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Sandra Sequeira, Pedro C Vicente and Catia Batista

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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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Sandra Sequeira - s.sequeira@lse.ac.uk
LSE and CEPR

Pedro C Vicente - pedro.vicente@novasbe.pt
Nova SBE

Catia Batista - cbatista@novasbe.pt
Nova SBE

CLOSING THE GENDER PROFIT GAP*

CATIA BATISTA† SANDRA SEQUEIRA‡ PEDRO C. VICENTE§

March 11, 2021

Abstract

We examine the complementarity between access to mobile savings accounts and improved financial management skills on the performance of female-led micro-enterprises in Mozambique. This combined support is associated with a large increase in both short and long-term firm profits and in financial security, when compared to the independent effect of each of these interventions. This support allowed female-headed micro-enterprises to close the gender gap in performance and financial literacy relative to their male counterparts. The main drivers of improved business performance are increased financial management practices (bookkeeping), an increase in accessible savings and reduced transfers to friends and relatives.

Keywords: Microenterprise development, management, gender, mobile money, financial literacy, economic development.

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†Nova School of Business and Economics, IZA, NOVAFRICA. (email: catia.batista@novasbe.pt)

‡Corresponding author, London School of Economics, CEPR, NOVAFRICA. (email: s.sequeira@lse.ac.uk)

§Nova School of Business and Economics, BREAD and NOVAFRICA. (email: pedro.vicente@novasbe.pt)

1 Introduction

Over 50% of the urban poor are currently engaged in some form of micro, non-agricultural business (Banerjee and Duflo 2011; Gindling and Newhouse 2014).[1] While self-employment is often considered an important mechanism for poverty alleviation (Yunnus 1999; Banerjee and Duflo 2011), the reality is often one of struggling micro-enterprises, with low levels of business growth and low survival rates (Banerjee et al 2010; Bloom et al 2010; Mckenzie and Paffhausen 2017).

Recent literature has focused on two key constraints for micro-enterprise performance in the developing world: access to financial capital and the managerial ability of entrepreneurs (Mckenzie and Woodruff 2017; Mckenzie, 2020). In contexts of imperfect capital markets, sustaining an optimal level of savings can play a critical role in overcoming credit constraints and helping low-income micro-entrepreneurs optimize their cash flow management, their investment strategies and improve the performance of their business (Dupas and Robinson 2013). In contexts of poor human capital and limited exposure to entrepreneurial capital, financial management training can potentially improve financial practices that allow for better savings, improved management of cash flow, better forecasting of revenues and expenses, and consequently, improved firm performance. However, most interventions that have attempted to improve each of these margins independently have achieved mixed results (Banerjee et al 2015; Dupas et al 2016; Fox and Thomas 2016; Brooks et al 2018). Access to savings products have not always translated into increased investment and income (Dupas et al 2016; Dupas et al 2018) while financial training programmes on their own have often not resulted in improvements in business performance (Karlan, Knight, and Udry 2015; Bruhn, Karlan, and Schoar 2018; McKenzie 2020).

This paper attempts to reconcile these puzzling results. The first hypothesis we test is that the mixed results in the literature can mask significant heterogeneity in treatment effects: the positive effects of financial literacy training and access to savings can be concentrated in spe-

[1] The ILO estimates that 78% of the world's poor living in low-income countries is currently self-employed (ILO 2017).

cific types of firms. Second, we hypothesize that the complementarity between the two interventions might be central to their effectiveness: access to financial capital may not be a sufficient condition for micro-enterprise performance if micro-entrepreneurs lack the ability to manage resources well (Dupas and Robinson 2013; Bernhardt et al 2019). Similarly, improved financial literacy and management capabilities may not translate into improved business performance if micro-enterprises have limited financial resources to invest towards business growth.

We test the heterogeneity and complementarity hypotheses through a field experiment with micro-entrepreneurs operating in formal urban markets in Mozambique. We randomly assigned 1,270 micro-entrepreneurs in services and retail[2] into three different treatment arms: i) access to a savings account through mobile money with a short-term financial incentive to save[3]; ii) access to four one-hour training modules in core financial management (with an emphasis on cash flow management, bookkeeping and the implications of transfers to family and social networks); and iii) access to savings technology and financial management training. The financial management course followed a standard rules of thumb approach (Drexler et al 2010), and relied heavily on visual illustrations and examples from everyday market situations to ensure that participants understood how to apply the training to their day-to-day business activities.[4]

To test the heterogeneity hypothesis we focus on gender. An extensive literature has shown that female micro-entrepreneurs may be particularly constrained by financial rigidities in the market and by the lack of exposure to good practices in financial management. The effects of this gender disadvantage have been previously documented in access to capital (Bruhn and Love 2009; Collins et al 2009; de Mel et al 2010), in management know-how (de Mel et al 2010) and in access to business networks (Rosenthal and Strange 2012; Field et al 2016). We stratified our sample by the gender of the micro-entrepreneur and examined the differential impact of

[2]The breakdown according to sectors is food retail (55%), nonfood retail (clothes, household items 31%) and services (restaurants 14%). 88% of the sample had only one employee.

[3]Participants earned a bonus equivalent to 5% of their average monthly mobile savings for the three months that followed the opening of their accounts.

[4]This intervention also provided a manual and a comic book illustrating the main concepts taught for future reference.

the treatments across each sample of female and male-led micro-enterprises.

Our evidence is consistent with both the heterogeneity and complementarity hypotheses. We find that twelve months following the interventions, the combined treatment increased overall profits of female micro-entrepreneurs by over 30% (equivalent to a 74 USD increase in monthly profit) relative to the control mean. These effects on profits persist and increase to 46% 5 years after the intervention took place. Removing financial and management constraints had a positive impact on female-owned business performance but appeared to be infra-marginal for the performance of male-owned businesses, who started with higher levels of savings and financial literacy at baseline. The joint treatment is also associated with higher levels of financial security at the household level for female micro-entrepreneurs when measured through an index capturing whether in the last 12 months, anyone in the household went without food and if the micro-entrepreneur was able to pay for schooling expenses for her children.

The key mechanisms behind these treatment effects were a sustained improvement in financial management knowledge and practices such as bookkeeping, lower remittances[5], and higher savings in more liquid and potentially safer mobile money accounts.[6] Data from the mobile operator suggests that the mobile money account was used primarily to store money and make remote payments to an electricity company, as opposed to making payments to suppliers or receiving payments from clients.

Male micro-entrepreneurs learn from our financial management training programme and improve their bookkeeping practices. They also take up the mobile money service but are less likely to report replacing traditional bank savings with mobile money savings, reflecting the persistence of higher access to traditional banking observed at baseline.

These findings shed light on an important complementarity between providing micro-enterprises with the enabling technology to build their savings, while at the same time providing financial management skills with a special focus on how these savings can be applied to maximize busi-

[5]Our baseline survey revealed that there is limited reciprocity with regards to family transfers.

[6]We do not find any changes in expectations and beliefs about the future performance of the businesses suggesting that an increase in confidence or optimism imparted by our training is unlikely to be driving our results.

ness returns. When targeted to female micro-entrepreneurs, these interventions can help close the gap in knowledge and performance relative to their male counterparts.

Our findings contribute to several literatures. First, these findings complement a growing literature on the importance of savings for business growth (Dupas and Robinson 2013). Our evidence suggests that access to storable savings when complemented with financial management skills can have a sizable effect in the short-run, and that this effect grows with time.

Second, we add to an extensive literature on the importance of access to mobile technology in the developing world. We provide new evidence on how savings accounts in mobile money can drive business performance, complementing results from studies that have documented the impact of mobile money on household finance, remittances, internal migration and educational and agricultural investment (Jack and Suri 2014; Jack and Habyarimana 2018; Batista and Vicente 2017, 2018, 2020).

Third, we contribute to the literature on the role of financial literacy and management capabilities on small firm development. Our findings are consistent with the importance of a rules of thumb approach to teaching financial literacy (Drexler et al 2014; Arraiz et al 2019) and suggest that these teachings can be sustained in the long-run and translated into improved business performance (McKenzie and Woodruff 2017). This adds to the literature that has found similar effects for medium-sized to large companies (Bloom et al 2010; Bloom et al 2018; Custodio et al 2020). We highlight the channels for improved performance such as improved bookkeeping and reduced transfers to family and social networks.

We also contribute descriptively to the literature on the impact of transfers to relatives and friends on small firm performance. In particular, we document low expectations about the reciprocity associated with these transfers and how financial literacy can limit contributions to this "family tax".

The paper proceeds as follows: in section 2 we discuss the main hypotheses on the role of financial management skills, access to savings and gender on micro-enterprise performance; section 3 describes the setting of our experiment; and section 4 presents the empirical analysis.

Section 5 discusses how the interventions helped close the performance gap between male and female-led micro-enterprises and section 6 concludes.

2 Financial Management Skills, Savings and Gender in Micro-Enterprise Performance

In contexts of imperfect capital markets, sustaining an optimal level of savings can allow micro-entrepreneurs to overcome credit constraints, optimize their cash flows, build long-term financial and business assets (Ashraf et al 2005; Collins et al 2009) and, consequently, improve the performance of their businesses (Dupas and Robinson 2013). However, supply-side constraints may limit the extent to which micro-entrepreneurs have access to the necessary tools to effectively manage their finances and save. As a result, micro-entrepreneurs often engage in costly informal savings strategies or suffer cash losses through theft that can limit investment and growth.

The exponential rates of cell phone adoption in the developing world suggest that mobile technology can potentially transform the management of household finance (Jack and Suri 2014).[7] The impact of mobile money on business performance has, however, received less attention in the literature. Moreover, the impact of the technology on small business performance is theoretically ambiguous. Mobile money can facilitate payments to suppliers and payments from clients by enabling low-cost payment services over easily accessible cell phones (Plyer et al 2010), and it can also enable savings that help micro-enterprises smooth investment, accumulate long-term assets and increase incomes (Ashraf et al 2005; Collins et al 2009; Jack and Suri 2014; Mbiti and Weil 2016).[8] On the other hand, mobile money can reduce the cost of these savings being dissipated in the form of transfers to family or other non-income generating types of

[7] In our context, there are over five million cell phone subscribers (close to one fourth of the Mozambican population), and the geographic coverage of existing cell operators extends to almost 80% of the country's populated territory.

[8] Evidence from Mbiti and Weil (2016) and Jack and Suri (2014) suggest that mobile money could be associated with an increase in formal savings of households by reducing the cost of safely storing money and reducing over-reliance on other less efficient forms of informal savings.

consumption.

