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Keeping It Simple: Financial Literacy and Rules of Thumb[†]

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Micro-entrepreneurs often lack the financial literacy required to make important financial decisions. We conducted a randomized evaluation with a bank in the Dominican Republic to compare the impact of two distinct programs: standard accounting training versus a simplified, rule-of-thumb training that taught basic financial heuristics. The rule-of-thumb training significantly improved firms' financial practices, objective reporting quality, and revenues. For micro-entrepreneurs with lower skills or poor initial financial practices, the impact of the rule-of-thumb training was significantly larger than that of the standard accounting training, suggesting that simplifying training programs might improve their effectiveness for less sophisticated individuals. (*JEL* D4, G21, J24, L25, L26, M41, O16)

Individuals and micro-entrepreneurs alike are asked to make complex financial decisions in many areas of life, whether in their personal finances in the form of savings decisions and retirement planning or in a business context as small business owners or investors. However, a growing literature shows that a large fraction of the population is woefully underprepared to make these decisions. Lusardi and Mitchell (2007b) and Lusardi and Tufano (2009), for example, find low levels of financial literacy in the US population, an inability to understand basic financial concepts, such as the importance of retirement savings and poor judgment in borrowing decisions. Similarly, Cole, Sampson, and Zia (2011) document very low levels of financial literacy for households in India and Indonesia. In addition, these studies find a strong association between understanding financial concepts, better financial decisions, and household well-being.

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The challenge is to determine whether and how financial literacy can be taught and, closely related, whether there is a causal link between improving financial literacy and individual outcomes. The evidence so far has been mixed, with large heterogeneity in the estimated success of training programs. For example, Bernheim and Garrett (2003) and Lusardi (2005) provide survey evidence that people who attend financial counseling programs subsequently make better financial decisions, especially those attendees with low income and education levels. The estimated effects of the programs are large; however, self-selection into training could lead to an upward bias. In contrast, Duflo and Saez (2003) conduct a randomized evaluation exposing employees to a benefits fair that raises awareness about retirement savings, but they find only a small effect on savings plan enrollment. Similarly, Cole, Sampson, and Zia (2011) find only modest effects from a financial literacy training program in Indonesia.

One major challenge in studying the impact of such financial literacy programs is that measured impacts conflate the usefulness of the financial skills with the effectiveness of the specific training methodology used in the study. To date we have only very limited systematic knowledge about the dimensions that determine the impact of a financial literacy program. This impact might be crucially affected by the comprehensiveness and complexity of the materials, and all training programs face a trade-off between the ease with which participants can grasp the concepts and their potential depth of understanding.

To advance our knowledge of how differences in the structure and complexity of training programs affect participants' performance, we worked with a bank in the Dominican Republic to conduct a randomized evaluation comparing the impact of two financial literacy training programs for small business owners. While we do not focus specifically on consumer financial literacy of the sort studied by Lusardi and Mitchell (2007a) and others, we note that for microenterprises the boundary between business and personal financial decisions is often blurred. In order to understand the channel through which financial training may affect recipients, we worked with ADOPEM, a microfinance institution in the Dominican Republic with a long history of offering training to its clients, to develop two distinct types of training that span the spectrum between comprehensiveness of the material and ease of understanding. Our aim in designing and evaluating these two programs is to assess whether there may be advantages to reducing the complexity of training programs and, in particular, if the simpler rule-of-thumb training is a better fit for less-educated or less financially sophisticated clients.

The standard accounting program closely follows a standard approach to small business training, which is designed to teach micro-entrepreneurs the basics of double-entry accounting, working capital management, and investment decisions. Similar programs are used around the world by groups such as Freedom from Hunger, the International Labor Organization, BRAC, and many others.[1] The rule-of-thumb training focuses on very simple heuristics or routines for financial decision making

[1] The traditional accounting training was based on the then-current curricula of Freedom from Hunger and the ILO's Start and Improve Your Business program. Working with the training center at ADOPEM, we adapted these programs to the Dominican context in terms of language, idiom, and the specific examples used in teaching.

without aiming to provide comprehensive accounting knowledge. For example, the standard accounting trainings taught participants to separate their business and personal accounts by instructing them how to calculate business profits based on a typical accounting curriculum for micro-entrepreneurs. The rule-of-thumb training gave them a physical rule to keep their money in two separate drawers (or purses) and to only transfer money from one drawer to the other with an explicit "IOU" note between the business and the household. At the end of the month they could then count how much money was in the business drawer and know what their profits were.

Between November 2006 and July 2008, we implemented a randomized evaluation of these two training programs in collaboration with ADOPEM. We selected 1,193 of their existing clients who had expressed some interest in training and randomly assigned them either to one of the two trainings or a control group. Our results document important differences in the impact of the two approaches. People who were offered rule-of-thumb-based training showed significant improvements in the way they managed their finances and in the accuracy and internal consistency of the numbers they reported. They were more likely to keep accounting records, calculate monthly revenues, and separate their books for the business and the home. Improvements along these dimensions are on the order of 10 percentage points. In contrast, we did not find any significant changes for those in the standard accounting training. We note that while only the rule-of-thumb training generated significant improvements in business practices and reporting quality, the differences between the two treatments in the full sample were not statistically significant. However, for the subset of clients that are lower skilled or had poorer financial practices in the baseline, we show that the rule-of-thumb training had a larger and significantly more positive impact than the standard accounting training. Overall, it appears that the micro-entrepreneurs in our study were more likely to implement what they learned in the rule-of-thumb training.

In studying training programs, measurement effects are a natural concern. Respondents may report what they believe surveyors want to hear. Therefore, we developed and looked for changes in objective measures of reporting quality. Consistent with the belief that SMEs lack financial controls, the quality of self-reported firm data is poor. In the baseline survey, nearly half of the respondents make at least one error when asked to report sales and profits over different time horizons and levels of aggregation. Similarly, self-reported profits are, on average, substantially lower than what one would calculate from respondents' own revenue and expense detail.[2] The standard accounting training generates small and not statistically significant improvements in both dimensions. In contrast, the rule-of-thumb training significantly improves objective reporting quality. The error rate falls by 9 percentage points, and the mean difference between the two profit measures drops

[2] The direction of this reporting bias goes in the opposite direction from what De Mel, McKenzie, and Woodruff (2009) found in their sample of small firms in Sri Lanka, for which self-reported profits are larger than those calculated from revenue and expense detail. We speculate that the firms in our sample have less incentive to underreport revenues but have poor recall over expense detail and fail to record the necessary information. Note also that there is substantial variation in these errors. In the control group, directly reported profits are less than calculated profits for 58 percent of the sample and larger for 28 percent.

by more than 50 percent. These improvements in objective reporting quality suggest that the rule-of-thumb training changes actual business management practices. They also underscore a key challenge in using profits as an outcome measure in business training studies. Not only are profits difficult to measure—this is well understood—but estimated effects often conflate the effect of the treatment on actual profits with changes in reporting quality.

When looking at the impact of training on business outcomes, we again find a more significant change in the group that received the rule-of-thumb training. We find a statistically significant and economically meaningful impact of 0.11 standard deviations on an index of revenue measures. The most significant effect is observed in the level of sales during self-reported bad weeks. While these results should be interpreted with caution—the training may have affected revenue reporting as well as actual revenues—we note that this is consistent with an emerging pattern in other recent studies (Karlan and Valdivia 2011; Berge, Bjorvatn, and Tungodden 2012). The standard accounting training produces no significant effects. The differences between the two trainings is large and statistically significant.

In a second step, we test for heterogeneous treatment effects, comparing the relative effect of the trainings across clients with different characteristics. The rule-of-thumb training produces a more pronounced effect for less sophisticated clients: those with the lowest human capital, limited ex ante interest in accounting or financial training, or with baseline business practices in the lowest quartile.[3] For these clients, the differences between the rule-of-thumb and standard accounting trainings are economically and statistically significant. These findings highlight the importance of heterogeneity and targeting training materials to client characteristics. A simplified rule-of-thumb training appears well suited to the needs of the less sophisticated clients.[4]

Taken together, these results suggest that effective training may operate by helping individuals to better manage negative shocks or by improving their financial controls, which may allow them to predict and counteract the effect of slow weeks more proactively. However, it is important to note that improvements for firms in the rule-of-thumb treatment could stem from net business growth or from a redistribution from other enterprises in their area. Our study design allows us to test for these negative spillovers. We find a small but statistically significant drop in sales for firms located near more treated firms if these treated firms are in the same general line of business. These results are suggestive that some of the growth in the treated firms

[3] The original sample frame of 1,193 individuals comprised borrowers who expressed interest in generic business training before the start of the program. In the baseline survey, respondents were asked to indicate their interest in specific forms of training. We classify an individual as "interested in training" if she indicated a desire to receive training in business accounting or financial management.

[4] Simplicity could benefit trainees in two ways, either by making concepts more accessible or by allowing more time for repetition of each topic. This difference is conceptually important; however with a fixed time budget, the two are jointly determined. To disentangle these mechanisms, we aimed to keep the teaching time of each topic similar across the two training programs. The rule-of-thumb training was implemented in a total of five training sessions versus six for the standard accounting program. Furthermore, we implemented an additional treatment arm that provided focused, hands-on repetition of all the concepts to a subset of both primary treatment groups. The results, reported in Appendix Table A4, show no significant improvements from relaxing the time constraint. This suggests that in this context simplicity per se and not repetition is driving the results.

was due to crowding out of other firms and identify an important avenue for future work.

