02 s.d., and not statistically different from zero, for those with initial high entrepreneurial attitude. Even with such differences in average effects, we cannot reject the null hypothesis that the effects are no different by entrepreneurial attitude levels at standard levels of confidence, especially for the GT+TA group, although the corresponding p-value is below 0.2 for those in the GT group. This difference would suggest that training alone can substitute for initial low entrepreneurial attitude, helping these microfirms achieve efficiency and productivity gains. Firms run by women with better entrepreneurial attitude may require a more direct advice to increase their sales. For the GT+TA group, the average effect is also larger for those with initial low entrepreneurial attitude, but the p-value is further away from rejecting the null hypothesis.

The aggregate standardized index for business practices does show statistically significant positive average effects of the training, but again only among those that received full treatment (0.05 s.d.). The fact that the effect measured by this standardized index is so clearly statistically significant while very few individual business practices show

¹⁹ We use an entrepreneurial attitude index, built by aggregating on self-reported attitudes towards independence, innovations, persistence and drive, in a way analogous to the way aggregation was done for the business results and practices indexes. See appendix A for the precise definition of the entrepreneurial attitude index.

that significance supports the notion that this BDS intervention generated different adjustments for different firms, a result that is consistent with the findings reported by Bruhn, Karlan and Schoar (2012). Also, the effects on business practices are rather homogeneous across the analyzed dimensions for the GT+TA treatment group, although the p-value for the null hypothesis that effects are homogeneous by education group is only 0.171. With respect to the participation in business associations, both treatment groups increase their participation, although the effect for those with the GT+TA treatment (0.075 s.d.) more than doubles the one for those with only GT treatment (0.033 s.d.). Thus, for the most part, the GT+TA intervention did move microentrepreneurs into some adjustments of their business practices that led to sizable productivity gains.

Finally, in Table 8, we analyze whether the training led to an increased use of business credit, either from formal or informal sources. We find no change in the use of credit, as measured by loan size, from either source, formal or informal. However, we see a portfolio adjustment as trained microentrepreneurs decrease the use of regulated sources in favor of non-regulated ones, as measured by the number of loans. The increase in the number of informal loans comes especially from juntas or associations of peers, and is present in all treated microentrepreneurs.

Robustness checks

The results reported in tables 5-8 were ITT estimates obtained using T-C differences based on the sample that was found at the follow-up survey. In this sub-section, we look at the

robustness of our findings when looking at the double-difference estimates and worst-case scenarios for the implications of attrition.

Appendix Table C. 1 compares the average treatment effects reported in Table 7, based on expression (1), with those that result from calculating the double-difference while controlling for individual fixed effects. We see the treatment effects are rather similar. We find the treatment effects on sales and practices are of similar magnitude. Sales increases for the GT+TA treatment group are estimated at 0.14 s.d., very similar to the 0.13 s.d. found with our preferred specification. In the case of business practices, the DD estimate is 0.06 s.d., also very similar to the 0.05 s.d. obtained with our preferred specification. We do find meaningful differences in the productivity and associativity indexes. The DD productivity effect is still significant on average, but with a different distribution across treatment groups. It is smaller for the GT group but larger for the GT+TA group, which results in a significant difference between the two treatment groups. On the contrary, the DD associativity effect stops being significant on average, although the difference between the two treatment groups remains significant and in favor of the GT+TA group.

We declared before that the attrition rate was 18%, and slightly higher for the control group. Given this relatively high non-response rate, we analyze next the implications of different plausible assumptions about the non-respondents upon our estimated ITT effects, in the lines of the nonparametric approaches followed in Horowitz and Manski (2000) and Lee (2002). In Appendix Table C. 2, we report the lower and upper bound estimates for the mean standardized treatment effects for all treated, under the same scenarios used in

Karlan and Valdivia (2011). Column 5 reproduces the mean standardized treatment effects in Table 7. Columns 1 and 9 present the lower and upper bounds obtained under the worst-case scenario. For the lower (upper) bound, we impute the minimum (maximum) value of each variable in the observed treatment distribution to the non-responders in the treatment group, and the maximum (minimum) value of the observed control distribution to the non-responders in the control group.

The second scenario (columns 2 and 8) adjusts the worst-case scenario considering the behavior observed at baseline for those attrited by the follow up. For dichotomous variables, the lower (upper) bound assumes non-reversal for the non-responders in the control group. If variables are continuous or categorical, it imputes the median growth rate of the bottom (top) growth quintile of each variable in the observed treatment distribution to the non-responders in the treatment group, and the median growth rate of the top (bottom) growth quintile of the observed control distribution to the non-responders in the control group.

The third scenario (columns 3 and 7) follows Kling and Liebman (2004) and imputes to the lower (upper) bound the mean minus (plus) 0.25 standard deviations of the observed treatment distribution to the non-responders in the treatment group, the mean plus (minus) 0.25 standard deviations of the observed control distribution to non-responders in the control group. The fourth scenario (columns 4 and 6) repeats the third scenario but with a 0.1 standard deviations.

Given the 18% attrition rate, it is not surprising to find very large differences between the lower and upper bounds of the worst-case scenario. In the case of the index for the family of business sales, the mean standardized treatment effect can be either largely negative (a reduction of 0.78 standard deviations) or largely positive (an increase of 0.97 standard deviations). The next three scenarios reduce the range gradually, with the last one (± 0.1 SD) implying a definite positive range for the mean standardized treatment effect for the business sales and associativity indexes. That is, with our level of non-response and size effect, if the treatment effect for the non-response varies by more than 0.1 standard deviations from the observed, then the results are no longer statistically different than zero.

