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Business Practices in Small Firms in Developing Countries

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Abstract. Management has a large effect on the productivity of medium and large firms. But does management matter in micro and small firms, where the majority of the labor force in developing countries works? We develop 26 questions that measure business practices in marketing, stock-keeping, record-keeping, and financial planning. These questions have been administered in surveys in Bangladesh, Chile, Ghana, Kenya, Mexico, Nigeria, and Sri Lanka. We show that variation in business practices explains as much of the variation in outcomes—sales, profits, and labor productivity and total factor productivity—in microenterprises as in larger enterprises. Panel data from three countries indicate that better business practices predict higher survival rates and faster sales growth. The association of business practices with firm outcomes is robust to including numerous measures of the owner's human capital. We find that owners with higher human capital, children of entrepreneurs, and firms with employees employ better business practices.

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Keywords: business practices • small enterprises • productivity • management

1. Introduction

Management has long been recognized to be an important determinant of firm productivity in large firms. There has been a recent surge in quantitative measures of management, with a particular focus on human resource (HR) practices (Ichniowski et al. 1997, Bresnahan et al. 2002) and total quality management (Easton and Jarrell 1998, Osterman 2000). The 18 practices quantified by Bloom, Van Reenen, and their collaborators (Bloom and Van Reenen 2007, Bloom et al. 2016) take a slightly broader approach, with roughly a third of their 18 indicators measuring HR practices, a third measuring performance tracking, and a third measuring target-setting and other forward-looking practices. What is common in these studies is that they focus on medium and large firms, with most focused on high-income countries.[1] But the literature has left out the majority of firms. The vast majority of firms around the world have fewer than 10 workers and are located in low-and middle-income countries.[2]

In this paper, we examine the relationship between management practices and firm outcomes using several samples of micro- and small enterprises in seven countries. In each of these samples, firm owners were asked 26 questions related to business practices using a common survey instrument first used in de Mel et al. (2014). Management in the small-firm context is less focused on human relations than is the case in larger firms. Our diagnostic instrument reflects this, with questions covering the areas of marketing, record-keeping, financial planning, and stock control. We refer to these as "business practices" rather than management practices to reflect the fact that HR management is less important in our context.

Our samples come from two South Asian, three African, and two Latin American countries. The samples were all drawn for purposes other than testing our business practices instrument, and some were selected to reflect very specific subpopulations of interest for particular studies. They range from female-owned subsistence enterprises to a sample of highly educated owners applying to a business plan competition. While the samples were not formally designed to be representative of micro- and small-scale enterprises in each country, collectively they reflect the ranges of enterprises in low- and middle-income countries quite well.

Our measures of business practices are designed to be collected in surveys with fixed responses, and we code each of the 26 practices as either carried out or not. For most of the analysis, we focus on a simple aggregation that measures what percentage of the 26 practices a business implements. We examine first the correlation between business practices and firm outcomes—sales, profits, and productivity—in the cross section. The exercise is very much in the spirit of Bloom and Van Reenen (2007), and our results for the sample of microenterprises are remarkably similar to those in

Bloom et al. (2016): a one-standard-deviation improvement in business practices is associated with a 35% increase in labor productivity and a 22% increase in total factor productivity. The comparable relationships for much larger firms based on data from Bloom et al. (2016) are 43% and 17%, respectively.

The cross-sectional analysis provides correlations without providing any evidence on causation. We then take two steps in the direction of uncovering causality. First, we provide some evidence using panel data available from three countries—Kenya, Nigeria, and Sri Lanka. Using these data, we show that business practices measured at baseline are associated with higher rates of enterprise survival and higher rates of sales growth in the following year or years. In this analysis, business practices proceed growth/exit, but, of course, both may still be caused by a third factor. Second, we assess evidence from the literature measuring the impact of microenterprise training programs. Overall, the evidence from entrepreneurship training programs disappointingly finds little evidence that training induces faster rates of growth (McKenzie and Woodruff 2014).[3] Focusing on five studies that measure business practices with a version of our instrument, we show that the effects on sales and profits found in these studies are always consistent with the predicted effects given the observed changes in business practices. Most of the studies find small, and statistically insignificant, effects on sales and profits because they find small effects of the training programs on business practices. Thus, we cannot conclude from the literature that business practices do not matter. The correct conclusion is that most of the existing training programs have effects that are too weak to generate statistically significant effects on outcomes.