Financial management skills can also shape micro-enterprise growth through several channels. Improved financial management skills can be critical to increase savings, optimize investment strategies, introduce new products, manage inventories and optimize cash flows. These skills can also improve the forecasting of revenue, expenditures and profit through improved bookkeeping practices.

While there is evidence of a strong correlation between financial literacy and savings (Cole et al. 2011), studies on the impact of financial literacy and business management training interventions on micro-enterprise performance have shown sometimes positive (Klinger and Schuelden 2011; Blattman et al. 2016; Field et al. 2016; McKenzie and Puerto 2020)[9] and sometimes negative or zero effects (Karlan and Valdivia 2010; Drexler et al. 2014; Fiala 2018).

Finally, a growing literature has documented that female-led micro-enterprises experience lower profits compared to their male counterparts.[10] In theory, female vendors may face more binding constraints in accessing savings products in the formal banking sector due to a higher opportunity cost of time and lower levels of financial literacy. Poor financial management skills may also be particularly constraining for female entrepreneurs. Women often have less exposure to good management practices, fewer business networks and business role models, and more limited levels of formal education (Bruhn and Love 2009; Collins et al 2009; de Mel et al 2010; Rosenthal and Strange 2012). Female entrepreneurs may also be more exposed to social pressure to pay the "family tax" out of business revenue or they may over-invest in fixed capital to avoid the pressure to give away cash to other members of the family.[11] Alternatively, female

[9] Klinger and Schuelden (2011) identify an overall positive impact of business training programmes on business development in Central America, though the authors suggest that these effects are often dampened by financial constraints. Bloom et al (2010) document a positive impact of business consulting programmes on medium-sized firms' productivity and performance in India, arguing that informational constraints had prevented firms from adopting profitable and more modern management practices. McKenzie and Woodruff (2017) show that firms using better business practices are more profitable and grow faster over time.

[10] Bruhn and Love (2009) examine several Latin American countries and find that women-run firms have lower sales, assets, and profits. Nix et al. (2015) find lower earnings for female-led micro-enterprises, compared to men across several sub-Saharan African countries, while Hardy and Kagy (2018) find that male-led micro-enterprises have higher profit than female-led micro-enterprises in Ghana.

[11] Consistent with this conjecture, Fafchamps et al. (2014) find that in-kind transfers are more effective than cash transfers in increasing profits for female business owners. Similarly, Friedson-Ridenour and Pierotti (2019)

micro-entrepreneurs could have different objectives for their businesses short of profit maximization such as providing a means of flexible employment to supplement household chores.

Despite an initial female disadvantage, it is unclear which group is more likely to have the highest returns to improved financial management capabilities and access to savings. Female-led micro-enterprises may be farther from the productivity frontier, but their male counterparts may be better placed to take advantage of both interventions due to improved client and supplier networks, or higher initial levels of capital and savings.

3 Empirical Setting

3.1 Study Location, Population and Sampling

Our sample of 1,270 market vendors was drawn from 23 urban and peri-urban markets in Maputo, the Mozambican capital, and its main residential and industrial satellite city of Matola.[12] All markets had relatively good accessibility and proximity to both residential and industrial areas, so lack of access to wholesale markets and to centres of demand did not represent significant constraints to business. Vendors can operate their businesses as a stall or as a store[13], both of which have a fixed location in the market and are traditionally engaged in general retail activities (selling produce, food or general groceries) or services (sewing, shoemaking and restaurants). While there is significant variation across both types of establishments, there is generally less variation in characteristics within each category of establishment.

We stratified our sample based on the gender of the participant and on the type of establishment (stall vs store). Our sample was then randomly assigned to four experimental groups, within each stratum. The first group received financial management training only, the second

find that spousal pressure can push female entrepreneurs to invest less in their business and to hide income so as to not have to pay for their spouse's share of expenses.

[12] The municipalities of Maputo and Matola contain 120 markets located in low-income neighborhoods, where they are the primary hubs of economic activity. Our analysis is restricted to formal vendors, which we classify as having paid an annual fee to operate within the area that they are assigned to in the formal market.

[13] For a visual illustration of each type of business see Appendix Figure 3.

group received mobile money access only and the third group received a combination of both treatments. The fourth group represented the control group, receiving no treatment.

3.2 Interventions

Mobile Money: We took advantage of the early stages of the roll-out of mobile money by Mozambique's largest cell operator to generate exogenous variation in access to mobile money. We opened a mobile money account and enrolled all the participants in this treatment arm in an incentive scheme for savings that provided a bonus corresponding to 5% of the average amount of savings kept in the mobile account each month.[14] This bonus was restricted to the first 3 months from account opening.[15]

Financial Management Training: The aim of the financial management training was to introduce vendors to basic concepts of financial management and bookkeeping. It was conducted during four one-hour visits, during work time but off-peak hours, with visits spaced four weeks apart. The training took place at the establishment, and the training staff ensured that the opportunity cost of the training was low by allowing respondents to interrupt and continue to interact with clients. During the first session, the trainers covered general concepts of financial management namely the difference between business costs and household expenditures, revenue and profit, the importance of savings and investment, how to deal with requests for transfers from relatives and friends, how to compute and interpret interest rates when obtaining a bank loan, and how to manage risk. The second session discussed the theory and practice of how to prepare a budget and the importance of bookkeeping. All participants received three different books to record inventories for the main products, sales on credit and the basic components of a budget (total expenditures and total sales). The last two sessions were meant to

[14] The vendors in this experimental group received a leaflet explaining the bonus: they would receive 5 meticais for each 100 meticais they kept in their accounts for an entire month.

[15] All participants that were part of this treatment group received basic training on how to use their mobile money accounts. Our trainers transferred a small amount of 50 meticais (approximately 2 dollars at the currency exchange rate in 2014) for them to practice how to receive and access funds in their account. Beneficiaries also learned the location of the mobile money agent in the market, where they could make cash-ins and cash-outs from their accounts.

revisit the materials covered previously and to clarify any questions. Importantly, all participants received a manual with the core teachings as consultation material and we also designed and distributed a comic book written in colloquial Portuguese embedding the core learnings into everyday scenes in the market, drawn by a local Mozambican artist.[16]

During each visit, enumerators checked the books to see if they were being adequately filled in. By the end of the fourth visit, we provided 150 meticais (equivalent to 5 USD or 0.004% of average monthly income) if the books were filled in correctly and 75 meticais (equivalent to 2.5 USD) if the books were in the store/stall but incomplete. This financial literacy and management training followed a "rules of thumb" approach to teaching concepts (Drexler et al 2014; Arraiz et al. 2019), and relied heavily on teaching by analogy and by way of examples from everyday life in the markets.[17]

Combined Treatment: Micro-entrepreneurs assigned to the combined treatment received both the financial management training and the mobile money treatments at the same time.

3.3 Data

To examine the impact of mobile money and financial management training on micro-enterprise performance we rely on a combination of survey and transaction-level data from the mobile money operator. The baseline and the first endline surveys were conducted 12 months apart (in July 2014 and July 2015), face-to-face. The final endline survey, which captures the long-term effects of our interventions was conducted over the phone five years after the baseline in 2020.

Administrative data on mobile money transactions were collected between 2014-2018, and include all transactions and average balance kept in the mobile accounts across time for all groups.[18] The groups are balanced across treatment and control, and across survey waves, de-

[16] Berg and Zia (2013) find that story-telling can be an effective way of teaching about debt management.

[17] For a more detailed description of the training materials see Appendix Figures 6, 7, 8, 9 and 10.

[18] We obtained the mobile phone numbers associated with the mobile money accounts of all participants at baseline (including those in the control and in the financial literacy groups), and we repeated this exercise in the endline survey to ensure that all our participants could be matched to the administrative dataset.

spite significant attrition in the last endline survey.[19]

The majority of businesses (89%) are owner-managed and the average age of businesses is approximately 10 years. Most businesses keep inventory that would allow them to continue selling for on average 20 days and the main types of investments micro-entrepreneurs have engaged in during the preceding six months is the introduction of new products. This is also the stated preferred type of investment micro-entrepreneurs would like to engage in for the following six months. Approximately half of the sample has had experience with similar businesses in the past and the majority of the sampled micro-entrepreneurs reported having funded the business with their own savings (75%), highlighting the critical role of savings for capital investments.

At baseline, overall savings levels are similar between female and male micro-entrepreneurs: men are more likely to have access to traditional banking but females are more likely to engage in informal savings practices such as savings groups in the market.

Levels of financial and numerical literacy differed significantly across female and male micro-entrepreneurs: women scored 4% lower in a simple applied arithmetic exercise that involved calculating discounted prices in the marketplace and were 15% less likely to keep consistent bookkeeping. Female-managed businesses also started with lower capital investments and they reported lower levels of investment in new products in the preceding six months, as well as lower monthly expenditures and lower monthly sales.[20]

Importantly, female micro-entrepreneurs do not appear to have different objectives for their businesses or different levels of commitment: they report similar intentions to invest, similar objectives for savings and are even more optimistic in terms of the future growth prospects of

[19] Tables A1 and A2 in the Appendix show balance across comparison groups for baseline characteristics of the business and the micro-entrepreneur that could be correlated with their receptivity to a new technology such as mobile money, and to financial management training and show balance at baseline for both endline samples in 2015 and in 2020. These include the micro-entrepreneurs' prior access to technology, the performance of their business', levels of risk aversion, numerical literacy, and importantly, their savings and banking behaviors at baseline. Tables A3 and A4 show that attrition at either of the two endlines, while particularly pronounced for the 2020 endline survey, did not differ substantially across those that stayed and those that left the sample.

[20] Tables A5 and A6 of the Appendix show differences between female and male-owned micro-enterprises at baseline.

their businesses than their male counterparts. When asked about their goals when saving, they are just as likely to prioritize saving for their business over saving for their children's education or to cope with health shocks.[21]

4 Empirical Analysis

Given the random assignment of our interventions within each gender stratum, we can obtain unbiased estimates of their effect by estimating the following equation for each subgroup of micro-entrepreneurs:

$$y_i^E = \alpha_i + \beta_1 \text{Treatment}_i + \gamma X_i + \delta y_i^B + \epsilon_i \tag{1}$$

where y_i^E is the endline value of an outcome variable of interest (e.g. profit), i indexes micro-enterprises and α_i denotes market fixed effects. X_i is a matrix of baseline measured covariates including an indicator on whether the micro-entrepreneur operates a stall or a store, the number of employees, baseline numerical literacy, an indicator capturing familiarity with a cell phone, the age of the establishment, inventory size at baseline, the entrepreneurs' previous experience as a business owner, and whether the entrepreneur has given/received a loan from a family member in the year prior to intervention. The control group is the omitted category in all specifications. The baseline measure of the outcome variable y_i^B explains a substantial share of the variance in outcomes across individuals and is included in the specification. Standard errors are clustered at the market level to account for market-level shocks to general business conditions.

