

Heuristics on Call: The Impact of Mobile Phone Based Business Management Advice

Shawn Cole, Mukta Joshi, and Antoinette Schoar *

January 27, 2023

Abstract

There is growing evidence that business training for micro-entrepreneurs can be effective. In-person training can be expensive and imposes costs on the target beneficiaries. This paper presents the results of a two-site randomized control trial evaluating the effectiveness of a light-touch, mobile phone-based business training for micro-entrepreneurs in India and the Philippines. We find that the training had a statistically significant impact on the adoption of improved business practices, with an increase of 0.07 to 0.13 standard deviation points. We find no evidence of impacts on sales or profits, though the confidence intervals are wide enough to include meaningful effect sizes (positive or negative). These results suggest that mobile phone-based training can be a cost-effective and scalable way to impart business skills to micro-entrepreneurs.

*Cole: Harvard Business School, scole@hbs.com; Joshi: idea42, mjoshi@ideas42.org; Schoar: Massachusetts Institute of Technology - Sloan School of Management, aschoar@mit.edu.

1 Introduction

There are approximately 420 - 510 million micro, small, and medium enterprises (MSMEs) around the world International Finance Corporation (2013). MSMEs account for about 90% of businesses and over 50% of employment worldwide International Council for Small Business (2019) and employ a majority of the population in many low-income countries International Finance Corporation (2013). A majority of MSME entrepreneurs do not receive training or support to help them manage the financial complexity of a small enterprise. And yet we know that in-person training programs based on simple business management heuristics or “rules of thumb” can significantly improve micro-entrepreneurs’ business practices and firm revenue in low-income country settings Drexler et al. (2014).

We run a two-site field experiment whose primary purpose is to examine whether financial heuristics training – delivered via mobile phone technology – can affect the management practices of micro-entrepreneurs and improve firm outcomes. The mobile phone based delivery of this training seeks to overcome key barriers that may hamper the efficacy and reach of “traditional” business training courses. First, such courses are costly; per-pupil direct cost estimates often range from \$20 to above \$750, and these estimates do not factor in the value of the entrepreneurs’ time McKenzie (2020). These programs are often subsidized by governments van Lieshout and Mehtha (2017) and few, if any, charge tuition to beneficiaries, suggesting a low willingness to pay. Developing low-cost measures to reach MSME owners may be particularly important, as a recent meta-analysis finds effects of such programs are positive, but modest in size (McKenzie and Woodruff (2013) and McKenzie (2020)).

In contrast to traditional training, distilling information into actionable, simple rules of thumb may lower adoption barriers and improve financial management even in the absence of complete understanding of accounting or business planning Feldman (2003); Maddox et al. (2008). Financial heuristics or rules of thumb which lighten the cognitive burden of learning useful financial management skills may therefore be more effective for many micro-entrepreneurs in low-income countries who face frequent scarcity of money and time. Drexler et al. (2014), in a field experiment in the Dominican Republic, demonstrate that

in-person classroom training of this sort can improve micro-entrepreneurs’ management practices and revenues. Arráiz et al. (2019) use a randomized controlled trial to test the effects of a traditional training program relative to the effects of a tailor-made heuristics based program for micro-entrepreneurs in Ecuador and find statistically and economically meaningful incremental effect sizes on sales and profit of the tailored-heuristics training.

We build on that prior work and roll out similar financial heuristics training via lower-touch mobile phone delivery. A key advantage of mobile delivery is that programs can scale quickly, at low cost, with high fidelity (a recorded message is identical whether sent to one thousand or one million people, while scaling traditional “train the trainers” programs could require significant human resources and management). Partnering with microfinance institutions in a two-site field experiment in the Philippines and India, we deliver weekly audio messages to micro-entrepreneurs with financial heuristic training content. Combining our various recommended practice into a binary indicator of improved practices, we find this low-touch intervention increases adoption of recommended practices (on our binary scale) by 0.01 to 0.02 (0.07 to 0.13 standard deviation points), roughly 20%-40% of the effect size found in McKenzie (2020)’s meta-analysis of higher-cost and higher-touch traditional classroom training programs. While we do see evidence of change in business practices, effects on sales and profits are substantially noisier and our point estimates of effects are statistically indistinguishable from zero.

We contribute to two broad strands of related literature. The first is on managerial skill, firm productivity and economic growth. Managerial skill can contribute to firm productivity Bruhn et al. (2010). Some businesses in low-income country settings employ poor business practices Bloom et al. (2012) and these practices hamper productivity Hsieh and Klenow (2009). McKenzie (2020) provides a comprehensive review of the managerial training literature. While some individual studies find that customized management consulting advice can improve management practices and firm outcomes Bloom and Van Reenen (2010), Bruhn et al. (2018), dalla Pellegrina et al. (2021), others are underpowered to detect meaningful effects on sales and profits. McKenzie (2020)’s meta-analysis finds positive effects on profits and sales in the

order of magnitude of 5 to 10 percentage points.

Relative to this literature we find a much lower-touch intervention, mobile-phone based heuristic financial advice, delivered over a longer period of time, in our preferred specification, can have 20-40% of the effect of these much higher-touch interventions. Our intervention is longer lasting and less affected by the attendance and attrition problems other studies have faced.¹ It is, additionally, in sites where few papers in this literature have reported on.²

In this literature our work is perhaps most closely related to Acimovic et al. (2020), which reports on a field experiment conducted by a mobile network operator with the goal of encouraging its independent sales agents to improve their inventory management. Agents who received both in-person training and explicit recommendations improved their performance.

We also contribute to the literature on digital service delivery, more generally, in low-income countries. Cole and Fernando (2020) find that agricultural advice delivered via a phone-based platform improves farmer decision making, and a meta-analysis by Fabregas et al. (2019) suggests that such approaches are effective at increasing agricultural yield in a variety of contexts. Aker et al. (2012) find that basic skills can be taught via mobile phone. We extend this to show that heuristic based training delivered via mobile phones can in fact change entrepreneurs' behaviour.

2 Setting: Training and Intervention

This experiment was run in two sites, one in the Philippines and the other in India. MSMEs employ a substantial share of the national labour force in both countries: MSMEs are 99% of all registered enterprises in the Philippines CPBRD (2020) and employ approximately 63 million workers in India Ministry of Micro and Medium Enterprises (2019). Additionally, both coun-

¹Many traditional training programs last a week or less. In our setting participants do not need to travel to receive the training content and we see very limited attrition. We conjecture the borrowing relationships between our participants and partner microfinance institutions lead to the low levels of attrition in our sample

²We found no studies set in the Philippines, and only one in India, which evaluates the impact of business training on micro-entrepreneurs. dalla Pellegrina et al. (2021) find management training offered by a microfinance organization in India has a positive effect on financial management skills. Bloom et al. (2012) was conducted in India, but involves an intense management consulting program.

tries have relatively high mobile phone penetration International Telecommunication Union (2019).

In both sites we collaborated with a trusted local micro-finance institution (MFI) to roll out the mobile-phone based heuristic training to entrepreneurs randomized into treatment. In the Philippines we worked with member entrepreneurs of the Negros Women for Tomorrow Foundation (NWTF) MFI and in India we worked with Janalakshmi. In collaboration with these partners we conducted extensive qualitative interviews with micro-entrepreneurs to understand the bottlenecks their businesses face, the kinds of training that would be useful and different delivery alternatives of content that would be more or less engaging. We ran a robust pilot phase of this study which differed materially in execution, but was similar in spirit. (That pilot found no effects on behaviour or business outcomes.) Refinements to that pilot – in content, delivery method, technology partners, etc. – in conjunction with micro-entrepreneurs’ interviews informed the structure of this intervention.

Treated entrepreneurs received a 30-minute in-person orientation to the training module that they would receive over the subsequent 20+ weeks via pre-recorded weekly interactive voice response (IVR) messages on their mobile devices. The in-person orientation sessions were held in group settings with 25-30 treated entrepreneurs in each session.³ The orientation session had three objectives. First, they introduced the training program to the treated MFI clients and made them aware of what to expect over the coming weeks. Second, it ensured the MFI clients knew how to use their mobile phones to receive incoming IVR calls.⁴ And finally the in-person orientation introduced clients to the concept of “cash separation”, one of the four key pillars of the training curriculum.⁵

³Clients who were unable to attend the in-person training were oriented individually.

⁴The IVR service was based on outgoing “push” calls, which automatically called MFI clients and played a recorded message when MFI clients answered the phone. Treated clients could also dial the training phone number and leave a missed call in order to trigger a call back to listen to the previous two weeks’ messages. These outbound weekly calls were free for treated MFI clients. The decision to use voice calls meant that all mobile phone types were compatible with the service, and sidestepped concerns about literacy with text-based training.