In interpreting the data, we should keep in mind two ways in which the situation of small firms differs from that of larger firms. First, all of our data on both practices and outcomes are self-reported. We might be concerned that individuals who are prone to overstatement will overstate both practices and outcomes. We address this head on by conducting auditing exercises in two of the samples. We find that assessments of auditors hired by us, and blind to the survey responses of the owners, are correlated very highly with the self-reports. We also note that the strong association between practices and enterprise survival supports the veracity of the measures. Second, the owner is almost always the top manager in our firms. Both practices and outcomes may be affected by characteristics of the owners that we cannot measure. We show that the correlation between practices and outcomes is little changed by the inclusion of several measures of owner ability, most of which themselves are strongly associated with business practices. This suggests that, conditional on the other covariates, the effect of management practices measured by the regressions is largely independent of ability.

2. Defining and Measuring Business Practices in Small Firms

2.1. Defining and Scoring Business Practices

We developed a set of 26 questions that measure key business practices used in the day-to-day running of small businesses. The questions are shown in Appendix 1 of the online appendix. These questions were motivated by the content of the "Improve Your Business" training curriculum of the International Labour Organization (ILO) that covers marketing, buying and stock control, costing and record-keeping, and financial planning (Borgenvall et al. 1999). The questions cover practices that apply broadly across a range of different sectors and countries. As in Taylor (1911), they should be seen as "best practices" that are universally good so that firms generally would benefit from adopting them. They are all meant to be practices that can be learned, so they are not meant to be measures of innate managerial ability. However, the practices require some effort, and in some cases, the level of effort required may be decreasing in innate ability. To give a couple of examples, in the marketing section we ask owners whether they have asked any of their customers if there are products the customers want but that they do not currently sell. On record-keeping, we ask whether firms maintain written records that allow them to determine sales patterns for particular products or services. This is a case where owners who are more numerate or more conscientious may require less effort to undertake the required record-keeping. Since our focus is on a set of practices that can be applied in the vast majority of small firms, we exclude practices that might apply only to certain industry sectors or firms of a certain size. In particular, we do not include human resource practices, since the modal small firm in most of the world has no paid workers.

Our goal was to design questions that could be included in large-scale surveys taken of owners of small firms. In practice, these surveys in developing countries are typically administered by survey enumerators. For this reason, we rely on closed-ended questions. The surveys are usually administered on the premises of the business, but they can also take place at the dwelling of the owner, or in a third location such as the offices of the survey firm. As such, we rely on questions that can be asked regardless of location. This precludes the use of measures involving physical inspection of the business premises or of the businesses' books by the interviewer. We discuss reporting issues in Section 2.6.

To reduce the subjectivity associated with ordinal scales, we use binary measures of each practice—the firm either is doing the practice or is not. For

many practices this involves imposing a time frame on the frequency of the practice. For example, under marketing practices, we measure whether or not a firm has visited at least one of its competitors' businesses to see what prices its competitors are charging within a period of the last three months. A firm that checks on the prices of the competition less frequently would then be coded as not employing this practice. Appendix 1 of the online appendix details each of the 26 practices.