The rest of the paper is organized as follows. Section I briefly describes the related literature, and Section II details the experimental design. Section III describes the data and empirical strategy, Section IV presents the results, and Section V concludes.

I. Related Literature and Background

A growing literature has documented the low level of financial literacy in the general population and its impact on individual decision making. Lusardi (2009) finds widespread lack of financial literacy among large sections of the US population, especially among people with low levels of education, women, and ethnic minorities. This lack of financial literacy is associated with poor financial decision making, in particular, regarding retirement planning (Lusardi and Mitchell 2007a), borrowing decisions (Lusardi and Tufano 2009; Stango and Zinman 2009), investment choices (Lusardi and Mitchell 2007b), and participation in the formal financial system (van Rooij, Lusardi, and Alessie 2011).

Yet despite the strong association between financial literacy and a range of measures of financial well-being, little is known about the efficacy of financial literacy training programs in improving these outcomes. Causal inference for many studies is hindered by endogenous selection into training programs.[5] Where causal effects can be clearly identified, the results are mixed. Bernheim, Garrett, and Maki (2001) exploit variation across states and time in mandatory financial education for high school students and find that mandates increased exposure to financial curricula and ultimately asset accumulation. However, subsequent work by Cole, Paulson, and Shastry (2012) uses a larger sample and finds little effect. Cole, Sampson, and Zia (2009) conduct a randomized evaluation of a financial education program in Indonesia. They find that while financial literacy is strongly correlated with the demand for financial services, financial literacy education had modest effects on demand and was dwarfed by the effect of even a small subsidy to open a savings account.

Moreover, most studies use the term "financial literacy training" to refer to a myriad of different programs, varying from one-day consultation sessions in the field to one year of detailed in-class training. This variation makes it difficult to interpret results and compare the impact of training across studies. In particular, these studies do not allow one to test which features of literacy training are more effective than others. In contrast, this study explicitly tests the impact of different types of financial literacy training—standard accounting and a simplified, rule-of-thumb approach—with the aim of beginning to understand the mechanisms through which training programs may or may not work.[6]

[5] Meier and Sprenger (2008), for example, document that individuals who choose to acquire personal financial information through a credit counseling program discount the future less than individuals who choose not to participate.

[6] A number of papers in the education literature demonstrate that both choosing the appropriate level of curriculum and targeting concrete tasks rather than broad improvement are important for learning outcomes. See, for example, Glewwe, Kremer, and Moulin (2009); Duflo, Dupas, and Kremer (2011); and Fryer (2011).

We also focus on a specific type of training aimed at small business owners. Until recently, surprisingly few studies looked at financial literacy for this population, even though significant resources are devoted to accounting and financial literacy training for them.[7] The first notable exception was Karlan and Valdivia (2011), which studies the impact of teaching basic finance concepts to micro-entrepreneurs.[8] Their study finds a large impact on clients' knowledge of financial terms and reported business practices. Results are more mixed on real outcomes, such as sales or consumption, but the microfinance institution benefited from increased retention and repayment.

The issue of building managerial capital for small business owners has received increased attention of late (McKenzie and Woodruff 2014). Field, Jayachandran, and Pande (2010) evaluate a two-day training program for clients of an Indian microfinance institution. Their study focuses on constraints to women's entrepreneurial choices, with particular attention on encouraging savings and improving debt management, and finds that being invited to the training program increased both borrowing and the likelihood of personal labor income. A recent program evaluation by Berge, Bjorvatn, and Tungodden (2012) evaluates the effect of financial grants and a wide-ranging business training program for clients of a microfinance institution in Tanzania. They find little effect on female clients, but a substantial impact on men's business practices and outcomes. Bruhn and Zia (2013) study a training program for young entrepreneurs in post-conflict Bosnia and Herzegovina, finding that while the program did not affect business survival, it significantly improved business practices for surviving businesses. Similar to our study, they find some evidence of heterogeneous responses. The training program appears to improve business performance only for those individuals who were more skilled before the program began.

A related strand in the literature on capacity building for small- and medium-size enterprises focuses on providing consulting and management services to firms. Bloom et al. (2013) study the impact of intensive consulting services from an international management consulting firm on the business practices of medium- to large-size firms in the Indian textile industry. Even these large firms were unaware of many modern management practices, and treated plants significantly improved their management practices. Bruhn, Karlan, and Schoar (2010) conduct a randomized evaluation of consulting services in which small businesses were paired with a local management consultant for one year. The study assigned firms to a wide range of management consulting services, with financial literacy as an integral part of the intervention. More than 30 percent of the firms requested financial advice as one of the main inputs.

[7] For example, the US Small Business Administration's (SBA) small business training network, the World Bank's SME Toolkit, the International Labour Organization's Know About Business Programme, the Financial Education for the Poor (FEP) project sponsored by Microfinance Opportunities, the Citigroup Foundation, Freedom from Hunger, and many others aim to teach financial skills at a huge expense every year. The SBA training includes modules on finance and accounting, business planning, business startup, business management, government contracting, marketing and advertising, and how to survive in a slow economy. The training is available online at http://www.sba.gov/training/. The FEP targets microfinance clients, many of whom have only subsistence-level business activity. The FEP project includes five modules: credit administration, savings, financial negotiation, budgeting, and bank services.

[8] The micro-entrepreneurs in their study are part of a group lending program with weekly meetings. In these weekly sessions, clients in the treatment group also receive training.

We contribute to this literature by conducting an experiment designed to further our understanding of the mechanisms through which training can affect businesses, explicitly comparing a standard accounting training with a simplified, rule-of-thumb-based program. In this vein, we also build on a growing literature that supports the merits of simplification in settings as varied as retirement savings plan enrollment (Beshears et al. 2013; Choi, Laibson, and Madrian 2009), Medicare drug plans (Mullainathan and Shafir 2009), weight loss (Mata, Todd, and Lippke 2010), and college student loan applications (Bettinger et al. 2012). Research in cognitive psychology offers additional evidence that simpler rules and less feedback may be preferable in certain learning environments (Maddox et al. 2008; Maes and Eling 2007). As Feldman (2003) notes, it is not surprising that more complex tasks are also often more difficult to learn. However, this seemingly obvious idea has until recently played little role in theories of concept learning. Similarly, the trend in business and financial literacy training appears to have been toward increasing complexity. In the context of Dominican micro-entrepreneurs, our results suggest that optimality may lie in the direction of simplification.

II. Experimental Design

ADOPEM is a savings and credit bank based in Santo Domingo, Dominican Republic serving primarily low-income, urban individuals and small businesses throughout the country. ADOPEM was founded in 1982 as a nongovernmental organization providing a range of programs aimed at reducing poverty levels in the Dominican Republic. Since then, they have increased their focus on financial services and related activities, incorporating as a bank in 2004. Large by Dominican standards, in 2006 ADOPEM had approximately 59,000 clients in 19 branches. The bank offers a wide range of lending products. In 2006, 90 percent of loans were for amounts between RD$2,500 and RD$50,000 (US$70–$1,400). Over that same period, 56 percent of loans were made to individual persons or businesses and 44 percent were made to solidarity groups of two to five borrowers.[9] Approximately 80 percent of these clients were women.

In addition to extending loans, ADOPEM offers savings, insurance, and remittance products. It also operates a training center, with programs including basic computing, entrepreneurship, and specific trade skills. In the year before this experiment was launched, ADOPEM was actively planning to launch a dedicated financial education program and was interested in evaluating different approaches.

We worked with ADOPEM and Dominican training experts to develop two alternative financial education training programs. The standard accounting treatment offered a traditional, principles-based course in basic accounting techniques. Topics covered included daily recordkeeping of cash sales and expenses, aggregation of daily records into monthly reports, inventory management, accounts receivable and accounts payable, calculating cash profits, and investment planning. The materials

[9] ADOPEM's solidarity groups follow the traditional joint liability model. Each borrower takes out his or her loan as an individual, but all group members are jointly responsible for one another's repayment. Should any member fail to repay, each member suffers the default consequences as if she herself failed to repay.

and capacitator training program for the standard accounting treatment were based on the financial education program designed by Freedom from Hunger, a US-based nonprofit organization, together with the Citigroup Foundation and adapted to local conditions.[10]

The rule-of-thumb treatment taught participants simple rules for financial decision making, focusing on the need to separate business and personal accounts. Account separation is a staple rule in developed country entrepreneurship. In developing countries, where the tax and legal motivations for account separation often are weaker, it continues to receive a great deal of attention. The proposed benefits of account separation are twofold. On the one hand, it is seen as a very crude but easy way to monitor whether the business is self-sustainable and provides an estimate of the profitability of the business. The second rationale is more behavioral: keeping accounts separate serves as a commitment device for the business owner (or relatives) not to overconsume and deplete the working capital in the business. In addition to presenting several strategies for physically separating business and personal funds, the rule-of-thumb treatment taught how to estimate business profits by simple changes in business cash on hand, paying oneself a fixed salary, distinguishing business and personal expenses, and easy-to-implement tools for reconciling accounts when business funds have been used for personal expenses or the reverse. In both treatments, clients received record-keeping books, handouts, and homework assignments to reinforce ideas or techniques from the meetings. Both classes were offered once a week for three hours at a time. The standard accounting treatment lasted for six weeks and the rule-of-thumb treatment for five. The first three classes of both treatments covered consumption, savings, and debt management. The final three classes of the standard accounting treatment comprised basic cash accounting, distinguishing business and personal expenses, calculating profits, and working capital management. Classes four and five of the rule-of-thumb treatment focused on separating business and personal money and estimation techniques for calculating profits.[11] Attendance for classes one through five did not differ across the two treatments.