Cost-effectiveness and the rationale for low take up and retention

Our estimates are clear in indicating that the full treatment (GT+TA) leads towards an average increase of 20% in sales during a normal month, which on average implies US \$ 136. On the other hand, the full intervention was budgeted at US \$ 674 per beneficiary, distributed roughly evenly between the GT and TA components²⁰. That is the intervention can be paid with 5 months of the extra sales. Is this return enough to justify the investment by our microentrepreneurs? The answer depends on the profit rate but also on the

²⁰The consortium presented a total budget of US \$ 392,921 to provide the basic training component to at least 660 beneficiaries, and the TA component to at least 330 of them. Recruitment, coordination, monitoring and administrative costs were distributed evenly considering that each component (GT and TA) lasted three months. Field supervision and logistics were distributed based on the number of beneficiaries of each component.

sustainability of the effects and the uncertainty the microentrepreneur perceives about the returns to the training and technical assistance they can find in the market. If the training succeeded in making beneficiaries better entrepreneurs, we can imagine effects to be more permanent, although recent evidence seems to suggest that even strong training interventions have effects that vanish over time. If effects come solely, or mainly, from the TA component, we can think the positive effects would vanish as the economic context changes and innovations depreciate, unless the entrepreneur can now hire a consultant to help them design and implement new adjustments. However, beneficiaries' perception of the returns to the intervention may be affected by adverse selection and moral hazard that tends to characterize the market for the provision of these services (see Bruhn, Karlan and Schoar, 2012).

Although the intervention had no monetary cost for the beneficiary, recall that the take up rate was slightly above fifty percent. Furthermore, only 42% of those that started the training attended at least half of the training sessions. It may be that those that did not participate much in the training were those that predicted correctly that such intervention was not going to help them much. However, others may have noticed the full costs, including the opportunity cost of their time, was going to be high for them. Even if these returns were positive, it may happen that women cannot sustain the commitment over the whole course due to family or business emergencies, and then catching up becomes too costly. Recall from section five that one of the observed characteristics that predicted lower participation were those associated to travel time to attend classes and their

childbearing demands, which suggests that an intervention more efficient in the time demanded from beneficiaries could increase participation of female microentrepreneurs that would in fact benefit greatly from it, thus increasing its cost effectiveness.

7) Summary and discussion

We report here the results of an experimental impact evaluation of a BDS intervention aimed at female microentrepreneurs in Lima, Peru, that expressed interest in receiving business training. This study is thus related to key research and policy questions. For one, is there room for efficiency gains for female microentrepreneurs that are often thrown into self-employment due to the rigidities of formal jobs? Second, can we transfer entrepreneurial capital to these female microentrepreneurs so that they can improve their likelihood to grow by adopting best business practices? Third, does teaching general business practices enough, or does specific business advice is required to help these businesses grow? We explore these questions by using a RCT to evaluate the impacts of two additive interventions applied to female microentrepreneurs: one that offers only general training (GT), and a second one that adds specific advice tailored to the needs of each business (TA).

Our findings, based on ITT estimates and a wide variety of self-reported performance and practices indicators, indicate that all those that received the treatments experimented a productivity residual increase, but only those that received the full treatment (GT+TA) experimented sizable increases in business sales and adjustments in their business

practices. Those GT treated also saw some increases in their sales, but they are not significant and smaller on average, if we slightly relax the threshold under which a p-value indicates the rejection of the null hypothesis. The productivity increase is about 0.1 S.D. Those that received full treatment increased their sales by about 20% or 0.13 S.D.

That is, training may help microentrepreneurs improve their productivity through a more efficient use of capital or labor, but the specific advice combined with the general training seemed to have been key in helping microentrepreneurs adopt recommended business practices and sales, at least in the short run. Although the analysis of the heterogeneity of effects is affected by imprecise estimates and low statistical power, it provides important information about what works and for whom. Those that received only general training also saw their sales revenue grow, but the higher variance did not allow us to reject the null hypothesis of no effect, except for those with less initial entrepreneurial attitude. For such sub-sample, the sales effect was 0.15 SD for those that received training only, suggesting that training can indeed substitute for entrepreneurial traits to increase sales. However, productivity gains and the adoption of recommended business practices accrue among the most educated suggesting the full intervention is complementary to formal education. Also, increased associativity concentrates among the larger firms, for both treatment groups.

The sales revenue effects observed for those fully treated come along with the adoption of some of the business practices recommended during the training or supported through the specific advice, as can be observed when we look at the aggregate index in

Table 7. However, many other specific business practices were not adopted widely enough, including those related to tax formalization, keeping records and separating home finances from that of the women's business. We interpret this finding as an indication that the adoption of specific practices was highly heterogeneous but the adoption of at least some of them was high among the GT+TA treated. This result is consistent with the finding by Bruhn, Karlan and Schoar (2012).

Overall, we interpret these results as evidence that management capital is a binding constraint for business growth for microfirms in Lima and that efficiency gains can be achieved by providing these female entrepreneurs with the right support to their managerial capital. As in previous studies, the estimated effects are smaller or weaker for those that only received the general training, and more robust for those that also received technical assistance, especially in the adoption of recommended business practices and increased sales revenue. Thus, our results suggest that previous studies finding no performance effects of business training were not evidence against the existence of room for efficiency gains, but rather that traditional business training may not be enough to help the adoption of recommended business practices and revenues, and that a more personalized support is required to help family businesses grow, taking their families out of poverty.