We then define our main measure, the *business practices score*, as the proportion of these 26 business practices used by a firm. This method of aggregation has several attractive features. It naturally lies between 0 and 1, so coefficients can be interpreted easily as the effect of employing none of the practices to employing all of the practices. It also allows to compare practices even when not all 26 questions are asked in a particular country or answered by a given firm, since we can scale by the proportion of questions answered.[4] Nevertheless, for robustness purposes we also considered the first principal component of the individual practices, as well as the average of standardized z-scores for each practice. The correlations between all three of these aggregates range between 0.965 and 0.997. As such, our results are robust to these alternative methods of aggregation, as we show in Table A1 of the online appendix.

2.2. Data Collection

These questions were included in surveys of micro- and small enterprises conducted in seven countries between 2008 and 2014. These samples vary in their representativeness and size, since they were in most cases conducted as part of impact evaluations of particular programs. The surveys conducted in Bangladesh, Kenya, and Mexico provide representative samples of firms of particular size cutoffs. The samples in Ghana and Nigeria come from applicants to business plan competitions, with the Nigeria competition targeting high-growth entrepreneurs and the Ghana survey targeting established businesses in low-income urban neighborhoods. The Chilean survey was administered to a sample of applicants to a government microenterprise training program. There are three samples from Sri Lanka, each representative of firms with given characteristics. The first is a sample of female-owned firms earning less than LKR 5,000 (about USD 50) per month at baseline. The second is a sample of males with fewer than two paid employees. And the third is a sample of small- and medium-sized employers with 5 to 50 workers at baseline. Appendix 2 of the online appendix provides more detail on each sample. A consequence of these differences in sample frames in different countries is that we will not be able to compare the levels of business practices across countries, as Bloom and Van Reenen (2007) did for management practices. Instead, this sample of over 20,000 small firms provides rich data that enable us to examine how business practices relate to outcomes across countries and to explore what determines differences in business practices among firms within each country.

Four of the surveys (in Ghana, Kenya, Nigeria, and Sri Lanka) also provide panel data on the sampled firms. These allow us to examine survival rates over a one-year horizon using data from 7,016 firms and the stability of business practices over a one-year horizon with data from 5,742 firms. The Sri Lankan data also provide a longer panel, enabling us to examine the relationship between business practices and subsequent survival over a 5.5-year period.

2.3. Summary Statistics

Table 1 provides summary statistics for the full sample and for each of the seven countries. In the combined sample, the median firm has zero employees and earns USD 167 per month. Moreover, 96.7% of the sample has nine or fewer workers. The gender distribution varies across countries, from the all-female samples in Kenya and Mexico, to a sample of 99% male owners in Bangladesh. The average business owner is 41 years of age and has 9.7 years of education; the average firm age is 8.7 years. Owners are the youngest and most educated in the Nigerian sample, which comes from a youth business plan competition. Across all samples, most firms are informal, with only 34% in the combined sample reporting that they are registered for taxes. The businesses are a mix of trade, manufacturing, and services, with this mix varying across the different countries.

2.4. Distribution of Business Practices

Table 1 shows that, on average, firms in the samples employ 39% of the 26 business practices measured. The most frequently used practices are knowing which goods make the most profit per item (83%), not running out of stock frequently (70%), working out the cost of producing each main product sold (66%), and attempting to negotiate with suppliers for lower prices (58%). The least frequently used practices are preparing a balance sheet (5%), preparing a cashflow statement (7%), preparing an income and expenditure statement (16%), and advertising (17%). This is reflected in the four main subcomponents: the financial planning score is lower on average than the scores for other components. Table A4 of the online appendix reports means for the individual practices by country.

