

Do Gender and Business Trainings Affect Business Outcomes?

Experimental Evidence from Vietnam

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Abstract: We use an RCT to evaluate the impact of a gender and business training for female clients of a microfinance institution in northern Vietnam, and consider the impact on business knowledge, practices and outcomes, as well as firm entry and exit decisions. In addition, we vary the nature of the intervention by inviting husbands to participate in the trainings for a subsample of the treated centers. To gauge both short and medium-term effects, we combine data from two separate post-interventions surveys. We find evidence of economically substantive impacts on knowledge, practices and outcomes, and on the extensive margin (entry and exit). We also document that it takes time for the “downstream” outcomes of the trainings to materialize – while we find evidence of medium-term effects, no such evidence exists for the short-term. Inviting husbands to participate in the trainings does not affect any of our knowledge or practice measures, but we document weak evidence for differential impact on profits.

Keywords: Microfinance, Finance-Plus, evaluation of training interventions.

JEL Codes: D1, G2, O1.

Acknowledgements: we would like to thank 3IE (OW3.1132: Business training services) and the Netherlands Organisation for Scientific Research (N.W.O. grant # 453-10-001) for financial support.

1. Introduction

Not so long ago, microfinance was celebrated as one of the more promising development tools. This situation has changed in recent years. New theories question the usefulness of microcredit to raise incomes of poor people (e.g. Banerjee et al. 2013), and empirical evidence tends to reject the hypothesis that simply providing access to capital to the poor will lift them out of poverty. For example, Banerjee et al. (2015) summarize the results from randomized controlled trials (RCTs) in six countries on four continents (Bosnia, Ethiopia, India, Mexico, Morocco and Mongolia). While they document some (mixed and generally weak) evidence of positive effects of microcredit on various relevant outcomes – including entrepreneurial activity, business size, and female empowerment – they conclude microcredit does not have “transformative effects” and generally fails to help the poor to raise their incomes above subsistence levels. This conclusion is consistent with evidence from other countries, including Sri Lanka (De Mel et al., 2008, 2009), Ghana (Fafchamps, 2011), and Tanzania (Berge et al. 2014). Interestingly, the impact of access to microfinance appears to be heterogeneous. Various researchers observe that impact varies with gender (Berge et al. 2014, De Mel et al. 2009, Giné and Mansuri 2014; Bruhn and Zia, 2013), and others have pointed at the importance of human capital as a key complement of financial capital (e.g., Bloom et al., 2010; Bruhn et al., 2010; Saringanza et al., 2015).

In response, many microfinance institutions (MFIs) have embraced business development and financial literacy trainings as a key component of their expansion strategy. This is occasionally referred to as the Finance-Plus strategy. Evaluating the impact of such trainings is complicated by selection effects. Demand-side bias emerges when better (or worse) entrepreneurs self-select into treatment, or when individuals who know they stand to gain most from participating in a training choose to participate. Supply-side bias arises when training agencies target the best entrepreneurs, focus on the most promising sectors, or choose to

operate in regions with the most suitable geographical conditions. Likewise, bias emerges when they target the least promising individuals, for distributional reasons. While the evidentiary base is still thin, several researchers have adopted an RCT approach to tackle these concerns. The mounting evidence, however, remains ambiguous and mixed (e.g., Berge et al. 2014; Bjorvatn and Tungodden 2010; Giné and Mansuri, 2014; Karlan and Valdivia 2022).¹ Most studies conclude that especially women do not gain much from attending business trainings.

This emerging literature is summarized by McKenzie and Woodruff (2014). While most studies confirm that training programs affect knowledge levels, there is much weaker evidence for the hypothesis that it also affects business practices. Some evaluations, but not all, find that trainings affect firm survivorship or start-up rates. Evidence for the hypothesis that trainings affect firm profits or entrepreneurial income is weakest. However, and importantly, McKenzie and Woodruff (2014) point to various shortcomings of existing studies, compromising the ability of these studies to find impact. For example, most studies tend to suffer from low statistical power due to small sample sizes combined with highly variable outcome variables and heterogeneous firms. Most studies also focus on impacts in the “short term”—often endline data are collected within months after completing the training. Arguably, many “downstream effects” will materialize later. They also argue in favor of analyzing improved outcome measures, and propose that future analyses should seek to test which elements of content matter most for transforming the lives of micro-entrepreneurs.

In this paper we evaluate the impact of a Gender and Business Training provided to female clients of the *Tao Yeu May* (TYM) Fund, a large microfinance institution in the North of Vietnam. We use an RCT design to measure effects on business knowledge, business

¹ According to Berge et al. (2012) these estimates of impact are best viewed as upper bounds of what can be achieved when research-led interventions are “scaled up” to the (sub)national level, and are no longer managed by local organisations or researchers.

practices and business results. We also estimate the impact of the intervention on business entry and business exit. Minding the various challenges to the interpretation of results in earlier studies, we used a sample that is sufficiently large to detect relatively modest effect sizes, and measured impact twice after completing the training (so as to gauge the “dynamics” of impact—see also Berge et al. 2012). We also distinguish between different outcome measures (associated with different economic activities) and try to probe the importance of varying the content of the training by introducing an innovation. Specifically, and responding to recent suggestions in the literature, for a random sub-sample of centers we asked women to bring their husbands along to participate in the training (e.g., Rahman et al. 2011, World Bank 2011). We incentivized men to participate in the trainings, but did not expect all men to actually participate. Nevertheless, the participation of (some) men was expected to raise the quality of the trainings, as they could share their knowledge with female clients – changing the nature and depth of discussions. Participating men may also be affected by the training themselves. In particular, the gender module might alter their outlook on gender inequality, affecting female entrepreneurship along multiple dimensions.²

We compute both intention to treat (ITT) and local average treatment effects (LATE),³ and find that participating in the training has large and robust effects on knowledge and business practices of female clients. “Downstream” impacts on profits, profit margins, and sales are weaker, not surprisingly, but we do document some positive effects. Notably, we find some evidence that medium-term profits increase (even for agriculture—an economic activity not targeted by the intervention). Importantly, impact changes time – there is no positive profit or sales response shortly after finishing the intervention. Hence, the training’s impact becomes

² For example, many businesswomen face time constraints and are limited in their (spatial) movements because they are responsible for the bulk of the housework (Giné and Mansuri 2014, Berge et al. 2014). Many business women also mention that key (household and business) decisions are made by their spouses. When men participate in trainings, such external constraints may be relaxed – improving female business outcomes.

³ Since there is only one-sided non-compliance in our experiment (see below), the estimated LATE parameter is also known as the effect of *Treatment on the Treated* (TOT).

stronger over time, as firms have been able to incorporate some of the new insights into practice. Hence, like Berge et al. (2014) and Gine and Mansuri (2014), we conclude that business trainings can have large effects on business outcomes (and possibly on poverty in the longer run). However, unlike these earlier studies we also find that trainings “work” for women. Moreover, we don’t find that impact dissipates over time – the reverse seems true. Existing evidence for Tanzania (Berge et al. 2014) and Pakistan (Gine and Mansuri 2014) reveals that benefits are gender-dependent and concentrated among male clients. Our study, focusing on female microfinance clients in Vietnam, finds that women can also benefit from trainings.⁴ This points to local culture as an important yet often-times overlooked determinant of the impact of development interventions. Finally, we do not find that inviting husbands to participate in the trainings affects knowledge or practices, and we only find weak evidence for the hypothesis that inviting husbands affects outcomes (profits).

This paper is organized as follows. In section 2 we outline the background (context), introduce the intervention, and briefly discuss the (implicit) theory of change applied by the MFI. In section 3 we will introduce and discuss our data, and show that randomization “worked” in the sense that we obtained a dataset that appears balanced on observables across treatments and control. We also present our simple identification strategy, based on cross-section OLS estimators, and panel (difference-in-differences) estimator. Results are presented in section 4. We consider both intention to treat and local average treatment effects, and distinguish between short-term and medium-term effects of the intervention separately. Section 5 concludes.

⁴ Some studies focusing on female entrepreneurs do find positive effects of training on business outcomes (Calderon et al. 2012; Valdivia, 2013). According to Calderon et al. (2012) business training increases profits, revenues and the amount of clients served due to improvements in business knowledge and practices. Valdivia (2013) concludes that women with general business training are more likely to stop losing business activities. Women receiving personal assistance plan and execute more innovations, resulting in an increase in sales.

2. Context and intervention

We conduct our study in northern Vietnam, a region characterized by rapid economic growth, and the emergence of a (middle) class of entrepreneurs. Vietnam is characterized as a deeply patriarchal society, with traditional gender norms based on Confucianism and Buddhism (Duvvury et al., 2012). While, according to the Vietnam Country Gender Assessment (VCGA, World Bank, 2011), Vietnam has made progress in terms of gender equality, a serious gender gap remains. According to the 2009 Labor Force Survey (LFS), the employment status of no less than 69 percent of women is “vulnerable,” compared to only 54 percent of men (ILO, 2010). Some 36 percent of men and 43 percent of women are classified as unskilled workers. Hence, Vietnam is an appropriate country to study the impact of microfinance in relation to gender issues.

We collaborate with TYM fund to evaluate the impact of a gender and business training to poor female clients. The TYM fund is the largest microfinance organization in northern Vietnam – it started as a microfinance project of the Vietnam Woman Union in 1989, and has been in operation in its current form since 1992. Its main mission is to improve the quality of life and the status of poor women and their families by providing them with access to financial and non-financial services. This is achieved by three financial services: loans, savings opportunities, and mutual assistance funds. As of September 2011, TYM is active in 10 poor areas in northern Vietnam, working through 43 branches. It established 1,450 training centers, each serving 30–40 female clients, for a total of approximately 48,000 female clients. In return for receiving financial and non-financial services, women must become members of a lending center. All the services are provided at weekly or monthly center meetings, in which loan officers assess loan application forms and collect repayments and savings. Center meetings also allow TYM members to exchange experiences and information about production and

business, as well as enable TYM staff and external experts to disseminate knowledge on family, gender, and other issues. Finally, the centers host a range of social activities.