The sample consisted of 1,193 existing ADOPEM business or personal loan clients from Santo Domingo.[12] Of these, we assigned 402 to the accounting treatment, 404 to the rule-of-thumb treatment, and 387 to a control group that received no additional training services. The treatment was assigned at the individual level and administrative data was used to stratify according to loan size, years of borrowing, and whether or not a client maintained a formal savings account with the bank. Baseline survey data was not available at the time of the stratification. ADOPEM

[10] The ADOPEM training program is most closely related to the budgeting module of the FFH training program. This module includes training on: how to develop a financial plan for the household expenses, how to adapt the spending to a restricted income, how to develop a budget for the house and the business, how to prioritize spending, how to record income and expenses, how to use income and expenses bookkeeping to make financial decisions, and how to store financial documents. Importantly, both ADOPEM training programs focused on maintaining a clear separation of business accounts.

[11] See Table A1 for a more detailed summary of the materials covered.

[12] At the request of ADOPEM, group loan clients with loans smaller than RD$15,000 were excluded from the study. The original sample comprised 1,200 individuals; however, 7 observations were discarded due to errors in the baseline survey.

made no additional policy changes concurrent with the training program. The treatment was conducted in two waves. The first wave, comprising 302 treatment assignments, was conducted from March to May 2007, and the second wave, comprising the remainder, ran from July to August of the same year.[13]

All courses were taught by qualified local instructors. The majority had university degrees and experience with adult education, in most cases with ADOPEM directly. Courses were offered at seven schools throughout Santo Domingo and scheduled based on preferences elicited during the baseline survey. In addition, the course was heavily subsidized. Fees were randomly assigned at RD$200 (approximately US$6) or zero, relative to an overall program cost of approximately RD$700.[14]

In order to begin understanding the potential limitations to classroom-based, financial training, we also randomly assigned half of the people in each of the treatment groups to receive follow-up training consisting of in-person visits of a financial trainer to the micro-entrepreneur's business. When necessary, the trainers reviewed the class materials with the entrepreneurs, helped clarify any questions they had, and reviewed their account records, if any. The purpose of the on-site visits was to ensure that individuals understood the material and were capable of implementing their newly-acquired financial accounting skills in their businesses. This structure helps us to differentiate the channel by which training affects the participants. If we do not find an effect of training we can determine whether this result is due to the inability of the participants to understand what was taught in class or whether the material itself, even when properly understood, is not helpful.

III. Data and Empirical Strategy

We constructed the original sample frame based on administrative data collected by ADOPEM in the ordinary course of operations. Beginning in November 2006, we conducted a baseline survey of each study participant using a professional survey firm unaffiliated with ADOPEM. We collected information on household and business characteristics, business practices and performance, business skills, training history, and interest in future training. The endline survey was conducted during the summer of 2008, at least 12 months after training was completed. We augmented the surveys with administrative data from ADOPEM.

A. *Descriptive Statistics*

Table 1 reports summary statistics for the full sample and each of the three assignment groups from the baseline data. Given that the treatments were randomly assigned, we expect individuals in the three assignment groups to be similar

[13] A third wave of 800 individuals across all three assignment categories was planned for late 2007, but was cancelled due to the disruption caused by Hurricanes Dean and Noel and Tropical Storm Olga.

[14] The original design was intended to test for selection effects. As noted in Karlan and Valdivia (2011), the emerging approach to business development services calls for pricing training services at or above marginal costs. However, if those entrepreneurs who would most benefit are uncertain of the program's benefits or subject to tighter credit constraints, this approach may induce adverse selection. Unfortunately, due to logistical issues associated with data gathering we are unable to analyze the selection results along this dimension.

TABLE 1—BASELINE SUMMARY STATISTICS[a]

	Observations (1)	Full sample mean (2)	Control (3)	Standard accounting treatment (4)	Difference from control (5)	Rule-of-thumb treatment (6)	Difference from control (7)
Panel A. Borrower characteristics							
Age	1,189	40.2	40.1	40.7	0.58	40.0	−0.08
		(10.4)	(10.5)	(10.3)	[0.44]	(10.5)	[0.92]
Female	1,193	0.90	0.90	0.90	0.00	0.90	0.01
		(0.30)	(0.30)	(0.30)	[0.86]	(0.30)	[0.75]
Number of children	1,193	2.9	2.9	3.1	0.17	2.9	0.00
		(1.7)	(1.7)	(1.8)	[0.17]	(1.7)	[0.98]
Any savings	1,193	0.66	0.68	0.62	−0.06	0.68	−0.01
		(0.47)	(0.47)	(0.49)	[0.08]	(0.47)	[0.85]
High school education or more	1,193	0.35	0.37	0.36	−0.01	0.33	−0.04
		(0.48)	(0.48)	(0.48)	[0.69]	(0.47)	[0.27]
Expressed interest in financial training	1,193	0.47	0.50	0.45	−0.06	0.47	−0.04
		(0.50)	(0.50)	(0.50)	[0.11]	(0.50)	[0.28]
Sales and trading business	1,193	0.50	0.48	0.50	0.02	0.52	0.04
		(0.50)	(0.50)	(0.50)	[0.49]	(0.50)	[0.27]
Panel B. Loan characteristics							
Individual loan	1,183	0.61	0.61	0.60	0.00	0.62	0.01
		(0.49)	(0.49)	(0.49)	[0.89]	(0.49)	[0.70]
Amount of last ADOPEM loan	1,191	26,514	26,702	26,500	−202	26,349	−353
		(17,411)	(18,126)	(17,366)	[0.87]	(16,790)	[0.78]
Panel C. Sales performance							
Revenue index[b]	1,133	0.00	0.03	0.01	−0.03	(0.04)	−0.07
		(1.00)	(1.04)	(1.06)	[0.72]	(0.89)	[0.31]
Sales, average week (RD$)[c]	971	6,399	6,674	6,513	−161	6,017	−658
		(9,340)	(9,853)	(9,992)	[0.84]	(8,080)	[0.35]
Sales, bad week (RD$)[c]	960	3,539	3,887	3,564	−323	3,166	−720
		(6,509)	(7,352	(6,679)	[0.56]	(5,326)	[0.16]
Panel D. Business practices							
Separate business and personal cash	1,156	0.74	0.75	0.75	−0.01	0.72	−0.03
		(0.44)	(0.43)	(0.44)	[0.87]	(0.45)	[0.35]
Keep accounting records	1,160	0.66	0.68	0.61	−0.07	0.68	0.00
		(0.47)	(0.47)	(0.49)	[0.05]	(0.47)	[0.95]
Separate business and personal account	1,156	0.54	0.57	0.50	−0.07	0.54	−0.02
		(0.50)	(0.50)	(0.50)	[0.07]	(0.50)	[0.53]
Calculate revenues formally	1,159	0.81	0.80	0.82	0.02	0.79	0.00
		(0.40)	(0.40)	(0.38)	[0.46]	(0.40)	[0.87]
Business practices index[b]	1,163	(0.00)	0.01	(0.06)	−0.07	0.06	0.05
		(1.00)	(1.01)	(0.99)	[0.33]	(1.00)	[0.50]
Assigned observations		1,193	387	402		404	

[a] Standard deviations of variables appear in parentheses and p-values for differences of means appear in square brackets. Section III in the paper describes both treatment groups, columns 4 and 6, in detail.

[b] Sales composite is normalized, z-score composite of all revenue measures. Aggregate business practice is normalized z-score composite of all reported business practices. See Section IVC for details.

[c] Variable winsorized at 1 percent.

in the baseline. As shown in the table, this expectation generally holds across our 18 baseline characteristics; however, there are two marginally significant differences. Individuals assigned to the standard accounting treatment are marginally less likely to report keeping accounting records or separating their business and personal accounts in the baseline. Individuals in the rule-of-thumb training also report lower revenues in both average and bad weeks, although these differences fall below the 10 percent significance level.[15] Therefore, we control for these characteristics in the regression analytics that follow. Based on our sample size of approximately 400 individuals per assignment group, any small-sample bias introduced by inclusion of these baseline characteristics as covariates is minimal.[16]

As shown in the table, the average person in our sample is 40 years old, has three children, and holds a loan size of RD$26,514, (approximately US$750); the median was RD$20,000. The median borrower in the sample reported revenues during an average week of RD$3,000 (US$85). In addition, 90 percent of the sample is female, 35 percent have more than a high school degree, and 66 percent have at least some savings. While all participants had been chosen by ADOPEM as clients who potentially were interested in financial training, only about 47 percent explicitly stated interest in training when surveyed. Reported sales are RD$6,399 in an average week and RD$3,500 in a bad week. Approximately half of the participants operate businesses engaged in retail sales and trading. We also found (not reported in the table) that 60 percent of the businesses are sole proprietorships with no employees in addition to the borrower. Of the rest, 80 percent have 1 or 2 employees in addition to the borrower and few have more than 5. Typical businesses include small retail shops, general stores (*colmados*), beauty salons, and food service, serving geographically-clustered, local markets.

The final panel of Table 1 reports the business practices of the small business owners. A majority of them report already implementing several financial management practices: 74 percent report that they are separating personal and business cash; 66 percent keep accounting records; 53 percent have separate business and personal accounts, and 80 percent say they calculate their revenues formally.