Figure 1 plots histograms of the distributions of business practice scores in each country. Recall that differences in the sample frames across countries make intercountry comparisons less meaningful. For example, the Nigerian sample of highly educated young

Table 1. Summary Statistics

	Full sample		Means by country						
	Mean	SD	Bangladesh	Chile	Ghana	Kenya	Mexico	Nigeria	Sri Lanka
Male	0.23	0.42	0.99	0.09	0.78	0.00	0.00	0.85	0.47
Owner's age	41.0	12.6	41.9	36.6	39.3	35.7	45.3	30.9	37.3
Years of education	9.7	4.1	9.7	10.0	14.0	9.0	8.6	14.8	10.8
Digitspan recall	4.5	2.1	5.4	n.a.	6.5	5.0	3.3	7.5	6.4
Raven test score	5.0	2.9	n.a.	n.a.	n.a.	6.9	4.9	4.4	3.2
Father owned a business	0.35	0.48	n.a.	n.a.	0.36	0.30	n.a.	n.a.	0.42
Mother owned a business	0.28	0.45	n.a.	n.a.	0.53	0.41	n.a.	n.a.	0.07
Trade	0.55	0.50	0.51	0.73	0.44	0.76	0.62	0.04	0.34
Manufacturing	0.11	0.32	0.28	0.37	0.24	0.00	0.05	0.24	0.31
Firm age (years)	8.7	10.5	12.4	3.5	10.7	6.4	9.2	4.5	10.0
Number of paid workers	2.3	25.8	12.5	0.2	4.2	0.2	0.2	6.7	3.6
Monthly sales (USD)	2,751	25,258	13,999	293	3,571	279	1,285	3,835	2,818
Monthly profits (USD)	647	5,523	1,461	195	2,067	53	512	1,996	280
Capital stock (USD)	25,229	945,813	42,757	n.a.	9,809	163	1,463	229,730	6,740
Registered for taxes	0.34	0.47	0.46	n.a.	0.61	n.a.	0.31	0.38	0.33
Business practice score	0.39	0.25	0.40	0.38	0.44	0.52	0.30	0.76	0.32
Marketing score	0.36	0.31	0.27	0.37	0.41	0.62	0.25	0.66	0.30
Buying and stock score	0.57	0.30	0.55	0.57	0.42	0.81	0.47	0.78	0.57
Record-keeping score	0.46	0.34	0.66	0.44	0.62	0.42	0.38	0.85	0.42
Financial planning score	0.28	0.32	0.20	0.26	0.31	0.35	0.23	0.73	0.14
Medians									
Median sales (USD)	500		2,676	128	1,135	132	667	1,290	231
Median profits (USD)	167		294	96	355	47	267	645	93
Median capital stock (USD)	506		1,176		2,128	39	545	45,161	926
Median number paid workers	0		4	0	3	0	0	4	0
Number of observations	20,400		1,724	158	335	3,532	10,265	1,725	2,661

Notes. "n.a." denotes not asked in this data set. Business practice score is the proportion of 26 business practices used by the firm. Marketing (seven practices), buying and stock (three practices), record-keeping (eight practices), and financial planning (eight practices) are subcomponents.

entrepreneurs who were selected through a nationwide business plan competition averages much higher scores than the other samples. However, we do see a large dispersion in business practices within each country. This echoes the large spread of management practices found by Bloom and Van Reenen (2007) across larger firms within countries. The dispersion is evident even within samples that screened the firms to be similar in terms of size and industry. For example, the Kenyan sample consists of female-owned firms largely operating retail trade businesses in small markets, with fewer than three employees and profits below KSH 4,000 per week (USD 47). The standard deviation of the business practice score is still 0.19 relative to a mean of 0.52 even in this relatively homogeneous sample. Thus there are large differences in the way even very small firms operate.