We conducted our study in four TYM branches: one in HaNoi and three in Vinh Phuc. Most of our sample characteristics are comparable to the country average. For example, the percentages of rural and urban population are similar, as is the share of households primarily involved in agriculture-related activities (about 70%). Economic developments in Vinh Phuc, a booming region, are also rather comparable with developments in other regions of Vietnam, as are geographical conditions (a mixture of plain, midland, and mountainous regions). Moreover, and like other provinces in Vietnam, Vinh Phuc and Ha Noi, face many social problems, including high poverty rates for women. Therefore, we expect our main findings are rather representative for most of Vietnam.

We evaluate the impact of a gender and business (G&B) training intervention offered to female clients of TYM. The trainings provided through TYM fund are based on the Gender and Entrepreneurship Together (GET) Ahead for Women in Enterprise Training Package and Resource Kit, designed by the International Labor Organization (ILO). The standard content has been slightly modified to better fit the Vietnamese context. The first module of the program covered basics on gender and entrepreneurship, promotion of equality between men and women, and the life cycle of people and enterprises. The second module considered business woman and her self-confidence. The third module focused on business woman and her environment, self-development and business mapping. The fourth module discussed business projects, including business ideas, opportunities and challenges. The fifth module covered marketing and sales. The sixth module covered calculations and aspects of financial literacy. The seventh module focused on managing cash. The eighth module discussed how to record accounts receivable and accounts payable. The ninth and final module covered how to calculate cost of production and cost of goods sold. The theory of change, as envisaged by

TYM, is very simple: By increasing business knowledge, the training is expected to change business practices – women are expected to implement “innovative” practices such as bookkeeping and separating domestic from firm finance. They are also expected to engage in marketing activities and professionalize their relations with suppliers and clients. In turn, these changes should improve business outcomes (sales and profits). The ultimate downstream impact is that improved business outcomes increases human capital (health and education) and the intra-household bargaining power of both women and girls (daughters of trained clients), but in this paper we do not focus on these long-term and distant impacts.

As mentioned, we use two treatment arms to probe whether inviting husbands to participate in the training is a (scalable) approach to enhance the impact of the training. Importantly, we did not expect every woman to bring her husband along (even if this would have been welcomed). Some husbands are unlikely to participate, even when incentivized, and 18 percent of the clients in our sample are single, widowed, divorced, or separated. Hence, our analysis captures the effect of the presence of (some) husbands—not necessarily one’s own husband—on business knowledge, practices and outcomes. To encourage male participation in the trainings, we offered a fee to participating men. Since we were also interested in better understanding how fees affects male participation, we varied the size of the fee across modules. Specifically, and for simplicity, the fee was diminished “linearly” over time. For the first module we offered 100,00 VND (USD 5), and this amount was lowered by 10,000 VND for all successive modules (so that the fee for participating in the sixth module was 50,000 VND).

Trainings took place during nine monthly center meetings, and each module took 45–60 minutes. Because most TYM clients lacked a strong educational background, the trainers used many support tools, including role play, color cards, and pictures, to help clients understand and remember the content. In addition to the monthly training module, the trainers organized

the possibility of individual sessions to discuss client-specific problems every week. These consultations generally took 15–30 minutes. Some of the staff members at TYM headquarters were trained by ILO about the GET training package. Before the training started, all loan officers in treatment groups attended “training of trainers” courses taught by the TYM headquarters staff. The training was free of charge and voluntary; clients could leave after they made their loan payment and before the training began.

3. Data

We randomly assign credit centers, each with an average of 30 female clients, to one of the two treatment arms or to the comparison group.⁵ Since we randomize the G&B training at the credit center level (to limit spillover effects) we use a cluster sampling approach. The four branches included in this study contain 187 credit centers. We stratify randomization by lending branch, taking similar proportions of treatment and control groups across branches. Due to concerns about non-compliance among husbands (reducing power), we oversampled the treatment groups where husbands were invited. Our design includes 70 credit centers where male partners were invited to join the G&B training (T1), and 31 credit centers for which only female clients were invited (T2). The control groups C includes 86 credit centers. We randomly selected 23 members per center for the interviews. A few centers had fewer than 23 clients, in which case we interviewed all borrowers.

At the baseline, midline and endline we interviewed 4,041, 3826 and 4350 female microfinance borrowers, respectively. To increase sample size for T2, we decided to interview all members per center (30 instead of 23) during the midline. At the midline, 316 “new women” were interviewed. For the three groups, attrition rates between baseline and midline were 13%, 16% and 13%, for T1, T2 and C, respectively. We interviewed 3,412 female

⁵ Our study followed the standard ethical guidelines: before starting we discussed ethical issues with TYM and the Vietnam Woman Union, and obtained ethical approval from the Vietnam Woman Union. We also used “informed consent.”

borrowers across all three waves (where T1 = 1,311; T2 = 549; and C = 1,552). During the endline, we also interviewed (almost all) female borrowers who dropped out as a member from TYM, so that there is almost zero attrition between midline and endline (0.1; 0.0 and 0.2 %, for T1, T2 and C, respectively). These women are included in the analyses. Overall attrition rates are low, compared to most papers in the literature.

We use a logistic regression to study differences in attrition across groups. A dummy for attrition is equal to one if households are not interviewed in at least one of the two follow-up surveys. Since attrition between mid to endline was almost zero, the attrition analyses predominantly refer to attrition between baseline and midline. Table 1, column 1 reveals that attrition is not significantly different between the treatment and control groups (treatment dummy is not significantly different from zero). In terms of observables, however, we find that younger people and people living in Hanoi are more likely to drop out of the study ($p < 0.10$). The Wald test, testing the joint significance of parameters, suggests the parameters estimated in column 1 are jointly insignificant. In the 2nd column of Table 1 we test whether there is a difference in attrition between T1 and T2. Women in treatment group T1 are more likely to drop out of the study ($p < 0.10$) than women from group T2. We now also find that the estimated parameters are jointly significant at the 1% level. To attenuate potential concerns about non-random attrition, we will compute (lower) bounds on our estimates of treatment effects. >>

<< *Insert Table 1 about here* >>

Data collection started in October and November of 2011, with a baseline survey. Selected women received the training between February and October 2012. Midline data, intended to capture “short-term effects” were collected in March and April 2013, or some six months after completing the training (and 15 months after completing the first module). One

full year after completing the intervention (or some 21 months after completing the first module) we organized an additional endline survey to pick up “medium-term effects.” Hence, these data were collected in October and November 2013. We compare short- and medium term effects to learn about the dynamics of impact –whether the impact tapers off over time (as individuals abandon practices, and revert back to pre-training practices) or increases. The impact might increase because trained individuals will have had more time to adopt new practices. In February 2013, we also organized six focus group discussions, as well as in depth interviews with two women from each group to learn about the perceived relevance of the training, and gauge overall satisfaction. In December 2014 some additional focus group discussions and in-depth interviews have been conducted to discuss our main findings with different stakeholders. Baseline values of our dependent and control variables are summarized in Table 2.

<< *Insert Tables 2, 3 and 4 about here* >>

We construct two knowledge indices, called *Business Knowledge 1* and *Business Knowledge 2*. Following Karlan and Valdivia (2011), these indices are the sum of correct answers to a series of business-related questions. *Business Knowledge 1* is based on 16 such questions, asked at the baseline, midline and endline. *Business Knowledge 2* is based on 23 (other) questions, and these questions were only asked during the midline and endline. This obviously implies we cannot use the difference-in-differences estimator for this variable (see below). Details of the questions are available in the online appendix.

We also use survey data to construct four business practice indices: *General Business Practices (GBP)*, *Innovation*, *Marketing*, and *Record Keeping & Planning (Record)*. Data for the first two indices were collected three times: at the baseline, midline and endline. For the other indices we only have midline and the endline values. *GBP* and *Innovation* are based on

the outcomes of a principal component analysis (PCA) on 7 business practices questions. *GBP* is the first component, and *Innovation* is the second component. The “weights” obtained by applying the PCA on baseline questions are used to construct indices for *GBP* and *Innovation* at midline and endline (see for details the online appendix) . The *Marketing* and *Record* indices are calculated similarly. However, in the absence of baseline data, *Marketing* simply refers to the first principal component from a PCA on 13 business questions at midline, and *Record* is the second component. The weights obtained from PCA at midline are used to construct *Marketing* and *Record* indices at endline (again, see the online appendix for details).

We construct different indicators for profits and sales. To distinguish between effects on business and farming activities, we evaluate the impact of the program on business (non-farming) and farming outcomes separately. In the baseline, midline and endline surveys, we asked respondents to report profits and sales of their three main business activities and their three main farming activities. The variables *Agri sales*; *Agri profit*; *Business sales* and *Business profit* refer to summed sales and profits for these most important activities. We also measure sales and profits of the main business activity separately as most respondents indicated they have only one major business activity. We measure sales and profits in the month prior to the surveys (*Sales LM* and *Profits LM*). Moreover, we asked respondents to report sales and profits in normal months. Table 3 presents definitions of all our outcome variables.

To probe whether randomization resulted in “comparable groups” of female clients, we use baseline data and regress our household variables on the treatment dummies. Results are reported in Table 4. Demographic and other baseline variables for the treatment groups are not significantly different from the control group at the baseline. Table 4 also contains several measures of business knowledge, business practices and business results. Most of these variables are also statistically indistinguishable across groups.

We monitored attendance at the training sessions by asking loan officers to keep attendance lists. The average participation rate was about 80% for women. To address issues associated with non-compliance, we will compute both intention to treat (ITT) and local average treatment effects (LATE). Overall, the training content was much appreciated by participating women, and the average score was close to 9 (on a scale from 1 to 10).⁶ The participation rate was much lower for husbands (in treatment 1), and declined from 40% to slightly under 10%. However, there were always some men present in the sessions of the T1 treatment arm. The reason provided by most men for not participating was high opportunity costs (but of course we cannot exclude that some men found the focus on gender issues uninteresting).⁷ In spite of the low participation rate by husbands, both our survey evidence and the focus group discussions confirmed that woman greatly appreciated the attendance of husbands. Our data suggest that male attendance responds to financial incentives, so in future interventions the NGO can increase husband participation by providing sufficient financial compensation.⁸

4. Identification Strategy

We use multiple estimators to evaluate the impact of the training (with and without husbands) on business knowledge, practices, and outcomes. Random assignment occurs at the center level, so we cluster standard errors at the center level in all models. We include (baseline) controls in all specifications to improve precision of our estimates.