The policy implications of these results may be huge if we interpret them as evidence that technical assistance is required to generate growth of these micro businesses, as TA is more expensive and less scalable. If so, the challenge may be to find delivery mechanisms

for this TA component that are cheaper and more scalable. However, we need to be cautious to discard general training just yet, especially this type of rigorously designed and of sizable length training, as we cannot rule out the possibility that the lack of growth among GT treated women be the result of low statistical power and little time passed after the intervention. Statistical power, in particular, raises a very important research and policy question about why people that expressed interest in training, as the ones in this study, showed such low take up of the intervention and such high dropout rates. If the training was judged to be rather irrelevant for many of these female microentrepreneurs, then even experienced and renowned training providers, as the ones included in this study, need to improve their recruitment techniques as well as the content and dynamic of the sessions. But another factor may be that time demands by the training exceeds the capacities of these busy microentrepreneurs, so that what could be required is to make the training more efficient in the use of time or to insert mechanisms that support reinsertion of those that had to skip a few sessions.

Another reason to remain cautious is that the reported evidence does not assure us that the intervention made a better entrepreneur out of our small traders/producers in the sample. It just tells us that the business advisors were effective in identifying some of the businesses' flaws and in making microentrepreneurs improve some aspect of their business practices, which led to increased productivity and sales revenue. But we do not know whether this experience has permanently improved the business skills of the microentrepreneurs, so that their vulnerability to future changes in the economic context

is indeed reduced. We could think that they could indeed purchase again technical advice, now that they know it can work, but that may be complicated if such market is missing or faces serious informational asymmetries. Further systematic experimentation may help complete the understanding of the potential contribution of BDS for micro firms to economic growth and poverty reduction.

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Table 1: Socio-economic characteristics of beneficiary and characteristics of main business

(standard errors in parenthesis)

	Control (1)	GT (2)	GT+TA (3)	p-value		
				(2)-(1)	(3)-(1)	(3)-(2)
<i>Age (years old)</i>	42.9 (0.822)	42.8 (0.603)	43.4 (0.634)	0.883	0.440	0.279
<i>Schooling (years)</i>	10.2 (0.195)	10.3 (0.212)	9.9 (0.143)	0.927	0.107	0.100
<i>Marital Status</i>						
Single	0.180 (0.014)	0.197 (0.018)	0.184 (0.017)	0.375	0.837	0.614
Married / Cohabiting	0.614 (0.018)	0.634 (0.024)	0.631 (0.025)	0.431	0.525	0.932
Divorced / Widowed	0.206 (0.017)	0.169 (0.015)	0.185 (0.017)	0.072	0.367	0.491
<i>Role at home</i>						
Head	0.322 (0.024)	0.284 (0.023)	0.316 (0.024)	0.217	0.791	0.246
Head's partner	0.504 (0.026)	0.544 (0.024)	0.534 (0.027)	0.243	0.106	0.765
<i>Number of household members</i>	4.795 (0.097)	4.769 (0.051)	4.744 (0.065)	0.825	0.624	0.736
<i>Partner living at home</i>	0.681 (0.017)	0.724 (0.018)	0.699 (0.019)	0.080	0.367	0.387
<i>Family businesses</i>						
# of family businesses	1.222 (0.039)	1.232 (0.031)	1.192 (0.025)	0.824	0.454	0.121
# of family businesses run by beneficiary	0.995 (0.016)	1.008 (0.016)	1.013 (0.018)	0.513	0.248	0.809
<i>Business line of work</i>						
Commerce						
Food	0.320 (0.034)	0.354 (0.029)	0.360 (0.026)	0.338	0.294	0.837
Non-Food	0.335 (0.034)	0.319 (0.030)	0.345 (0.019)	0.687	0.788	0.283
Production / processes						
Food	0.117 (0.013)	0.113 (0.016)	0.125 (0.013)	0.764	0.617	0.555
Manufacturing	0.073 (0.014)	0.058 (0.009)	0.047 (0.009)	0.276	0.083	0.340
Services	0.060 (0.006)	0.073 (0.007)	0.063 (0.012)	0.214	0.867	0.304
<i>Business size</i>						
Weekly sales	538.30 (45.631)	522.66 (59.817)	475.51 (40.228)	0.828	0.198	0.556
Up to S/. 100 (per week)	0.259 (0.024)	0.234 (0.027)	0.252 (0.024)	0.334	0.735	0.451
From S/.101 to S/.500 (per we	0.481 (0.018)	0.540 (0.022)	0.526 (0.016)	0.013	0.030	0.505
Over S/.500 (per week)	0.259 (0.019)	0.226 (0.022)	0.222 (0.021)	0.239	0.091	0.899
# Observations	565	711	703			

Table 2: Access to credit and background on business training

(standard errors in parenthesis)

	Control	GT	GT+TA	p-value		
	(1)	(2)	(3)	(2)-(1)	(3)-(1)	(3)-(2)
<i>Credit access (any source, any reason)</i>						
Last year	0.495 (0.028)	0.536 (0.018)	0.510 (0.022)	0.146	0.636	0.382
Business credit (any source)	0.420 (0.026)	0.451 (0.016)	0.4359 (0.017)	0.254	0.574	0.475
Formal	0.288 (0.027)	0.307 (0.017)	0.295 (0.017)	0.531	0.818	0.562
Informal	0.173 (0.023)	0.193 (0.013)	0.201 (0.017)	0.346	0.143	0.635
Home credit (any source)	0.158 (0.019)	0.157 (0.023)	0.153 (0.020)	0.968	0.832	0.889
<i>Background on business training</i>						
Previous experience	0.174 (0.020)	0.150 (0.014)	0.167 (0.015)	0.344	0.715	0.439
Interest in training (general)	4.840 (0.024)	4.814 (0.021)	4.826 (0.026)	0.432	0.723	0.685
free training	4.866 (0.022)	4.851 (0.018)	4.858 (0.021)	0.554	0.793	0.764
10 soles per session	4.292 (0.046)	4.187 (0.073)	4.248 (0.049)	0.191	0.483	0.258
# Observations	565	711	703			