The endline survey was conducted in mid-2008, one year after the last wave of training was completed. Anecdotal evidence and discussions with ADOPEM suggest an unusually high level of program dropout, business closure, and out-migration from the Dominican Republic by the sample population in response to Hurricanes Dean and Noel and Tropical Storm Olga, which flooded large parts of the country

[15] Average, good, and bad periods were self defined by the respondents. For good and bad periods, the questions were framed as follows: "Now we want to know how much your business sells when things are going well and when things are not going so well. Try to give us your best estimate. Do not worry if you do not know the exact value. How much do you sell in a [bad/good] week?"

[16] Appendix Table A2 demonstrates a clear pattern of selection into training and highlights the need for exogenous variation in treatment assignment to assess the causal mechanisms though which training can affect outcomes. Conditional on assignment to the treatment group, those who attend have more education. They are also more likely to have expressed an interest in accounting training during the baseline survey; however, a prior interest in increasing savings or improving cash management is not associated with increased attendance. They also tend to have lower revenues but bigger plans, as measured by the share of the loan intended for fixed asset purchases. Attendance does not vary with individuals' business type. Interestingly, we see some evidence for the reverse of an "Ashenfelter dip": individuals reporting that their business had improved in the month preceding the baseline survey were 6.4 percentage points more likely to attend the training.

and caused catastrophic damage. The survey team utilized various forms of contact information from baseline and administrative data as well as credit officers in the field in its efforts to locate all individuals in the study for the endline survey. Ultimately, we collected endline data for 87 percent of participants reporting in the baseline.[17]

B. *Objective Reporting Measures*

Self-reporting bias raises concerns about any measures of business management practices. Treated individuals may, for example, report maintaining separate business and personal accounts because they were told this was important and not because they actually do so. To allay such concerns, we construct an objective index of financial reporting errors. We classify as an error any report of bad period sales greater than average or good; average period sales better than good; or average period profits better than good period sales for each of daily, weekly, and monthly reported outcomes. In the baseline, 45 percent of subjects make at least one mistake and 11 percent make three or more. Along the same lines, we compare self-reported profits to profits calculated from respondents' own revenue and expense detail. These differences are large; self-reported profits are only 60 percent of those calculated from the disaggregated components. While these differences could result from misreporting any of the components, we believe the most plausible explanation is that respondents fail to remember and, hence, underreport their various detailed business expenses. This poses challenges when interpreting the impact of either treatment on profits. For example, training could increase actual profits while improving recall of business expenses, leaving reported profits unchanged. For this reason, we are cautious when interpreting any profit measure as a stand-alone outcome. To account for this possibility, we estimate the effect of each treatment on the raw and absolute difference between self-reported and calculated profits. Because we do not have a measure of true profits, we cannot make statements about the accuracy of these measures; however, we expect that if either treatment improves financial controls, the difference between the two profit measures become smaller.

C. *Empirical Strategy*

Random assignment of the treatments allows us to obtain unbiased estimates of the effect of being offered the training program by estimating the following equation:

$$y_i^E = \alpha + \beta_1 Acct_i + \beta_2 RoT_i + \gamma X_i + \delta y_i^B + \varepsilon_i, \tag{1}$$

where y_i^E is the endline value of the outcome variable of interest; $Acct_i$ is an indicator for being assigned to the accounting treatment; RoT_i is an indicator for being assigned to the rule-of-thumb treatment; X_i is a matrix of baseline-measured covariates including business types, loan size, and participation in an ADOPEM

[17] Section IVD discusses attrition in more detail.

savings account. The pretreatment measure of the outcome variable, y_i^B, explains a substantial share of the variance in outcomes across individuals and is included where available. The β parameters are an estimate of each program's average effect on outcome y. For binary outcome variables, we estimate a linear probability model following the same specification in (1), which allows interpretation of β as the difference in the mean level of an activity, e.g., keeping formal accounts, conditional on assignment to the particular treatment group. We restrict the sample to only those individuals who report owning a business in the endline, so answers to all business outcome and performance measures (e.g., weekly revenues or keeping business and personal accounts separate) are well defined.[18] Standard errors are clustered at the barrio level to account for community-level shocks to business conditions.[19]

We test for heterogeneous treatment effects with respect to skill level, prior interest in training, and baseline quartile of business financial practices by reestimating equation (1), while restricting the sample in turn to each of the partitioning subgroups.[20]

While we focus on a few key business practices and performance measures, we have data on a range of distinct outcomes. Because testing multiple outcomes independently increases the probability that we will reject the null of no effect for at least one outcome, we follow Kling, Liebman, and Katz (2007) and Karlan and Valdivia (2011) in constructing index measures for three families of outcomes: business practices, personal financial practices, and business revenues.[21] Within each category, we rescale each outcome, such that larger values indicate better values for the individual or business, and convert each measure to a z-score, such that $z_{ki} = (y_{ki} - \mu_k)/\sigma_k$, where μ and σ are the mean and standard deviation of y_k for the control group. Thus, each component of the index has mean 0 and standard deviation 1 for the control group. For each category, we then construct a summary measure $z_i = \sum_k z_{ki}/k$. We then estimate

$$z_i^E = \alpha + \beta_1 Acct_i + \beta_2 RoT_i + \gamma X_i + \delta z_i^B + \varepsilon_i, \tag{2}$$

[18] The rate of business ownership in the endline is 78.1 percent in the full sample and does not differ significantly across the various treatment groups. See Section IVD for a discussion of attrition and potential differential nonreporting.

[19] We also estimate the simple cell means regression, $y_i^E = \alpha + \beta_1 Acct_i + \beta_2 RoT_i + \delta y_i^B + \varepsilon_i$, to verify that the choice of covariates is not affecting parameter estimates. The results, not reported, do not differ meaningfully from those estimated with equation (1), except as otherwise noted in the text.

[20] Each of these subgroups was specified in the analysis plan before the endline data was collected. We also considered heterogeneity across industries and loan type (individual or group). The results, not reported, are available on request.

[21] Business practices include indicators for keeping financial accounts, maintaining accounts separately for business and home, keeping business and personal cash separate, maintaining a plan for business expenditures, setting aside cash for business expenditures, paying a salary, taking business funds for personal use,* calculating revenues, calculating profits, keeping records of revenues, keeping records of expenses, keeping records of accounts payable, keeping records of accounts receivable, and keeping records of inventory. Personal financial practices comprise gambling,* buying goods from door-to-door vendors that one would not otherwise buy,* buying goods that one regrets afterwards,* saving regularly, the amount saved in the last month, and utilizing remittances for business purposes. The revenue index comprises reported business revenues in good, average, bad, and the last period across three reporting periods: day, week, and month. All reported revenue measures are winsorized at 1 percent. Items marked with an asterisk (*) are rescaled such that positive values indicate better outcomes.

to test whether the training treatments affected the set of outcomes within the category.

Next, we turn to look for potential spatial externalities from the training. These spillovers can take two forms. First, there may be positive knowledge spillovers. Trained clients may actively pass on newly acquired knowledge to their peers or neighboring businesses may observe and mimic improved management practices. Second, business outcomes for the treated may improve either by expanding the overall market, "growing the pie", or by a reallocation of revenues from control firms to the treated, "business stealing". As described above, the businesses in this study tend to serve spatially local markets, therefore we follow a strategy similar to Miguel and Kremer (2004) in testing for these externalities. Using address information for each observation in the sample, we construct a measure of the distance between every pair of businesses.[22] We then construct density measures for the total number of firms located within 0.5 kilometers of business i, N_i, as well as the number of firms in the accounting (N_i^A) and rule-of-thumb (N_i^R) treatments. We can further characterize these proximate firms by whether or not they operate in the same basic industry as firm i (N_i^{AS} and N_i^{RS}) or a different industry (N_i^{AD} and N_i^{RD}). We then run the following regressions:

$$(3) \qquad y_i^E = \alpha + \beta_1 Acct_i + \beta_2 RoT_i + \eta_1 N_i + \eta_2 N_i^A + \eta_3 N_i^R + \delta y_i^B + \varepsilon_i,$$

and

$$(4) \qquad y_i^E = \alpha + \beta_1 Acct_i + \beta_2 RoT_i + \sum_I \{\eta_1^I N_i^I + \eta_2^I N_i^{AI} + \eta_3^I N_i^{RI}\} + \delta y_i^B + \varepsilon_i,$$

where $I \in \{S, D\}$. We consider as outcome variables both revenues and business practices. Positive treatment externalities would generate $\eta_2, \eta_3 > 0$. Whereas if firms are growing through "business stealing" we would expect $\eta_2^S, \eta_3^S < 0$ when revenues are the outcome.

IV. Results

A. *Business and Personal Financial Practices and Firm Performance*

Table 2 presents the effect of each training program on our three main sets of outcomes: business and financial practices, objective reporting quality, and business performance. All the regressions in this section follow the estimation strategy detailed in the prior section. The first set of results reported in column 3

[22] Measurement error in the actual travel distance between firms and the effective catchment area for customers leads to attenuation bias, making it more difficult to find treatment externalities.