4.1 Post-treatment analysis (ITT)

⁶ Yet, when directly asked, only 16% of the women indicated to be willing to pay for the business training.

⁷ However, participating men were positive about the quality and usefulness of the training. Between 87 and 97 percent of those men reported that they learnt something new from the training, and that they applied what they learnt in their own business.

⁸ Since we varied the fee across training modules (albeit not randomly), we can explore to what extent financial compensation affects husbands' take up rates. We estimate a logit model explaining husband attendance, add husband and module dummies, and cluster standard errors at the center level. Our regression results (not shown) reveal that if the fee increases by 10,000 VND (0.5 USD), the take up rate increases by 2.7 percent.

First, we use intention-to-treat (ITT) estimators. We estimate impact at both the midline and endline for both treatment arms separately. We also use two estimators: post-treatment and difference-in-differences analysis. The post-treatment analysis simply regresses (midline and endline) outcomes Y_{ijt} on treatment dummies groups and controls:

$$Y_{ijt} = \beta_0 + \beta_1 T1_{ij} + \beta_2 T2_{ij} + \beta_3 \mathbf{X}_{ij0} + \varepsilon_{ijt} \quad (1)$$

where Y_{ijt} refers to an outcome variable for an individual i in centre j at the midline or endline survey t ; β_0 is a constant, $T1_{ij}$ is a dummy equal to one if training is offered to a woman as well as to her husband (group T1); $T2_{ij}$ is a dummy variable that takes the value of one if the woman is selected to receive business training individually; \mathbf{X}_{ij0} is a vector of baseline controls: age, household size, marital status and region; and ε_{ijt} is an error term. Coefficients of interest are β_1 and β_2 ; The latter estimates the effect of participating in the standard training at the midline (or endline) survey, and the former estimates the effect of training when husbands are invited. The additional effect of inviting husbands is obtained by subtracting β_2 from β_1 .

4.2 Difference-in-differences estimation (ITT)

To control for (time-invariant) unobservables and further improve precision, we estimate a double difference estimator. Time dummies control for time trend effects and dummies per treatment group control for differences before the treatment. The difference-in-differences estimation reads as:

$$Y_{ijt} = \beta_0 + \beta_1 \text{Mid}_t * T1_{ij} + \beta_2 \text{Mid}_t * T2_{ij} + \beta_3 \text{End}_t * T1_{ij} + \beta_4 \text{End}_t * T2_{ij} + \beta_5 T1_{ij} + \beta_6 T2_{ij} + \beta_7 \text{Mid}_t + \beta_8 \text{End}_t + \beta_9 \mathbf{X}_{ijt} + \varepsilon_{ijt} \quad (2)$$

where Mid_t is a dummy equal to one if the observation belongs to the midline survey; and End_t is a dummy for endline data; The coefficients of interest are β_1 , β_2 , β_3 , and β_4 , measuring respectively, the short-term impact for women with participating husbands; the short-term

impact for women without husbands; the medium-term impact for T1 and medium-term effects for T2. We have estimated all models using both balanced and unbalanced panels. The results presented below refer to the unbalanced panel data, but qualitatively similar results are obtained when we use the balanced panel set instead (details available on request).⁹

4.3 Local Average Treatment Effects (LATE)

We also estimate the impact on (a sub-sample of the) treated individuals, namely those females who were enticed to actually participate in the training after receiving the invitation. We adopt an instrumental variable (IV) approach, using assignment to treatment groups (T1 and T2) as an instrument for the percentage of attended training sessions.

$$Z1_{ij} = \alpha_0 + \alpha_1 T1_{ij} + \alpha_2 T2_{ij} + \alpha_3 \mathbf{X}_{ij0} + \varepsilon_{ijt} \quad (3a)$$

$$Z2_{ij} = \alpha_0 + \alpha_1 T1_{ij} + \alpha_2 T2_{ij} + \alpha_3 \mathbf{X}_{ij0} + \varepsilon_{ijt} \quad (3b)$$

$$Y_{ijt} = \beta_0 + \beta_1 \widehat{Z1}_{ij} + \beta_2 \widehat{Z2}_{ij} + \beta_3 \mathbf{X}_{ij0} + \varepsilon_{ijt} \quad (3c)$$

where $Z1_{ij}$ is the participation rate of women in group T1; $Z2_{ij}$ is the participation rate of women in group T2; and where $\widehat{Z2}_{ij}$ and $\widehat{Z1}_{ij}$ are the predicted participation rates. The coefficients of interest are β_1 and β_2 , estimating the effect of women from group T1 and group T2 attending training sessions. We again estimate LATE for midline and endline data separately.

It is important to notice that the (incomplete) attendance of husbands is not captured by this specification. The LATE estimator for treatment group 1 estimates the effect of attending a training in the presence of some men (and not necessarily of the own husband). As an additional result we ask whether the presence of a woman's own husband matters for training outcomes (for example because attending the training affects his preferences and attitudes). For

⁹ An advantage of the balanced model is that the treatments dummies are simply fixed effects (so that it is possible to estimate a household fixed effects model with time dummies—provided no additional controls are included in the model). However, the advantage of the unbalanced panel is that we can include all variables and respondents (less attrition).

this purpose we also did an extra analysis based on two new variables we created: $self_i$ which captures the percentage of the trainings attended by female client i and $husband_i$ which captures the percentage of trainings attended by client i 's husband. Note that $self_i$ equals $Z1_{ij}$ plus $Z2_{ij}$ and thus measures the impact of attending trainings by women, irrespective of whether the women is invited alone or with her husband. The coefficient associated with $husband_i$ measures the additional effect of the percentage of training followed by her husband. In a 2SLS model we next regress $self_i$ and $husband_i$ on the two instrumental variables T1 and T2, and use the predicted values to explain variation in outcomes variables. When estimating these models, we never found that the husband variable entered significantly (results not reported). In other words, the presence of a client's own husband is not correlated with knowledge, practices or profits.

4.4. Logit estimation of business entry and exit (ITT)

Next, we gauge the impact of training on the extensive margin, and estimate the effect of the training (with and without husbands) on the probability of women to start new business activities or stop their main business activity. For this purpose we use a logistic regression:

$$D_{ijt} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 T2_{ij} + \beta_2 T1_{ij} + \beta_3 X_{ijt})}} + \varepsilon_{ijt} \quad (4)$$

where D_{ijt} is a dummy for business start-up (S_{ij}) or business failure (F_{ij}). The coefficients of interest are β_1 and β_2 : the former estimates the effect of training on business start-up and business failure, and the latter estimates the effect of the presence of husbands on women's business entry and exit.

4.5 Probing the theory of change

Finally, we seek to assess the plausibility of the (implicit) theory of change of TYM, namely that trainings build knowledge, which affects practices and business outcomes. To do this, we estimate an IV model where we first regress our first business knowledge indices on the treatment dummies, and then use predicted knowledge levels to explain variation in business practices adopted, and variation in profits:

$$Business\ Knowledge_{ij} = \alpha_0 + \alpha_1 T1_{ij} + \alpha_2 T2_{ij} + \alpha_3 \mathbf{X}_{ij0} + \varepsilon_{ij} \quad (5a)$$

$$Practices_{ij} = \beta_0 + \beta_1 \widehat{Business\ knowledge}_{ij} + \beta_2 \mathbf{X}_{ij0} + \varepsilon_{ij} \quad (5b)$$

$$Profits_{ij} = \beta_0 + \beta_1 \widehat{Business\ knowledge}_{ij} + \beta_2 \mathbf{X}_{ij0} + \varepsilon_{ij} \quad (5c)$$

$$Profits_{ij} = \beta_0 + \beta_1 \widehat{Practices}_{ij} + \beta_2 \mathbf{X}_{ij0} + \varepsilon_{ij} \quad (5d)$$

Note that (5d) considers the link between (predicted) practices and profits.

4.6 Attrition: Lee bounds analysis

While our dataset suffers only from mild attrition, our impact estimates will be biased when attrition is correlated with potential outcomes. To gauge the sensitivity of our results with respect to such bias we compute extreme (lower) bounds for the estimated treatment effects by trimming our dataset (Gerber and Green 2012). We compute so-called Lee bounds to create a credible counterfactual for the subsample of MFI clients that always participates in a survey (regardless of treatment status). More specifically, our control group has the lowest attrition rate (13%) and the T2 group the highest attrition rate (16%). We therefore drop, for each outcome variable, the *bottom* 3% of the (post-treatment) observations of the control group, and redo the analyses using the restricted sample. For example, for *Business Knowledge 1* we dropped all observations of the control group with an index score below 6, and for *Business Knowledge 2* we dropped all observations with index scores below 7. This trimming of the control group depresses the difference between outcomes for the treatment and control group, hence the interpretation of the new impact estimate as a lower bound.

5. Results

Tables 5-7 summarize our estimates of the causal effect of participating in the G&B training on business knowledge, practices and outcomes. These Tables present regression results of the ITT and LATE estimator, based on midline as well as endline data. For those variables where we have collected baseline data, these Tables also contain difference-in-differences results. To economize on space we only report coefficients of interest, and suppress the results for the other covariates (these results are available on request). Table 8 contains the Logit results for the extensive margin, and Tables 9abc consider the theory of change.

<< *Insert Tables 5-7 about here* >>

5.1 Effects of the G&B training on business knowledge

Table 5 demonstrates that the G&B training has a large impact on our measures of business knowledge. For both of our knowledge indices we find that, across estimators, participating in the training increased performance. All results are statistically significant at the 1% level, and are also economically significant – corresponding with approximately 25% of the mean knowledge score (at the baseline) and with more than one full standard deviation of this variable. The Table also reveals that inviting husbands does not matter for knowledge accumulation: the coefficients of the T1 treatment arm are statistically indistinguishable from the coefficients of the T2 treatment arm. Moreover, extending the impact period from 6 to 12 months also does not have a significant effect on the depreciation or accumulation of knowledge. Extreme (lower) bounds for both the ITT and LATE are reported in on-line Appendix 2 (Tables A5-A6). While the estimated coefficients are somewhat smaller than the ones reported in the main text, all estimated treatment effects are significant at the 1% level.