Table 3: Treatment take up and retention through general training (GT), by treatment group

	Treated	GT	GT+TA	p-value Diff.
Take up	0.511	0.491	0.531	0.097
Retention (attendance)				
less than 50% of classes	0.578	0.576	0.579	0.957
50%-75% of classes	0.145	0.146	0.145	0.972
more than 75% of classes	0.277	0.278	0.276	0.969
# of obs.	1,414	711	703	

Notes: (GT) Women invited only to training classes. (GT+TA) Women invited to full treatment (training and technical assistance). For differences across treatment groups.

Table 4: Compliance and retention by treatment component
(marginal effects reported, standard errors clustered by zone)

	Training component			TA component	
	Started	Attendance GT sessions		Started	Attendance group sessions
		50% or more	75% or more		75% +
<i>Age</i>					
35 to 50 years old	0.140 *** (0.043)	0.192 *** (0.053)	0.106 ** (0.044)	0.189 *** (0.042)	-0.285 (0.252)
more than 50 years old	0.162 *** (0.052)	0.206 *** (0.054)	0.142 ** (0.057)	0.246 *** (0.054)	-0.655 *** (0.173)
Household head	0.018 (0.031)	0.010 (0.047)	0.002 (0.038)	0.082 *** (0.028)	-0.090 (0.145)
<i>Education</i>					
secondary	-0.002 (0.051)	0.065 (0.044)	0.075 ** (0.036)	0.004 (0.036)	0.112 (0.214)
Higher education	0.062 (0.049)	0.127 ** (0.050)	0.060 (0.054)	0.045 (0.044)	-0.046 (0.237)
<i>Number of children</i>					
[0-5] years old	-0.019 (0.029)	-0.070 * (0.040)	-0.105 ** (0.042)	0.002 (0.041)	0.029 (0.152)
]5-15] years old	0.015 (0.018)	0.013 (0.029)	0.018 (0.027)	0.010 (0.025)	0.315 ** (0.131)
<i>Business size (by weekly sales)</i>					
medium (S/.101 to S/.500)	-0.052 (0.041)	-0.032 (0.050)	-0.016 (0.047)	-0.050 (0.040)	-0.190 (0.200)
large (over S/.500)	-0.010 (0.060)	-0.048 (0.058)	-0.041 (0.050)	-0.068 (0.057)	0.210 (0.222)
Very interested in training	0.054 *** (0.021)	0.025 (0.028)	0.035 (0.027)	0.043 * (0.023)	0.014 (0.111)
<i>Attitudes (self-reported)</i>					
risk prone	0.010 (0.031)	0.043 (0.044)	0.063 * (0.036)	0.064 * (-0.034)	0.314 ** (0.138)
impatient	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.009 *** (0.003)
independent (dislikes orders)	-0.038 (0.036)	0.029 (0.040)	0.006 (0.044)	0.026 (0.032)	-0.579 *** (0.112)
persistant	-0.047 (0.052)	0.003 (0.077)	-0.012 (0.078)	0.029 (0.093)	-0.647 *** (0.042)
innovator	-0.003 (0.066)	-0.006 (0.087)	-0.005 (0.065)	-0.016 (0.085)	0.392 *** (0.144)
driven	-0.065 (0.088)	0.125 (0.086)	0.001 (0.114)	0.077 (0.086)	0.499 *** (0.034)
<i>Business dependence</i>					
Medium	-0.002 (0.036)	-0.035 (0.041)	-0.019 (0.036)	-0.070 (0.043)	0.129 (0.221)
High	-0.023 (0.066)	0.028 (0.041)	0.010 (0.044)	-0.065 (0.041)	0.434 (0.288)
<i>Distance</i>					
Different zone	-0.036 (0.082)	-0.131 (0.083)	-0.115 ** (0.072)	-0.066 (0.105)	-0.341 (0.332)
# observations	1414	597	392	317	139

Notes: All regressions include district and business activity fixed effects. Also, regressions include clusterization by 34 zones. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Intention to Treat (ITT) effects – business results
(standard errors in parenthesis)

	# de obs.	Control at FU (1)	Treatment at FU (2)	No covariates (3) = (2)-(1)	with covariates (4)	GT (5)	GT+TA (6)	P-value (6)-(5)
Monthly sales (log)								
Last week	1547	5.275	5.427	0.152 * (0.082)	0.141 ** (0.069)	0.087 (0.087)	0.186 *** (0.065)	0.209
Excelent month	1544	7.200	7.347	0.147 (0.088)	0.121 (0.075)	0.058 (0.092)	0.168 ** (0.071)	0.176
Normal month	1536	6.801	6.950	0.149 * (0.074)	0.154 *** (0.053)	0.101 (0.069)	0.203 *** (0.059)	0.187
Bad month	1535	6.167	6.357	0.190 ** (0.084)	0.159 ** (0.072)	0.106 (0.087)	0.190 *** (0.069)	0.285
Capital (log)	1623	5.97	5.986	0.016 (0.189)	0.074 (0.154)	0.052 (0.154)	0.042 (0.198)	0.958
Employment								
Number of total workers	1623	0.556	0.452	-0.104 (0.063)	-0.085 (0.050)	-0.089 (0.069)	-0.095 (0.070)	0.812
Number of non-family workers	1623	0.229	0.156	-0.073 (0.046)	-0.065 (0.052)	-0.068 (0.055)	-0.063 (0.053)	0.903
Productivity residual								
Last week	1547	0.054	0.171	0.117 ** (0.045)	0.077 * (0.043)	0.075 * (0.044)	0.081 (0.054)	0.907
Normal month	1536	0.084	0.222	0.138 *** (0.048)	0.107 ** (0.043)	0.095 ** (0.043)	0.122 * (0.061)	0.656