[21] See Figure 4 in the Appendix.

4.1 Treatment Effects on Profits and Financial Security

Table 1 presents the effect of each intervention on profits, with Panel A representing the effects for female micro-entrepreneurs and Panel B the effect for male micro-entrepreneurs. We find that 12 months following the interventions, female entrepreneurs in the combined treatment experienced an average increase in profits of approximately 30% over the control mean.[22] The positive effect on profit persists and, in fact, grows with time. Five years after our intervention, we find that profits reported by the combined treatment group are now 66% higher relative to the control mean.[23] While the point estimates are significant, the test of the combined treatment having an effect that is greater than the independent effect of each of the treatments is not statistically significant at conventional levels.

Micro-entrepreneurs who received support to open a mobile money account only also experienced a significant increase in profits by 2020, but this effect does not appear to be robust to further analysis as discussed in section 5.

In Columns 5 and 10 we examine the impact of the interventions on household-level financial security. This is measured through an unweighted average of responses to whether all members of the household had enough to eat in a given day and whether the micro-entrepreneur had been able to pay for schooling expenses in the previous 12 months.[24] We find that the combined treatment is associated with both higher profits and higher levels of financial security for female-led micro-entrepreneurs.

[22] All variables are deflated to 2015 prices. In 2015 we measure profits as revenue minus expenses. The mean of profits in the control group is negative, likely due to measurement error. The results are however unchanged in Appendix Table A7 when we account for those reporting higher levels of bookkeeping, suggesting that measurement error is likely to be similar across all groups and result from imperfect recall. In 2020, we ask directly about profit, which has substantially less measurement error.

[23] We do not find any evidence of treatment effects varying by market size, which might have indicated, among others, business stealing effects of our treatment (McKenzie and Puerto 2020).

[24] The financial security indicator is rescaled in the table to be increasing with positive numbers. However, the question asked in the survey was how frequently anyone in the household had gone without eating in the previous 12 months and whether the micro-entrepreneur had been unable to cover schooling expenses, both of which mitigate concerns with affirmative bias in responses.

4.1.1 Mechanisms: Financial Management Skills

We begin by assessing the effectiveness of our financial management training intervention by administering a 15-question test covering the material taught during the training. This included questions about how to separate business and household accounts, how to differentiate between gross and net profits, what costs to consider when setting prices, how to deal with peer or family pressure for redistribution and how to engage in banking activities. All participants first took the test immediately after the end of the training with the groups that received the financial management training scoring on average 60% (with a 20% standard deviation).[25] Table 2 shows that all treated groups that received the training scored approximately 11% higher in the test, relative to the control and mobile money groups. These results suggest that our training succeeded in improving financial management skills, and that these learnings persisted even 12 months after the intervention.[26]

The second dimension of financial management practices that we assessed was the quality of bookkeeping, 12 months after micro-entrepreneurs had been trained and encouraged to engage in regular bookkeeping to track sales on credit, total sales and inventories. Column 3 shows that only the group receiving the combined treatment reported improved practices of bookkeeping 12 months after the interventions - a 31% improvement on a score that ranges from 0-3. Bookkeeping was a critical component of the financial management training intervention and all participants were provided with logbooks to encourage bookkeeping for the first 3 months following the intervention.[27] Taken together, these results suggest that the financial management training was successful in improving financial management skills among the treated groups, assessed in terms of the vendors' theoretical knowledge of how to manage

[25] Performance in this test was standardized to be between 0 and 1. Table A8 in the Online Appendix shows that the training was also effective for male micro-entrepreneurs.

[26] To test that we are isolating the effect of training, we measure performance in a four question numerical literacy test both at baseline and at endline. This test involved calculating simple price discounts in the marketplace. Reassuringly, we find no effect of our treatments on numerical literacy - neither of our interventions were designed to impart more numerical skills to participants (Column 2).

[27] We measured bookkeeping based on a visual check on whether the books were in the store and whether they had entries on them.

the finances of the business, but that the actual management practices implemented were only sustained for the combined group. It is possible that the rate of decay of financial knowledge is fast if micro-entrepreneurs have no means to apply it effectively for lack of the right financial tools.

We also find that the financial literacy training was effective in reducing transfers to relatives and friends. In our baseline survey, 77% of respondents reported a belief that transfers to relatives and friends would never be repaid and 70% of respondents believed that this assistance would not be reciprocated in case of need. An important part of our financial training alerted participants to ensure that any redistribution should not occur out of business revenue and that saving and re-investing profits could enlarge the pie for potential redistribution. Column 4 suggests that while all groups appear to have engaged in lower remittances by 2020 relative to the control group, only the estimate for the combined treatment was statistically significant at conventional levels. This might reflect the change in attitude towards remittances but also the ability to keep savings in a mobile money account, where it is less accessible and visible to other members of the family and of the household.[28]

4.1.2 Mobile Money and Savings

Panel B of Table 2 reports the impact of the interventions on exposure to, and usage, of mobile money. While over 93% of all respondents both in the control group and in the financial literacy group had heard of mobile money by the first endline in 2015, usage levels were significantly lower when compared to the treatment groups that received access to a mobile money account as shown in Column 5.

Column 6 reveals that participants in the mobile money treatments were more likely to use their accounts but only those in the combined treatment group reported keeping their savings stored in their mobile money accounts. Columns 7 and 8 shows that these two groups also

[28]An additional mechanism could operate through our training and technology having a positive impact on micro-entrepreneurs' confidence and the future earning potential of their business. Yet we find that female micro-entrepreneurs in the combined treatment group are not more optimistic or more self-confident relative to those in the other experimental groups.

conduct transactions of similar value and have similar weekly balances.[29]

5 Closing the Gender Gap

In this section we examine whether our combined treatment allowed female micro-entrepreneurs to close the gap in knowledge and performance relative to their male counterparts. Figure 1 shows a clear closing of the gap in financial literacy, bookkeeping and profits between female-led micro-enterprises in the combined treatment and male-led micro-enterprises in the control group by our 2015 endline survey.

We then examine whether the differences between the performance of female and male-led enterprises can be fully attributed to core differences in observable firm and entrepreneur characteristics at baseline. If so, our combined treatment might have been equally ineffective on a subset of female micro-entrepreneurs that were more comparable to male micro-entrepreneurs. To do so, we estimate a propensity score for all participants determining the propensity of being ''male-led" based on an extensive set of covariates.[30] Table 3 shows that when we restrict the analysis to a sample of comparable female and male micro-entrepreneurs and pool the data, the impact of the combined treatment on profits (Panel A) is still significant and of similar magnitude to the coefficients observed in Table 1. Panel B confirms the key mechanisms identified previously in 2. In this more comparable set of micro-entrepreneurs we no longer find a positive effect of access to mobile money on any differential long-run profits.

To better understand which female micro-entrepreneurs benefit the most from the intervention, we examine heterogeneous effects of the combined treatment among female micro-entrepreneurs based on their baseline levels of financial literacy, savings and bookkeeping. Fig-

[29]Table A9 reports the types of transactions performed over mobile money across male and female micro-entrepreneurs. Mobile accounts are used to make remote payments (mostly paying for electricity), for cash-ins and to buy air time.

[30]These include the age of the business, the number of employees, the number of register books, space for inventory, baseline profit, total number of clients, and whether the micro-entrepreneur has another business. We then restrict our analysis to the sample with a propensity score between 0.3 and 0.65. Our results are not sensitive to the choice of this threshold. See Figure 5 in the Appendix for a distribution of the propensity scores.

ure 2 suggests that the treatment effects were strongest for female micro-entrepreneurs who had intermediate levels of financial literacy and financial management practices at baseline, but for those who had the highest level of savings. These are the micro-entrepreneurs who are most likely to benefit from the interventions and who had potential to grow their businesses. These results are also consistent with Table 3.

Finally, we conduct a cost-benefit analysis to assess the cost-effectiveness of the combined treatment in closing the profit gap between female and male-microentrepreneurs. The unitary costs of providing the financial management training were 33 USD (2004.74 Meticais), which included the salaries of the trainers, the production and printout of materials (manual and comic book) and the bookkeeping bonus. The mobile money intervention was considerably cheaper, at 6.3 USD (382.72 Meticais), including the cost of sim cards, the practice purchase bonus during the training and the savings bonus during the first three months. The total unit cost of the combined treatment was therefore approximately 39 USD (2387.5 Meticais). The benefit from the combined treatment was approximately 5744.9 Meticais at the end of 12 months suggesting that the cost of this intervention was easily repaid within the first 5 to 6 months following the intervention.

6 Conclusions

A key policy question is whether access to savings technology is more effective when micro-entrepreneurs have higher levels of financial literacy. This paper provides novel evidence on the importance of this complementarity for female micro-entrepreneurs: combining financial literacy and access to savings technology has a positive, significant, sizable and long-lasting effect on profits and on financial security. The main mechanisms behind these effects are improved financial management practices and increased savings. The findings suggest that female micro-entrepreneurs with the highest level of savings and intermediate levels of financial literacy at baseline are the most likely to benefit from this support, thus closing the well-documented

gender gap in performance and skills relative to their male counterparts operating in the same markets.