4.2 Effects of the G&B training on business practices

Table 6 summarizes our impact estimates for the adoption of key business practices: record-keeping, marketing efforts, innovation behavior, and general business practices. We again find economically meaningful and statistically significant effects across our estimators. Moreover, these positive results emerge for both our midline and endline datasets. All estimated coefficients are significant at the 1% level, and all impacts exceed one standard deviation of the dependent variable of interest (at the baseline).

Unlike the results for the knowledge indices, we now find an apparent additional effect of extending the impact analysis from six to twelve months. Our endline estimates of impact on business practices are significantly greater than our estimates of impact on business practices at the midline ($p < 0.05$ for all measures), which reflects that adopting new practices takes time. For example, consider our general practices measure. An additional six months delay in impact measurement results in an increase in the index score of approximately 0.8, or almost 60% of a standard deviation (when measured at the baseline). The impact on innovation is even much larger. Hence, these results suggest that limiting the analysis to short-term data, collected within 6 months of the training, would hugely underestimate the true effect of the training. From Table 6 is also clear that inviting husbands does *not* significantly change the effect of training on business practices. In online Appendix 2 we present lower bounds for the ITT and LATE for all business practices; all treatment effects remain significant at the 1% level.

5.3 Effects of the G&B training on business outcomes

Table 7 contains our estimates of the impact of participating in the training on sales and profits. We report outcomes for outcome measures aggregated across all business activities of the client (internalizing any spillover effects), but we also report sales and profit outcomes for the main economic activity separately. While the training did not focus on agricultural

activities, it is possible that some of the lessons spill over to this domain as well, so we report the impact (in terms of sales and profits) for agricultural activities separately. For most variables we report outcomes for a “normal month” and for “last month.”

Not surprisingly, these “downstream” results are a lot more variable than the earlier ones. Nevertheless, while more tentatively, we believe the findings tell a compelling story. First of all, in terms of extra sales (rows 1 and 2), the training does not seem to have a (robust) significant effect. Two coefficients are significant and negative, perhaps suggesting that participating in the training and following-up on the lessons learned during the sessions was at the expense of day-to-day running of the business. But this result is not robust. Likewise, we do not detect a robust difference the two treatment arms – inviting husbands does not significantly affect sales (p -values for differences across treatment arms are always larger than 0.10).

The results for profits, summarized in rows 3 and 4, are somewhat more encouraging— even if not fully robust either. Specifically, while we fail to document any significant impact based on the midline data, we now document a number of positive and significant coefficients based on the endline estimates. The ITT estimates are only significant for T1 where husbands were invited to participate, but these coefficients are not significantly different for those of the T2 treatment ($p > 0.10$). The difference-in-differences estimator also suggests a significant impact on profits (in three out of 4 models) and again we cannot reject the hypotheses that the estimated coefficients are the same across models. The magnitude of the effect on profits is relatively small and perhaps only detectable because our sample is rather large. For the diff-in-diff models, we find an average effect of 0.15 standard deviations of last month’s profits (measured at the baseline). The effect on profits in a normal month is 0.10 standard deviations. The combination of an insignificant sales effect and a positive profit effect suggests the training reduces costs.

When we consider the LATE, we again find evidence of a significant effect only at the endline. Moreover, as for the ITT estimates, this significant effect only materializes in the treatment arm with husbands. However, a simple t-test (again) reveals we cannot distinguish between the coefficients of the T1 and T2 treatment, so the additional effect on profitability of including husbands is too small to be picked up by our sample. On-line Appendix 2 contains the lower bounds for the various treatment effects. These lower bounds are close to the estimates in Table 7, and most lower bounds for our profit measures are significantly different from zero. This suggests our results are not sensitive to attrition bias.¹⁰

Interestingly, the positive outcomes in terms of enhanced profits is *not* necessarily explained by improved performance in the main economic activity of the respondents. While we consistently document positive coefficients across our range of estimators, we observe that only a few are statistically significant. For example, the training significantly affects profits of the main economic activity for women in the group with invited men. Next, while the training does not contain a module concentrating on farming activities, we expect that some of the business lessons “spill over” to the domain of agriculture. The training may also improve the efficiency of other activities, increasing time available for farming (or draw effort away from farming if it encourages a shift to business activities). We lack details to test via which channels the training affects farming outcomes, but do observe that the training has a positive impact on both farming sales and profits at the endline. Moreover, this effect is significantly larger if husbands were invited ($p < 0.05$).

The relatively small impact of the training on profits is in line with the existing literature, surveyed by McKenzie and Woodruff (2014). Only few studies find significant

¹⁰ For example, the Lee lower bound associated with the *Last Month profit* variable, measured at the endline, is still significant at the 1% level for the treatment with husbands, and the *Normal month profit* variable remains marginally significant at the 10% level (Table A12). The Lee lower bound for *Last month main profits* is marginally insignificant ($p=0.11$). Table A13 presents the associated LATE estimates, and again the training positively affects both *Last month profits* and *Normal month profits*. *Last month main profits* is again marginally insignificant ($p=0.11$).

positive effects of trainings on profits, partly because of low power of most studies.

Interestingly, while we find that the impact of the training on profits increases over time, other studies suggested these gains tend to dissipate over time (e.g. Berge et al. 2012 and De Mel et al. 2014).

5.4 Effects of the G&B training on business entry and survival

Does the training affect business activity at the extensive margin, by speeding up or delaying the start-up of new economic activities, and the exit of existing ones? Vietnam's business community is dynamic, as illustrated by the simple fact that no less than 194 women in our sample reported to start new business activities at the midline (and no less than an additional 170 activities have been started between mid- and endline). Most of these activities involved retail trading. Table 8 shows that trained women were more likely to start new activities (significant at the 1% level). This finding is not unexpected, given that modules 3 and 4 of the training focused on self-development, business mapping and business opportunities.¹¹ Moreover, we find that the effect is larger for the treatment arm where husbands were not invited to participate in the training ($p < 0.05$). This would be consistent with a story emphasizing that husbands prefer their women around the house, working on chores, rather than starting up new businesses. If so, it appears as if the aim to promote gender equality by inviting husbands may have backfired. But this interpretation is presumably too negative, as additional data we have collected on female empowerment—including proxies for personal control beliefs and relations oppression – do not suggest that participating in the trainings made men more oppressive (details available on request). Nevertheless, additional research into the intra-household implications of participating in gender trainings seems worthwhile (see also Allen et al. 2010).

¹¹ In addition, one might expect that start-ups are more likely when women are more confident (or face less restrictions due to the gender training).

Exit of business activities is defined as business activities reported at the baseline which were subsequently abandoned at the midline or endline. Some 1338 women reported to undertake one or more business activities at the baseline. Of these women, 281 stopped one or more economic activities at the midline, and an additional 252 women stopped an activity between the mid- and endline. Variation in the probability of stopping with an economic activity is correlated with participating in the training, but only significantly so for treatments where husbands were not invited. Training may promote exit if the abandoned activities generated net losses for the household (see also Valdivia 2013), but we find the opposite effect – participating in the training reduced exit. This would be consistent with the interpretation that the incidence of loss-generating activities is reduced by the training. Unfortunately, we lack information about the profitability of the activities that were abandoned, so cannot assess this issue further.

5.5 Probing the theory of change

In a final bit of analysis we probe the theory of change, and try to establish whether the effects on the adoption of new business practices and profits is indeed caused by augmented knowledge levels. Representative results, based on *Business knowledge 1*, are summarized in Tables 9a and 9b. Table 9a contains the effect of (predicted) business knowledge on the adoption of practices measured at the midline.¹² The estimated coefficients are consistently greater than zero ($p < 0.01$) so that we indeed observe that enhanced knowledge is one channel via which adoption is encouraged.

<< *Insert Table 9a, 9b and 9c about here* >>

¹² We have also tested the effect of knowledge on adoption at the endline. The results are qualitatively similar but, not surprisingly in light of the results above, we find that the coefficients at the endline tend to be larger (sometimes significantly so). We also re-estimated all models using *Business Knowledge 2* as the linking pin between training and practices or profits, and obtained very similar results (results available on request).

In Table 9b we consider the downstream effects on profits, distinguishing between overall profits (last month and in a normal month) and profits from the main economic activity, also evaluated last month as well as in a normal month. All these profit measures were collected at the endline. We now find mixed support for the thesis that enhanced knowledge boosts profits – while all coefficients have the “right sign” we only document significant effects in two out of four regression models. Specifically, knowledge has positively affected overall profits as well as profits from the main economic activity in the last month.

Finally, we consider the next element of the theory of chain, and ask whether training-induced changes in business practices affected business outcomes (i.e. model (5d)). Table 9c indeed confirms that altered business practices significantly raise last month’s profits. Results for normal month profits are qualitatively similar.

6. Conclusions and Discussion

Recent evidence suggests microfinance is *not* the panacea it was once believed to be, and that augmenting enhanced access to financial capital with efforts to accumulate human capital may be a more successful strategy to reduce poverty. In response, so-called business training programs and financial literacy trainings for micro-entrepreneurs have been implemented in many countries. However, knowledge of the impact of such trainings on “downstream” outcomes of interest among the target population is sparse.

We evaluate the impact of a gender and business training that was offered to female clients of a large microfinance institution in Vietnam. We consider impacts on a range of outcomes, varying from knowledge to profits, and “unpack” profits by distinguishing between the returns to different activities. We also seek to assess whether the nature of this impact “evolves” over time – i.e. is different in the short-term than in the medium term – and whether the training’s impact is conditional on the presence of husbands at the trainings. Gender issues are at the heart of many microfinance initiatives (if only because many projects, including the

one we evaluate, exclusively target female clients), and the added value of including men in initiatives for women is debated in the literature.

Our results provide support for the finance-plus approach to development. We find that the gender and business trainings improve knowledge, increase the uptake of new business practices, and after some delay cause an increase in profits. We also find that the magnitude of the measured impact varies over time, and that measuring the impact on downstream variables like profits is likely to result in under-estimates of the true impact if data are collected too early after the end of the training. We also document effects at the extensive margin, and find that participating in the training may increase the start-up of new economic activities and slow-down the exit of existing ones. Finally, we document that the general business training significantly increased the returns to agricultural practices, even if agriculture was not specifically targeted – an example of a household-level spillover across economic sectors.