⁵Our partners felt in-person orientation was necessary due to the novel nature of mobile-phone service delivery. Our overall treatment can be thought of as a bundle of financial heuristics delivered via mobile phone and this brief in-person orientation. The majority of treated clients received the training: 95% in the Philippines and 92% in India.

The training curriculum was developed by a partner non-profit, ideas42, that oversaw the overall execution and project management of the field experiment. They did so in concert with extensive field interviews with partner institutions and micro-entrepreneurs and learning from the pilot study. The training curriculum was built off of Drexler et al. (2014) and contained simple rules of thumb on financial management organized into four modules:

1. *Cash Separation (Profit Calculation)*: Presented micro-entrepreneurs with simple action steps around how to separate business and household cash, and to pay themselves a fixed weekly salary, in order to better monitor their own business' profitability
2. *Customer Credit*: Provided simple rules of thumb on when and when not to offer credit to customers.
3. *Inventory Management*: Presented simple action steps on how to manage inventory of a retail business.
4. *Supplier Management*: Provided action steps on selecting reliable suppliers that offer the best price and product quality.

The specific heuristics taught are provided in Online Appendix XX with some example messages. Clients were introduced to the first module at the brief in-person orientation session where they were given two handouts in their local language. One summarized how to access the training service via their phones and the second was a visual aid describing the concept of cash separation between household and business.

The core of our intervention was 3-4 minute long audio messages delivered each week via IVR calls to treated entrepreneurs. Entrepreneurs were called at their preferred times, which they specified at the in-person orientation. Entrepreneurs could ring the training number and receive a free call back with training content from that week as well as the previous week. Calls were free to participants. The training was delivered in a soap opera format to bolster engagement. The lead character (voice actor) in the series played the part of a successful small business owner with years of experience who offered the micro-entrepreneurs practical

tips on business management that she had learned over the years from running her own business. The messages were delivered to the treated entrepreneur in their local language weekly for a total of 21 weeks in the Philippines (between August 2016 and January 2017) and 22 weeks in India (between August 2016 and March 2017).⁶ The per participant cost of training delivery (airtime only) in India was \$2.04 for messages in Hindi (total of 73 minutes) and \$2.38 for messages in Kannada (total of 85 minutes). In the Philippines, where airtime charges are much higher, the per participant cost of training delivery was \$14.99 (total of 81 minutes).⁷

We work with microfinance institutions, which have been extensively studied. Banerjee et al. (2015), as well as Meager (2022) summarize this evidence, and, importantly, find heterogeneous effects, with limited impact for the median borrower, but large gains for borrowers at the upper tail. Our study seeks to measure the incremental benefit of advisory services on top of credit.

3 Experimental Design

The two-site experiment was conducted in the Philippines and in India. We describe the experimental design in each setting in turn.

The field experiment in the Philippines ran from March 2016 to June 2017. Our sample was drawn from active group loan clients of our partner MFI. In order to be eligible for the experiment clients had to speak Hiligaynon, manage a retail business and have access to a mobile phone. From March to June 2016, we conducted the baseline data collection exercise consisting of in-person interviews with eligible clients to gather detailed information on their demographics, business ownership, financial and managerial practices, and business outcomes. A total of 2,096 clients were interviewed. We then randomly assigned them into a control arm (1,030 clients) and a treatment arm (1,066 clients). As the clients were beneficiaries of

⁶The India sample was augmented after the start of the experiment in a manner we explain Section 3.

⁷Because content from a successful intervention could quite easily be scaled to reach hundreds of thousands (or even millions) of entrepreneurs, we focus on marginal costs, rather than the content development cost. The primary content development costs were staff time of ideas42.

group loans, randomization was carried out at the group level to account for the possibility of spillovers; 676 groups were randomly assigned to treatment and 675 into control. We stratified group randomization by the number of members in each group (which ranged from one to five). We did this to ensure an equal number of treatment and control clients for each stratum of group size.

The in-person orientation sessions, described in Section 2, for clients assigned to the treatment arm were held at community-level group meeting sites where group members met on a weekly basis. 78% of treatment beneficiaries attended the group orientation sessions. Our partner MFI contacted those clients who were unable to attend initially for make-up orientation held in group or individual settings. Roughly 5% of treatment beneficiaries did not receive any orientation.

Heuristic training messages were sent out for a total of 21 weeks between August 2016 and January 2017 in the Philippines. We conducted the in-person endline surveys between April and June 2017. We managed to survey a total of 2,047 beneficiaries at the endline out of the baseline sample of 2,096.

The field experiment in India ran from March 2016 to July 2017. Our sample in this site was drawn from individual loan clients of our partner MFI. In order to be eligible for our sample, clients had to speak Kannada, Hindi or Urdu, and - just as in the Philippines - manage a retail business and have access to a mobile phone.

We began with a total sample of 2,407 clients in Bangalore (henceforth referred to as Wave-1). We increased our sample by a further 1,442 beneficiaries (Wave-2) midway through the experiment in order to increase our study’s statistical power. The Wave-2 sample was drawn based on the same eligibility criteria and included clients from Bangalore, Mysore, Davangere, Gulbarga, Indore, and Delhi. We conducted the baseline data collection for Wave-1 beneficiaries between March and May of 2016. We did not conduct a baseline survey for Wave-2 beneficiaries.

In India randomization was conducted at the individual level. For Wave-1 beneficiaries randomization was stratified by MFI branch in order to ensure an equal number of treatment

(1,203 clients) and control clients (1,204) in each branch. Wave-1 randomization was conducted after baseline data collection. Wave-2 randomization was also conducted at the individual level but stratified by region and language to ensure an equal proportion of treatment (721 clients) and control (721 clients) beneficiaries in each region and for each language.

The in-person orientation sessions for this site were held in our partner MFI's local offices. Only 22% of beneficiaries attended these sessions. We followed up with non-attendees individually for make-up orientation conducted on individual bases. 70% of treatment beneficiaries received individual make-up orientation sessions.

Heuristic training messages were sent out for a total of 22 weeks in India. Wave-1 beneficiaries received messages from August to December 2016 and were interviewed for endline data collection between April and June 2017. Wave-2 beneficiaries received messages from October 2016 to March 2017. Their endline surveys were conducted between June and July 2017. We managed to survey a total of 3,318 beneficiaries at the endline out of the baseline sample of 3,849.

4 Data and Estimation Strategy

4.1 Data

Our primary data sources are the in-person interviews conducted at baseline and endline for our study participants. The endline surveys in both sites were conducted in private, one-on-one interviews between enumerators and the entrepreneurs, who were informed that the financial institution would not have access to their individual data. We rely on self-reported measures of firm productivity, which are imperfect de Mel et al. (2009), but allow for comparability to a number of other studies.

We augment these survey responses with administrative data about the entrepreneurs in our sample from our partner MFIs. We also collect pick-up and listenership data from our IVR platform provider to gauge engagement of the treated clients with the training content.

Tables 1A & 1B report baseline summary statistics and balance tests for our two sam-

ples. In the Philippines our typical study participant is, on average, a 45 year old female entrepreneur, who in 70% of cases has a high-school diploma. In the Philippines 53% of the sample entrepreneurs report that their current business is their primary source of income. The sample in India is somewhat different. The typical study participant is, on average, a 38 year old female entrepreneur. Only 35% of the Indian sample has a high-school diploma and 49% report that their business is their primary source of income.

The second panel reports a snapshot of the business practices sampled entrepreneurs adopt at the baseline. In the Philippines, 68 percent report they separate business and household cash, 77 percent calculate profits, 78 percent give credit for no more than seven days, 77 percent keep business records, 70 percent keep records of customer credit, 68 percent record important information of customer credit, and 76 percent take full advantage of cash discounts offered by suppliers. These baseline adoption measures are similar to those in Drexler et al. (2014) in the Dominican Republic wherein 74 percent of sampled entrepreneurs reported separating business and personal cash, 66 percent kept reports of their accounts and 81 percent formally calculated their revenues.

Baseline adoption of recommended business practices is considerably lower in India, as Table 1B illustrates. Of the sampled entrepreneurs at baseline (Wave-1), only 35 percent separate household and business cash, 18 percent calculate profits, 28 percent give credit to customers for a week and only 40 percent keep business records. Unlike the Philippines, only 42 percent keep records of customer credit, 10 percent note important customer credit details and 39 percent take advantage of cash discounts offered by suppliers.