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8 Tables and Figures

Table 1: Treatment Effects on Profits

	Panel A: Female Entrepreneurs					*Panel B: Male Entrepreneurs*				
OUTCOMES	(1) Monthly Profit 2015^a	(2) Monthly Profit 2015^a	(3) Monthly Profit 2020^{at}	(4) Monthly Profit 2020^{at}	(5) Financial Security Index	(6) Monthly Profit 2015^a	(7) Monthly Profit 2015^a	(8) Monthly Profit 2020^{at}	(9) Monthly Profit 2020^{at}	(10) Financial Security Index
Treatment Condition										
FL	3,776.725	3,602.118	404.176	774.289	0.057	2,017.375	1,636.711	341.340	-168.752	0.002
	(3,223.602)	(3,062.448)	(766.577)	(844.257)	(0.071)	(3,106.894)	(3,344.417)	(1,176.832)	(1,245.338)	(0.046)
Combined	5,271.423	5,744.910*	1,786.369**	1,987.211**	0.174*	784.360	-103.175	679.061	479.952	0.044
	(3,265.631)	(3,039.084)	(797.991)	(737.592)	(0.087)	(4,366.442)	(4,814.584)	(1,211.676)	(1,209.812)	(0.064)
MM	-686.048	-1,550.274	1,794.499**	1,798.989**	0.159*	1,252.256	742.624	-700.023	-1,086.707	0.073
	(3,658.245)	(3,439.381)	(713.769)	(672.089)	(0.077)	(3,754.272)	(3,940.938)	(1,227.636)	(1,279.186)	(0.071)
Control Group Mean	-15334.840	-15185.400	1219.375	1194.291	2.559	-16841.390	-17716.870	2449.267	2560.338	2.73
Control Group St.d	28969.670	29146.500	1669.294	1689.674	0.821	32757.930	33661.510	3669.321	3726.349	0.615
p-value: FL = Comb	0.587	0.444	0.071	0.100	0.215	0.687	0.567	0.770	0.575	0.495
p-value: MM = Comb	0.046	0.014	0.992	0.792	0.815	0.870	0.789	0.366	0.203	0.682
p-value: MM = FL	0.165	0.065	0.080	0.201	0.276	0.792	0.779	0.345	0.226	0.324
p-value: MM = FL = Comb	0.129	0.038	0.102	0.230	0.448	0.919	0.846	0.589	0.323	0.590
p-value: MM + FL = Comb	0.620	0.419	0.699	0.567	0.622	0.508	0.487	0.600	0.390	0.710
p-value: MM + FL >= Comb	0.310	0.209	0.650	0.716	0.688	0.745	0.756	0.300	0.196	0.644
Controls	NO	YES	NO	YES	YES	NO	YES	NO	YES	YES
Observations	584	565	143	140	648	492	457	138	128	518
Adjusted R2	0.041	0.053	0.013	-0.032	0.067	0.048	0.056	-0.012	0.060	0.093
F-Statistic	1.515	7.014	3.210	2.216	2.770	0.956	8.964	0.398	18.160	5.100

Notes: Robust standard errors in parentheses, clustered at the market level. All models control for the dependent variable's baseline value and marked fixed effects. The full set of controls include the age of the business, the type of business (store or stall), the number of employees at baseline, an index of financial numeracy, inventory size at baseline, the entrepreneurs' previous experience as a business owner, and whether the entrepreneur has given/received a loan from a family member in the year prior to intervention. Models 1, 2, 5, 6, 7, and 10 correspond to an endline survey conducted in July, 2015. Models 3, 4, 8 and 9 correspond to a follow-up survey completed in November, 2020. ^{a} indicates that the outcome variable was winsorized, and ^{t} indicates that the outcome variable was deflated to correspond to prices in 2015.*** p<0.01, ** p<0.05, * p<0.1

Table 2: Mechanisms, Female Entrepreneurs

	Panel A: Business Practices				*Panel B: Mobile Money Usage*			
OUTCOMES	(1) Financial Literacy Index	(2) Numerical Literacy Index	(3) Book-Keeping Index	(4) Remit. To Family^{t}	(5) Reports Using MM	(6) Reported MM Savings^{m}	(7) Weekly MM Balance^{m}	(8) Weekly Transaction Value^{m}
Treatment Condition								
FL	0.057***	0.005	0.168	-142.077	-0.059	0.137	0.058	0.006
	(0.020)	(0.023)	(0.124)	(91.275)	(0.040)	(0.994)	(0.086)	(0.016)
Combined	0.062***	0.017	0.268**	-139.587*	0.202***	1.959***	1.796***	0.061***
	(0.020)	(0.023)	(0.129)	(82.527)	(0.050)	(0.741)	(0.150)	(0.021)
MM	0.028	-0.010	0.025	-198.738	0.173***	0.857	1.924***	0.061***
	(0.019)	(0.024)	(0.118)	(127.894)	(0.052)	(0.760)	(0.153)	(0.017)
Control Group Mean	0.593	0.803	0.862	270.932	0.117	2.209	0.118	0.017
Control Group St.d	0.174	0.211	1.012	1045.890	0.323	2.755	0.659	0.342
p-value: FL = Comb	0.810	0.587	0.440	0.963	0.000	0.026	0.000	0.030
p-value: MM = Comb	0.065	0.258	0.052	0.615	0.307	0.061	0.517	0.991
p-value: MM = FL	0.130	0.525	0.236	0.521	0.000	0.404	0.000	0.006
p-value: MM = FL = Comb	0.141	0.528	0.143	0.789	0.000	0.037	0.000	0.012
p-value: MM + FL = Comb	0.389	0.509	0.670	0.165	0.202	0.395	0.384	0.830
p-value: MM + FL >= Comb	0.805	0.254	0.335	0.082	0.101	0.197	0.808	0.585
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	648	652	634	223	522	127	127,573	127,573
Adjusted R-squared	0.099	0.068	0.030	0.074	0.102	0.098	0.298	0.038
F Statistic	2.591	0.457	1.580	0.707	5.929	3.21	11.480	2.651

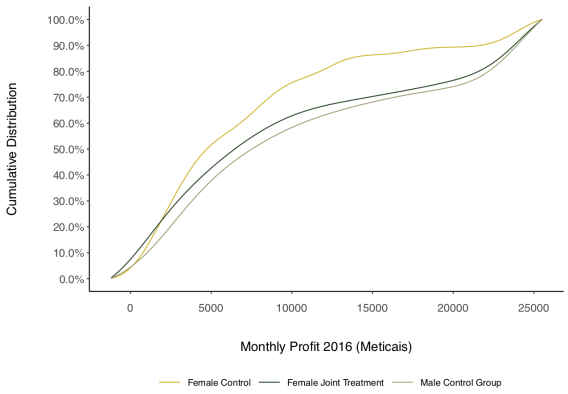
Notes: Robust standard errors in parentheses, clustered at the market level. All models control for the dependent variable's baseline value, marked fixed effects, the age of the business, the type of business (store or stall), the number of employees at baseline, an index of financial numeracy, inventory size at baseline, the entrepreneurs' previous experience as a business owner, and whether or not the entrepreneur has given/received a loan from a family member in the year prior to intervention. The dependent variable in models 1, 2, 5, 6, 8 correspond to its value in the endline survey (July, 2015), while model 4 corresponds to it's value in the follow-up survey (November, 2020). Models 7 and 8 correspond to an administrative data set from the Mobile Money operator that tracks mobile money usage and account balances between June 2014 and February 2018. ^{t} indicates that the outcome variable was deflated to correspond to prices in 2015, and ^{m} indicates that that the dependent variable was log transformed. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Matched Set of Male and Female Entrepreneurs

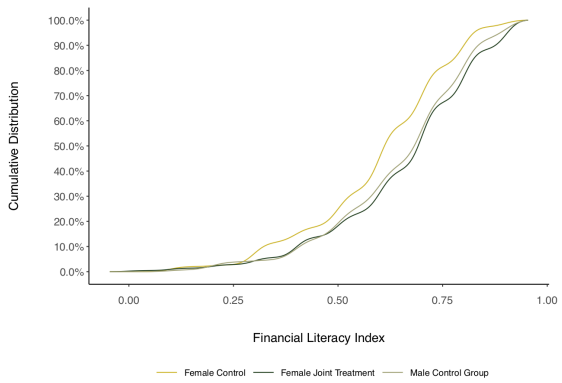
	Panel A: Profit			*Panel B: Mechanisms*					
OUTCOMES	(1) Monthly Profit 2015^{a}	(2) Monthly Profit 2020^{at}	(3) Financial Security Index	(4) Financial Literacy Index	(5) Book-Keeping Index	(6) Remit. To Family^{t}	(7) Reports Using MM	(8) Weekly MM Balance^{m}	(9) Weekly Transaction Value^{m}
Treatment Condition									
FL	5,476.941	3,168.411	0.176	0.068**	0.502**	-229.182	-0.017	0.166	0.001
	(4,534.551)	(3,006.743)	(0.156)	(0.031)	(0.206)	(361.606)	(0.046)	(0.135)	(0.034)
Combined	7,518.704	3,533.319**	0.114	0.049	0.573***	-153.972	0.279***	1.706***	0.061**
	(5,824.378	(1,630.088)	(0.209)	(0.030)	(0.199)	(329.028)	(0.071)	(0.218)	(0.030)
MM	-5,512.701	1,138.506	0.232	-0.006	0.262	-140.094	0.206**	1.850***	0.104**
	(6,934.530)	(1,934.022)	(0.220)	(0.034)	(0.225)	(413.527)	(0.080)	(0.264)	(0.040)
Male	-3,708.419	3,833.864	0.310*	0.049	0.273	907.363	0.115	0.360	0.053
	(9,652.401)	(2,287.667)	0.157	(0.035)	(0.228)	(700.814)	(0.081)	(0.230)	(0.041)
FL * Male	1,514.028	-4,015.074	-0.324	0.006	0.002	-1,063.711	0.002	-0.377	0.029
	(9,942.785)	(4,637.663)	(0.188)	(0.045)	(0.326)	(809.382)	(0.102)	(0.295)	(0.056)
Combined * Male	836.944	-3,662.552	-0.164	0.069	-0.135	-816.614	-0.021	0.286	0.071
	(11,729.016)	(4,256.076)	(0.241)	(0.045)	(0.319)	(821.585)	(0.129)	(0.419)	(0.074)
MM * Male	9,370.887	-2,702.088	-0.198	-0.048	-0.244	-951.659	0.003	0.064	0.062
	(12,433.107)	(3,070.253)	(0.243)	(0.054)	(0.357)	(718.000)	(0.134)	(0.457)	(0.086)
Control Group Mean	-18271	2281	2342.975	0.635	0.765	717.089	0.113	0.207	0.004
Control Group St.d	34662	3475	3540.140	0.174	0.925	2159.721	.319	0.967	0.160
p-value: FL = Combined	0.640	0.893	0.614	0.52	0.740	0.708	0.000	0.000	0.052
p-value: MM = Comb	0.022	0.047	0.444	0.10	0.177	0.955	0.425	0.660	0.216
p-value: MM = FL	0.075	0.433	0.648	0.032	0.318	0.764	0.003	0.000	0.016
p-value: MM = FL = Comb	0.069	0.113	0.740	0.095	0.387	0.926	0.000	0.000	0.046
p-value: MM + FL = Comb	0.1411	0.827	0.209	0.784	0.539	0.638	0.379	0.385	0.353
p-value: MM + FL >= Comb	0.141	0.586	0.895	0.607	0.730	0.319	0.189	0.807	0.823
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	366	93	381	377	376	145	363	74,884	74,884
Adjusted R-squared	0.0166	-0.147	0.049	0.197	0.0483	0.0401	0.0938	0.324	0.0559
F Statistic	6.192	359.8	9.690	12.60	2.198	0.544	4.332	8.576	1.639