Not all our hypotheses were supported by the data. Most importantly, we do not document statistically robust effects of including husbands in the training for most of our outcome variables. However, we are careful not to dismiss the potential contribution of participating husbands too lightly. First, while the differences across treatment arms are not statistically significant, we consistently find that estimated treatment effects on profits are larger when men are involved in the trainings. Second, their participation was appreciated by the women, and it is possible that positive outcomes emerges along other dimensions (i.e. beyond business-related variables). We also note that most men were not interested in participating in the trainings – especially when the financial incentive associated with participation was reduced – so that participation rates were low. Future studies could try to evaluate the impact of an intervention based on more salient incentives, so that a larger share of the target population of men participates in the trainings. Moreover, to examine whether financial and human capital are compliments or substitutes, future research may fruitfully

distinguish between the impact of trainings for women who are and who are not credit rationed—our data do not allow us to do this as all respondents are members of the microfinance institutions and have access to loans.

References

- Allen, T., Armendáriz, B., Karlan, D. and Mullainathan, S. (2010). Inviting husbands in women-only solidarity groups: Evidence from Southern Mexico, *Working Paper*.
- Armendariz, B. and Roome, N. (2008). Gender empowerment in microfinance. *Munich Personal RePEc Archive. Working paper*.
- Armendáriz de Aghion, B., and Morduch, J. (2010) *The economics of microfinance*, 2nd edition, Cambridge: MIT Press.
- Bamberger, J. (1974). The Myth of Matriarchy: Why Men Rule in Primitive Society, in Rosaldo Lamphere eds., *Women, Culture, and Society*, (pp: 263–280). Stanford, CA: Stanford University Press.
- Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York, NY: Freeman.
- Banerjee, A. (2013). Microcredit under the Microscope: What Have we Learned in the Last Two Decades, What do we Need to Know? *Annual Review of Economics* 5: 487-519
- Banerjee, A., D. Karlan and J. Zinman (2015). Six Randomized Evaluations of Microcredit: Introduction and Further Steps. *American Economic Journal: Applied Economics* 7(1): 1-21
- Berge, L. I. O., Bjorvatn, K. and Tungodden, B. (2014). Human and financial capital for microenterprise development: Evidence from a field and lab experiment. *Management Science*, In Press.
- Berge, L.I.O., K. Bjorvatn, K.S. Juniwaty and B. Tungodden (2012). Business training in Tanzania”From research-driven experiment to local implementation. *Journal of African Economies* 21(5): 808-827
- Bjorvatn, K. and Tungodden, B. (2010). Teaching business in Tanzania: Evaluating participation and performance. *Journal of the European Economic Association*, 8(2/3), 561-570.
- Blascovich, J. and Tomaka, J. (1991). Measures of self-esteem. *Measures of Personality and Social Psychological Attitudes*, 1, 115-160.

- Bloom, N., Mahajan, A., McKenzie, D. and Roberts, J. (2010). Why do firms in developing countries have low productivity? *The American Economic Review*, 619-623.
- Brown, D. E. (1991). *Human universals*. New York: McGraw-Hill.
- Bruhn, M. and Zia, B. (2013). Stimulating managerial capital in emerging markets: The impact of business training for young entrepreneurs. *Journal of Development Effectiveness*, 5(2), 232-266.
- Bruhn, M., Karlan, D. and Schoar, A. (2010). What capital is missing in developing countries? *The American Economic Review*, 629-633.
- Buvinic, M., Furst-Nichols, R. and Courey Pryor, E. (2013). *A Roadmap for promoting women's economic empowerment*. Washington DC: The United Nations Foundation.
- Calderon, G., Cunha, J. and de Giorgi, G. (2012). Business literacy and development: Evidence from a randomized trial in rural Mexico. Mimeo, Stanford University. *Working paper*
- De Mel, S., McKenzie, D. and Woodruff, C. (2008). Returns to capital in microenterprises: Evidence from a field experiment. *The Quarterly Journal of Economics*, 123(4), 1329-1372.
- De Mel, S., McKenzie, D. and Woodruff, C. (2009). Are women more credit constrained? Experimental evidence on gender and microenterprise returns. *American Economic Journal: Applied Economics*, 1-32.
- De Mel, S., McKenzie, D. and Woodruff, C. (2014). Business training and female enterprise start-up, growth, and dynamics: Experimental evidence from Sri Lanka. *Journal of Development Economics*, 106, 199-210.
- Drexler, A., Fischer, G. and Schoar, A. (2014). Keeping it simple: Financial literacy training and rule of thumbs: Evidence from a field Experiment. *American Economic Journal: Applied Economics*, 6(2) 1-31.
- Duvendack, M., Palmer-Jones, R. and Vaessen, J. (2014). Meta-analysis of the impact of microcredit on women's control over household decisions: Methodological issues and substantive findings. *Journal of Development Effectiveness*, 6(2), 73-96.
- Duvvury, N., Carney, P. and Nguyen, H. M. (2012). *Estimating the cost of domestic violence against women in Viet Nam* (1st edition). Vietnam: UN Women Vietnam.
- Fafchamps, M., McKenzie, D., Quinn, S. and Woodruff, C. (2011). Female microenterprises and the fly-paper effect: Evidence from a randomized experiment in Ghana. *World Bank*.
- Field, E., Jayachandran, S. and Pande, R. (2010). Do traditional institutions constrain female entrepreneurship? A field experiment on business training in India. *American Economic Review Papers and Proceedings*, 100 (2) 125-129.

- Garcia-Moreno, C., Jansen, H. A., Ellsberg, M., Heise, L. and Watts, C. H. (2006). Prevalence of intimate partner violence: Findings from the WHO multi-country study on women's health and domestic violence. *The Lancet*, 368(9543), 1260-1269. doi: [http://dx.doi.org/10.1016/S0140-6736\(06\)69523-8](http://dx.doi.org/10.1016/S0140-6736(06)69523-8)
- Gerber, A. and D. Green (2012). *Field experiments: Design, analysis and interpretation*. New York: Norton
- Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B. and Vermeersch, C. M. (2011). *Impact evaluation in practice*, World Bank Publications.
- Giné, X. and Mansuri, G. (2014). Money or ideas? A field experiment on constraints to entrepreneurship in rural Pakistan. *Policy Research Working Paper 6959*. Washington DC: World Bank.
- Goodman, D. J. (2000). Motivating people from privileged groups to support social justice. *Teachers College Record*, 102(6), 1061-1085.
- Hansen, N. (2014). Female empowerment through access to microfinance services. A field experiment in Sri Lanka. Invited manuscript submitted for the special issue “Resisting and confronting disadvantage: from individual coping to societal change” in *Journal of Social Issues*.
- Hair, J. F., Black, W. C., Anderson, R. E., Babin, B. J. and Tatham, R. L. (2010), *Multivariate data analysis: a global perspective*, 7th edition, New Jersey: Pearson Prentice Hall.
- Holvoet, N. (2005). The impact of microfinance on decision-making agency: Evidence from South India. *Development and Change*, 36(1), 75-102.
- Jewkes, R. (2002). Intimate partner violence: Causes and prevention. *The Lancet*, 359, 1423-1429.
- Jewkes, R., Levin, J., Penn-Kekana, L. (2002). Risk factors for domestic violence: Findings from a South African cross-sectional study. *Social Science and Medicine*, 55(9), 1603-1617.
- Johnson, S. (2005). Gender relations, empowerment and microcredit: Moving on from a lost decade. *The European Journal of Development Research*, 17(2), 224-248.
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30, 435-464.
- UNIFEM (2000) *Progress of the world's women*. New York: United Nations Development Fund for Women.
- Karlan, D. and Valdivia, M. (2011). Teaching entrepreneurship: Impact of business training on microfinance clients and institutions. *Review of Economics and Statistics*, 93(2), 510-527.

- Karlan, D. and Zinman, J. (2010). Expanding credit access: Using randomized supply decisions to estimate the impacts. *Review of Financial Studies*, 23(1), 433-464.
- Kim J. C., Ferrari G., Abramsky, T., Watts, C., Hargreaves, J., Morison, L., ... Pronyk, P. (2009). Assessing the incremental effects of combining health and economic interventions: the IMAGE study in South Africa. *Bulletin of the World Health Organization*, 87, 824–32.
- Klinger, B. and Schündeln, M. (2011). Can entrepreneurial activity be taught? Quasi-experimental evidence from Central America. *World Development*, 39(9), 1592-1610. doi:<http://dx.doi.org/10.1016/j.worlddev.2011.04.021>
- Kulkarni, V. S. (2011). Women's empowerment and microfinance: An Asian perspective study. *Occasional paper International Fund for Agricultural Development (IFAD) no. 13*.
- Lattin, J. M., Carroll, J. D. and Green, P. E. (2003). *Analyzing multivariate data*, Pacific Grove, CA: Thomson Brooks/Cole.
- Mayoux, L. (1999). Questioning virtuous spirals: Microfinance and women's empowerment in Africa. *Journal of International Development*, 11, 957-984.
- Mbweza, E., Norr, K. and McElmurry, B. (2008). Couple decision making and use of cultural scripts in Malawi. *Journal Of Nursing Scholarship*, 40(1), 12-19.
- McKenzie, D. (2012). Beyond baseline and follow-up: The case for more T in experiments. *Journal of Development Economics*, 99(2), 210-221.
- McKenzie, D. and Woodruff, C. (2014). What are we learning from business training and entrepreneurship evaluations around the developing world? *The World Bank Research Observer*, 29(1), 48-82.
- Page, N. and C. Czuba (1999) Empowerment: What is it? *Journal of Extension*, 37(5), 1-6.
- Pratto, F. and Walker, A. (2004). The bases of gendered power. In Eagly, Beall, & Sternberg, eds., *The Psychology of gender*, 2nd edition (pp. 242-268). NY: Guilford Publications.
- Rahman, M., Hoque, A. and Makinoda, S. (2011). Intimate partner violence against women: Is women empowerment a reducing factor? A study from a national Bangladeshi sample. *Journal of Family Violence*, 26, 411-420.
- Rosenberg, M. (1965). Society and the adolescent self-image. *Princeton, NJ: Princeton University*.
- Rosenthal, L. and Levy, S. R. (2010). Understanding women's risk for HIV infection using social dominance theory and the four bases of gendered power. *Psychology of Women Quarterly*, 34, 21-35.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1.