TABLE 2—IMPACT OF TRAINING ON BUSINESS PRACTICES AND PERFORMANCE[a,b]

	Observations	Control mean	Standard accounting	Rule-of-thumb	p-value for equality[c]
	(1)	(2)	(3)	(4)	(5)
Business and personal financial practices					
Separate business and personal cash	793	0.71	0.00	0.08***	0.014
		(0.46)	(0.03)	(0.03)	
Keep accounting records	794	0.58	0.04	0.11***	0.095
		(0.49)	(0.05)	(0.03)	
Separate business and personal accounting	791	0.50	0.03	0.12***	0.103
		(0.50)	(0.05)	(0.03)	
Set aside cash for business expenses	793	0.48	0.07**	0.12***	0.188
		(0.50)	(0.03)	(0.04)	
Calculate revenues formally	794	0.72	0.02	0.06**	0.242
		(0.45)	(0.04)	(0.03)	
Business practices index[d]	795	0.00	0.07	0.14***	0.195
		(0.59)	(0.06)	(0.04)	
Any savings	804	0.53	0.02	0.08*	0.177
		(0.50)	(0.05)	(0.04)	
Savings amount, \$RD[e, h]	661	15,033	−2,952	1,187	0.107
		(34,722)	(2,909)	(2,383)	
Objective reporting quality					
Any reporting errors[f]	757	0.50	−0.04	−0.09***	0.161
		(0.50)	(0.04)	(0.03)	
Raw profit calc. diff. (RD\$), weekly[g]	427	−2,154	905	1,058*	0.831
		(5,307)	(741)	(556)	
Absolute value profit calc. diff. (RD\$), weekly[g]	427	3,844	−333	−660	0.565
		(4,238)	(642)	(480)	
Business performance					
Total number of employees	794	0.81	0.07	−0.03	0.399
		(1.26)	(0.09)	(0.09)	
Revenue index[c]	774	0.00	−0.02	0.09*	0.031
		(0.82)	(0.05)	(0.05)	
Sales, average week[h]	570	8,711	−682	424	0.290
		(11,710)	(809)	(867)	
Sales, bad week (RD\$)[h]	551	5,232	−660	979*	0.002
		(7,880)	(514)	(524)	

[a]Each coefficient reported in columns 3 and 4 is from a regression for each outcome variable of the form described in equation (1). Standard errors, clustered at the barrio-level, in parentheses. Sample includes only those individuals with own business.
[b]Covariates include variables used for stratification: business types, loan size, and participation in an ADOPEM savings account.
[c]p-value for F-test of equality of accounting and rule-of-thumb treatment effect coefficients.
[d]Indices are unweighted mean of z-scores of all component elements, scaled by control group mean and standard deviation, as detailed in Section IVC.
[e]Results reflect OLS regression of savings amount on treatment indicator, unconditional on any savings. Results of CLAD and Tobit regressions are available on request and not significant at the 10 percent level.
[f]Error defined as reporting bad period revenues better than average or good period; average period revenues better than good; or average profits greater than good period revenues.
[g]Raw difference equals self-reported profits for period minus profits calculated for period using reported revenues minus expenses. Absolute value of raw difference described above. Tobit and CLAD regressions for absolute value generate similar estimates. Results available on request.
[h]Variable winsorized at 1 percent.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

shows that assignment to the standard accounting training has a muted impact on business practices. The estimated effect on the business practices index is 0.07, approximately 0.12 standard deviations, but not statistically significant (p-value: 0.198). Among the component elements, only the estimated effect on setting aside funds for business expenses is significant at the 10 percent level or better. Estimates for the other business practice outcomes, while all positive, are not statistically significant and generally close to zero.

In contrast, the rule-of-thumb training, reported in column 4, substantially increases the likelihood that individuals adopt better financial practices. Clients in that treatment group report a higher likelihood of separating business and personal cash, keeping accounting records, separating business and personal accounts, setting aside cash for business, and calculating revenues formally. Each of these measures increases by 6 to 12 percentage points relative to the control group, which did not receive training, and all are significant at the 5 percent level or better. The rule-of-thumb treatment also produces a significant 0.14 increase in the business practices index, approximately 0.25 standard deviations. When looking at savings behavior, we find a marginally significant impact of the rule-of-thumb training on the likelihood of having any savings. The increase in total reported savings, while large, is not significant. Column 5 reports the p-values for tests of the equality of the standard accounting and rule-of-thumb treatment effects. When considering the full sample, the rule-of-thumb training has a consistently more positive effect. The differential impact on both separating business and personal cash and keeping accounting records are significant at the 10 percent level or better, but despite the rather large difference we cannot reject equality for the impact on the index of business practices.

The second set of results shows the impact of training on measures of objective reporting quality. Fifty percent of the control group made at least one objective reporting error in their responses to survey questions regarding financial outcomes (see Section IIIB for a detailed description). Individuals in both treatment groups are less likely to make any such mistakes. However, only for the rule-of-thumb training is the improvement significant, with treated individuals 8 percentage points less likely to make any errors. Similarly, both treatments appear to reduce differences between directly reported profits and profits calculated from respondents' reported revenues and expenses. The rule-of-thumb training reduces the mean difference between these measures by nearly 50 percent (p-value: 0.56), and the nonparametric Wilcoxon rank-sum test rejects equivalence in the distribution of reporting errors (p-value: 0.077).

Finally, when looking at business performance outcomes, we find an increase of 0.09 (0.11 standard deviations) in the revenue index[23] for individuals assigned to the rule-of-thumb treatment (p-value: 0.054). No significant change is observed in the standard accounting treatment, and, as reported in column 5, this difference between the treatments is significant at the 5 percent level. While there are differences throughout the revenue measures, the most significant difference is observed

[23] See Section IIIC for details on index construction.

Table 3—Impact of Training on Institutional Outcomes[a]

	Observations	Control mean	Standard accounting	Rule-of-thumb	*p*-value for equality[b]
	(1)	(2)	(3)	(4)	(5)
Loan size (RD$)	801	36,572	35	617	0.664
		(25,439)	(1,140)	(1,547)	
Any savings	804	0.53	0.02	0.08*	0.177
		(0.50)	(0.05)	(0.04)	
Savings last month (RD$)[c]	762	1,755	301	443	0.812
		(6,808)	(646)	(580)	
Individual loan	796	0.61	0.02	0.00	0.453
		(0.49)	(0.03)	(0.03)	
Dropout[d]	804	0.46	−0.01	0.02	0.527
		(0.50)	(0.05)	(0.05)	

[a] Each coefficient reported in the table is from a regression of each outcome variable of the form described in equation (1) for columns 4 and 6 and equation (2) for columns 3 and 5. Baseline level of dependent variable excluded for dropout regression. Standard errors, clustered at the barrio-level, in parentheses. Regression includes only those individuals with own business. Covariates include variables used for stratification: business types, loan size, and participation in an ADOPEM savings account.
[b] *p*-value for *F*-test of equality of accounting and rule-of-thumb treatment effect coefficients.
[c] Results reflect OLS regression of savings amount on treatment indicators, unconditional on any savings. Results of CLAD and Tobit regressions, available on request, are not significant at the 10 percent level.
[d] No loans taken from ADOPEM in prior twelve months.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

in sales during bad weeks, where the rule-of-thumb treatment generates a substantial increase. This increase of RD$967 to RD$979 is economically large—25 percent of mean endline reports and nearly 60 percent of the median—and significant at the 10 percent level. Those assigned to the rule-of-thumb training also reported higher sales in average weeks, but the effect is not statistically significant.

These results should be interpreted with some caution. As noted, individuals assigned to the rule-of-thumb training reported lower sales in these periods than those assigned to the control group. These differences in baseline revenues are not significant at conventional levels; however, the treatment effect is insignificant when the controls for baseline sales are dropped. Moreover, the quality of a period (i.e., good, average or bad) was defined by the respondent, and our results are consistent with both a change in how respondents classified periods and an improvement in actual revenues. With this caveat in mind, these results parallel those of Karlan and Valdivia (2011) and Berge, Bjorvatn, and Tungodden (2012), both of which find revenue improvements in bad periods as a result of training. The findings remain consistent with the possibility that effective training may operate by helping individuals to better manage negative shocks or by alerting them to such shocks such that they can counteract the effect of slow weeks. In contrast, the standard accounting program has no discernible effects on revenues in the broad sample.

Table 3 describes the effects of training on institutional outcomes. The accounting treatment had no appreciable effects on loan size, loan type, savings, or dropout. Those assigned to the rule-of-thumb treatment are approximately 8 percentage points more likely to save, with the result marginally significant. Point estimates for the effect of training on savings in the month immediately prior to the endline survey are large—an increase of RD$443 or nearly 25 percent of the endline mean—but not statistically significant. There is no evidence that the rule-of-thumb training causes any other changes in institutional outcomes.

B. *Heterogeneous Treatment Effects*

The efficacy of different training programs is likely to vary through the population. Table 4 reports whether the rule-of-thumb and standard accounting trainings have heterogeneous treatment effects for different subgroups. We focus on three dimensions along which we expected training may have differential effects. First, we classify an individual as *high-skilled* if she has completed high school or received previous formal financial training and *low-skilled* otherwise. Differences in treatment effects along this dimension allow us to test whether the effectiveness of training depends on initial levels of human capital. Second, we classify an individual as *interested in training* if she indicated in the baseline survey a desire to receive training in business accounting or financial management and not otherwise. Differences along this dimension allow us to test whether the effectiveness of training depends on a participant's motivation. Third, we compare individuals across the quartiles of baseline business management practices.