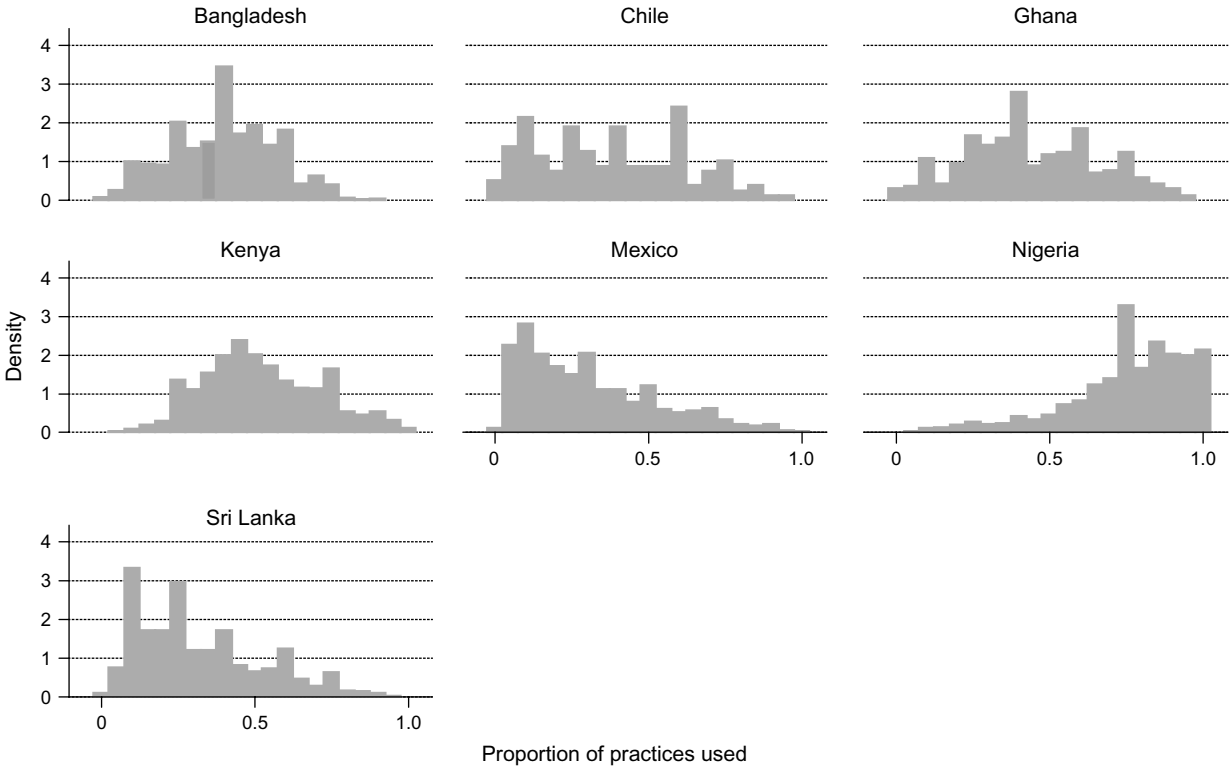
2.5. Stability of Business Practices Over Time

The data from Ghana, Kenya, Nigeria, and Sri Lanka enable us to examine how stable these practices are over a one-year period. Figure 2 plots the business practices score in a one-year follow-up survey against that in the baseline.[5] The mass lies close to a 45° line; however, there are also firms that change their practices dramatically from one year to the next. The Pearson (Spearman) correlation is 0.591 (0.593). There is thus a strong persistent component of these scores. It is unclear how much of the variation over time reflects genuine change in practices versus measurement error. By way of comparison, Bloom and Van Reenen (2007) report that for a sample of 64 firms for which repeat interviews were done by different interviewers of different managers in a plant, but at the same point in time, the correlation was 0.73, while Bloom et al. (2016) report that their correlation in reinterviews was 0.51 when done for 222 reinterviews.[6]

2.6. Reporting Issues and Audit Results

Our measures of business practices come from survey self-reports. This raises three potential concerns. The first is that the survey responses may not be informative if everyone claims to be employing good practices. The second is that there is a systematic bias in reporting after a training intervention, with individuals who have gone through training claiming to employ more practices than they actually employ because they want to show they have done what the training instructed. The final concern is that a systematic bias arises because more able business owners are better at knowing what the correct answer to these practices should be and also do better in business.