Average sales for sampled entrepreneurs are about 6,094 pesos in the Philippines and 14,115 Rupees in India. Profits in a regular week are, on average, 2,344 pesos in the Philippines and about 5,233 Rupees in India. In Drexler et al. (2014) average week sales were on average 6,399 Dominican Pesos.⁸

In comparing the two study sites, we note the baseline adoption of recommended practices

⁸Exchange rate in 2016: India: USD 1=INR 67.18; The Philippines: USD 1= PHP 47.49. The intervention in Drexler et al. (2014) was implemented in the Dominican Republic between March and May 2007 at which time the exchange rate was roughly 1 USD = 33 Dominican Pesos. Exchange rates sourced from: <https://www.exchangerates.org.uk/>.

is substantially higher in the Philippines. This may be due to the higher level of education of the Filipino entrepreneurs in our sample (72% high school or better versus 34%) since education level and business practices are positively correlated (correlation not reported). Additionally, the market structures likely vary substantially across the two sites. An important strength of this study is that it tests whether similar business training can affect business practices in three different settings.

We finally note the average age of entrepreneurs ranges from 38 (India) to 45 (Philippines); to examine the hypothesis that older individuals may be “set in their ways” we will measure treatment heterogeneity by age in our analysis.

We also present the listenership rates in India and the Philippines in Tables 2A and 2B. These rates provide a snapshot of participant engagement with our program. The average pickup rate across the two countries was 76%. However, the listenership rate conditional on pickup across the two countries was 71%.

4.2 Estimation Strategy

The primary purpose of our study was to examine whether mobile phone based technology could affect business practices and firm productivity. Our study was inspired by Drexler et al. (2014), and thus we focus on the outcomes identified in that paper, namely, business practices, sales, and profits.⁹ Since treatment was randomly assigned, the differences estimator, specified in the model below, provides unbiased estimates of our target estimand – the training’s average treatment effect:

$$y_i^E = \alpha + \beta T_i + \gamma W_i + y_i^B + \varepsilon_i \quad (1)$$

where y_i^E is the endline outcome of interest, T_i is a treatment dummy, W_i is a vector of controls and y_i^B is the baseline measure of the outcome variable and is included where available.¹⁰

⁹We did not create a pre-analysis plan.

¹⁰Covariates in the Philippines include location, age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification: number of clients in each group. Covariates in India include wave dummy, time of survey, gender, age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification: branch and language.

The outcomes of interest are business practices, sales and profits. Our business practice measures collected at endline were enumerated on a three point scale, with 1 being the least desired and 3 being the most desired outcome in reference to the practices taught in the training. For instance, we asked how often do entrepreneurs call customers whose credit is due. If an entrepreneur said “None of the time” that would get a score of 1, “Some of the time” that would get a score of 2, and “Often / all of the time” that would get a score of 3. Much of the literature reports business outcomes as binary practices, rather than ranges that we use. For example, de Mel et al. (2009) states “for every 20 practices that business training attempts to teach firms to do, on average firms invited to training only implement one additional practice.” To provide some (admittedly imperfect) comparability, for each business practice, we convert our three-value range into a binary variable.^{11,12} We report both results in our outcome table but discuss the binary index measure for comparability to other papers.

In terms of productivity measures we take “regular week” sales and profits as our outcomes of interest. We report these in levels winzorised at the 1% level as well as in logs.¹³ For both sales and profits, respondents were asked three questions at endline. The first two included enumeration of sales / profits on the previous day and an assessment of whether the previous day’s profits were ‘good’, ‘bad’ or ‘regular’. This was followed by respondents being asked to report sales / profits in a typical week.¹⁴

Under this baseline model standard errors are clustered at the group level in the Philippines

¹¹We do this by assigning the low value 0, the high value 1, and the intermediate value to zero if there are more highs than lows for that item, or to 1 if there are more lows than highs. This, in effect, passes our three point scale through an above / below median filter to convert it into a binary outcome.

¹²The relevant business practices include separating business and household cash, paying a fixed weekly salary to self, calculating profits, giving credits for no more than seven days, calling the customers whose credit is due, keeping business and credit records, buying more of the most popular products and less of the least popular products, visiting competitors to check out price, talking to customers to check out need, introducing new product, comparing price and quality of various suppliers, negotiating prices and terms with suppliers, and taking advantage of cash discount.

¹³We note regarding the log transformation that no entrepreneurs in our sample reported null or negative profits for a “regular week”.

¹⁴The precise wording of the sales question was: “(1) What were the sales in your business yesterday? (Sales from primary business only); (2) How would you classify yesterday in terms of sales?; (3) Can you tell us what the average sales per week are in your business?” Respondents were asked the same question for profits.

given the weekly-group meetings in that setting. We report heteroskedasticity robust standard errors in India where randomization was done at the individual level.

We also test for heterogenous treatment effects along four dimensions of heterogeneity, namely, the entrepreneur’s level of education, age, business size and baseline adoption of recommended business practices. We do so by running the following model on our full sample

$$y_i^E = \alpha + \beta_1 T_i + \beta_2 X_i + \beta_3 T_i * X_i + \gamma W_i + y_i^B + \varepsilon_i \quad (2)$$

where X_i is a dummy that is turned on when the entrepreneur has an above median measure of the relevant axis of heterogeneity being tested. For instance, for age $X_i = 1$ if the entrepreneur is as old or above the median age of the sample and zero otherwise. In this model, $\hat{\beta}_3$ is the estimate of interest. We calculate and report Anderson (2008) sharpened q-values, to correct for multiple hypothesis testing in our heterogeneity analysis.

5 Results

5.1 Uptake & Engagement

We begin by reporting take-up and engagement with the training content in Tables 2A & 2B. In India, the mean (median) number of calls answered was 16.7 (19), while in the Philippines it was 15.3 (18). We present the summary statistics of uptake and engagement with the heuristic training content in Tables 2A & 2B. The uptake of the program, as measured by pick-up rates, was high - with around three quarters of calls picked up across all four training modules in both sites. Moreover, participants were engaged with the training as listenership rates were above 60% in the Philippines and about 50% in India¹⁵. Participants were more engaged with the first two modules, which covered cash separation and customer credit, compared to the later modules on inventory/supplier management. Additionally, around 32%

¹⁵We calculate a listenership rate as the total number of minutes listened to by a participant divided by the total number of minutes of contents the participant would have heard had they listened to all messages. A participant who never answered a call would be 0%.

of treated beneficiaries in the Philippines used the missed call service at least once and about 40% did so in India.

As part of our endline data collection, we collected participants' feedback on the training. 78% of the training participants in the Philippines and 62% of the training participants in India reported that they were likely to recommend this training program to their family, friends, and other business owners like them.

Tables 3A & 3B report predictors of engagement with the training content. Pick-up and listenership rates increase with age in the Philippines and do not in India. Owning a cellphone (as opposed to having access via some other means, say a family member, for instance) is the strongest predictor of engagement with the training calls in both contexts. [Comment on education Table which requires clarification.] Engagement does not appear to vary materially by other covariates.

5.2 Impact on Practices and Productivity

We report our main experimental findings in Table 4. Financial heuristics training delivered via mobile phones increases the adoption of recommended business practices by 0.01 (India) - 0.02 (Philippines) on our unweighted average binary business practice index. These results are significant at the 10% and 5% levels respectively. The magnitude of this change in business practices is 0.07 - 0.13 standard deviation points, an effect size of 20% - 40% of the magnitude of the effect of traditional training programs suggested by McKenzie (2020)'s meta-analysis. The results are of comparable magnitude but more statistically significant when expressed on the three point range over which initial survey responses were enumerated.

We find no statistically significant changes in firm productivity. Point estimates are positive for revenues in the Indian sample and mildly negative in the Philippines. Point estimates for profits are near zero for both samples as well. For both sales and profits in both sites none of the productivity measures are statistically distinguishable from zero at the 10% confidence level.

Attrition is relatively low in both the Philippines (treatment (9.1%) and control (9.81%))

and India (treatment (13.88%) and control (13.71%)). In both settings the attrition rate is statistically indistinguishable across treatment and control groups. We test for evidence of differential attrition by testing whether there is a statistically significant difference in baseline variables between the treatment and control observations in the attrited samples. We find no statistically significant difference (Online Appendix Table X).

Why might we not observe the same positive, statistically significant effects on sales and profits in our sample as Drexler et al. (2014) report in the Dominican Republic? We explore a number of possibilities. One possibility is that mobile phone based intervention is simply weaker: while the barriers to attendance were lower, the total “contact time” in this intervention was much less (an average of XX minutes, as opposed to YY minutes of contact in Drexler et al. (2014)).¹⁶ Another possible explanation is that generalized heuristics are not optimized for specific entrepreneurs and as such will not drive growth in sales and profits in some specific settings for some entrepreneurs. Respondents in India were affected by a demonetization policy that negatively impacted business. Moreover, there is in fact very little systematic evidence isolating the *specific* business practices that drive the most sales and profit growth. Like most of the literature, this paper evaluates a bundled program, based on the best curriculum we could devise. But perhaps the suggestion of credit limits for certain customers in some contexts, for example, might have limited sales.