- Snijders, T. A. B. (2005). Power and sample size in multilevel linear models. *Encyclopedia of Statistics in Behavioral Science*.
- Straus, M. A. (1979). Measuring intrafamily conflict and violence: The conflict tactics (CT) scales. *Journal of Marriage and the Family*, 75-88.
- Valdivia, M. (2013). Business training plus for female entrepreneurship? Evidence from a field experiment in Peru. *Working paper*.
- World Bank (2011). *Vietnam gender assessment*. Washington DC: The World Bank.

TABLES

Table 1: Test for random attrition

	1	2
Treatment	-0.04 (0.147)	0.239 (0.215)
T1		-0.422 (0.220)*
Business knowledge 1	0.022 (0.033)	0.0221 (0.033)
Age	-0.0098 (0.006)*	-0.0101 (0.006)*
Household size	-0.0612 (0.039)	-0.060 (0.039)
Married	-0.111 (0.148)	-0.122 (0.147)
Region (Hanoi)	-0.398 (0.236)*	-0.405 (0.232)*
Constant	Yes	Yes
N	3941	3941
Wald (Prob>Chi2)	9.13 (0.17)	18.62 (0.01)***

*Note: robust clustered standard errors between parentheses. *** denotes significance at the 1% level; ** at the 5% level and * at the 10% level*

Table 2 Descriptive statistics: Control and outcome variables at the baseline

	N	Mean	St.dev	Min	Max
Age (years old)	4035	43.77	10.33	19.00	72.00
Schooling (years)	4030	6.82	2.91	0.00	18.00
Married	4041	0.82	0.39	0.00	1.00
Ethnic group (Kinh)	4041	0.94	0.23	0.00	1.00
Household size	3943	4.74	1.56	1.00	15.00
City (Hanoi)	4041	0.26	0.44	0.00	1.00
Credit access TYM	4037	1.10	0.70	0.00	2.00
Interest in training	4037	0.76	0.43	0.00	1.00
Monthly income	4037	6,064.50	3,418.23	0.00	50,000.00
Agricultural activity	4036	0.78	0.41	0.00	1.00
Land size	4041	1,439.44	1,116.41	0.00	7,200.00
Business activity	4035	0.33	0.47	0.00	1.00
Knowledge index 1	4041	8.94	1.72	0.00	14.00
General practices	4036	0.00	1.42	-2.50	2.60
Innovation	4036	0.00	1.12	-0.37	14.42
Agri sales	4041	2,006.99	8,062.21	0.00	270,000.30
Agri profit	4041	186.89	3,374.76	-66,666.66	108,333.30
Business sales	4039	15,697.59	75,024.85	0.00	3,300,000.00
Business profit	4039	2,600.80	26,837.27	-420,000.00	1,500,000.00
Sales main business	4039	15,201.54	73,820.09	0.00	3,300,000.00
Profit main business	4039	2,536.61	26,799.53	-420,000.00	1,500,000.00

Table 3: Definition of outcome variables

	Description	Base (B), mid (M)- or endline (E)
Business knowledge		
Knowledge index 1 (BK1)	The amount of correct answers on 17 business questions	B, M, E
Knowledge index 2 (BK2)	The amount of correct answers on 23 business questions.	M, E
Business practices		
General practices	Index based on 7 business practices - 1 st component of PCA	B, M, E
Innovation	Index based on 7 business practices - 2 nd component of PCA	B, M, E
Marketing skills	Index based on 13 business practices - 1 st component of PCA	M, E
Record and planning	Index based on 13 business practices - 2 nd component of PCA	M, E
Farming activities		
Agri sales	Total sales of max. 3 agricultural activities	B, M, E
Agri profit	Total profit of max. 3 agricultural activities	B, M, E
Agri profit margin	Total sales divided by total profit	B, M, E
Business activities		
Business sales	Total sales of max. 3 business activities	B, M, E
Business profit	Total profit of max. 3 business activities	B, M, E
Sales main business	Sales of the main business activity present in all surveys	B, M, E
profit main business	Profit of the main business activity present in all surveys	B, M, E
Business entry	New business activities in midline or endline, not in baseline	B, M, E
Business exit	Main business activity reported in baseline, not present at midline and/or endline	B, M, E
LM after a variable	Previous month	
NM after a variable	Normal month	

Table 4: Balance test.

	Age (years old)	Schooling (years)	Married	Ethnic group (Kinh)	Members hh	City (Hanoi)	Credit access TYM	Interest in training	Monthly income	Agr. activity	Land size	Business activity
T2	-0.08	-0.05	0.01	0.00	-0.06	0.01	-0.07	-0.02	457.62	-0.02	-63.22	0.00
	-0.901	-0.849	-0.651	-0.892	-0.577	-0.909	-0.189	-0.618	-0.212	-0.643	-0.587	-0.993
T1	-0.52	-0.18	-0.01	-0.01	-0.04	-0.01	0.00	0.02	53.85	0.00	36.59	-0.03
	-0.409	-0.268	-0.521	-0.611	-0.688	-0.888	-0.896	-0.624	-0.805	-0.909	-0.708	-0.327
Constant	43.98	6.90	0.82	0.94	4.76	0.26	1.11	0.76	5,968.09	0.79	1436.30	0.34
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
N	4,035	4,030	4,041	4,041	3,943	4,041	4,037	4,037	4,037	4,036		
R ²	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.001	0.002	0.000	4,041	4,035
											0.001	0.001

	Business 1	General	Innovation	Sales	Profit	Sales	Profit	Sales	Profit
T2	-0.13	-0.30	0.18	24.38	-55.48	3,947.69	-413.98	3,568.54	-426.40
	(0.519)	(0.114)	(0.061)*	(0.965)	(0.790)	(0.486)	(0.416)	(0.513)	(0.386)
T1	-0.08	-0.08	0.04	75.23	-65.00	1,362.34	15.27	1,707.53	51.35
	(0.633)	(0.510)	(0.427)	(0.797)	(0.657)	(0.729)	(0.989)	(0.648)	(0.962)
Constant	8.99	0.08	-0.05	1,974.83	220.40	14,531.16	2,664.08	13,969.40	2,588.49
	(0.000)***	(0.335)	(0.153)	(0.000)***	(0.034)**	(0.000)***	(0.000)***	(0.000)***	(0.000)***
N	4,041	4,036	4,036	4,041	4,041	4,039	4,039	4,039	4,039
R ²	0.001	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000

Table 5: Training and Business Knowledge

	Intention to Treat Effect								Local Average Treatment Effect			
	<i>Midline</i>		<i>Endline</i>		<i>Difference-in differences</i>				<i>Midline</i>		<i>Endline</i>	
	Mid * T1	Mid * T2	End * T1	End * T2	Mid * T1	Mid * T2	End * T1	End * T2	Mid * Z2	Mid * Z1	End * Z2	End * Z1
Business	2.23***	2.05***	2.52***	2.30***	2.32***	2.23***	2.62***	2.42***	2.47***	2.73***	3.17***	3.40***
Knowledge 1	(0.23)	(0.28)	(0.28)	(0.37)	(0.26)	(0.33)	(0.30)	(0.42)	(.338	(.284)	(.529)	(0.392
Business	2.73***	2.71***	3.05***	2.62***					3.17***	3,40***	3.61***	4.11***
knowledge 2	(0.42)	(0.54)	(0.428)	(0.55)					.629	(0.498	(.771	(0.596

Notes: Based on regression analysis that contain the following covariates: age, household size, married, region, and the relevant level terms (i.e. dummies for midline and/or endline, and assignment to treatment). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Training and Business Practices

	Intention to Treat Effect								Local Average Treatment Effect			
	<i>Midline</i>		<i>Endline</i>		<i>Difference-in differences</i>				<i>Midline</i>		<i>Endline</i>	
	Mid * T1	Mid * T2	End * T1	End * T2	Mid * T1	Mid * T2	End * T1	End * T2	Mid * Z1	Mid * Z2	End * Z1	End * Z2
General	1.25***	1.26***	1.82***	1.74***	1.32***	1.45***	1.88***	2.03***	1.53***	1.53***	2.44***	2.40***
	(0.13)	(0.17)	(0.10)	(0.14)	(0.14)	(0.19)	(0.16)	(0.24)	(.158)	(.204)	(0.142)	(.174)
Innovation	2.96***	3.17***	5.68***	6.07***	2.92***	3.11***	5.63***	5.90***	3.64***	3.83***	7.63***	8.40***
	(0.42)	(0.59)	(0.44)	(0.60)	(0.42)	(0.58)	(0.44)	(0.59)	(.513)	(.722)	(0.598)	(.784)
Marketing	1.69***	2.00***	3.11***	2.94***					2.07***	2.42***	4.18***	4.83***
	(0.20)	(0.22)	(0.17)	(0.23)					(.235)	(.271)	(0.243)	(.303)
Record	1.93***	2.04***	2.74***	2.62***					2.37***	2.46***	3.69***	3.59***
	(0.18)	(0.22)	(0.17)	(0.21)					(.218)	(.270)	(0.247)	(.279)

Notes: Based on regression analysis that contain the following covariates: age, household size, married, region, and the relevant level terms (i.e. dummies for midline and/or endline, and assignment to treatment). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Training and Business Outcomes