Notes: All standard errors are clustered at zone (34 zones). Regressions in columns (4)-(6) include zone's fixed effects, the value of the dependent variable at BL and controls such as business activity, business size, age and schooling of the eligible female

Table 6: Intention to Treat (ITT) effects – business practices and associativity

(standard errors in parenthesis)

	# de obs.	Control at FU (1)	Treatment at FU (2)	No covariates (3) = (2)-(1)	with covariates (4)	GT (5)	GT+TA (6)	P-value (6)-(5)
Business Practices								
Tax formality	1624	0.132	0.127	-0.005 (0.022)	-0.001 (0.016)	-0.008 (0.017)	0.005 (0.021)	0.524
Financing strategies business vs household								
Paid fixed salary to herself	1623	0.056	0.071	0.015 (0.013)	0.018 (0.013)	0.018 (0.015)	0.019 (0.014)	0.988
Taking money/products of the business	1624	0.776	0.762	-0.014 (0.019)	-0.026 (0.021)	-0.030 (0.023)	-0.019 (0.026)	0.649
Keeping records of business activities								
sales	1623	0.238	0.263	0.025 (0.022)	0.032 (0.023)	0.019 (0.026)	0.044 * (0.025)	0.303
withdrawals	1623	0.168	0.180	0.012 (0.023)	0.022 (0.023)	0.020 (0.021)	0.024 (0.028)	0.846
other payments	1623	0.063	0.037	-0.026 ** (0.011)	-0.015 (0.010)	-0.022 ** (0.009)	-0.005 (0.011)	0.020
Innovations in business activities								
Started new business last year	1624	0.121	0.124	0.003 (0.020)	0.003 (0.021)	0.014 (0.024)	-0.006 (0.022)	0.288
Stop any business operation - last two years	1624	0.157	0.173	0.016 (0.020)	0.032 (0.020)	0.045 * (0.025)	0.021 (0.018)	0.197
Identify problems with business - last year	1623	0.630	0.614	-0.016 (0.024)	-0.024 (0.022)	-0.013 (0.025)	-0.036 (0.031)	0.510
Planned innovations in her business - last year	1623	0.753	0.769	0.016 (0.022)	0.011 (0.022)	-0.008 (0.024)	0.026 (0.026)	0.133
Executed innovations in her business - last year	1623	0.693	0.715	0.022 (0.024)	0.025 (0.022)	0.006 (0.026)	0.038 (0.024)	0.228
Participation in business related associations								
Participates	1624	0.105	0.142	0.037 ** (0.017)	0.054 *** (0.017)	0.033 ** (0.015)	0.075 *** (0.024)	0.034
# in which she participates	1624	0.112	0.153	0.041 ** (0.019)	0.060 *** (0.020)	0.037 ** (0.017)	0.083 *** (0.029)	0.055

Notes: See notes to table 5.

Table 7: ITT effects – Aggregate standardized indexes for business results and practices by sub-groups

(standard errors in parenthesis)

	Business Productivity				Business sales				Business practices				Associativity		
	# de obs.	GT (1)	GT+TA (2)	P-value	# de obs.	GT (3)	GT+TA (4)	P-value	# de obs.	GT (5)	GT+TA (6)	P-value	GT (7)	GT+TA (8)	P-value
Full sample	1512	0.075 (0.044)	0.100 (0.057)	* 0.650	1481	0.049 (0.056)	0.126 (0.047)	** 0.161	1623	0.010 (0.015)	0.050 (0.015)	*** 0.012	0.033 (0.015)	** 0.075 (0.024)	*** 0.034
Education															
Non - higher education	1154	0.078 (0.057)	0.051 (0.059)	0.627	1130	0.082 (0.058)	0.114 (0.057)	* 0.519	1242	-0.005 (0.019)	0.033 (0.020)	0.011	0.035 (0.017)	* 0.065 (0.023)	*** 0.151
Higher education	358	0.066 (0.077)	0.273 (0.113)	** 0.111	351	-0.048 (0.128)	0.175 (0.088)	* 0.065	381	0.062 (0.058)	0.111 (0.046)	** 0.355	0.029 (0.026)	0.112 (0.055)	** 0.118
P-value diff		0.912	0.060			0.355	0.583			0.324	0.171		0.856	0.390	
Business size for sales - median															
Minus than weekly S/. 250	756	0.094 (0.054)	* 0.137 (0.089)	0.593	740	0.101 (0.084)	0.158 (0.090)	* 0.442	806	0.004 (0.033)	0.036 (0.029)	0.238	-0.004 (0.020)	0.052 (0.026)	* 0.034
Over weekly S/. 250	756	0.059 (0.056)	0.076 (0.068)	0.793	741	-0.002 (0.082)	0.104 (0.051)	* 0.118	817	0.018 (0.021)	0.075 (0.030)	** 0.006	0.069 (0.022)	*** 0.100 (0.032)	*** 0.323
P-value diff		0.576	0.592			0.398	0.627			0.775	0.447		0.020	0.152	
Entrepreneurial attitude index															
Low	550	0.107 (0.069)	0.062 (0.098)	0.659	536	0.149 (0.065)	** 0.185 (0.075)	** 0.582	588	0.034 (0.039)	0.049 (0.036)	0.739	0.027 (0.026)	0.056 (0.050)	0.442
Medium	575	0.037 (0.072)	0.076 (0.065)	0.527	564	-0.006 (0.094)	0.077 (0.100)	0.323	618	0.007 (0.043)	0.039 (0.043)	0.158	0.059 (0.027)	** 0.084 (0.029)	*** 0.458
High	387	0.083 (0.098)	0.193 (0.104)	* 0.413	381	-0.020 (0.133)	0.115 (0.107)	0.294	417	-0.024 (0.046)	0.065 (0.046)	0.023	0.004 (0.030)	0.088 (0.040)	** 0.014
P-value diff (Medium - Low)		0.500	0.894			0.197	0.456			0.702	0.869		0.427	0.657	
P-value diff (High - Low)		0.828	0.397			0.166	0.529			0.382	0.823		0.564	0.596	
P-value diff (High - Medium)		0.724	0.272			0.936	0.814			0.670	0.732		0.211	0.932	