To summarize our main finding, the primary purpose of our study was to examine whether mobile phone based training could affect business practices. While we do see evidence of change in business practices, a shortcoming of our approach is that we have limited information on financial performance. While our business practices are relatively precisely measured, financial outcomes such as sales and profits, are unfortunately substantially noisier. Even with a sample of 3,849 entrepreneurs in India and 2,096 in the Philippines, our standard error is approximately 5% of the sample mean, which prevents us from ruling out meaningful economic effects.

¹⁶An alternative possibility is that entrepreneurs in the Dominican Republic respond more to business training; unfortunately, achieving a necessary sample size for a mobile-phone based intervention in the Dominican Republic may have been impossible.

Like most evaluations in this literature, we evaluate only one program, and are therefore unable to answer important questions such as whether training combined with credit is more effective than training alone, or whether the identity of the provider of information affects take-up. These are important design questions, and we do note that a digitally designed and delivered service, such as the one we evaluate, may be particularly well suited to investigate these questions, through for example a series of A/B tests with a large population.

5.3 Heterogeneity Analysis

There is no reason to believe that treatment effects must be homogenous, and the differential findings in the Dominican Republic, India, and the Philippines suggest it is worth exploring treatment heterogeneity. Tables 5 & 6 report heterogeneous effects, as estimated by Equation (2), along the dimensions we expect to matter most.

We focus on four dimensions of heterogeneity, namely, the entrepreneur’s level of education, age, business size, and baseline adoption of recommended business practices. Differences along the education dimension allow us to understand if the effectiveness of training depends on the baseline level of human capital where we predict that micro-entrepreneurs with lower levels of educational attainment might be able to understand and apply the practices equally well as micro-entrepreneurs with higher levels of educational attainment given that the rule of thumb training is designed to be relatively easy to implement regardless of one’s educational background. We examine the hypothesis that older individuals may be “set in their ways” by measuring treatment heterogeneity by age in our analysis.

Testing along business size (baseline regular week sales used as a proxy) helps us examine if there are differential treatment effects for small versus large businesses. micro-entrepreneurs with larger businesses may be less willing to change practices that have enabled them to reap larger sales. Additionally, micro-entrepreneurs with lower sales may have a greater incentive to learn and adopt more effective practices to increase their sales.

Finally we also test for treatment heterogeneity by baseline business practice adoption. We hypothesize that micro-entrepreneurs with lower baseline adoption of recommended financial

practices may have larger room for improvement and thereby see greater gains from the training.

As Tables 5 & 6 illustrate, we find evidence of heterogeneous treatment effects in the Philippines. Specifically, we find the treatment to be twice as effective among young entrepreneurs compared to older entrepreneurs, and to be substantially more effective among small businesses. In India, we find no evidence of heterogeneity among these four dimensions of heterogeneity.

The results in the Philippines suggest the training is more effective at changing the behaviour of younger entrepreneurs who are likely less set in their business practices. This is consistent with the effect size being larger for small businesses as well, as they might have greater flexibility to change and adopt new practices.

6 Conclusion

This paper presents the results of a two-site randomized experiment assessing the impact of mobile phone based financial heuristics training on micro-entrepreneur's practices and firm productivity. The training intervention was taken up by most entrepreneurs and the majority engaged with the content as Table 2 illustrates. We find that the training led to a significant improvement in business practices amongst the treated micro-entrepreneurs. The effect size estimate on improved business practices ranges between 0.07 and 0.13 standard deviation points of our practice adoption index. In the wider literature that focuses on much higher-touch interventions, effect sizes of the order of magnitude of 20%-40% are found.

The paper extends the work in the managerial skill, training and firm productivity literature. The focus on a mobile-phone based intervention allows for a greater scalability due to lower costs. The more modest effect sizes might be more beneficial on a cost-benefit basis since the marginal cost of extending this training to other entrepreneurs is negligible.

References

- ACIMOVIC, J., C. PARKER, D. DRAKE, AND K. BALASUBRAMANIAN (2020): “Show or Tell? Improving Inventory Support for Agent-Based Businesses at the Base of the Pyramid,” <http://dx.doi.org/10.2139/ssrn.3186575>.
- AKER, J. C., C. KSOLL, AND T. J. LYBBERT (2012): “Can Mobile Phones Improve Learning? Evidence from a field experiment in Niger,” *American Economic Journal: Applied Economics*, 4, 94–120, 10.1257/app.4.4.94.
- ANDERSON, M. L. (2008): “Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects,” *Journal of the American Statistical Association*, 103, 1481–1495, 10.1198/016214508000000841.
- ARRÁIZ, I., S. P. BHANOT, AND C. CALERO (2019): “Less is More: Experimental Evidence on Heuristic-Based Business Training in Ecuador,” *DB Invest Working Paper TN*, 18, <https://idbinvest.org/en/download/8300>.
- BANERJEE, A., D. KARLAN, AND J. ZINMAN (2015): “Six Randomized Evaluations of Microcredit: Introduction and Further Steps,” *American Economic Journal: Applied Economics*, 7, 1–21, 10.1257/app.20140287.
- BLOOM, N., B. EIFERT, A. MAHAJAN, D. MCKENZIE, AND J. ROBERTS (2012): “Does Management Matter? Evidence from India *,” *The Quarterly Journal of Economics*, 128, 1–51, 10.1093/qje/qjs044.
- BLOOM, N., AND J. VAN REENEN (2010): “Why Do Management Practices Differ across Firms and Countries?” *Journal of Economic Perspectives*, 24, 203–24, 10.1257/jep.24.1.203.
- BRUHN, M., D. KARLAN, AND A. SCHOAR (2010): “What Capital Is Missing in Developing Countries?” *American Economic Review*, 100, 629–33, 10.1257/aer.100.2.629.

——— (2018): “The Impact of Consulting Services on Small and Medium Enterprises: Evidence from a Randomized Trial in Mexico,” *Journal of Political Economy*, 126, 635–687, 10.1086/696154.

COLE, S. A., AND A. N. FERNANDO (2020): “‘Mobile’izing Agricultural Advice Technology Adoption Diffusion and Sustainability,” *The Economic Journal*, 131, 192–219, 10.1093/ej/ueaa084.

CPBRD (2020): “MSMEs in the Philippines,” Congressional Policy and Budget Research Department - Congress of the Philippines.

DE MEL, S., D. J. MCKENZIE, AND C. WOODRUFF (2009): “Measuring microenterprise profits: Must we ask how the sausage is made?” *Journal of Development Economics*, 88, 19–31, <https://doi.org/10.1016/j.jdeveco.2008.01.007>.

DREXLER, A., G. FISCHER, AND A. SCHOAR (2014): “Keeping It Simple: Financial Literacy and Rules of Thumb,” *American Economic Journal: Applied Economics*, 6, 1–31, 10.1257/app.6.2.1.

FABREGAS, R., M. KREMER, AND F. SCHILBACH (2019): “Realizing the potential of digital development: The case of agricultural advice,” *Science*, 366, eaay3038, 10.1126/science.aay3038.

FELDMAN, J. (2003): “The Simplicity Principle in Human Concept Learning,” *Current Directions in Psychological Science*, 12, 227–232, 10.1046/j.0963-7214.2003.01267.x.

HSIEH, C.-T., AND P. J. KLENOW (2009): “Misallocation and Manufacturing TFP in China and India*,” *The Quarterly Journal of Economics*, 124, 1403–1448, 10.1162/qjec.2009.124.4.1403.

INTERNATIONAL FINANCE CORPORATION, I. (2013): “Small and Medium Enterprise Finance: New Findings, Trends and G-20/Global Partnership for Financial Inclusion Progress,” <https://openknowledge.worldbank.org/handle/10986/21727>.

INTERNATIONAL TELECOMMUNICATION UNION, I. (2019): “World Telecommunication/ICT Indicators Database,” 10.7910/DVN/IP5UBV.

VAN LIESHOUT, S., AND P. MEHTHA (2017): “THE NEXT 15 MILLION Start and Improve Your Business Global Tracer Study 2011-15,” The International Labour Organization, https://www.ilo.org/empent/areas/start-and-improve-yourbusiness/WCMS_178124/lang--en/index.htm.

MADDOX, W. T., C. L. BRADLEY, B. D. GLASS, AND J. V. FILOTEO (2008): “When more is less: Feedback effects in perceptual category learning,” *Cognition*, 108, 578–589, <https://doi.org/10.1016/j.cognition.2008.03.010>.