Notes: Robust standard errors in parentheses, clustered at the market level. All models control for the dependent variable's baseline value, marked fixed effects, the age of the business, the type of business (store or stall), the number of employees at baseline, an index of financial numeracy, inventory size at baseline, the entrepreneurs' previous experience as a business owner, and whether or not the entrepreneur has given/received a loan from a family member in the year prior to intervention. The dependent variable in models 1, 3, 4, 5, and 7 correspond to its value in the endline survey (July, 2015), while models 2 and 6 corresponds to it's value in the follow-up survey (November, 2020). Models 8 and 9 correspond to an administrative data set from the Mobile Money operator that tracks mobile money usage and account balances from June 2014 to February 2018. ^{a} indicates that the outcome variable was winsorized, ^{t} indicates that the outcome variable was deflated to correspond to prices in 2015, and ^{m} indicates that that the dependent variable was log transformed. *** p<0.01, ** p<0.05, * p<0.1

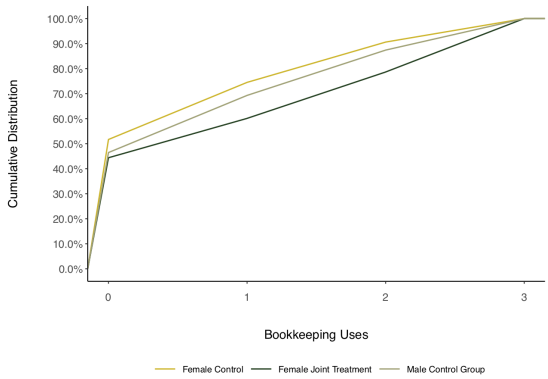
Figure 1: Closing the Gap on Profit, Financial Management And Bookkeeping



(a) Profit



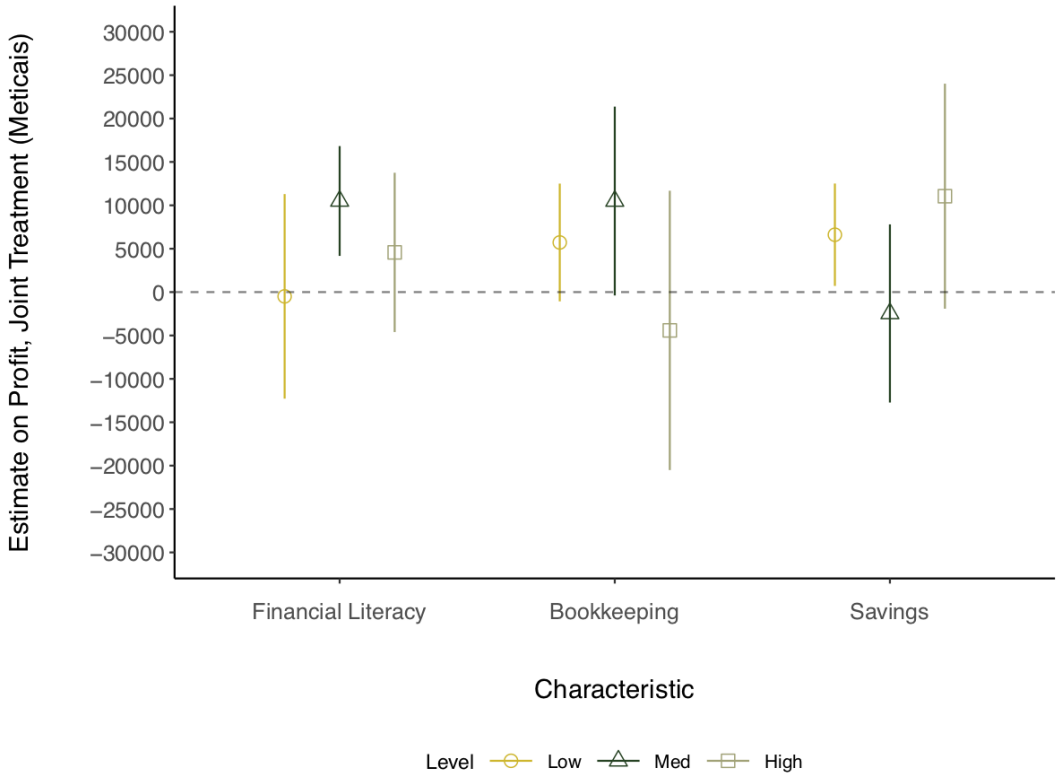
(b) Financial Management



(c) Bookkeeping

Notes: Panel (a) reports the closing of the gap in profit between 2014 and 2015 for female-led micro-enterprises in the combined treatment group and male-led micro-enterprises in the control group. Panel (b) shows the closing of the gap in financial management knowledge, as measured by a 15-question test on core financial literacy and management concepts. Panel (c) shows the closing of the gap in bookkeeping practices.

Figure 2: Heterogeneity of Treatment Effects by Baseline Levels of Financial Literacy, Bookkeeping and Savings for Female Entrepreneurs in the Joint Treatment.



Notes: Financial Literacy is measured by a 15-question test on core financial literacy and management concepts, bookkeeping refers to number of bookkeeping uses at baseline (0-3), and savings refers to baseline savings reported by the micro-entrepreneur. Characteristic levels correspond to the bottom, middle, and top 3rd of the characteristics' distribution. 90% confidence intervals shown on graph.

ONLINE APPENDIX FOR
CLOSING THE GENDER GAP

CATIA BATISTA
Nova SBE

SANDRA SEQUEIRA
LSE

PEDRO VICENTE
Nova SBE

(NOT FOR PUBLICATION)

March 2021

Table A1: Descriptive Statistics And Sample Balance Across Experimental Groups At Baseline, Endline 2015 Survey Sample

	Control	Financial Management	Financial Management + Mobile Money	Mobile Money	Overall Sample	Joint Orthogonality Test
Business Characteristics						
Business Type	1.398	1.419	1.403	1.401	1.405	0.948
	(0.029)	(0.028)	(0.027)	(0.027)	(0.014)	
% Owns Business	0.891	0.898	0.895	0.879	0.891	0.878
	(0.018)	(0.017)	(0.017)	(0.018)	(0.009)	
Initial Investment[a]	16030.469	15704.581	14483.279	17085.279	15806.970	0.844
	(2354.797)	(1976.711)	(1640.401)	(2334.864)	(1038.714)	
% Business Has Space For Inventory	0.595	0.606	0.569	0.590	0.590	0.818
	(0.029)	(0.027)	(0.028)	(0.027)	(0.014)	
Inventory Levels[a]	18.319	20.475	22.180	17.528	19.675	0.326
	(1.710)	(2.018)	(2.267)	(1.795)	(0.990)	
Establishment Age	131.532	128.242	108.059	130.066	124.311	0.015
	(6.028)	(6.402)	(5.299)	(5.839)	(2.961)	
Number of Employees	0.532	0.472	0.434	0.476	0.477	0.640
	(0.059)	(0.053)	(0.046)	(0.052)	(0.026)	
Business Owner Characteristics						
Gender	1.462	1.462	1.434	1.459	1.454	0.871
	(0.030)	(0.028)	(0.028)	(0.027)	(0.014)	
% Was Previously A Vendor	0.442	0.430	0.462	0.411	0.436	0.622
	(0.029)	(0.028)	(0.028)	(0.027)	(0.014)	
% Owns Another Business	0.045	0.043	0.046	0.033	0.042	0.918
	(0.012)	(0.011)	(0.012)	(0.010)	(0.006)	
% Played Lottery in last 12 Months	0.133	0.158	0.108	0.108	0.126	0.162
	(0.020)	(0.020)	(0.017)	(0.017)	(0.009)	
Risk Aversion Index	0.819	0.770	0.819	0.822	0.807	0.721
	(0.039)	(0.040)	(0.035)	(0.035)	(0.019)	
Financial Literacy Index	0.866	0.844	0.840	0.854	0.850	0.334
	(0.011)	(0.011)	(0.011)	(0.011)	(0.005)	
% Uses Book-Keeping	0.250	0.272	0.235	0.267	0.256	0.700
	(0.026)	(0.025)	(0.024)	(0.024)	(0.012)	
Business Performance						
Total Expenditure Last Month[a]	24989.137	27359.024	24219.925	24241.634	25199.682	0.369
	(1617.667)	(1562.349)	(1367.881)	(1320.714)	(731.806)	
Total Sales Last Month[a]	26258.427	28537.509	26641.231	27898.561	27361.154	0.731
	(1620.473)	(1656.458)	(1554.377)	(1622.647)	(807.180)	
Number Of Productive Assets	4.930	4.804	4.794	4.756	4.817	0.988
	(0.396)	(0.336)	(0.357)	(0.321)	(0.175)	
Number Of Client Past 3 Days	22.824	22.004	21.675	23.211	22.417	0.813
	(1.405)	(1.148)	(1.191)	(1.371)	(0.639)	
N	286	325	325	333	1269	

Notes: [a] indicates that the variable was winsorized

Table A2: Descriptive Statistics And Sample Balance Across Experimental Groups, Endline 2020 Survey Sample