Notes: See notes to table 5.

Table 8: ITT effects – Credit activity of main business

(standard errors in parenthesis)

	# de obs.	Control at FU (1)	Treatment at FU (2)	No covariates (3) = (2)-(1)	with covariates (4)	GT (5)	GT+TA (6)	P-value diff (7)
# of loans								
Requested loans - all sources	1623	0.538	0.664	0.126 *** (0.041)	0.103 ** (0.041)	0.105 * (0.060)	0.100 (0.067)	0.958
Approved loans - all sources	1623	0.538	0.664	0.126 *** (0.041)	0.101 ** (0.041)	0.104 * (0.061)	0.099 (0.067)	0.958
From formal source	1624	0.269	0.242	-0.027 (0.024)	-0.039 * (0.021)	-0.017 (0.026)	-0.058 ** (0.025)	0.155
From bank	1624	0.193	0.177	-0.016 (0.018)	-0.025 (0.016)	-0.006 (0.022)	-0.043 * (0.021)	0.220
From Caja- EDPYME	1624	0.076	0.065	-0.011 (0.012)	-0.013 (0.013)	-0.011 (0.015)	-0.014 (0.015)	0.849
From informal source	1624	0.200	0.254	0.054 ** (0.021)	0.062 *** (0.021)	0.051 ** (0.025)	0.070 *** (0.025)	0.496
From "Junta"	1624	0.078	0.131	0.053 *** (0.015)	0.064 *** (0.016)	0.053 *** (0.015)	0.076 *** (0.021)	0.202
From relative, friend	1624	0.103	0.098	-0.005 (0.016)	-0.010 (0.015)	-0.014 (0.020)	-0.010 (0.016)	0.857
From NGO	1624	0.011	0.016	0.005 (0.006)	0.008 (0.006)	0.011 * (0.006)	0.005 (0.006)	0.152
From Other	1624	0.072	0.067	-0.005 (0.015)	-0.007 (0.015)	-0.010 (0.017)	-0.007 (0.016)	0.879
With some colateral	1623	0.137	0.142	0.005 (0.020)	0.003 (0.021)	0.011 (0.022)	0.001 (0.026)	0.648
With property title as colateral	1623	0.070	0.067	-0.003 (0.016)	-0.007 (0.016)	0.000 (0.016)	-0.011 (0.020)	0.510
Total business debt - any source								
Loan size (nuevos soles)	1623	1658.4	1486.3	-172.1 (275.0)	-210.6 (250.0)	-67.5 (306.0)	-362.8 (258.0)	0.234
From formal source	1623	1347.0	1212.8	-134.1 (242.4)	-170.6 (251.6)	-93.1 (294.5)	-270.4 (260.9)	0.404
From informal source	1623	311.4	273.5	-37.9 (93.5)	-19.8 (91.6)	15.0 (95.0)	-54.3 (92.8)	0.141
Default	1624	0.022	0.017	-0.005 (0.008)	0.000 (0.007)	0.004 (0.009)	-0.004 (0.007)	0.285

Notes: All standard errors are clustered at zone (34 zones). Regressions in columns (4)-(6) include zone's fixed effects, the value of the dependent variable at BL and controls such as business activity, business size, age and schooling of the eligible female

Table A. 1: Description of variables used in the analysis

Variable	Description
Business Results	
Sales	
Last week sales (log)	Logarithm of main business' sales in the week preceding each survey.
Excelent month sales (log)	Logarithm of main business' sales in an excelent month.
Normal month sales (log)	Logarithm of main business' sales in a good month.
Bad month sales (log)	Logarithm of main business' sales in a bad month.
<i>Business sales index</i>	Standarized index about business sales calculated following Kling, Liebman and Katz (2007) as was described in section 3. Includes all four sales variables above mentioned.
Capital (log)	Logarithm of nuevos soles values of main business' actives
Employment	
Number of total workers	Number of workers in the main business (not including eligible women)
Number of non-family workers	Number of workers in the main business that are not household members
Productivity	
Last week	Residual calculated from the estimation of last week sales as a function of capital (value of business assets) and labour (total number of workers, including eligible women).
Normal month	Residual calculated from the estimation of normal month sales as a function of capital (value of business assets) and labour (total number of workers, including eligible women).
<i>Productivity index</i>	Standarized index about business sales calculated following Kling, Liebman and Katz (2007) as was described in section 3. Includes both productivities variables above mentioned.
Business Practices	
Tax formality	Binary variable equal to one if elegible woman has a tax ID number
Financing strategies business vs household	
Paid fixed salary toherself	Binary variable equal to one if elegible woman pays herself a fixed salary
Taking money/products from the business	Binary variable equal to one if elegible woman takes money or products from the business
Keeping records	
Keeping record of sales	Binary variable equal to one if elegible woman records sales in a registry or notebook
Keeping record of withdrawals	Binary variable equal to one if elegible woman records her withdrawals (money or products) in a registry or notebook
Keeping records of payments	Binary variable equal to one if elegible woman records payments to workers that are not hh members in a registry or notebook