McKENZIE, D. (2020): “Small Business Training to Improve Management Practices in Developing Countries: Reassessing the Evidence for “Training Doesn’t Work”,” *World Bank Open Knowledge Policy Research Working Papers*, 9408, <https://openknowledge.worldbank.org/handle/10986/34506>.

McKENZIE, D., AND C. WOODRUFF (2013): “What Are We Learning from Business Training and Entrepreneurship Evaluations around the Developing World?,” *The World Bank Research Observer*, 29, 48–82, 10.1093/wbro/lkt007.

MEAGER, R. (2022): “Aggregating Distributional Treatment Effects: A Bayesian Hierarchical Analysis of the Microcredit Literature,” *American Economic Review*, 112, 1818–47, 10.1257/aer.20181811.

MINISTRY OF MICRO, S., AND I. MEDIUM ENTERPRISES (2019): “Annual Report 2019-20,” Ministry of Micro, Small and Medium Enterprises - Government of India.

DALLA PELLEGRINA, L., M. SKULLY, T. WALKER, P. WANKE, AND M. WIJESIRI (2021): “Does ownership structure affect firm performance? Evidence of Indian bank efficiency before and after the Global Financial Crisis,” *American Economic Journal: Applied Economics*, 29, 1842–1867, <https://doi.org/10.1111/itor.13072>.

INTERNATIONAL COUNCIL FOR SMALL BUSINESS, I. (2019): “Annual Global Micro, Small and Medium-sized Enterprises Report.”

TABLE 1A: Summary Statistics & Balance-Philippines

Variable	N (1)	Total Sample (2)	Control (3)	Treatment (4)	Difference (p-value) (3)-(4)
A. Client Characteristics					
Age	2096	44.688 (11.08)	44.734 (11.18)	44.644 (10.97)	0.09 (0.85)
Female	2096	0.998 (0.05)	0.999 (0.03)	0.996 (0.06)	0.003 (0.19)
Education					
Completed High School	2096	0.53 (0.50)	0.53 (0.50)	0.53 (0.50)	0 (1.00)
Business Type					
Retail: Food	2096	0.524 (0.50)	0.533 (0.50)	0.516 (0.50)	0.017 (0.43)
B. Business Practices					
Do Separate Business & Household Cash	2096	0.683 (0.47)	0.676 (0.47)	0.689 (0.46)	-0.014 (0.50)
Do Pay Salary to Self	2096	0.152 (0.36)	0.141 (0.35)	0.162 (0.37)	-0.022 (0.17)
Do Calculate Profit	2096	0.772 (0.42)	0.763 (0.43)	0.782 (0.41)	0.019 (0.29)
Give customers credit for at most 7 days	1793	0.779 (0.42)	0.759 (0.43)	0.797 (0.40)	-0.038* (0.05)
Do nothing when customers do not pay credit	2096	0.102 (0.30)	0.1 (0.30)	0.104 (0.31)	-0.004 (0.76)
Keep Business Records	2096	0.771 (0.42)	0.773 (0.42)	0.77 (0.42)	0.003 (0.89)
Keep Customer Credit Records	1802	0.701 (0.46)	0.72 (0.45)	0.684 (0.47)	0.036* (0.10)
Determine stock based on a good strategy	2096	0.239 (0.43)	0.232 (0.42)	0.246 (0.43)	-0.014 (0.46)
Never Visit competitors to check prices/quality	2096	0.758 (0.43)	0.775 (0.42)	0.742 (0.44)	0.033* (0.08)
Never Talk to customers to understand needs	2096	0.532 (0.50)	0.541 (0.50)	0.523 (0.50)	0.017 (0.43)
Never do supplier quality comparison	2096	0.388 (0.49)	0.396 (0.49)	0.38 (0.49)	0.016 (0.45)
Never Negotiated terms with suppliers	2096	0.504 (0.50)	0.514 (0.50)	0.495 (0.50)	0.018 (0.40)
Took full advantage of cash discount	592	0.762 (0.43)	0.757 (0.43)	0.766 (0.42)	-0.01 (0.79)
D. Business Performance					
Sales-Regular Week (Winsorized at 1%) in INR	1930	6093.881 (7917.27)	6287.659 (8647.28)	5908.357 (7148.40)	379.302 0.29
Profits-Regular Week (Winsorized at 1%) in INR	1961	2343.967 (2702.36)	2297.904 (2612.48)	2388.233 (2786.60)	-90.329 0.46

Notes: This table presents summary statistics based on baseline survey data. Standard deviations (column 2, 3, 4) of variables and p-values (column 5) appear in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

TABLE 1B: Summary Statistics & Balance-India

Variable	N (1)	Total Sample (2)	Control (3)	Treatment (4)	Difference (p-value) (3)-(4)
A. Client Characteristics					
Age	2407	38.371 (8.36)	38.605 (8.38)	38.138 (8.33)	0.467 (0.17)
Female	2407	0.795 (0.40)	0.802 (0.40)	0.788 (0.41)	0.014 (0.39)
Education					
Completed High School	2406	0.311 (0.46)	0.318 (0.47)	0.304 (0.46)	0.013 (0.48)
Business Type					
Retail: Non-Food	2402	0.401 (0.49)	0.405 (0.49)	0.397 (0.49)	0.008 (0.68)
C. Business Practices					
Do Separate Business & Household Cash	2407	0.351 (0.48)	0.363 (0.48)	0.34 (0.47)	0.023 (0.24)
Do Pay Salary to Self	2407	0.045 (0.21)	0.042 (0.20)	0.048 (0.21)	-0.007 (0.43)
Do Calculate Profit	2407	0.182 (0.39)	0.17 (0.38)	0.195 (0.40)	0.024 (0.12)
Give customers credit for at most 7 days	1325	0.278 (0.45)	0.253 (0.44)	0.304 (0.46)	-0.051** (0.04)
Do nothing when customers do not pay credit	1324	0.073 (0.26)	0.07 (0.26)	0.077 (0.27)	-0.007 (0.63)
Keep Business Records	2407	0.396 (0.49)	0.393 (0.49)	0.398 (0.49)	-0.005 (0.79)
Keep Customer Credit Records	1327	0.417 (0.49)	0.421 (0.49)	0.412 (0.49)	0.009 (0.73)
Determine stock based on a good strategy	2407	0.16 (0.37)	0.165 (0.37)	0.155 (0.36)	0.011 (0.48)
Never Visit competitors to check prices/quality	2407	0.568 (0.50)	0.566 (0.50)	0.569 (0.50)	-0.002 (0.92)
Never Talk to customers to understand needs	2407	0.639 (0.48)	0.639 (0.48)	0.639 (0.48)	-0.001 (0.98)
Never do supplier quality comparison	2407	0.36 (0.48)	0.369 (0.48)	0.352 (0.48)	0.017 (0.38)
Never Negotiated terms with suppliers	2407	0.262 (0.44)	0.262 (0.44)	0.262 (0.44)	0 (0.99)
Took full advantage of cash discount	739	0.388 (0.49)	0.382 (0.49)	0.395 (0.49)	-0.013 (0.72)
D. Business Performance					
Sales-Regular Week (Winsorized at 1%) in PHP	2399	14114.973 (14870.72)	13702.085 (14358.24)	14527.517 (15360.61)	-825.432 (0.17)
Profits-Regular Week (Winsorized at 1%) in PHP	2389	5232.516 (4809.68)	5128.308 (4710.81)	5336.636 (4906.24)	-208.328 (0.29)

Notes: This table presents summary statistics based on baseline survey data. Standard deviations (column 2, 3, 4) of variables and p-values (column 5) appear in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

TABLE 2A: Pickup & Listening Rates-Philippines

	Pick Up Rate (%)	Listening Rate	Listening Rate
		Regardless of Pick Up (%)	Conditional on Pick Up (%)
Module	(1)	(2)	(3)
Cash Separation	78%	67%	85%
Customer Credit	72%	61%	84%
Inventory Management	70%	60%	84%
Supplier Management	68%	56%	81%
Overall	73%	62%	83%

Notes: This table presents the pick up rates and listening rates for each section of financial heuristics training curriculum. Pick up rate = number of pickups / total number of calls. Listing rate regardless of pick up = listenership / total duration. Listening rate conditional on pick up = listenership / total duration if call picked up.