Figure 1. Variation in Business Practices Within Countries



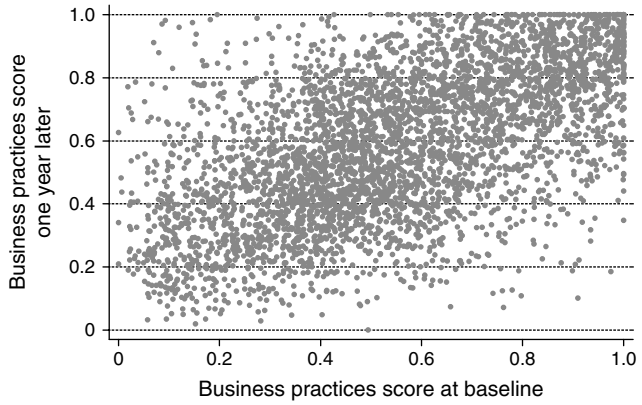
Notes. The sampling strategy varies by country, so this figure is not intended for intercountry comparisons. Shown is the distribution of the proportion of 26 business practices (described in the online appendix) used by firms in the countries as labeled. Bangladesh ($n = 1{,}724$) is a representative sample of firms with one or more employees, Chile ($n = 158$) samples participants in a government microenterprise support program, Ghana ($n = 335$) is made up of participants in a business plan competition, Kenya ($n = 3{,}532$) is a representative sample of female-run businesses with fewer than four employees and profits in a specified range, Mexico ($n = 10{,}265$) is a representative sample of female-run business with less than six employees and sales below a specified level, Nigeria ($n = 1{,}725$) is made up of participants in a business plan competition, and Sri Lanka ($n = 2{,}661$) comes from three representative samples of male businesses with two or fewer employees, female-run businesses with profits below a specified level, and small- and medium-sized enterprises with 5–50 workers.

We employ several methods to address these concerns. The first consists of *audit visits*. We selected a random sample of 135 firms in Nigeria and 200 firms in Sri Lanka that we had interviewed one to two months earlier. These businesses were visited by a business mentor—individuals experienced in business and/or business training—hired by us. The visits were framed to firm owners as a chance to receive individualized feedback on their business. The mentors were given a set of open-ended questions to ask (e.g., "What methods do you use to ensure your customers are satisfied with your products?," "Tell me about any advertising you have done lately," "Can you tell me how you keep track of inventory?," "What are your targets for the business for the coming year?") and typically spent two to three hours with the business owner. At the end of the interview, they provided the owner with suggestions for areas where he or she could improve practices and provided us with an independent assessment of whether or not the firm owner was using each of the 26 business practices.

When we compare the business practice score based on this audit with the survey responses, we find a Pearson (Spearman) correlation of 0.74 (0.73). This is higher than Bloom et al. (2016) report for their repeat interviews by different surveyors using double-blind surveying. Figure 3 plots the audited score against the survey score, along with a 45° line and line of best fit. Note that the fitted line has slope less of less than 1, implying that it is more common for the audit visit to suggest a lower score than the survey than vice versa. This could reflect some overreporting by firm owners, or it could reflect that mentors are not able to always tell whether a practice is being implemented on the basis of the visit. Nevertheless, the strong positive correlation provides us with some confidence that the reported scores contain a strong signal of actual business practice.

In Sri Lanka, 90 of the 200 firms audited had been assigned to a business training course. The Sri Lankan audit sample can therefore also be used to assess the extent to which training biases the self-reported

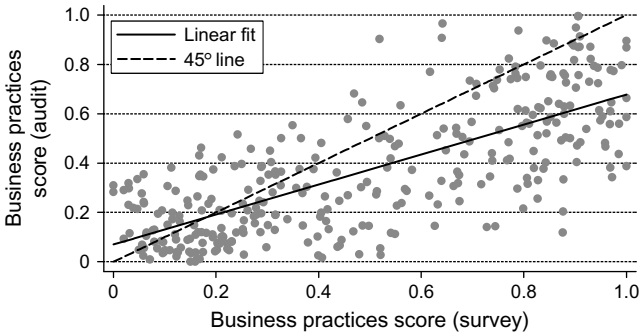
Figure 2. Stability of Business Practices Over One Year