	Control	Financial Management	Financial Management + Mobile Money	Mobile Money	Overall Sample	Joint Orthogonality Test
Business Characteristics						
Business Type	1.459	1.476	1.424	1.408	1.442	0.702
	(0.048)	(0.045)	(0.046)	(0.045)	(0.023)	
% Owns Business	0.892	0.911	0.907	0.883	0.899	0.882
	(0.030)	(0.026)	(0.027)	(0.029)	(0.014)	
Initial Investment[a]	20196.036	14233.598	16432.156	16644.522	16764.632	0.723
	(4755.588)	(2558.118)	(3050.370)	(4186.964)	(1821.202)	
% Business Has Space For Inventory	0.622	0.677	0.585	0.612	0.624	0.502
	(0.046)	(0.042)	(0.046)	(0.044)	(0.022)	
Inventory Levels[a]	21.019	21.218	30.930	18.718	23.018	0.089
	(3.453)	(2.655)	(4.823)	(3.494)	(1.842)	
Establishment Age	137.432	146.421	118.121	139.893	135.610	0.221
	(9.892)	(11.595)	(8.374)	(9.840)	(5.024)	
Number of Employees	0.545	0.366	0.543	0.419	0.466	0.279
	(0.088)	(0.067)	(0.088)	(0.078)	(0.040)	
Business Owner Characteristics						
Gender	1.495	1.500	1.415	1.471	1.470	0.543
	(0.048)	(0.045)	(0.046)	(0.046)	(0.023)	
% Was Previously A Vendor	0.450	0.411	0.458	0.380	0.424	0.596
	(0.047)	(0.044)	(0.046)	(0.044)	(0.023)	
% Owns Another Business	0.045	0.081	0.068	0.025	0.055	0.233
	(0.020)	(0.025)	(0.023)	(0.014)	(0.010)	
% Played Lottery in last 12 Months	0.189	0.185	0.110	0.124	0.152	0.204
	(0.037)	(0.035)	(0.029)	(0.030)	(0.017)	
Risk Aversion Index	0.807	0.750	0.741	0.820	0.779	0.776
	(0.063)	(0.066)	(0.071)	(0.061)	(0.033)	
Financial Literacy Index	0.872	0.860	0.839	0.844	0.853	0.534
	(0.017)	(0.018)	(0.019)	(0.016)	(0.009)	
% Uses Book-Keeping	0.236	0.268	0.265	0.246	0.254	0.935
	(0.041)	(0.040)	(0.041)	(0.040)	(0.020)	
Business Performance						
Total Expenditure Last Month[a]	25354.218	26371.395	26441.351	22512.804	25170.832	0.603
	(2535.290)	(2481.816)	(2314.321)	(2090.644)	(1178.180)	
Total Sales Last Month[a]	26717.814	26744.575	25775.817	26779.234	26495.949	0.991
	(2873.004)	(2502.554)	(2527.052)	(2749.595)	(1323.575)	
Number Of Productive Assets	4.775	4.645	4.822	4.876	4.778	0.992
	(0.635)	(0.500)	(0.558)	(0.544)	(0.278)	
Number Of Client Past 3 Days	25.168	21.383	20.483	23.375	22.493	0.462
	(2.848)	(1.893)	(1.552)	(2.569)	(1.110)	
N	111	124	118	121	474	

Notes: [a] indicates that the variable was winsorized.

Table A3: Descriptive Statistics And Sample Balance By Attrition Group, Endline 2015 Survey Sample

	Left Sample	Remained Sample	Overall Sample	Joint Orthogonality Test
Business Characteristics				
Business Type	1.457	1.405	1.416	0.098
	(0.028)	(0.014)	(0.012)	
% Owns Business	0.866	0.891	0.886	0.222
	(0.019)	(0.009)	(0.008)	
Initial Investment[a]	16737.138	15806.970	15985.169	0.691
	(1953.151)	(1038.714)	(919.035)	
% Business Has Space For Inventory	0.529	0.590	0.578	0.049
	(0.028)	(0.014)	(0.012)	
Inventory Levels[a]	13.930	19.675	18.543	0.006
	(1.211)	(0.990)	(0.832)	
Establishment Age	99.032	124.311	119.294	0.000
	(6.391)	(2.961)	(2.702)	
Number of Employees	0.590	0.477	0.499	0.060
	(0.058)	(0.026)	(0.024)	
Business Owner Characteristics				
Gender	1.439	1.454	1.451	0.638
	(0.028)	(0.014)	(0.013)	
% Was Previously A Vendor	0.468	0.436	0.442	0.304
	(0.028)	(0.014)	(0.013)	
% Owns Another Business	0.035	0.042	0.040	0.569
	(0.010)	(0.006)	(0.005)	
% Played Lottery in last 12 Months	0.080	0.126	0.117	0.023
	(0.015)	(0.009)	(0.008)	
Risk Aversion Index	0.837	0.807	0.813	0.482
	(0.036)	(0.019)	(0.017)	
Financial Literacy Index	0.862	0.850	0.853	0.345
	(0.011)	(0.005)	(0.005)	
% Uses Book-Keeping	0.277	0.256	0.260	0.469
	(0.025)	(0.012)	(0.011)	
Business Performance				
Total Expenditure Last Month[a]	25303.156	25199.682	25220.245	0.950
	(1502.517)	(731.806)	(657.808)	
Total Sales Last Month[a]	27173.296	27361.154	27324.416	0.917
	(1556.179)	(807.180)	(716.875)	
Number Of Productive Assets	6.494	4.817	5.151	0.000
	(0.424)	(0.175)	(0.165)	
Number Of Client Past 3 Days	22.029	22.417	22.339	0.787
	(1.306)	(0.639)	(0.573)	
N	317	1269	1588	

Notes: [a] indicates that the variable was winsorized.

Table A4: Descriptive Statistics And Sample Balance By Attrition Group, Endline 2020 Survey Sample

	Left Sample	Remained Sample	Overall Sample	Joint Orthogonality Test
Business Characteristics				
Business Type	1.494	1.442	1.449	0.386
	(0.056)	(0.023)	(0.021)	
% Owns Business	0.802	0.899	0.884	0.012
	(0.045)	(0.014)	(0.014)	
Initial Investment[a]	14000.774	16764.632	16365.193	0.553
	(3496.155)	(1821.202)	(1637.185)	
% Business Has Space For Inventory	0.481	0.624	0.604	0.015
	(0.056)	(0.022)	(0.021)	
Inventory Levels[a]	12.436	23.018	21.472	0.020
	(1.841)	(1.842)	(1.604)	
Establishment Age	117.716	135.610	132.975	0.181
	(13.642)	(5.024)	(4.735)	
Number of Employees	0.613	0.466	0.487	0.167
	(0.106)	(0.040)	(0.038)	
Business Owner Characteristics				
Gender	1.407	1.470	1.461	0.294
	(0.055)	(0.023)	(0.021)	
% Was Previously A Vendor	0.457	0.424	0.429	0.583
	(0.056)	(0.023)	(0.021)	
% Owns Another Business	0.074	0.055	0.058	0.494
	(0.029)	(0.010)	(0.010)	
% Played Lottery in last 12 Months	0.099	0.152	0.144	0.209
	(0.033)	(0.017)	(0.015)	
Risk Aversion Index	0.704	0.779	0.769	0.413
	(0.094)	(0.033)	(0.031)	
Financial Literacy Index	0.866	0.853	0.855	0.577
	(0.022)	(0.009)	(0.008)	
% Uses Book-Keeping	0.296	0.254	0.260	0.427
	(0.051)	(0.020)	(0.019)	
Business Performance				
Total Expenditure Last Month[a]	22912.017	25170.832	24839.975	0.460
	(2675.460)	(1178.180)	(1078.907)	
Total Sales Last Month[a]	24577.108	26495.949	26223.429	0.580
	(2933.681)	(1323.575)	(1208.963)	
Number Of Productive Assets	7.370	4.778	5.157	0.001
	(0.871)	(0.278)	(0.272)	
Number Of Client Past 3 Days	17.537	22.493	21.765	0.075
	(1.778)	(1.110)	(0.985)	
N	81	474	555	

Notes: [a] indicates that the variable was winsorized.

Table A5: Descriptive Statistics And Sample Balance By Gender at Baseline, Endline 2015 Survey Sample

	Female	Male	Overall Sample	Joint Orthogonality Test
Business Characteristics				
Business Type	1.383	1.433	1.405	0.074
	(0.018)	(0.021)	(0.014)	
% Owns Business	0.904	0.874	0.891	0.085
	(0.011)	(0.014)	(0.009)	
Initial Investment[a]	12797.447	19388.774	15806.970	0.002
	(1189.046)	(1767.875)	(1038.714)	
% Business Has Space For Inventory	0.556	0.630	0.590	0.008
	(0.019)	(0.020)	(0.014)	
Inventory Levels[a]	17.083	22.875	19.675	0.004
	(1.172)	(1.667)	(0.990)	
Establishment Age	135.341	111.037	124.311	0.000
	(4.115)	(4.185)	(2.961)	
Number of Employees	0.478	0.475	0.477	0.952
	(0.035)	(0.040)	(0.026)	
Business Owner Characteristics				
Gender	1.000	2.000	1.454	
	(0.000)	(0.000)	(0.014)	
% Was Previously A Vendor	0.482	0.380	0.436	0.000
	(0.019)	(0.020)	(0.014)	
% Owns Another Business	0.032	0.054	0.042	0.144
	(0.007)	(0.009)	(0.006)	
% Played Lottery in last 12 Months	0.079	0.183	0.126	0.000
	(0.010)	(0.016)	(0.009)	
Risk Aversion Index	0.773	0.845	0.807	0.055
	(0.028)	(0.025)	(0.019)	
Financial Literacy Index	0.835	0.869	0.850	0.002
	(0.008)	(0.007)	(0.005)	
% Uses Book-Keeping	0.225	0.295	0.256	0.005
	(0.016)	(0.019)	(0.012)	
Business Performance				
Total Expenditure Last Month[a]	21409.807	29786.028	25199.682	0.000
	(850.586)	(1221.166)	(731.806)	
Total Sales Last Month[a]	23910.977	31592.753	27361.154	0.000
	(976.292)	(1317.746)	(807.180)	
Number Of Productive Assets	5.386	4.129	4.817	0.000
	(0.268)	(0.209)	(0.175)	
Number Of Client Past 3 Days	20.955	24.205	22.417	0.011
	(0.801)	(1.023)	(0.639)	
N	693	576	1269	

Notes: [a] indicates that the variable was winsorized.

Table A6: Descriptive Statistics And Sample Balance By Gender, Endline 2020 Survey Sample

	Female	Male	Overall Sample	Joint Orthogonality Test
Business Characteristics				
Business Type	1.442	1.441	1.442	0.986
	(0.031)	(0.033)	(0.023)	
% Owns Business	0.924	0.869	0.899	0.048
	(0.017)	(0.023)	(0.014)	
Initial Investment[a]	13350.824	20551.213	16764.632	0.048
	(2037.828)	(3087.154)	(1821.202)	
% Business Has Space For Inventory	0.594	0.659	0.624	0.142
	(0.031)	(0.032)	(0.022)	
Inventory Levels[a]	18.726	27.828	23.018	0.013
	(2.079)	(3.109)	(1.842)	
Establishment Age	142.976	127.273	135.610	0.119
	(6.746)	(7.488)	(5.024)	
Number of Employees	0.446	0.488	0.466	0.596
	(0.053)	(0.061)	(0.040)	
Business Owner Characteristics				
Gender	1.000	2.000	1.470	
	(0.000)	(0.000)	(0.023)	
% Was Previously A Vendor	0.474	0.368	0.424	0.019
	(0.032)	(0.032)	(0.023)	
% Owns Another Business	0.036	0.076	0.055	0.054
	(0.012)	(0.018)	(0.010)	
% Played Lottery in last 12 Months	0.092	0.220	0.152	0.000
	(0.018)	(0.028)	(0.017)	
Risk Aversion Index	0.758	0.799	0.779	0.536
	(0.048)	(0.044)	(0.033)	
Financial Literacy Index	0.843	0.865	0.853	0.195
	(0.013)	(0.012)	(0.009)	
% Uses Book-Keeping	0.196	0.321	0.254	0.002
	(0.025)	(0.032)	(0.020)	
Business Performance				
Total Expenditure Last Month[a]	21063.051	29796.712	25170.832	0.000
	(1363.762)	(1935.787)	(1178.180)	
Total Sales Last Month[a]	23352.930	30048.928	26495.949	0.011
	(1613.717)	(2127.588)	(1323.575)	
Number Of Productive Assets	5.414	4.063	4.778	0.015
	(0.440)	(0.317)	(0.278)	
Number Of Client Past 3 Days	19.946	25.405	22.493	0.014
	(1.316)	(1.824)	(1.110)	
N	251	223	474	

Notes: [a] indicates that the variable was winsorized.