TABLE 2B: Pickup & Listening Rates-India

	Pick Up Rate (%)	Listening Rate	Listening Rate
		Regardless of Pick Up (%)	Conditional on Pick Up (%)
Module	(1)	(2)	(3)
Cash Separation	83%	52%	61%
Customer Credit	81%	50%	60%
Inventory Management	78%	46%	57%
Supplier Management	72%	44%	59%
Overall	79%	49%	59%

Notes: This table presents the pick up rates and listening rates for each section of financial heuristics training curriculum. Pick up rate = number of pickups / total number of calls. Listing rate regardless of pick up = listenership / total duration. Listening rate conditional on pick up = listenership / total duration if call picked up.

TABLE 3A: Predictors of Engagement-Philippines

<i>Predictors</i>	Dependent Variables			
	Pick Up Rate (%)	Listenership - Regardless of pickup (%)		
	(1)	(2)	(3)	(4)
Age of Respondent	0.255*** (0.09)	0.248** (0.10)	0.243** (0.10)	0.217** (0.11)
Urban	3.836 (2.40)	4.161 (2.63)	4.343* (2.52)	3.649 (2.74)
Age of Business	-0.0497 (0.13)	-0.0471 (0.14)	0.0365 (0.14)	0.0848 (0.14)
Business is Primary Source of Income	-2.208 (1.88)	-1.519 (2.03)	-3.581* (1.94)	-2.779 (2.08)
Own a Cellphone	11.14*** (3.09)	10.08*** (3.24)	13.50*** (3.05)	13.39*** (3.19)
Less than 5th class	-16.28*** (5.94)	-15.40** (6.02)	-13.99** (5.76)	-12.74** (5.85)
Above 5th class	-11.32*** (2.75)	-11.20*** (2.97)	-11.91*** (2.85)	-11.35*** (3.08)
Completed High School	-5.347** (2.24)	-4.697* (2.44)	-5.908** (2.39)	-5.185** (2.60)
Sari Sari Store	1.648 (4.61)	5.002 (5.90)	5.605 (5.22)	9.218 (6.47)
Food Retail	-2.063 (4.56)	0.445 (5.82)	1.364 (5.22)	4.312 (6.43)
Baseline Practice Score		-0.697 (3.64)		-0.573 (3.59)
Log-Baseline Regular Week Sales		-1.664 (1.17)		-1.607 (1.23)
Log-Baseline Regular Week Profits		-0.52 (0.91)		-0.315 (0.99)
Constant	59.38*** (6.85)	75.55*** (12.45)	43.66*** (7.54)	56.91*** (13.10)
N	1066	947	1066	947

Notes: This table presents the predictors of engagement in training. We regress pickup rate (%) and listenership rate (%) on characteristics of participants. Urban takes value 1 for urban participants and 0 for rural participants. The fourth level of education is graduate/post graduate, which is omitted due to multicollinearity. The third type of business is non-food retail, which is omitted due to multicollinearity. Standard errors, clustered at the group-level, in parentheses. Business practice score, ranging from 1 to 3, is a scaled score such that higher score indicate better business practices. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

TABLE 3B: Predictors of Engagement-India

Predictors	Dependent Variables			
	Pick-up Rate (%)		Listenership-Regardless of Pickup	
	(1.00)	(2.00)	(3.00)	(4.00)
Age of Respondent	0.104 (0.08)	0.0297 (0.10)	0.0845 (0.10)	0.148 (0.13)
Female	-3.574** (1.52)	-2.61 (1.97)	0.333 (2.19)	2.31 (2.68)
Hindi	-0.702 (1.61)	-1.564 (2.04)	-2.361 (2.19)	-4.049 (2.65)
Age of Business	-0.118 (0.09)	-0.146 (0.12)	0.0196 (0.12)	-0.0836 (0.16)
Own a cellphone	25.51** (12.51)	52.78*** (3.12)	16.58* (10.03)	32.72*** (6.96)
Education-Less than 5th grade	3.305 (2.67)	8.054** (4.04)	-3.953 (3.61)	1.407 (5.10)
Education-Above 5th grade	1.906 (2.56)	4.117 (4.07)	-1.221 (3.44)	1.194 (5.01)
Education-Completed High School	0.393 (2.71)	3.767 (4.11)	-1.966 (3.58)	1.964 (5.07)
Shop	-4.157*** (1.44)	-3.846* (2.04)	-3.521* (1.88)	-3.957 (2.54)
Food Retail	-3.781** (1.58)	-2.604 (2.13)	-3.244 (2.12)	-2.187 (2.86)
Baseline Practice Score		-2.539 (3.23)		4.831 (4.33)
Log-Baseline Regular Week Sales		0.735 (1.20)		0.688 (1.25)
Log-Baseline Regular Week Profits		-0.362 (0.99)		-0.215 (1.09)
Constant	56.36*** (13.41)	29.26* (11.83)	39.66*** (11.96)	7.595 (15.36)
N	1600	972	1600	972

Notes: This table presents the predictors of engagement in training. We regress pickup rate (%) and listenership rate (%) on characteristics of participants, controlling for wave dummy. Hindi takes value 1 for participants who speak Hindi and 0 for participants who speak Kannada. The fourth level of education is graduate/post graduate, which is omitted due to multicollinearity. The third type of business is non-food retail, which is omitted due to multicollinearity. Heteroscedasticity-robust standard errors in parentheses. Business practice score, ranging from 1 to 3, is a scaled score such that higher score indicate better business practices. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

TABLE 4: INTENT TO TREAT ANALYSIS

<i>Dependent Variables</i>	India		Philippines	
	Control Mean	Treatment Effect	Control Mean	Treatment Effect
	(1)	(2)	(3)	(4)
Business Practice Index (1-3)	1.773	0.021**	1.911	0.037***
	[0.280]	(0.01)	[0.282]	(0.01)
		0.027		0.006
N		3311		1897
Business Practice Index (0-1)	0.365	0.010*	0.47	0.019**
	[0.1566]	(0.01)	[0.1549]	(0.01)
		0.058		0.01
N		3311		1897
Regular Week Sales-Winsorized at 1%	11153.823	686.093	6918.448	-483.22
	[13151.163]	(447.34)	[9520.558]	(378.07)
		0.125		0.201
N		3311		1733
Regular Week Sales-Log Transformed	8.782	0.062	8.272	-0.049
	[1.210]	(0.04)	[1.084]	(0.05)
		0.12		0.288
N		3311		1733
Regular Week Profits-Winsorized at 1%	4973.52	-11.976	2210.957	-91.64
	[5012.340]	(167.88)	[2512.830]	(106.96)
		0.943		0.392
N		3306		1773
Regular Week Profits-Log Transformed	8.066	-0.006	7.189	-0.017
	[1.160]	(0.04)	[1.230]	(0.06)
		0.87		0.765
N		3306		1773

Notes: This table presents the impact of training on business practices and performance for the experiments conducted in India and the Philippines. Control means are presented in columns 1 and 3 and standard deviations in square brackets. Each coefficient reported in columns 2 and 4 is from the regression for each outcome variable on the treatment variable. Covariates include time of survey (India), gender, age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification and language. Heteroskedasticity-robust standard errors in parentheses and p-values reported below standard errors. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

TABLE 5: HETEROGENEOUS IMPACT OF TRAINING**PHILIPPINES**

<i>Outcome Variables</i>	Level of Education			Age of Entrepreneur		
	Treatment	Low Education	Treatment*Low Education	Treatment	Old	Treatment*Old
Business Practices Index	0.0305*	-0.0157	0.0201	0.0631***	0.0426**	-0.0532**
<i>Standard Error</i>	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
<i>P-Value</i>	0.052	0.445	0.49	0.001	0.028	0.046
<i>Sharpened q-value</i>			0.451			0.147
<i>N</i>	1897	1897	1897	1897	1897	1897
Regular Week Sales-1% Winsor	-358.9	120.7	-466.6	-418.7	658.9	-139.5
<i>Standard Error</i>	(445.88)	(609.08)	(780.28)	(534.91)	(633.02)	(753.96)
<i>P-Value</i>	0.421	0.843	0.55	0.434	0.298	0.853
<i>Sharpened q-value</i>			1			1
<i>N</i>	1733	1733	1733	1733	1733	1733
Regular Week Profits-1% Winsor	-153	-212.4	198.9	-229.5*	231.4	257.2
<i>Standard Error</i>	(127.36)	(165.25)	(229.33)	(136.74)	(173.59)	(212.17)
<i>P-Value</i>	0.229	0.199	0.386	0.182	0.225	0.225
<i>Sharpened q-value</i>			1			0.819
<i>N</i>	1773	1773	1773	1773	1773	1773

Notes: This table presents heterogeneous treatment effect using interaction terms. We regress endline business outcome on treatment dummy, subgroup variable, and the interaction between treatment dummy and subgroup variable, controlling for covariates. Covariates include age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification. Heteroskedasticity-robust standard errors in parentheses. Sharpened q-values that correct for multiple hypothesis testing are also presented for the interaction terms * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