Notes. The business practices score is the proportion of 26 business practices (described in the online appendix) that are used by firms. Panel data on practices measured a year apart from Ghana ($n = 257$), Kenya (1,887), Nigeria (1,904), and Sri Lanka (836) are shown. Samples from Kenya and Sri Lanka are restricted to those firms that were not assigned to receive business training during the year in order to reflect practice stability in the absence of a training intervention.

responses. In Table A1 of the online appendix we show the results of regressing the difference between the audited business practice score and the survey score on treatment assignment. The treatment effect is small in magnitude (0.01) and not statistically significant, suggesting that there is no systematic bias in reporting coming from some individuals having done business training. Finally, on the possibility that more able business owners report more business practices than they actually employ, and also do well in business, we show below that controlling for multiple measures of owner ability has little effect on our results. Taken together with the audit results, this provides some confidence that the associations we find between business practices and business performance are not an artifact of biased survey reporting.

Figure 3. Audited Scores vs. Survey Scores



Notes. The business practices score is the proportion of 26 business practices (described in the online appendix) that are used by firms. Data are from 135 firms in Nigeria and 200 firms in Sri Lanka that received an audit visit by an independent mentor who used open-ended questions to assess their business practices. The score from this assessment (Y axis) is then compared to the score as obtained from a survey done within one to two months of this visit.

3. Validating the Data

We follow the approach of Bloom and Van Reenen (2007) in viewing the correlations of our business practice scores as a form of validation that the business practices are likely to be picking up a quantity of interest. As with their management practices, the purpose here is not to identify or claim a causal relationship between business practices and firm outcomes of interest; rather, the purpose is to demonstrate that these measures do seem to at least have some predictive power for explaining differences in performance across firms.

3.1. Business Practices and Firm Productivity

Consider a standard production decision of a small firm, in which the owner is choosing labor L, materials M, and capital K inputs to maximize output $Y = f(A, L, M, K)$, with output price p, cost of labor w, cost of raw materials s, cost of capital r, and productivity factor A. With a given wealth level W, the owner's production decision is

$$\max_{K,M,L} \{pf(A,L,M,K) - wL - sM - rK\}$$
$$\text{s.t. } wL + sM + rK \le \lambda W, \quad (1)$$

where λ reflects the tightness of borrowing constraints on both fixed and working capital. How then might business practices affect this production decision? Bloom et al. (2016) discuss several views of management that have analogs here. The first is to view management as another factor of production, which itself has a market price and is chosen by the firm owner similar to other inputs. In micro- and small firms, the owner is typically the manager (and often the only worker), so managers are not hired through the labor market. But owners may be able to purchase better business practices by investing in business training. A second view is that management is a technology, with better management allowing firms to produce more from the same inputs. In our context this would mean business practices affect the A term in this optimization decision. For example, better stock-keeping, record-keeping, and planning ahead may result in less spoilage and wastage, as well as less downtime that comes from not having the right parts or goods.

However, we believe that the types of business practices we measure also are likely to matter in ways other than productivity. In particular, marketing practices are likely to affect the demand faced by firms, which is reflected in the price p it receives. Better buying practices such as seeking an alternative supplier can result in low raw materials prices s, while better record-keeping and financial planning can potentially

affect the willingness of banks to lend (λ) and cost of finance r. As a result, both prices and inputs are likely to be endogenous to business practices B. But, in general, the different channels all suggest that we should expect firms with better business practices to have higher revenues and to be more profitable, so we can examine whether these associations hold.