	Intention to Treat Effect								Local Average Treatment Effect			
	<i>Midline</i>		<i>Endline</i>		<i>Difference-in differences</i>				<i>midline</i>		<i>Endline</i>	
	Mid * T1	Mid * T2	End * T1	End * T2	Mid * T1	Mid * T2	End * T1	End * T2	Mid * Z2	Mid * Z1	End * Z2	End * Z1
Sales last	-4,111	-8,503**	1,454	-5,622	491	-22,834	6,367	-17,057	-10743***	-5134	-7958	2005
Month (LM)	(5,482)	(4,174)	(7,145)	(6,915)	(9,622)	(15,180)	(10,174)	(16,831)	(5309)	(6825)	(9780)	(9762)
Sales normal	-3,180	-5,703	-2,067	-7,039	-6,862	-16,661	-5,446	-15,029	-7206	-3971	-9962	-2830
Month (NM)	(4,161)	(3,795)	(6,665)	(6,530)	(9,592)	(10,785)	(10,271)	(12,407)	(4790)	(5184)	(9232)	(9106)
Profit LM	1,473	378	2,438***	1,588	3,580	1,578	4,582***	3,331*	479	1840	2246	3347***
	(2,062)	(1,298)	(867)	(1,400)	(2,670)	(1,785)	(1,727)	(1,944)	(1627)	(2562)	(1951)	1190)
Profit NM	1,221	1,670	2,171*	1,930	1,214	2,776**	2,235	3,400*	2110	1526	2731	2980*
	(1,205)	(1,162)	(1,304)	(1,435)	(2,979)	(1,274)	(3,028)	(1,787)	(1441)	(1497)	(2007)	(1783)
Sales main	-1,298	-10,664**	-1.105	-6,246	-37	-14,420	236	-9,700	-13117**	-1621	-7682	-1379
business LM	(7,894)	(5,364)	(6,770)	(8,753)	(15,000)	(18,876)	(13,462)	(20,418)	(6554)	(9798)	(10709)	(8401)
Profit main	4,110	814	2,370*	3,095	5,147	3,978	3,485	5,949**	995	5135	3803	2960**
Business LM	(3,257)	(1,883)	(1,256)	(2,103)	(4,498)	(3,047)	(1,949)	(2,951)	(2293)	(4025)	(2517)	(1558)
Sales LM	203	61	1866***	1158*	132	-133	1435**	902	73	247	1574*	2519***
Agriculture	(287)	(350)	(542)	(644)	(336)	(623)	(559)	(662)	(418)	(347)	(860)	(725)
Profits LM	32	-60	719***	454	128	-127	803**	469	-72	39	617	971***
Agriculture	(123)	(157)	(230)	(291)	(227)	(281)	(326)	(384)	(188)	(150)	(388)	(308)

Notes: Based on regression analysis that contain the following covariates: age, household size, married, region, and the relevant level terms (i.e. dummies for midline and/or endline, and assignment to treatment). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered standard errors between parentheses.

Table 8: The Extensive Margin: Training and Business Entry and Exit

Logit: ITT	Business entry	Business exit
	(1)	(2)
End *T2	1.40 (0.267)***	-0.47 (0.214)**
End *T1	0.85 (0.227)***	-0.19 (0.179)
Controls	Yes	Yes
N	4,234	1,338

*** Denotes significance at the 1%-level, ** at the 5%-level, and * at the 10% level. Clustered standard errors between parantheses.

Table 9a: Theory of change I: knowledge and business practices

	(1)	(2)	(3)	(4)
VARIABLES	General	Innovation	Marketing	Record
Business knowledge 1	0.57 (0.083)***	1.38 (0.229)***	0.81 (0.113)***	0.90 (0.107)***
Observations	3,492	3,492	3,487	3,487

Notes: Second stage of a 2SLS model where business knowledge was instrumented by the treatment dummies. Based on regression analysis that contain the following covariates: age, household size, married, region. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered standard errors between parentheses.

Table 9b: Theory of change II: Knowledge and profits

	(1)	(2)	(3)	(4)
VARIABLES	Profit main activity last month	Profit main activity normal month	Profit last month	Profit normal month
Business knowledge 1	924 (431)**	120 (241)	745 (299)**	739 (459)
Observations	1,619	1,619	1,619	1,619
R-squared	0.010	0.000	0.022	0.003

Notes: Second stage of a 2SLS model where business knowledge was instrumented by the treatment dummies. Based on regression analysis that contain the following covariates: age, household size, married, region. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered standard errors between parentheses.

Table 9C: Theory of Change III: Business Practices and profits

	Profit last month	Profit last month	Profit last month	Profit last month
General	1,347 (518)***			
Innovation		371 (143)***		
Marketing			745 (283)***	
Record				847 (326)***
Observations	1,598	1,598	1,580	1,580
R-squared	0.033	0.028	0.032	0.028

*Notes: Second stage of a 2SLS model where business practices was instrumented by the treatment dummies. Based on regression analysis that contain the following covariates: age, household size, married, region. * p < 0.10, ** p < 0.05, *** p < 0.01. Clustered standard errors between parentheses.*

ONLINE APPENDIX 1: Construction of Knowledge and Practice Indices

I. Basic information about indices

Table A1: Construction of indices

Variable	Description	Time of measurement
<i>Business knowledge</i>		
Business knowledge index 1	Sum of correct answers of 16 business knowledge questions	Baseline, midline, and endline
Business knowledge index 2	Sum of correct answers of 13 other business knowledge questions	Midline and endline
<i>Business practices</i>		
<i>General</i> business practices	1 st component of principle component analysis (consisting of 7 business practices)	baseline and midline
<i>Innovation</i>	2 nd component of principle component analysis (consisting of 7 business practices)	baseline and midline
<i>Marketing</i> skills	1 st component of principle component analysis (consisting of 13 business practices)	midline
<i>Record</i> and planning	2 nd component of principle component analysis (consisting of 13 business practices)	midline

II. Questions for the knowledge indices

Table A2: Underlying Questions related to Business knowledge index 1

1	You should improve or expand your business to smooth sales over time
2	Only price determines sales
3	Sales records are needed for product mix evaluation
4	It is better to produce what you are good, than what your customers demand
5	When a new competitor starts selling at a lower price, you should decrease prices as well
6	If you charge more than competitors, customers will not buy from you
7	Advertisements are not necessary for villagers with small businesses
8	Word-of-mouth does not affect the sales of business
9	Many businesses lose part of their products because of poor storage facilities
10	It is not necessary to separate money used for business and money used for household
11	What is 400 plus 300?
12	What is one tenth of 100?
13	In a sale, a shop is selling all items at half price. Before the sale a TV costs 4,000,000 VND. How much will it cost in the sale? <i>4,000,000 / 3,000,000 / 2,000,000 VND</i>
14	If you sold two items for 8,000 VND each and your customer gave you 20,000 VND, how much balance do you owe the customer? <i>12,000 / 4,000 / 8,000 VND</i>
15	Assume again: 1,000,000 VND with 2% interest rate. What is the account balance after five years (incl. interest payments, but no other payments or withdrawal)? <i>More/ Exactly/ Less than 1,100,000 VND</i>
16	With an interest rate of 1% per year and 2% inflation per year. How much can you buy after one y

Note: Business knowledge index 1 is constructed by summing the correct answers for the 16 underlying questions, given in Table A1. These questions are asked at baseline, midline and endline

Table A3: Underlying questions for Business Knowledge Index 2

1	Imagine that five brothers are given a gift of 1,000,000VND. If the brothers have to share the money equally how much does each one get? <i>1,000,000 / 500,000 / 200,000 / 100,000 VND</i>
2	Now imagine that you get a gift of 1,000,000VND, and you put it in the drawer at home for 12 months. After one year you can buy with this <i>more/ same/ less/ depends on inflation</i>
3	You lend 1,000,000VND to a friend one evening and he gives you exact 1,000,000VND back the next day. How much interest has he paid on this loan? <i>More/ Equal/ Less than 0%</i>
4	Suppose you had 1,000,000 VND in a savings account with an interest rate of 2% per year. What is the account balance after one year (incl. interest payment, but no other payments or withdrawal)? <i>More/ Exactly/ Less than 1,020,000 VND</i>
5	'An investment with a high return is likely to be risky.' <i>True/ False</i>
6	'High inflation means that the costs of living increase rapidly?' <i>True/ False</i>
7	It is less likely that you will lose all of your money if you invest it in more than one project.' <i>True/ False</i>
8	Good methods to attract more customers are: posters, home visits, loudspeakers, radio, handbills, clear signs, and interesting 'look' of your place of business. <i>Product/ Price/ Place/ Promotion (4P)</i>
9	It is important to review the price of your product or service on a regular basis. <i>(4P)</i>
10	Your product or service must meet customers' needs. <i>(4P)</i>
11	Things to think about when you set your price: your costs, your production level, your competition, and your customers. <i>(4P)</i>
12	Your place of sales should be near your customers. <i>(4P)</i>
13	Cost of pork meat
14	Money taken to pay school fees for Ms. Hoa's son
15	Payment for hiring the kiosk in the market
16	A loan given to her friend to assist her wedding party
17	Telephone calls to friends to check on their health
18	Salary to assistant cleaning the kiosk at the end of the day
19	Total costs per product
20	Percentage of profit you expect
21	Education fee for your children
22	Competitor's price of similar products
23	Price client is willing to pay

Note: Business Knowledge Index 2 is constructed by summing correct answers for questions given in Table A2. These questions are measured at midline, and endline. Not at baseline!

III. Construction of Business Practices Indices: Principal Component Analysis

During the baseline, midline and endline, we asked 7 questions related to specific business practices. In addition, during the midline and endline we asked 13 different questions related to business practices. We use factor analysis using answers to the 7 questions at the baseline and, separately, using answers to the 13 questions at midline.

The factor analyses were done as follows:

Stage 1: check data including sample size, number of observations before performing factor analysis in order to check whether data is suitable for factor analysis

Stage 2: check when it is appropriate to use principal component analysis. We will base the analysis on variable correlation matrix, KMO measure of sampling adequacy

Stage 3: Derive factors and assess overall fit. In this stage we discuss which methods are applied to select the numbers of factors.

Stage 4: Interpret the factors. In this stage, we will focus on examining factor loading matrix, choosing factor rotation methods, then identifying the significant loadings for each variable and then labeling the factors.

After implementing these steps with component analysis, we will obtain factor scores. For the first set of business practices (the 7 questions), we conduct factor analysis using only the baseline data, and then use the “weights” to predict factor scores for both the baseline, midline and endline. For the second set of business practices (based on the 13 questions) we followed a similar approach. However, here we conduct factor analysis using only the midline data, and then use the “weights” to predict factor scores for both the midline and the endline.

IV. Principal Component Analysis Results

A. Assessing the Appropriateness of Factor Analysis

Based on the correlation matrix of the first and the second set of business practices, we find that most business practices in these two sets of business practices are highly correlated.

Moreover, the KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy equals 0.69 for the first set and 0.90 for the second set of business practices. These results indicate that the degree of inter-correlations among the business practices variables is big enough to justify principal component analyses.

B. Deriving Factors and Assessing Overall fit

We apply different criteria for extracting the number of factors.