Table A7: Treatment Effects On Profits, Control For End Line Bookkeeping

	Panel A: Female Entrepreneurs					*Panel B: Male Entrepreneurs*				
OUTCOMES	(1) Monthly Profit 2015^{a}	(2) Monthly Profit 2015^{a}	(3) Monthly Profit 2020^{at}	(4) Monthly Profit 2020^{at}	(5) Financial Security Index	(6) Monthly Profit 2015^{a}	(7) Monthly Profit 2015^{a}	(8) Monthly Profit 2020^{at}	(9) Monthly Profit 2020^{at}	(10) Financial Security Index
Treatment Condition										
FL	3,776.725	4,610.711	404.176	741.169	0.053	2,017.375	3,106.507	341.340	-277.929	-0.014
	(3,223.602)	(2,943.892)	(766.577)	(825.850)	(0.075)	(3,106.894)	(3,150.642)	(1,176.832)	(1,287.150)	(0.043)
Combined	5,271.423	7,452.004**	1,786.369**	1,916.238**	0.167*	784.360	1,889.433	679.061	264.895	0.041
	(3,265.631)	(3,096.648)	(797.991)	(762.154)	(0.090)	(4,366.442)	(4,551.676)	(1,211.676)	(1,298.162)	(0.059)
MM	-686.048	-1,858.508	1,794.499**	2,108.246***	0.180**	1,252.256	1,543.260	-700.023	-962.211	0.054
	(3,658.245)	(3,344.428)	(713.769)	(734.821)	(0.075)	(3,754.272)	(4,148.628)	(1,227.636)	(1,264.758)	(0.074)
Control Group Mean	-15334.840	-15240.540	1219.375	1211.001	2.553	-16841.390	-18534.840	2449.267	2576.169	2.754
Control Group St.d	28969.670	29090.400	1669.294	1745.554	0.826	32757.930	33986.780	3669.321	3781.192	0.565
p-value: FL = Comb	0.587	0.204	0.071	0.071	0.230	0.687	0.658	0.770	0.643	0.359
p-value: MM = Comb	0.046	0.000	0.992	0.801	0.841	0.870	0.905	0.366	0.328	0.812
p-value: MM = FL	0.165	0.017	0.080	0.108	0.173	0.792	0.619	0.345	0.397	0.290
p-value: MM = FL = Comb	0.129	0.003	0.102	0.136	0.376	0.919	0.861	0.589	0.544	0.528
p-value: MM + FL = Comb	0.620	0.228	0.699	0.344	0.448	0.508	0.442	0.600	0.448	0.996
p-value: MM + FL >= Comb	0.310	0.114	0.650	0.8278	0.775	0.745	0.778	0.300	0.224	0.498
Controls	NO	YES	NO	YES	YES	NO	YES	NO	YES	YES
Observations	584	556	143	135	636	492	447	138	124	507
Adjusted R-squared	0.0409	0.0782	0.0131	-0.0192	0.0704	0.0477	0.0710	-0.0120	0.0216	0.0972
F-Statistic	1.515	7.146	3.212	2.301	2.614	0.956	20.01	0.398	53.03	7.939

Notes: Robust standard errors in parentheses, clustered at the market level. All models control for the dependent variable's baseline value and marked fixed effects. The full set of controls include the age of the business, the type of business (store or stall), the number of employees at baseline, an index of financial numeracy, inventory size at baseline, the entrepreneurs' previous experience as a business owner, whether or not the entrepreneur has given/received a loan from a family member in the year prior to intervention, and an index of end line book-keeping. Models 1, 2, 5, 6, 7, and 10 correspond to an endline survey taken in July, 2015. Models 3, 4, 8 and 9 correspond to a follow-up survey taken in November, 2020. ^{a} indicates that the outcome variable was winsorized, ^{t} indicates that the outcome variable was deflated to correspond to prices in 2015, and ^{m} indicates that that the dependent variable was log transformed. *** p<0.01, ** p<0.05, * p<0.1

Table A8: Mechanisms, Male Entrepreneurs

	Panel A: Business Practices				*Panel B: Mobile Money Usage*			
OUTCOMES	(1) Financial Literacy Index	(2) Numerical Literacy Index	(3) Book-Keeping Index	(4) Remit. To Family^{t}	(5) Reports Using MM	(6) Reported MM Savings^{m}	(7) Weekly MM Balance^{m}	(8) Weekly Transaction Value^{m}
Treatment Condition								
FL	0.076***	0.004	0.371**	616.077	-0.004	0.033	-0.022	0.024
	(0.021)	(0.024)	(0.150)	(617.515)	(0.045)	(0.362)	(0.120)	(0.020)
Combined	0.077***	-0.011	0.429***	-399.755	0.327***	0.637*	1.914***	0.106***
	(0.022)	(0.024)	(0.155)	(355.418)	(0.057)	(0.353)	(0.186)	(0.028)
MM	-0.019	-0.012	-0.079	-290.272	0.257***	0.296	2.026***	0.107***
	(0.022)	(0.025)	(0.142)	(392.934)	(0.055)	(0.369)	(0.178)	(0.024)
Control Group Mean	0.652	0.836	0.963	686.933	0.133	2.950	0.227	0.005
Control Group St.d	0.177	0.185	1.103	1893.734	0.342	2.277	0.962	0.180
p-value: FL = Comb	0.967	0.530	0.706	0.058	0.000	0.060	0.000	0.013
p-value: MM = Comb	0.000	0.972	0.000	0.710	0.255	0.322	0.625	0.982
p-value: MM = FL	0.000	0.518	0.001	0.049	0.000	0.437	0.000	0.003
p-value: MM = FL = Comb	0.000	0.761	0.000	0.129	0.000	0.170	0.000	0.004
p-value: MM + FL = Comb	0.493	0.922	0.513	0.338	0.336	0.537	0.724	0.558
p-value: MM + FL >= Comb	0.246	0.538	0.256	0.830	0.168	0.268	0.637	0.720
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	518	522	506	185	507	515	101,325	101,325
Adjusted R-squared	0.0647	0.0403	0.0614	0.0164	0.127	0.0193	0.331	0.0854
F Statistic	4.212	1.734	2.416	0.764	6.180	1.420	11.05	1.966

Notes: Robust standard errors in parentheses, clustered at the market level. All models control for the dependent variable's baseline value, marked fixed effects, the age of the business, the type of business (store or stall), the number of employees at baseline, an index of financial numeracy, inventory size at baseline, the entrepreneurs' previous experience as a business owner, and whether or not the entrepreneur has given/received a loan from a family member in the year prior to intervention. The dependent variable in models 1, 2, 5, 6, 8 correspond to its value in the endline survey (July, 2015), while model 4 corresponds to it's value in the follow-up survey (November, 2020). Models 7 and 8 correspond to an administrative data set from the Mobile Money operator that tracks mobile money usage and account balances from June 2014 to February 2018. ^{a} indicates that the outcome variable was winsorized, ^{t} indicates that the outcome variable was deflated to correspond to prices in 2015, and ^{m} indicates that that the dependent variable was log transformed. *** p<0.01, ** p<0.05, * p<0.1

Table A9: Share Of Transactions Across Experimental Groups

	Total	Airtime	Balance	Deposit	Withd.	Remote Payment	Transfer Sent	Transfer Received	Reversal
Full Sample									
Control (N=286)	885	3.62%	0.45%	13.22%	1.13%	70.85%	8.93%	1.81%	0.00%
FL (N=325)	943	16.12%	2.12%	32.77%	7.53%	34.89%	3.08%	2.01%	0.42%
Combined(N=325)	4511	23.90%	3.37%	25.43%	4.41%	39.64%	2.50%	0.75%	0.00%
MM (N=333)	4910	14.81%	4.62%	32.81%	4.81%	39.23%	2.75%	0.84%	0.14%
Male									
Control (N=132)	69	26.09%	4.35%	37.68%	0.00%	26.09%	1.45%	4.35%	0.00%
FM (N=150)	491	19.96%	1.43%	26.88%	0.81%	43.79%	4.89%	2.24%	0.00%
FM + MM (N=141)	2513	3.02%	16.35%	22.32%	1.31%	54.20%	2.03%	0.76%	0.00%
MM (N=153)	3112	11.21%	3.50%	35.15%	6.88%	39.91%	2.15%	0.96%	0.22%
Female									
Control (N=154)	816	1.72%	0.12%	11.15%	1.23%	74.63%	9.56%	1.59%	0.00%
FL (N=175)	452	11.95%	2.88%	39.16%	14.82%	25.22%	3.32%	1.77%	0.88%
Combined (N=184)	1998	33.38%	3.80%	29.33%	8.31%	21.32%	3.10%	0.75%	0.00%
MM (N=180)	1798	21.02%	6.56%	28.75%	1.22%	38.04%	3.78%	0.61%	0.00%
Total	11249	17.68%	3.58%	28.30%	4.59%	41.51%	3.25%	0.98%	0.10%

9 Figures

Figure 3: Business Illustrations

Notes: Left panel illustrates a stall in the market and Right panel illustrates a store.