Columns 2 and 3 compare the impact of the trainings across different levels of initial human capital. The first row in each panel focuses on whether the clients adopted better business practices. The impacts of the rule-of-thumb treatment on business practices appear independent of skill level; both subgroups show large and significant improvements. We then look at our different measures of objective reporting quality. Across both skill levels, we find that the rule-of-thumb treatment, on average, reduced the likelihood that individuals made reporting errors, although the results are only significant for low-skill individuals. Finally, we also test whether there is a differential impact on business outcomes. The coefficients for the impact on the revenue measures are positive for both groups, but none of the effects is significant when splitting the sample by skill level.[24]

Columns 4 and 5 repeat the heterogeneous treatment analysis along the dimension of interest in training. Again, we find a positive effect on both groups, with similar and significant magnitudes. Objective reporting quality improves for both groups, with a larger effect for those expressing greater interest in training. There are no significant differences in the business performance measures across the groups.

This stands in contrast to the results of Karlan and Valdivia (2011), which finds that less interested clients benefitted more from the training. We hypothesize that this

[24] The results for employment, not reported here but available from the authors, are interesting. The rule-of-thumb treatment reduces the number of employees for the low-skill group but increases employment in the businesses of the high-skilled group. Both impacts are significant and significantly different from one another. We lack additional information with which to explore the precise mechanism at work here and therefore do not want to push the interpretation. However, in light of Karlan and Zinman's (2011) finding that small business owners in the Philippines shed paid employees after receiving a microcredit loan, the results suggest it would be valuable to further study the determinants of labor demand by small businesses.

TABLE 4—IMPACT OF TRAINING, BY SUBGROUP[a]

		Skill level[b]		Prior interest in training		Baseline business prac (by quartile)[f]		
	All	Low	High	No	Yes	First	Third	Fourth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule-of-thumb training								
Business practices index[c]	0.14***	0.16***	0.11*	0.13**	0.15***	0.28***	0.13*	0.07
	(0.04)	(0.05)	(0.06)	(0.06)	(0.04)	(0.09)	(0.08)	(0.06)
Any reporting errors[d]	−0.08**	−0.10**	−0.06	−0.04	−0.13***	0.07	−0.27***	−0.03
	(0.03)	(0.05)	(0.07)	(0.06)	(0.04)	(0.09)	(0.10)	(0.08)
Revenue index[c]	0.09*	0.10	0.08	0.14	0.05	0.12	0.07	0.14
	(0.05)	(0.07)	(0.08)	(0.09)	(0.06)	(0.10)	(0.06)	(0.11)
Sales, bad week (RD$)[e]	967*	533	1,378	1,066	853	970	297	942
	(523)	(647)	(964)	(974)	(723)	(1,442)	(647)	(1,456)
Standard accounting training								
Business practices index[c]	0.08	0.10*	0.05	0.01	0.16**	0.07	0.18*	−0.08
	(0.06)	(0.05)	(0.09)	(0.06)	(0.07)	(0.07)	(0.11)	(0.09)
Any reporting errors[d]	−0.04	0.02	−0.12*	−0.03	−0.04	0.15*	−0.17**	−0.07
	(0.04)	(0.05)	(0.06)	(0.06)	(0.06)	(0.09)	(0.07)	(0.08)
Revenue index[c]	−0.02	−0.07	0.07	−0.03	0.01	−0.15**	0.02	0.13
	(0.04)	(0.05)	(0.09)	(0.07)	(0.06)	(0.08)	(0.08)	(0.10)
Sales, bad week (RD$)[e]	−669	−1,503**	577	−678	−337	−2,520***	512	−735
	(507)	(594)	(948)	(801)	(701)	(896)	(869)	(1,063)
Difference between rule-of-thumb and standard accounting								
Business practices index[c]	0.07	0.06	0.05	0.12	−0.01	0.21	−0.05	0.15
	[0.225]	[0.328]	[0.449]	[0.052]	[0.899]	[0.010]	[0.501]	[0.055]
Any reporting errors[d]	−0.05	−0.12	0.07	0.00	−0.09	−0.08	−0.10	0.03
	[0.175]	[0.016]	[0.268]	[0.929]	[0.135]	[0.368]	[0.239]	[0.701]
Revenue index[c]	0.11	0.17	0.02	0.17	0.04	0.28	0.05	0.01
	[0.031]	[0.044]	[0.832]	[0.055]	[0.553]	[0.014]	[0.493]	[0.935]
Sales, bad week (RD$)[e]	1,635	2,036	801	1,743	1,190	3,490	−215	1,678
	[0.003]	[0.010]	[0.396]	[0.063]	[0.045]	[0.014]	[0.771]	[0.186]

[a] Each coefficient reported in the table is the parameter estimate on the indicator for assignment to the rule-of-thumb treatment in a regression of the form described in equation (1) for the indicated outcome. Column headings describe the sample restrictions. Sample includes only those individuals with own business. Standard errors, clustered at the barrio-level, in parentheses. *p*-values appear in brackets.
[b] High skill indicates individuals with high school or greater formal education or previous financial training.
[c] Indices are unweighted mean of *z*-scores of all component elements, scaled by control group mean and standard deviation, as detailed in Section IVC.
[d] Error defined as reporting bad period revenues better than average or good period; average period revenues better than good; or average profits greater than good period revenues.
[e] Variable winsorized at 1 percent.
[f] Results for second quartile are suppressed for space constraints and available in online Appendix.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

difference stems from the voluntary nature of ADOPEM's training program—individuals who were not sufficiently interested in training could opt out at any time—versus the mandatory program studied by Karlan and Valdivia. It suggests that in certain circumstances the price mechanism may effectively allocate training programs.

The last three columns of Table 4 show that the rule-of-thumb training had a larger impact on businesses with poorer management practices in the baseline.[25] On

[25] Results for the second quartile of baseline business practices are suppressed due to space constraints. The complete table is available in the online materials.

all dimensions of business practices, the first quartile exhibits the largest improvement in response to the training. The effects on objective reporting quality and business performance are insufficiently precise to draw further conclusions. This might suggest that the rule-of-thumb training allows the people with poor practices ex ante to catch up with the others. The ability of the rule-of-thumb training to benefit even the most poorly managed businesses is primarily responsible for its larger average treatment effect and supports the hypothesis that there may be advantages to reducing the complexity of training programs when targeting micro-entrepreneurs.

The second panel of Table 4 repeats the exact same set of regressions for the different subsamples for the standard accounting treatment group. There are several points of note. First, the standard accounting treatment improves objective reporting quality, but only for high-skilled individuals. The accounting training actually increases reporting errors for businesses in the lowest quartile of baseline business practices. Second, those who expressed greater interest in the training ex ante appear to change their business practices in response to the accounting training, while those with less interest are unaffected. This stands in contrast to the pattern of heterogeneity for the rule-of-thumb training, which produced comparable and in some cases larger improvements for those who expressed less interest in training. Finally, lower-skilled clients in the accounting training report meaningful drops in their revenues. These effects are substantial, approximately 0.2 standard deviations from the baseline reported values. Similarly, we find a significant reduction in sales for the quartile of clients with the worst business practices in the baseline.

These results are quite surprising and could be driven by several different channels. On the one hand, there could be a negative causal effect of accounting training on less educated clients if they spend a lot of time trying to implement standard accounting techniques without much success. Alternatively one could conjecture that trained clients are more realistic about their actual revenues while prior to the training they might have been overly optimistic. The relatively large effect on the raw difference in reported profits for this subgroup is consistent with the hypothesis that treated clients may be more aware of their true revenues but the observed increase in reporting errors points in the other direction. Ultimately, we cannot rule out either channel.

C. *Differences between Rule-of-Thumb and Standard Accounting Training*

We have shown above that the rule-of-thumb training has a stronger positive impact across several dimensions than the accounting training, especially on clients with low education and worse business practices relative to the control group. We now compare these two trainings directly to each other. The final panel of Table 4 reports the difference in the treatment effect between the rule-of-thumb and accounting trainings, and the *p*-values for testing the equality of treatment effects for all subgroups. Looking across the subgroups, we find a very strong and consistent pattern according to individuals' interest in training (columns 4 and 5). The rule-of-thumb training had a substantially more positive impact than the accounting training for clients that reported limited interest in training ex ante. There is a significantly larger effect of 0.12 in the index of business practices, 0.21 standard deviations

(p-value: 0.052), and a 0.17 difference in the revenue index, 0.20 standard deviations (p-value: 0.055). A similar pattern is observed in bad week sales, with results significant at approximately the 5 percent level. For those with a strong prior interest in training, the differences between the two trainings are not significant. On the whole, the rule-of-thumb training generates substantially better outcomes for those with a lower interest in training.

While not evident in the measures of business practices, we find similar outcomes along the skill dimension in terms of objective reporting quality and business performance. Low-skilled individuals in the rule-of-thumb treatment were 12 percentage points less likely to commit any reporting errors than those in the standard accounting training (p-value: 0.016). This translates into differences in reported revenues, with a difference of 0.17 in the revenue index, 0.20 standard deviations (p-value: 0.044).

Finally, we look across quartiles of baseline business practices. In line with the findings above, we see that the clients in the lowest quartile receiving the rule-of-thumb training see substantially larger and significant improvements in business and financial practices relative to those in the accounting training. Again, these results translate into substantially better sales outcomes. Within the middle quartiles there are no significant differences between the two trainings. Surprisingly, the difference in business practices reemerges in the top quartile, but these differences are not observed in objective reporting quality or revenues.