- **Latent Root Criteria**

The first criteria, we use is the eigen value. The rationale for the latent root criterion is that any individual factor should account for the variance of at least a single variable if it is to be retained for interpretation. With the component analysis, each variable contributes a value of 1 to the total eigenvalue. Thus, only the factors having latent roots or eigenvalues greater than 1 are considered significant. Based on eigenvalues, we decide to extract two factors out of 7 business practices variables of the first set and two factors out of the 13 business practices variables of the second set.

- **Parallel Analysis**

To further analyze whether our decision to extract two factors is appropriate, we conduct parallel analyses. With the component factor analysis, the later factors extracted contain both common and unique variance. Although, all factors contain at least some unique variance, the proportion of unique variance is substantially higher in later factors. The parallel analysis is used to identify the optimum number of factors that can be extracted before the amount of unique variance begins to dominate the common variance structure. Based on the shape of the resulting curve in the parallel analyses, we conclude that there are two factors that need to be extracted both for the first and second set of variables.

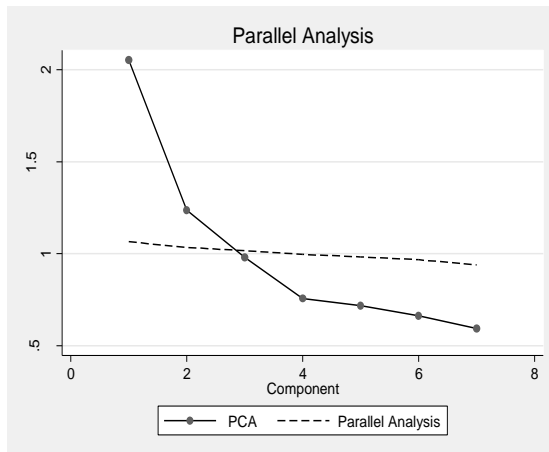


Figure a: *Parallel Analysis of the 1st set of business practices*

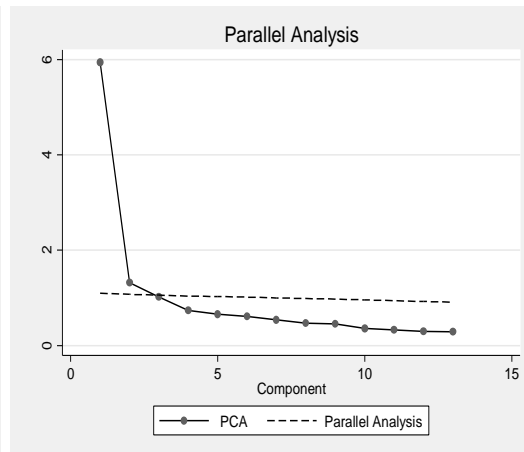


Figure b: *Parallel Analysis of the 2nd set of business practices*

C. Interpreting factors

Our initial unrotated factors are difficult to interpret. In order to obtain more meaningful solutions, we need to rotate the factor matrix. Based on the size of the factor correlations, we decided to use the “Varimax” approach for the first set of business practices, and the oblique promax rotation method for the second set of business practices .

Considering the factor loadings for the first set of business practices, it appears that the first factor has high factor loadings for the indicators related to recording, business discussion, marketing and business plan. Therefore, we label this factor as “*general business practices*”. The second factor has high factor loadings on indicators such as innovation, new ideas or any activities to increase number of buyers which are associated with “*innovation*”, thus we use this phrase to label this factor. For the second set of business practices, marketing strategies have high factor loadings on the first factor. Therefore, we label this factor as “*marketing*”. Recording and business planning are statistically significant for the second factor; therefore we label this factor as “*record and planning*.” Table A4 below presents the weights for the four indices.

Table A4: Weights per statement for business practices by principle component analysis

		General	Innovation	Marketing	Record & Planning
1	Records sales, withdrawals or payments to workers	0.397			
2	Discuss with anyone about how to improve activity	0.413			
3	Diversify and improves quality in last 6 months	0.419			
4	Makes sales on credit	0.495			
5	Has an idea for innovation in business		0.685		
6	Use an activity to increase customers or products in last 6 months		0.701		
7	Reinvests profits for growth or continuity business	0.502			
8	Use records for cash				0.422
9	Use records for debt				0.322
10	Use records to know profit per unit				0.414
11	Visits competitor to compare products and prices			0.421	
12	Asks customers which other products need to sell or produce			0.415	
13	Asks former customers why they stopped buying			0.389	
14	Advertises in last 6 months			0.368	
15	Cooperates with other people to sell or distribute together			0.411	
16	Decorates place to entice customer to her shop			0.347	
17	Actively discuss business with husband and family members				
18	Has a business target for sales in next year				0.455
19	Has a business budget for costs in next year				0.445
20	Reviews financial performances and analyzes areas for improvement				0.366

Note: Abs (loading) < 0.300 are expressed as blanks. The weights per statement in two indices (General and Innovation) are constructed with a PCA on 7 business practices questioned at the baseline and two indices (Marketing and Record & Planning) constructed with a PCA on 13 practices statement questioned in the midline.

ONLINE APPENDIX 2: Extreme bounds analysis

This Appendix presents lower bounds for coefficients of outcome variables that entered significantly in the main analysis. All models were estimated with the same controls as in the main text (suppressed). Table A5 and A6 contain ITT and LATE estimates for our knowledge variables:

Table A5 : ITT estimates (lower bounds) for knowledge variables

VARIABLES	(1) Know1 mid	(2) Know1 end	(3) Know1 DD	(4) Know2 mid	(5) Know2 end
Mid_T2	1.91 (0.267)***		2.09 (0.324)***	2.50 (0.538)***	
Mid_T1	2.09 (0.217)***		2.19 (0.254)***	2.52 (0.414)***	
End_T2		2.11 (0.361)***	2.22 (0.408)***		2.51 (0.542)***
End_T1		2.33 (0.260)***	2.43 (0.293)***		2.94 (0.422)***
Observations	3,464	4,137	11,840	3,479	4,169
R-squared	0.224	0.222	0.374	0.109	0.167

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A6: LATE estimates (lower bounds) for knowledge variables

VARIABLES	(1) Know1 mid	(2) Know1 end	(3) Know2 mid	(4) Know2 end
Z2	2.31 (0.325)***	2.91 (0.510)***	3.02 (0.631)***	3.46 (0.762)***
Z1	2.56 (0.268)***	3.13 (0.367)***	3.09 (0.498)***	3.95 (0.587)***
Observations	3,464	4,137	3,479	4,169
R-squared	0.200	0.167	0.114	0.123

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Next, consider the lower Lee bounds for the practice variables. Table A7 presents ITT results for the midline data, Table A8 presents ITT results for the endline data, and Table A9 presents difference-in-differences estimates.

Table A7: ITT estimates (lower bounds) for practices (midline data)

VARIABLES	(1) General	(2) Innovation	(3) Marketing	(4) Record
Mid_T2	0.91 (0.155)***	2.78 (0.597)***	1.92 (0.222)***	1.62 (0.230)***
Mid_T1	0.90 (0.109)***	2.58 (0.430)***	1.61 (0.196)***	1.51 (0.188)***
Observations	3,302	3,168	3,406	3,110
R-squared	0.149	0.088	0.205	0.196

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A8: ITT estimates (lower bounds) for practices (endline data)

VARIABLES	(1) General	(2) Innovation	(3) Marketing	(4) Record
End_T2	1.61 (0.131)***	5.42 (0.619)***	2.92 (0.231)***	1.88 (0.220)***
End_T1	1.69 (0.100)***	5.04 (0.471)***	3.09 (0.175)***	2.00 (0.188)***
Observations	4,094	3,797	4,121	3,576
R-squared	0.364	0.261	0.441	0.297

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A9: Difference-in-differences estimates (lower bounds) for practices (midline data)

VARIABLES	(1) General	(2) Innovation
Mid_T2	1.11 (0.190)***	2.72 (0.581)***
Mid_T1	0.97 (0.137)***	2.53 (0.426)***
End_T2	1.90 (0.239)***	5.26 (0.618)***
End_T1	1.76 (0.160)***	4.99 (0.468)***
Observations	11,633	11,202
R-squared	0.297	0.407

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tables A10 and A11 present the lower bounds for the LATE estimates (second stage) for business practices, for the midline and the endline, respectively.

Table A10: LATE estimates, (lower bounds) for practices (midline data)

VARIABLES	(1) General	(2) Innovation	(3) Marketing	(4) Record
Z2	1.10 (0.189)***	3.37 (0.728)***	2.33 (0.271)***	1.96 (0.277)***
Z1	1.10 (0.134)***	3.17 (0.523)***	1.98 (0.235)***	1.86 (0.228)***
Observations	3,302	3,168	3,406	3,110
R-squared	0.138	0.082	0.196	0.174

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A11: LATE estimates, (lower bounds) for practices (endline data)

VARIABLES	(1) General	(2) Innovation	(3) Marketing	(4) Record
perparticipationT2	2.23 (0.171)***	7.52 (0.821)***	4.00 (0.305)***	2.59 (0.295)***
perparticipationT1	2.27 (0.137)***	6.79 (0.638)***	4.15 (0.245)***	2.70 (0.260)***
Observations	4,094	3,797	4,121	3,576
R-squared	0.331	0.226	0.370	0.228

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Finally, consider the extreme bounds for our profit variables (we only consider variables that entered statistically significantly in the main analysis). Table A12 presents the ITT results and Table A13 presents the LATE results.

Table A12: ITT estimates (lower bounds), for profits

VARIABLES	(1) last month profit	(3) normal month profit	(4) last month main profit
End_T2	1,276 (1,371)	763 (872)	2,473 (2,028)
End_T1	2,111 (805)***	999 (606)*	1,735 (1,088)
Observations	1,618	1,618	796
R-squared	0.019	0.018	0.013

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A13: LATE estimates (lower bounds), for profits

VARIABLES	(1) Last month profits	(2) Normal month profits	(3) Last month main profit
Z2	1,805 (1,915)	1,079 (1,219)	3,040 (2,435)
Z1	2,899 (1,106)***	1,372 (830)*	2,167 (1,349)
Observations	1,618	1,618	796
R-squared	0.017	0.017	0.014

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1