(... continue)

Variable	Description
Business Practices	
Innovations in business activities	
Started new business last year	Binary variable equal to one if eligible woman started a new business in the 12 months prior to the survey
Stop any business operation - last two years	Binary variable equal to one if the eligible woman closed a business in the last two years
Identify problems with business	Binary variable equal to one if eligible woman identified problems with her business in the last two years
Planned innovations in her business	Binary variable equal to one if eligible woman planned innovations to her business in the last year
Executed innovations in her business	Binary variable equal to one if eligible woman executed innovations in her business in the last year
<i>Business practices index</i>	Standardized index about business practices calculated following Kling, Liebman and Katz (2007) as was described in section 3
Associativity	
participate in an association	Binary variable equal to one if eligible woman participates in a producers' association savings group or investment group (SPI)
# of associations	# of such organizations in which eligible woman participates
Business Credits	
Number of loans	
# of requested loans - all sources	# of requested loans from informal and formal sources
# of approved loans - all sources	# of approved loans from informal and formal sources
From formal source	# of approved loans from formal source for the business last year
From bank	# of approved loans from a bank for the business last year
From Caja-EDPYME	# of approved loans from a Caja or EDPYME for the business last year
From informal source	# of approved loans from informal source for the business last year
From "Junta"	# of approved loans from a "Junta" (group of entrepreneurs) for the business last year
From relative friend	# of approved loans from a relative or friend for the business last year
From NGO	# of approved loans from a NGO for the business last year
From Other source	# of approved loans from other informal source for the business last year
With some colateral	# of approved loans in which eligible woman gave a colateral for the business credit
With property title as a colateral	# of approved loans in which eligible woman gave her property title as a colateral for the business credit

(... continue)

Variable	Description
<i>Business Credits</i>	
<i>Indebtedness - any source</i>	
Loan size (nuevos soles)	sum of the loan amounts of the last four loans, any source, for business
From formal source	sum of the loan amounts of the last four loans, formal source, for business
From informal source	sum of the loan amounts of the last four loans, informal source, for business
<i>Default</i>	Binary variable equal to one if eligible woman reported having failed to make a loan payment during last year
<i>Risk proneness and time discounting</i>	
Risk prone	Binary variable equal to one if eligible woman chose one of the hypothetical lotteries to the sure gift (expected value of offered lotteries went from 2-5 times the amount of the sure gift)
impatient (discount)	Amount (soles) of the discount the eligible woman is willing to accept to receive a hypothetical prize today instead of 30 days from now
<i>Entrepreneurial attitudes</i>	
Independent (dislikes orders)	Binary variable equal to one if eligible woman selfreports that she dislikes taking orders from others
Innovator	Binary variable equal to one if eligible woman selfreports that she is always the one bringing new ideas
Persistent	Binary variable equal to one if eligible woman selfreports as not quitting before plans are fulfilled
Driven	Binary variable equal to one if eligible woman selfreports that she is always looking to improve
<i>Entrepreneurial attitudes index</i>	Standardized index about Entrepreneurial attitudes calculated following Kling, Liebman and Katz (2007) as was described in section 3

Table B. 1: Family participation in beneficiary's main business
(standard errors in parenthesis)

	Beneficiary	Other adults		Children		Total		
		Male	female	7-13 years male	female	14-17 years male	female	
Hours per week								
Work family business	48,3 (27,42)	11,7 (24,99)	10,7 (22,19)	1,6 (7,01)	2,3 (8,96)	4,9 (13,53)	6,1 (14,36)	85,5
Jobs outside home	4,0 (13,66)	33,6 (29,95)	17,1 (25,29)	0,3 (3,54)	0,2 (2,80)	2,1 (9,65)	1,4 (8,84)	58,7
Household chores	22,2 (13,20)	5,3 (8,16)	16,5 (15,27)	5,6 (6,60)	6,7 (7,25)	8,1 (13,55)	7,9 (10,79)	72,4
Studies	0,5 (3,89)	3,0 (9,90)	5,0 (12,32)	20,9 (17,56)	21,1 (16,60)	18,5 (17,81)	18,2 (17,86)	87,2
All activities	75,1	53,6	49,3	28,3	30,3	33,7	33,5	303,9
% by activity								
Work family business	0,61 (0,28)	0,19 (0,36)	0,17 (0,30)	0,05 (0,18)	0,06 (0,17)	0,11 (0,25)	0,12 (0,24)	
Jobs outside home	0,05 (0,18)	0,58 (0,45)	0,30 (0,40)	0,02 (0,13)	0,02 (0,11)	0,05 (0,20)	0,03 (0,15)	
Household chores	0,33 (0,23)	0,16 (0,28)	0,42 (0,38)	0,33 (0,38)	0,34 (0,36)	0,35 (0,35)	0,44 (0,36)	
Studies	0,01 (0,15)	0,08 (0,24)	0,11 (0,26)	0,60 (0,41)	0,60 (0,39)	0,49 (0,40)	0,41 (0,38)	
All activities	1,01	1,00	1,00	1,00	1,00	1,00	1,00	
# Observations	1963	2663	1430	526	504	361	369	7816