Taken together the findings suggest that the rule-of-thumb training has a significant and positive effect relative to the accounting training on clients that start from lower levels of skill, business practices, and interest in training. The same does not hold for higher skilled, better managed or more interested businesses, where the impact of both trainings is similar. Not only is the rule-of-thumb training more likely to improve business practices for clients at the lower end of the spectrum, it has real effects on outcomes. This suggests that it is important to correctly match the characteristics of the clients with the type of training that will be useful for them. Giving an unsophisticated client standard accounting training can actually reduce their performance, while the rule-of-thumb training substantially improves their outcomes.

D. *Robustness Checks*

First, we discuss attrition. Our response rate was relatively high—87 percent of participants were reached for the endline—but we find some evidence for selective attrition. Treatment group individuals who were not reached for the endline survey have generally higher baseline revenues (revenue index 0.05) than those who dropped from the control group (revenue index −0.09). Given the relatively low level of attrition, this difference of 0.18 standard deviations is not statistically significant. Nonetheless, it suggests that the reported results for business outcomes may understate the program's true effect. There are no differences across the two treatment groups.

In addition to survey nonresponse, there is a relatively high incidence of business exit: 78 percent of individuals reached in the endline report operating their own business relative to 97 percent in the baseline. As discussed above, qualitative evidence and discussions with ADOPEM suggest that a string of natural disasters led to an unusually high rate of out-migration from the Dominican Republic and business exit by the sample population. To test for differential attrition, we estimate a linear probability model of business ownership in the endline on indicators for treatment status. Coefficients for assignment to the standard accounting and rule-of-thumb trainings are -0.037 (p-value: 0.235) and 0.001 (p-value: 0.977).

We analyze the implications for our estimated treatment effects of different plausible assumptions for the potential outcomes of individuals who are not reached in the endline or who report not having a business. We construct bounds on the treatment effects for the rule-of-thumb training on the business practices index, revenue index, and any reporting errors indicator using a range of assumptions for the pattern of attrition following an approach based on Horowitz and Manski (2000), Lee (2002), and Kling and Liebman (2004).

Table 5 reports these results. Column 4 reproduces the unadjusted results from Table 2. Columns 1 and 7 report lower and upper bounds under the worst-case scenario. We compute worst-case lower bounds by imputing missing values for each observation in the treatment group as the minimum value observed in that group. For missing observations in the control group, we use the maximum value observed in the control group. In practice, because many of the outcomes are binary, this equates to assuming that all missing data for the treatment groups is zero and all missing data for the control is one. Worst case upper bounds are computed analogously.

We also consider alternative scenarios for missing observations. Column 2 constructs a lower bound by imputing missing values for the treatment group as the mean for treatment group minus 0.25 standard deviations of the observed distribution for the group. Missing values for the control group are imputed as the control group mean plus 0.25 standard deviations. Column 3 repeats this calculation for 0.10 standard deviations. Upper bounds calculated using the same scenarios are reported in columns 5 and 6. Given the combined magnitude of attrition and business closure, the worst case bounds are large and uninformative. The range tightens considerably when we employ plausible assumptions for the missing data. The results for business practices are the most robust, maintaining significance at the 10 percent level up to nearly a 0.50 standard deviation difference between the imputed values for missing treatment and control observations. The effect on reporting errors also maintains statistical significance for a relatively large band of assumptions regarding missing data. Results for the revenue index, which were only marginally significant in the unadjusted results, are the most sensitive to assumptions regarding missing observations.

We then consider the effect of the follow-up training, with the aim of understanding the mechanisms though which training improves or fails to improve outcomes.[26] The results, available in Appendix Table A4, are not conclusive. For both

[26] Because we randomly assigned treated participants to these visits conditional on attending the first class, we estimate the effect of the follow-up with the following specification, restricting the sample in turn to only those participants who attended the first class in either treatment group: $y_i^E = \alpha + \beta Follow_i + \gamma X_i + \delta y_i^B + \varepsilon_i$, where $Follow_i$ is an indicator for assignment to receive the in-person follow-up.

Table 5—Bounds Estimates for Rule-of-Thumb Treatment

	Lower bounds[a]			Unadjusted treatment effect	Upper bounds[b]		
	Worst case (1)	0.25 SD (2)	0.10 SD (3)	(4)	0.10 SD (5)	0.25 SD (6)	Worst case (7)
Business practices index[c]	−0.618	0.039	0.092	0.141	0.163	0.216	0.797
	(0.054)	(0.029)	(0.029)	(0.038)	(0.028)	(0.028)	(0.044)
Revenue index[c]	−1.846	−0.067	0.013	0.093	0.120	0.200	1.880
	(0.154)	(0.039)	(0.038)	(0.048)	(0.037)	(0.037)	(0.117)
Any reporting errors[d]	−0.378	−0.166	−0.119	−0.085	−0.055	−0.008	0.261
	(0.025)	(0.021)	(0.022)	(0.033)	(0.023)	(0.025)	(0.036)

Notes: Standard errors, clustered at the barrio-level, in parentheses.

[a] Column 1 imputes value of attrited treatment group as minimum value of nonattrited treatment observations and missing control group observations as maximum value of nonattrited control. Columns 2 and 3 impute attrited treatment group as the mean of nonattrited treatment minus the indicated fraction of the standard deviation for the nonattrited treatment. Attrited control are imputed as the mean of nonattrited control plus the indicated fraction of the standard deviation for the nonattrited control.

[b] Columns 5 and 6 impute attrited treatment group as the mean of nonattrited treatment plus the indicated fraction of the standard deviation for the nonattrited treatment. Attrited control are imputed as the mean of nonattrited control minus the indicated fraction of the standard deviation for the nonattrited control. Column 7 imputes value of attrited treatment group as maximum value of nonattrited treatment and attrited control group as minimum value of nonattrited control.

[c] Indices are unweighted mean of z-scores of all component elements, scaled by control group mean and standard deviation, as detailed in Section IVC.

[d] Error defined as reporting bad period revenues better than average or good period; average period revenues better than good; or average profits greater than good period revenues.

the standard accounting and rule-of-thumb trainings assignment to the intensive follow-up does not significantly change the quality of reported business practices. While the point estimates in both cases are negative, the results are too noisy to draw any inference, and we do not have sufficient sample size to evaluate the effect of the follow-up visits on further subgroups. We consider this weak suggestive evidence that our findings may be driven by simplicity per se rather than the standard accounting training—because it covered more material—requiring longer sessions or more contact with an instructor.

E. *Spillover Effects*

Table 6 provides suggestive evidence that some of the improvement in revenues generated by the treatments is due in part to crowding out competing businesses. It reports the results from estimating equations (3) and (4). As shown in columns 1 and 2, there is no evidence of learning spillovers from the training. Conditional on the density of businesses in one's neighborhood, the proximity of additional firms that were randomly assigned to either training program does not have a demonstrable effect on the index of own business practices. The results for the index of revenues, average week revenues and bad week revenues suggest the possibility of negative revenue spillovers. The coefficients on the number of treated firms within 0.5 kilometers are generally negative in columns 3 and 5. This is what we would expect if there were crowd-out, but the magnitudes are all close to zero and none are statistically

Table 6—Treatment Spillover Effects[a]

	Business practice index		Revenues[b]			
			Index		Bad week (RD$)	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
Baseline measure of outcome variable	0.42***	0.42***	0.82***	0.82***	0.80***	0.80***
	(0.03)	(0.03)	(0.82)	(0.82)	(0.80)	(0.80)
Standard accounting treatment	0.07	0.07	−0.02	−0.02	−712	−723
	(0.05)	(0.05)	(0.05)	(0.05)	(651)	(652)
Rule-of-thumb treatment	0.14***	0.14***	0.09*	0.09*	922	952
	(0.05)	(0.05)	(0.05)	(0.05)	(640)	(641)
Number of other businesses within 1/2 km						
any other business	0.00		0.01		7	
	(0.01)		(0.01)		(82)	
Accounting-treated business	−0.01		−0.02		−45	
	(0.01)		(0.02)		(188)	
Rule-of-thumb-treated business	0.00		−0.01		14	
	(0.01)		(0.01)		(107)	
Any other business, same industry[c]		0.02		0.03**		214
		(0.01)		(0.01)		(163)
Accounting-treated business, same industry[c]		−0.04*		−0.05*		−269
		(0.02)		(0.03)		(305)
Rule-of-thumb-treated business, same industry[c]		−0.02		−0.04**		−172
		(0.01)		(0.02)		(190)
Any other business, diff. industry[c]		0.00		0.00		−64
		(0.01)		(0.01)		(95)
Accounting-treated business, diff. industry[c]		0.00		−0.01		42
		(0.01)		(0.02)		(207)
Rule-of-thumb-treated business, diff. industry[c]		0.00		0.00		80
		(0.01)		(0.01)		(123)
Constant	−0.02	−0.02	−0.02	−0.02	2,066***	2,058***
	(0.04)	(0.04)	(0.04)	(0.04)	(536)	(536)
Observations	797	797	776	776	552	552

[a] See Section IV, equations (6) and (7) for details of regression specification. Standard errors, clustered at the barrio-level, in parentheses. Sample includes only those individuals with own business.
[b] Revenue variables winsorized at 1 percent. Revenue index is normalized, z-score composite of all revenue measures. See Section IV for details.
[c] Industry categorized as clothing or shoe stores; groceries or *colmados*; cafes or restaurants; personal-care; or other.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

significant. However, when we distinguish those neighboring businesses according to their industry, a clearer pattern emerges. Treatment of additional nearby businesses in different industries is no longer associated with a drop in own revenues. However, treating neighboring businesses in the same industry reduces own revenues. As reported in column 4, one additional treated business within 0.5 kilometers causes a firm's revenue index to fall by approximately 0.03 standard deviations for both the accounting and rule-of-thumb treatments with p-values of 0.077 and 0.023, respectively. The results for sales in bad weeks, reported in column 6, follow the same pattern, but none of the differences are significant. Overall these results provide suggestive evidence that at least some of the improved sales due to financial literacy training in this setting are due to crowd-out of other businesses.