Figure 4: Reported Savings Objectives At Baseline By Gender micro-entrepreneurs

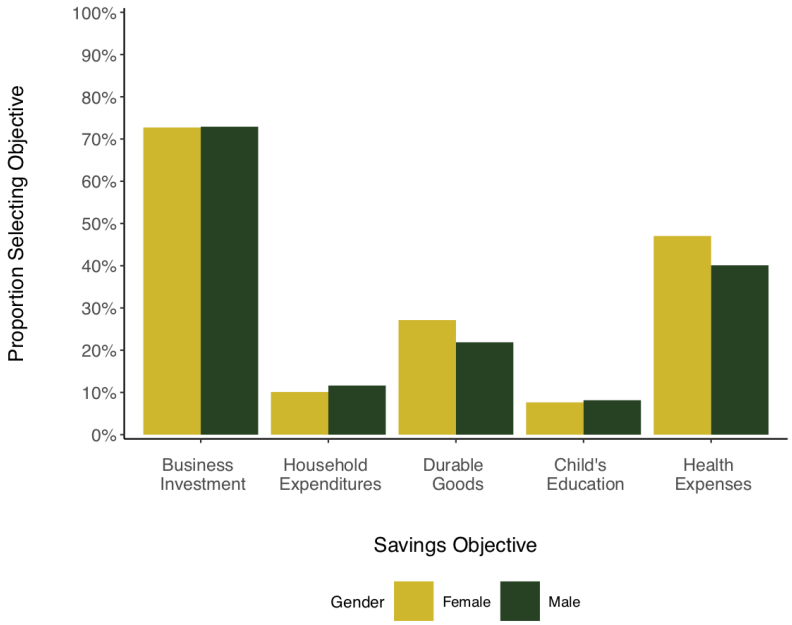


Figure 5: Propensity Scores Of Female and Male Micro-Enterprises

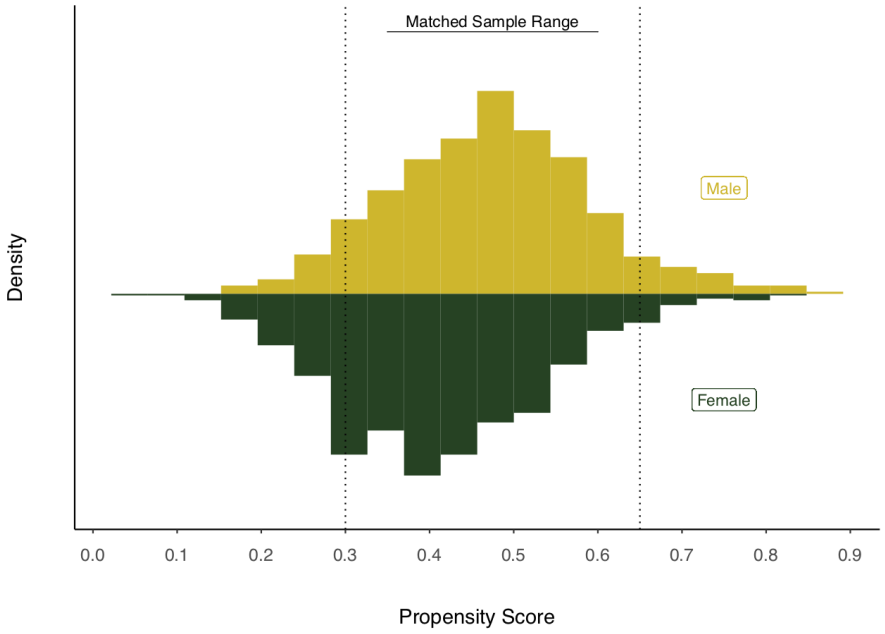


Figure 6: Front Cover Of The Manual Designed To Support Financial Management Training

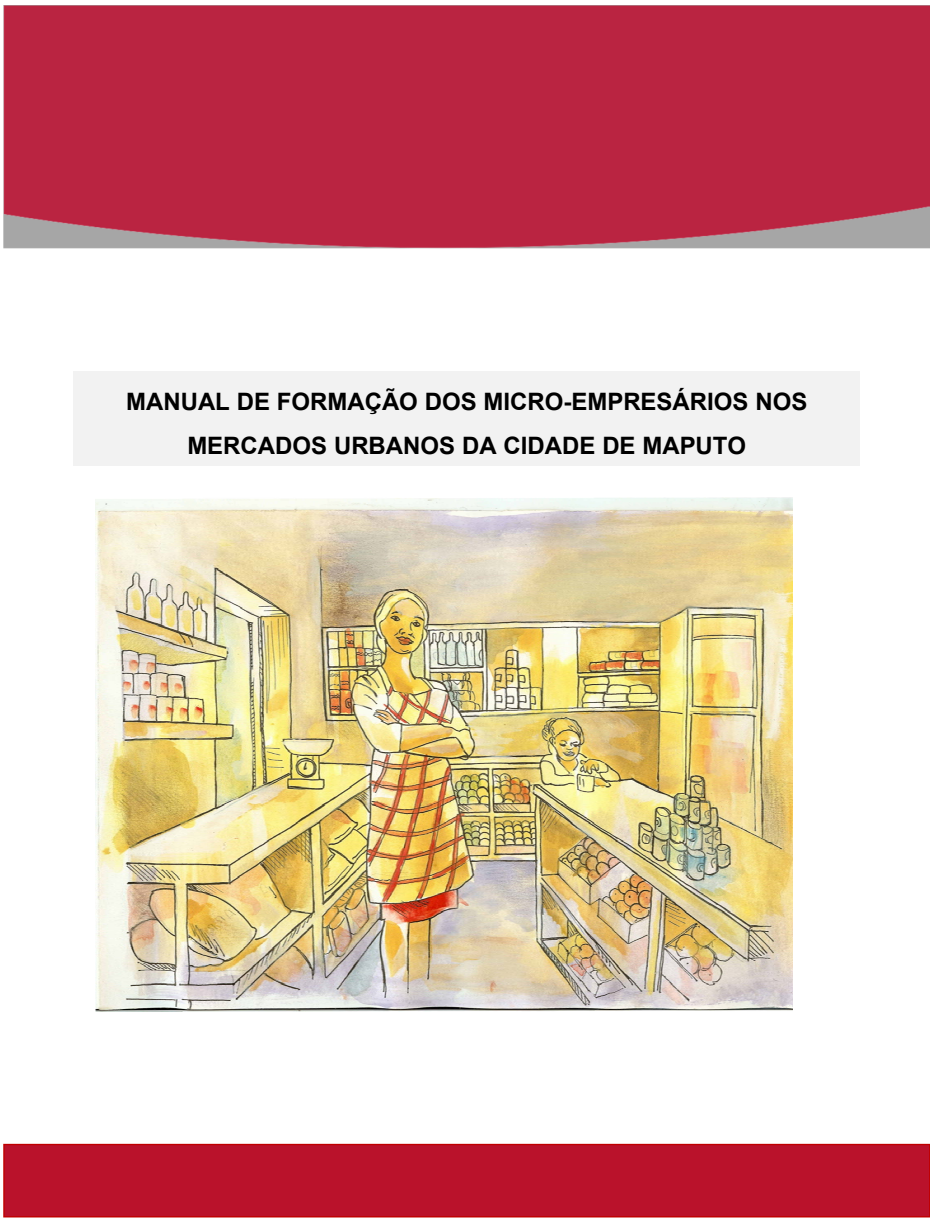


Figure 7: Example From The Financial Management Training Manual: How To Prepare A Budget.

9. Orçamento: o que é e como se deve fazer?

4 Passos para fazer um Orçamento!

2 **Prever as Compras – Como calcular?**

- Depois de prever as vendas, faz-se a previsão das compras necessárias;
- Quando fazemos a previsão das compras, não nos podemos esquecer que os preços podem variar.

Exemplo: O Senhor Ezequiel já calculou as vendas do próximo mês. No próximo mês, vai ter de comprar 100 sacos de batata para vender na sua banca.

- Actualmente o Sr. Ezequiel compra o saco de batatas a 240MT. Ao analisar o comportamento dos preços nos últimos 3 meses, como fizemos no passo 1, esperamos que no próximo mês o preço aumente para 245MT.
  - Compras = Preço por saco x número de sacos necessários
  - Exemplo: 245MT x 100 sacos = 24.500MT
- O Sr. Ezequiel vai gastar 24.500MT para comprar a sua mercadoria

Formação dos Micro-Empresários nos Mercados Urbanos das Províncias de Gaza e Maputo 12

Figure 8: Example Of Logbook Page Provided During The Financial Management Training

Livro 3 – Registo ao final do dia

Data	Compras Valor Total – Custos Directos	Vendas Valor Total – Receitas – Pago	Vendas Valor Total – Receitas – Não Pago (a crédito)	Despesas com a loja (eletricidade, taxa de mercado,...)		Transferências/Empréstimos		Poupança	
				Valor	Descrição	Valor	Pessoa - Descrição	Xitique	Banco

Figure 9: Example Of The Comic Book Designed To Help Teach Key Financial Concepts

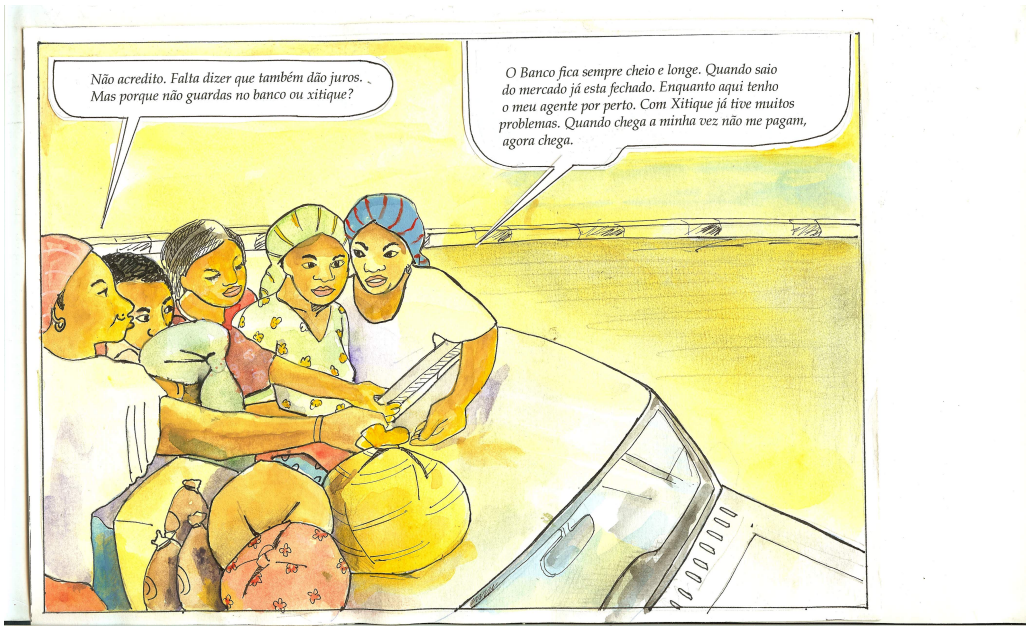


Figure 10: Example Of The Comic Book Designed To Help Teach Key Financial Concepts