INDIA

<i>Outcome Variables</i>	Level of Education			Age of Entrepreneur		
	Treatment	Low Education	Treatment*Low Education	Treatment	Old	Treatment*Old
Business Practices Index	0.0161	-0.0586***	0.00508	0.0278	0.0203	-0.0159
<i>Standard Error</i>	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
<i>P-Value</i>	0.428	0.001	0.84	0.111	0.237	0.509
<i>Sharpened q-value</i>			1			1
<i>N</i>	2034	2034	2034	2034	2034	2034
Regular Week Sales-1% Winsor	249.7	-276.8	-164.4	-179.5	218.7	611.6
<i>Standard Error</i>	(937.07)	(795.90)	(1137.75)	(743.28)	(764.65)	(1059.90)
<i>P-Value</i>	0.79	0.728	0.885	0.809	0.775	0.564
<i>Sharpened q-value</i>			1			1
<i>N</i>	2027	2027	2027	2027	2027	2027
Regular Week Profits-1% Winsor	-184.2	-691.2**	197.1	-119.6	-81.7	119.4
<i>Standard Error</i>	(392.52)	(345.42)	(478.08)	(320.88)	(320.24)	(441.02)
<i>P-Value</i>	0.639	0.045	0.68	0.709	0.799	0.787
<i>Sharpened q-value</i>			1			1
<i>N</i>	2016	2016	2016	2016	2016	2016

Notes: This table presents heterogeneous treatment effect by subgroups. We regress endline business outcome on treatment dummy, subgroup variable, and the interaction between treatment dummy and subgroup variable, controlling for covariates. Covariates include wave dummy, time of survey (month), gender, age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification: Jana centers (branches) and language. Heteroskedasticity-robust standard errors in parentheses. Sharpened q-values that correct for multiple hypothesis testing are also presented for the interaction terms. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

TABLE 6: HETEROGENEOUS IMPACT OF TRAINING**PHILIPPINES**

<i>Outcome Variables</i>	Size of Business			Baseline Business Practices		
	Treatment	Small Size	Treatment* SmallSize	Treatment	Low Practice Score	Treatment* LowPracticeS core
Business Practices Index	0.0147	-0.0327*	0.0470*	0.0293	-0.00713	0.0132
<i>Standard Error</i>	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)
<i>P-Value</i>	0.417	0.073	0.064	0.135	0.777	0.621
<i>Sharpened q-value</i>			0.147			0.451
<i>N</i>	1897	1897	1897	1897	1897	1897
Regular Week Sales-1% Winsor	-1149.9*	-905.1	1332.5*	-204.4	959.4*	-556.1
<i>Standard Error</i>	(645.71)	(623.06)	(719.61)	(527.00)	(580.04)	(746.36)
<i>P-Value</i>	0.075	0.146	0.064	0.698	0.098	0.456
<i>Sharpened q-value</i>			0.289			1
<i>N</i>	1733	1733	1733	1733	1733	1733
Regular Week Profits-1% Winsor	-319.9*	-740.8***	480.6**	-85.25	173.6	-24.93
<i>Standard Error</i>	(169.31)	(146.54)	(204.46)	(148.72)	(151.81)	(209.36)
<i>P-Value</i>	0.059	0	0.019	0.566	0.253	0.905
<i>Sharpened q-value</i>			0.18			1
<i>N</i>	1773	1773	1773	1773	1773	1773

Notes: This table presents heterogeneous treatment effect using interaction terms. We regress endline business outcome on treatment dummy, subgroup variable, and the interaction between treatment dummy and subgroup variable, controlling for covariates. Covariates include age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification. Heteroskedasticity-robust standard errors in parentheses. Sharpened q-values that correct for multiple hypothesis testing are also presented for the interaction terms. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

INDIA

<i>Outcome Variables</i>	Size of Business			Baseline Business Practices		
	Treatment	Small Size	Treatment* SmallSize	Treatment	Low Practice Score	Treatment* LowPractic eScore
Business Practices Index	0.026	-0.0289	-0.011	-0.00189	-0.0323	0.0419*
<i>Standard Error</i>	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
<i>P-Value</i>	0.171	0.103	0.654	0.914	0.176	0.082
<i>Sharpened q-value</i>			1			0.489
<i>N</i>	2034	2034	2034	2034	2034	2034
Regular Week Sales-1% Winsor	-244.4	-195.3	649.3	-72.59	-428.6	425.3
<i>Standard Error</i>	(1038.29)	(1021.25)	(1188.12)	(766.08)	(820.14)	(1073.88)
<i>P-Value</i>	0.814	0.848	0.585	0.925	0.601	0.692
<i>Sharpened q-value</i>			1			1
<i>N</i>	2027	2027	2027	2027	2027	2027
Regular Week Profits-1% Winsor	-117.1	-1196.2***	101.4	266.6	281.9	-635.7
<i>Standard Error</i>	(417.12)	(387.11)	(478.20)	(324.30)	(328.90)	(441.27)
<i>P-Value</i>	0.779	0.002	0.832	0.411	0.391	0.15
<i>Sharpened q-value</i>			1			1
<i>N</i>	2016	2016	2016	2016	2016	2016

Notes: This table presents heterogeneous treatment effect by subgroups. We regress endline business outcome on treatment dummy, subgroup variable, and the interaction between treatment dummy and subgroup variable, controlling for covariates. Covariates include wave dummy, time of survey (month), gender, age of business, own a cellphone indicator, primary source of income indicator, education level, business type, and variables used for stratification: Jana centers (branches) and language. Heteroskedasticity-robust standard errors in parentheses. Sharpened q-values that correct for multiple hypothesis testing are also presented for the interaction terms. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

ONLINE APPENDIX TABLE 1: ATTRITION: PHILIPPINES

Attrited Sample							
Variable	Control		Treatment		Total Sample		t-test
	N	Mean/SD	N	Mean/SD	N	Mean/SD	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(4)
Age	101	42.089 [11.123]	97	41.99 [11.291]	198	42.04 [11.177]	0.95
Gender (Female)	101	1 [0.000]	97	1 [0.000]	198	1 [0.000]	N/A
Completed High School	101	0.554 [0.500]	97	0.557 [0.499]	198	0.556 [0.498]	0.975
Retail: Food	101	0.614 [0.489]	97	0.536 [0.501]	198	0.576 [0.495]	0.271
Do Separate Business & Household Cash	101	0.644 [0.481]	97	0.732 [0.445]	198	0.687 [0.465]	0.182
Do Pay Salary to Self	101	0.139 [0.347]	97	0.175 [0.382]	198	0.157 [0.364]	0.481
Do Calculate Profit	101	0.743 [0.439]	97	0.804 [0.399]	198	0.773 [0.420]	0.304
Give customers credit for at most 7 days	82	0.817 [0.389]	83	0.807 [0.397]	165	0.812 [0.392]	0.872
Do nothing when customers do not pay credit	101	0.079 [0.271]	97	0.052 [0.222]	198	0.066 [0.248]	0.435
Keep Business Records	101	0.733 [0.445]	97	0.701 [0.460]	198	0.717 [0.452]	0.623
Never Ran out of stock in the past 2 weeks	101	0.485 [0.502]	97	0.485 [0.502]	198	0.485 [0.501]	0.993
Determine stock based on a good strategy	101	0.168 [0.376]	97	0.247 [0.434]	198	0.207 [0.406]	0.171
Never Visit competitors to check prices/quality	101	0.792 [0.408]	97	0.784 [0.414]	198	0.788 [0.410]	0.883
Never Talk to customers to understand their needs	101	0.545 [0.500]	97	0.546 [0.500]	198	0.545 [0.499]	0.979
Never do supplier quality comparison	101	0.446 [0.500]	97	0.381 [0.488]	198	0.414 [0.494]	0.363
Never Negotiated terms with suppliers	101	0.485 [0.502]	97	0.454 [0.500]	198	0.47 [0.500]	0.659
Successfully Asked suppliers for better terms	96	0.375 [0.487]	95	0.389 [0.490]	191	0.382 [0.487]	0.838
Sales-Good Week (Winsorized at 1%)	95	5407.474 [5940.294]	93	5721.237 [5469.179]	188	5562.686 [5699.005]	0.707
Sales-Regular Week (Winsorized at 1%)	89	4063.876 [4958.475]	90	3825.556 [3596.528]	179	3944.05 [4317.047]	0.713
Profits-Regular Week (Winsorized at 1%)	95	1634.947 [2506.625]	90	1960.667 [1806.503]	185	1793.405 [2194.321]	0.314