V. Conclusion

The results from this study suggest that training to improve knowledge of finance and financial accounting indeed can have a positive effect on the management practices of small businesses in an emerging market such as the Dominican Republic. However, we show that the impact of such training crucially depends on the form in which financial literacy training is provided. In this setting, a program that relies on the standard approach to small business training, teaching the fundamentals of financial accounting, had no measurable effect. But a training program based on simple rules of thumb led to significant improvements in the way businesses managed their finances. Businesses in the rule-of-thumb training were more likely to implement the material that was taught, keep accounting records, calculate monthly revenues, and separate their business and personal financial records. Moreover, these results translated into improvements in objective reporting quality and revenues.

Beneath these average results, there is a clear pattern of heterogeneity. The relative gains from the rule-of-thumb training were particularly large for firms starting at the lower ends of the performance, ability or interest spectrums. This highlights the importance of precisely evaluating the mechanisms through which training works or does not work. We do not suggest that the value of simplification is generic. Rather, we show that one size does not fit all when it comes to training programs. It is important to match the training to the targeted client base.

More research is needed to investigate how rules of thumb can be applied effectively. We believe that going forward it will be important to understand in more detail the potential costs and benefits of rule-of-thumb-based learning. For example, would more advanced clients do better with more sophisticated training material? Are there situations where rule-of-thumb-based training could make it more difficult for businesses to adjust to new circumstances or make sense of unforeseen developments?

These results come with two caveats. First, business performance is ultimately measured by profits not revenue. Not only are small business profits difficult to measure, but as we demonstrate, training can affect reporting quality as well as actual profits. Significant methodological improvements are necessary to generate reliable measures for this important outcome. Second, we find suggestive evidence that at least some of the observed revenue increases come from crowding out sales by other firms in the vicinity. More research is required before we can make conclusive statements about the welfare effects of business training programs. Nevertheless, based on these findings, it appears that in at least some contexts significant gains could be made from simplifying training programs and relying more on easy-to-implement, practical rules of thumb.

Appendix: Description of Training Programs

Table A1— Summary of Training Programs

	Rule of thumb	Accounting
Class 1	Savings • Why we should save • Set saving goals • Save for emergencies • Decide how to save • Compare saving services • Plan your future savings	Same
Class 2	Consumption • Financial burden • Study your income and expenses • Plan your future income & expenses	Same
Class 3	Debt management • Why borrowing • How much debt I can afford • Default, what is it and how it happens • Cost of default and excessive debt	Same
Class 4	Account separation • Why separate money for the household from money for the business • Separating household and business money • Setting ourselves a salary • How to recognize and keep records of flows between business and household	Basic Accounting 1 • Relevance of accounting • How to record expenses and revenues • How to estimate and record daily cash accumulation • Estimating profits using revenue and expense records • Understanding the difference between cash accumulation and profits
Class 5	Estimation methods • Estimate total monthly flow of money between household and business • Estimate increase/decrease of money in the business between beginning and end of the month • Estimating profits	Basic Accounting 2 • Recording personal income and expenses in business accounts • Estimating nonoperational (personal) cash outflows and inflows. • Incorporating personal cashflows into profit estimation. • How to include fixed costs into the profit calculations
Class 6	None	Basic Accounting 3 • Aggregating daily records into monthly records • Calculating monthly profit • Accounts payable record keeping • Accounts receivable record keeping

Table A2—Determinants of Attendance Conditional on Assignment to Treatment

Dependent variable	Attend any class[a] (1)	Attend any class[a] (2)
Female	0.081	0.062
	(0.063)	(0.061)
Number of children	0.035***	0.032***
	(0.011)	(0.011)
High skill[b]	0.104***	0.109***
	(0.040)	(0.039)
Any savings	0.011	0.016
	(0.039)	(0.038)
Interested in accounting and financial training	0.074**	0.081**
	(0.036)	(0.035)
Current loan (RD$0000)	−0.003	0.000
	(0.011)	(0.011)
Loan planned for fixed assets (RD$0000)	0.023**	0.024**
	(0.010)	(0.010)
Revenue index[c]	−0.047*	−0.050*
	(0.028)	(0.028)
Business practices index[c]	−0.045	−0.035
	(0.034)	(0.033)
Buy-sell business[d]	0.010	0.020
	(0.037)	(0.036)
Reports business improving	0.054**	0.051**
	(0.025)	(0.024)
Constant	0.197**	0.191**
	(0.083)	(0.080)
Observations	762	806
Impute values for missing data	No	Yes

[a] OLS regression of attending any class on the indicated set of variables, conditional on assignment to either treatment group.
[b] High skill indicates individuals with high school or greater formal education or previous financial trading.
[c] Indices are unweighted mean of z-scores of all component elements, scaled by control group mean and standard deviation, as detailed in Section IVC. Missing values for revenue index (43 observations) and business practices (23 observations) are imputed for column 2 based on predicted value from regression on other covariates.
[d] Indicator for main business line involving primarily purchase and resale. This includes industry categories clothing or shoe stores; groceries or *colmados*.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

Table A3—Summary of Treatment Assignment and Takeup

	Control (1)	Standard accounting (2)	Rule-of-thumb (3)
Total assigned	387	402	404
Attended any class	—	184	174
percent of total assigned		45.8	43.1
Assigned intensive follow-up	—	83	74
percent of total assigned		20.6	18.3
Reached in endline	335	349	348
percent of total assigned	86.6	86.8	86.1
Own business in endline	266	264	276
percent of total assigned	68.7	65.7	68.3

Table A4—Impact of Follow-Up Visits Conditional on Attending First Class

	Standard accounting (1)	Rule-of-thumb (2)
Business and personal financial practices		
Separate business and personal cash	0.06	−0.11
	(0.09)	(0.07)
Keep accounting records	−0.03	0.00
	(0.09)	(0.09)
Separate business and personal accounting	−0.05	−0.06
	(0.09)	(0.08)
Set aside cash for business expenses	−0.17**	−0.12
	(0.08)	(0.11)
Calculate revenues formally	−0.11*	0.07
	(0.06)	(0.09)
Business practices index[b]	−0.06	−0.09
	(0.11)	(0.09)
Any savings	0.07	−0.18**
	(0.07)	(0.09)
Savings amount (RD$)[c]	524	−7,721
	(6,255)	(5,515)
Objective reporting quality		
Any reporting errors[d]	−0.17**	−0.01
	(0.09)	(0.09)
Raw profit calculation diff., weekly[e]	−806	−657
	(1,293)	(989)
Abs. value profit calculation diff., weekly[e]	−1,192	553
	(962)	(917)
Business performance		
Total number of employees	−0.19	0.07
	(0.29)	(0.25)
Revenue index[b]	0.06	0.13
	(0.07)	(0.12)
Sales, average week (RD$)[f]	349	2,477
	(1,306)	(2,148)
Sales, bad week (RS$)[f]	1,024	1,767
	(712)	(1,432)

[a] Each coefficient reported in the table is the parameter estimate on the indicator for assignment to the treatment in a regression of the indicated outcome of the form described in equation (3). Sample includes only those individuals with own business.
[b] Indices are unweighted mean of z-scores of all component elements, scaled by control group mean and standard deviation, as detailed in Section IVC.
[c] Results reflect OLS regression of savings amount on treatment indicator, unconditional on any savings.
[d] Error defined as reporting bad period revenues better than average or good period; average period revenues better than good; or average profits greater than good period revenues.
[e] Raw difference equals self-reported profits for period minus profits calculated for period using reported revenues minus expenses. Absolute value is of raw difference.
[f] Variable winsorized at 1 percent.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A5—Training Content and Business Practice Index

	Standard accounting	Rule-of-thumb
Components of business practice index		
Keep financial accounts	x	x
Separate business and personal accounts	x	x
Separate business and personal cash	x	x
Maintain plan for expenditures	x	x
Set aside cash for business expenditures	x	x
Pay salary to one's self	x	x
Take business funds for personal use*	x	x
Calculate revenues	x	—
Calculate profits	x	x
Record revenues	x	x
Record expenses	x	—
Record accounts payable	x	—
Record accounts receivable	x	—
Track inventory	x	—

Notes: x indicates topic explicitly covered in training program. Note that while there was substantial overlap in the topics covered by each training, topics included in both were not necessarily covered equivalently. For example, both the Standard Accounting and Rule-of-Thumb treatments taught individuals to calculate profits. The Standard Accounting treatment followed a traditional cash accounting approach: teaching individuals to recognize revenues and expenses upon the exchange of cash and calculate revenues as the difference between cash income and cash expenses. The Rule-of-Thumb training taught individuals to write down the amount of cash physically in the business and to write "IOUs" to the business if they took business cash for personal use. Cash profits for any period can then be calculated as the difference between the ending and starting cash balance.

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