Table B. 2: Attitudes (self-reported)
(standard errors in parenthesis)

	Control (1)	GT (2)	GT+TA (3)	(2) - (1)	(3) - (1)	(3) - (2)
<i>Risk proneness and time discounting</i>						
risk prone	0.381 (0.036)	0.346 (0.022)	0.356 (0.026)	-0.035	-0.025	0.010
impatience (discount)	16.970 (1.356)	18.326 (1.329)	18.160 (1.334)	1.357	1.190	-0.167
<i>Entrepreneurial attitude</i>						
Independent (dislikes orders)	0.327 (0.030)	0.366 (0.023)	0.342 (0.022)	0.038	0.014	-0.024
Innovator	0.897 (0.015)	0.909 (0.016)	0.922 (0.012)	0.012	0.025 *	0.013
Persistent	0.906 (0.015)	0.914 (0.011)	0.922 (0.008)	0.009	0.016	0.007
Driven	0.948 (0.010)	0.952 (0.009)	0.964 (0.008)	0.004	0.016 **	0.012
Aggregate standardized index	0.001 (0.057)	0.033 (0.053)	0.037 (0.040)	0.032	0.037	0.005
Low level (%)	0.375 (0.037)	0.352 (0.031)	0.330 (0.029)	-0.024	-0.045 *	-0.021
Medium level (%)	0.461 (0.028)	0.463 (0.027)	0.506 (0.024)	0.002	0.045 *	0.043
High level (%)	0.164 (0.020)	0.186 (0.021)	0.164 (0.018)	0.022	0.000	-0.022
# Observations	565	1414	1979			

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%;

Table C. 1: Robustness check of mean standardized ITT effects – Double difference vs T-C at FU

	# obs.	Double Diff. FU1				Treatments - Control (T-C)			
		Treated (1)	GT (2)	GT + TA (3)	P-value (3)-(2)	Treated (4)	GT (5)	GT + TA (6)	P-value (6)-(5)
Productivity residual	3024	0.118 * (0.061)	0.033 (0.073)	0.205 ** (0.078)	0.008	0.085 * (0.043)	0.075 (0.044)	0.100 * (0.057)	0.650
Business sales	2927	0.069 (0.070)	-0.005 (0.089)	0.144 * (0.077)	0.133	0.089 * (0.044)	0.049 (0.056)	0.126 ** (0.047)	0.161
Business practices	3236	0.038 (0.029)	0.012 (0.033)	0.064 * (0.032)	0.046	0.031 ** (0.013)	0.010 (0.015)	0.050 *** (0.015)	0.012
Business associativity	3248	0.008 (0.034)	-0.010 (0.030)	0.027 (0.043)	0.072	0.054 *** (0.017)	0.033 ** (0.015)	0.075 *** (0.024)	0.034

Notes: Double difference estimates include individual fixed effects and controls such as business activity, business size, age and schooling of the eligible female. The T-C estimates are estimated as in table 8. All standard errors are clustered at zone (34 zones).

Table C. 2: Mean Standardized ITT Effects Under Varying Missing Data Assumptions

Missing data scenarios		Productivity residual	Business Sales	Business practices	Business Associativity
# of observations		1,975	1,975	1,975	1,975
Lower Bounds	(1)	-0.792 *** (0.087)	-0.781 *** (0.078)	-0.566 *** (0.055)	-0.165 *** (0.024)
	(2)	-0.440 *** (0.063)	-0.358 *** (0.044)	-0.398 *** (0.043)	-0.161 *** (0.024)
	(3)	-0.003 (0.040)	-0.007 (0.036)	-0.074 *** (0.015)	0.017 (0.014)
	(4)	0.075 * (0.038)	0.064 * (0.034)	-0.014 (0.012)	0.036 ** (0.013)
Average treatment effect	(5)	0.085 * (0.043)	0.089 * (0.044)	0.031 ** (0.013)	0.054 *** (0.017)
Upper Bounds	(6)	0.180 *** (0.036)	0.158 *** (0.033)	0.065 *** (0.011)	0.060 *** (0.013)
	(7)	0.258 *** (0.035)	0.229 *** (0.033)	0.124 *** (0.012)	0.079 *** (0.014)
	(8)	0.533 *** (0.051)	0.447 *** (0.036)	0.353 *** (0.037)	0.208 *** (0.024)
	(9)	0.958 *** (0.065)	0.967 *** (0.063)	0.562 *** (0.047)	0.214 *** (0.022)

(1) imputes minimum value of each variable in the non-attributed treatment distribution to

(2) same as (1) except it assumes non-reversal for attrited in treatment group.

(3) imputes mean minus 0.25 s.d. of the non-attributed treatment distribution to attrited in treatment group, mean plus 0.25 s.d. of the non-attributed control distribution to attrited in

(4) imputes mean minus 0.10 s.d. of the non-attributed treatment distribution to attrited in treatment group, mean plus 0.10 s.d. of the non-attributed control distribution to attrited in

(5) mean standardized treatment effect on the non-attributed (column 4 in table C.1).

(6) imputes mean plus 0.10 s.d. of the non-attributed treatment distribution to attrited in treatment group, mean minus 0.10 s.d. of the non-attributed control distribution to attrited in

(7) imputes mean plus 0.25 s.d. of the non-attributed treatment distribution to attrited in treatment group, mean minus 0.25 s.d. of the non-attributed control distribution to attrited in

(8) same as (9) except it assumes non-reversal for attrited in control group.

(9) imputes maximum value of each variable in the non-attributed treatment distribution to attrited in treatment group, minimum value of non-attributed control distribution to attrited in