Notes: This table presents summary statistics of the attrited sample based on baseline survey data. Standard deviations (column 2, 3, 4) of variables and p-values (column 5) appear in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

ONLINE APPENDIX TABLE 2: ATTRITION: INDIA

Attrited Sample							
Variable	Control		Treatment		Total Sample		t-test
	N	Mean/SD	N	Mean/SD	N	Mean/SD	P-value
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(4)
Age	264	37.292 [8.643]	267	37.199 [7.703]	531	37.245 [8.176]	0.896
Female	264	0.864 [0.344]	267	0.865 [0.342]	531	0.864 [0.343]	0.959
Completed High School	264	0.303 [0.460]	267	0.277 [0.448]	531	0.29 [0.454]	0.512
Retail: Food	264	0.284 [0.452]	267	0.236 [0.425]	531	0.26 [0.439]	0.207
Do Separate Business & Household Cash	264	0.254 [0.436]	267	0.232 [0.423]	531	0.243 [0.429]	0.563
Do Pay Salary to Self	264	0.03 [0.172]	267	0.045 [0.208]	531	0.038 [0.191]	0.377
Do Calculate Profit	264	0.58 [0.495]	267	0.584 [0.494]	531	0.582 [0.494]	0.912
Give customers credit for at most 7 days	98	0.255 [0.438]	95	0.316 [0.467]	193	0.285 [0.453]	0.353
Do nothing when customers do not pay credit	98	0.031 [0.173]	95	0.063 [0.245]	193	0.047 [0.211]	0.286
Keep Business Records	180	0.444 [0.498]	185	0.378 [0.486]	365	0.411 [0.493]	0.201
Never Ran out of stock in the past 2 weeks	264	0.303 [0.460]	267	0.345 [0.476]	531	0.324 [0.468]	0.307
Determine stock based on a good strategy	264	0.114 [0.318]	267	0.105 [0.307]	531	0.109 [0.312]	0.747
Never Visit competitors to check prices/quality	264	0.367 [0.483]	267	0.404 [0.492]	531	0.386 [0.487]	0.381
Never Talk to customers to understand their needs	264	0.447 [0.498]	267	0.446 [0.498]	531	0.446 [0.498]	0.976
Never do supplier quality comparison	264	0.25 [0.434]	267	0.213 [0.411]	531	0.232 [0.422]	0.32
Never Negotiated terms with suppliers	264	0.189 [0.393]	267	0.176 [0.382]	531	0.183 [0.387]	0.691
Successfully Asked suppliers for better terms	258	0.244 [0.430]	262	0.282 [0.451]	520	0.263 [0.441]	0.323
Sales-Regular Week (Winsorized at 1%)	179	13262.57 [14519.390]	185	14027.027 [14734.123]	364	13651.099 [14613.778]	0.618
Profits-Regular Week (Winsorized at 1%)	179	5074.022 [4561.282]	184	5455.163 [5329.171]	363	5267.218 [4962.215]	0.465

Notes: This table presents summary statistics of the attrited sample based on baseline survey data. Standard deviations (column 2, 3, 4) of variables and p-values (column 5) appear in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level

ONLINE APPENDIX TABLE 3:

EXEMPLARY MESSAGES OF HEURISTICS TRAINING

Module 1: Cash Separation – Message 2: Two Physical Locations [Philippines]

Lesson: Find two locations to keep business and household cash separate.

Episode Structure	Script
Standard episode intro	Hello! And welcome back to the Project Dungannon business training program. This is Tita Jo again.
Introduce the topic	A small business like my sari-sari store should not need a complex system just to determine its weekly profit, right? Then what should we do to track our weekly profits? I will help you by teaching you Cash Separation. Today, I'll teach you the first of the three steps of Cash Separation – how to keep your business and household cash separate.
The problem	<p>One of the first problems I encountered as a business owner was how to keep track of my weekly profits. I had income from the sari-sari store, my husband's salary, and a sideline viand selling business, but I also had expenses for both business and family - and they always mixed. I always had a hard time knowing which is which.</p> <p>For example, when I needed to buy Gasul for my viand selling business, I used to get the money from the day's sales of the sari-sari store. And when my daughter asked for money for her school project, I also got it from the sari-sari store money. As you can see, I was mixing up all my expenses, and didn't know how much my sari-sari store was making. How do I know then how much I can take from the business to spend for the home?</p>
The Solution	<p>The good news is, I have discovered a very simple way to keep business and household cash and expenses separate. It is called Cash Separation. You just need to have two separate places to keep the money for the business and household.</p> <p>All you need to do is find 2 separate places to keep your business and household money. You may use whatever is convenient for you - a drawer, a box, a garapon. For me, what worked best was a belt bag for the sari-sari store cash and a drawer in the aparador for the household money. Keep your business cash handy in your business, so you can do all business transactions from it. And remember not to mix them up -- put all business income only in the business location and pay all business expenses out of the same business cash location. Same with the household cash.</p> <p>Separating your business and household cash will be useful regardless if your family has only one source of income or earns income from multiple sources.</p>
Call to action	Now it's time to act: To start separating your cash, in the next two days go and find your two separate locations for your business and household cash. Choose one location for the business cash and one for the household cash. Next week, I will teach you how to use your two cash locations, so you can track how well your business is doing.

Closing statement	<p>Again, this is Tita Jo saying “Thank You” for listening! If you'd like to hear this message again, please give me a missed call at <0239XXXXX> any time.</p> <p>And remember, keep listening and keep prospering.</p>
-------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Module 2: Customer Credit - Message 1: 7-day Credit Rule [India]

Lesson: Only give credit to customers who can repay in 7 days.

Episode Structure	Script
Standard episode intro	Hello and welcome back to the Janalakshmi business training program. This is Sangeetha again.
Introduce the customer credit topic	In the next few weeks, I want to share with you a few new tips to help you manage your customer credit better. For business owners like us, a key to business success is treating our customers right. Customer credit is often an important element of our relationship with our customers. But there is such a thing as giving too much credit to your customers – I’ve experienced it in my own business. When you give credit to your customers you are not getting money into your business. So you might not have the money you need to pay your business loan or buy more supplies for your business. That is why I want to share with you some simple tricks for when and how to give credit to your customers in a way that doesn’t hurt your business.
Introduce the topic	Today I will share with you a tip I use to make sure that I do not have too much credit outstanding. When I started with my kirana store, I struggled to find a way to limit how much credit to give to my customers. For example, I had a relative, Karthik, who asked me to buy milk and yogurt on credit every week. I felt bad to say no, but week after week, he did not pay me back. His credit grew bigger every week.
The problem	I know we all have had such problems. But remember, customers that do not pay you back on time hurt your business. The money they owe you could make it hard for you to pay your own business expenses.
The solution	I have a simple solution for you: Only sell goods on credit to customers who can promise to pay you back in the next 7 days. At first, it will be hard to ask your trusted customers to pay back in 7 days. But if you explain politely to them that credit for longer than 7 days hurts your business, they will understand. Tell them that if you get paid after 7 days, it makes it harder for you to pay your business expenses. This will get your business in debt, and your business and family will suffer.

Call to action	<p>Time to act: Starting tomorrow, ask each of your customers who wants to buy on credit when they would pay you back. Give credit only to those customers who confirm that they will pay you back in the next 7 days. Explain to your customers that you cannot give them credit for longer than 7 days, as this would hurt your business.</p> <p>In the next weeks, I will teach you two more tricks to help you limit how much credit you give to customers.</p>
Closing statement	<p>This is Sangeetha! If you'd like to hear this message again, please give me a missed call at 0804XXXXXXX. And remember, keep listening and keep prospering.</p>

End Notes

Acknowledgments: We thank Marina Dimova for her contributions in the initial stages of this work as well as Yuting Wang and Anshul Maudar for their excellent research assistance. We are grateful to the Institute for Financial Management and Research (IFMR-LEAD), Innovations for Poverty Action (IPA), Janalakshmi, and Negros Women for Tomorrow Foundation (NWTF) for their partnership on this work.

Conflict of Interest Declarations: Authors have no financial conflict of interest with regard to this research. Shawn Cole is on the board of Precision Development, which provides mobile phone based agricultural advice to smallholder farmers. Antoinette Schoar is a co-founder and one of the board of directors of the non-profit organization ideas42.

Details of Funding Sources and Grant Numbers: For this work, ideas42 received funding from:

- Consultative Group to Assist the Poor (CGAP), Grant Number: 7172648
- Development Innovation Ventures (DIV), USAID; Grant Number: AID-OAA-F-14-00022

We also acknowledge financial support from the Division of Faculty Development and Research at Harvard Business School.