We start by simply examining whether firms with better business practices have higher revenues. To do this, we run local linear regressions of log sales on our business practices index. Next, we examine cross-sectional associations with labor productivity by estimating for firm i in industry j in country c:

$$y_{i,j,c} = \alpha_c + \beta_{c,j} + \theta B_{i,j,c} + \mu' l_{i,j,c} + \varepsilon_{i,j,c}, \qquad (2)$$

where y is log sales or log profits, B is our business practices index score, and l is labor. This specification controls for country and industry dummies. The industry sector is defined differently across the data sets, so we allow for the industry to vary by country. Typically, industry is classified at the two- or three-digit Standard Industrial Classification level, and in total, we have 294 industry × country dummies. For labor, we control for the log of the owner's labor hours and log of the number of workers. To deal with zero hours or zero workers, we include separate dummy variables for having zero hours and for having zero workers, as well as for having missing values of these variables.[7] A positive value of θ then shows that better business practices are associated with higher labor productivity in the cross section. This equation is estimated using only the first survey round we have for each country, providing a cross section of 18,146 firms that have both sales and business practice data.

We then add controls for the log of the value of inventories and log capital stock, again including separate dummies for zero and missing values, to capture total factor productivity.[8] Next, we add a set of controls for owner and firm characteristics that might be correlated with both firm productivity and the business practices used: the gender, age, and schooling of the owner; his or her ability as measured by Raven and Digitspan recall tests; and the age of the firm. Finally, we allow the coefficients on all of these control variables to differ by country.

3.2. Econometric Results for the Association of Business Practices with Productivity

Table 2 reports the results of estimating Equation (2) on the combined sample. Column (1) shows a strong positive and significant association between better business practices and higher labor productivity. A one-standard-deviation (0.25) increase in the business practices score is associated with 0.30 log points (35%) higher labor productivity. Controlling for inventories and raw materials reduces this association from a one-standard-deviation change in business practice scores to 0.24 log points (27%). Adding the set of owner and firm controls in column (3) reduces the coefficient on business practices only slightly, despite the controls themselves being highly significant. From column (3) we find that a one-standard-deviation increase in business practices scores is associated with a 23% increase in productivity. Allowing for additional flexibility in the production function in column (4) by allowing all control variables to have country-specific coefficients does not change this very much, with a one-standard-deviation increase in business practices still associated with a 22% increase in productivity.

Columns (5)–(8) show the corresponding regressions with log profits as the outcome; business practices are again statistically significant in all specifications. From column (8) we find a one-standard-deviation increase in business practices is associated with an 18-percentage-point increase in profits, conditional on labor, raw materials, capital, and owner and firm characteristics.

Because the survey respondent is also typically the manager, there might be a concern that the reported measures of business practices and outcomes are influenced by characteristics of the owners that we are unable to control for. High ability owners, for example, may report better business practices either because they are more likely to use better practices or because they are more likely to know what the "correct" answer to the questions is. Even if higher ability owners employ better practices, the relationship between practices and sales or profits may be biased upward by the exclusion of variables positively correlated with both practices and outcomes. In that regard, the comparison of column (2) with column (3), or column (6) with column (7), is reassuring. These results indicate that the inclusion of several controls for the ability of the owner does not reduce very much the relationship between measured business practices on the one hand and sales or profits on the other, suggesting that the relationship is not driven by unmeasured owner ability (Altonji et al. 2005).

The estimations reported on Table 2 impose a linear functional form between business practices and firm performance. One might alternatively hypothesize that business practices either have strongly decreasing returns (what matters is having a few in place) or have strongly increasing returns (business practices do not matter unless all of them are being done). We therefore relax the linearity assumption in two ways. First, Figure 4 shows local linear regressions of log sales against our business practices score for the combined sample and for each country separately. Pointwise 95% confidence intervals are also shown. In some of the individual country cases, the confidence intervals are wide at one or the other tail, reflecting few observations in

Table 2. Cross-Sectional Associations of Business Practices with Sales and Profits

	Log sales				Log profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Business practices score	1.211***	0.965***	0.833***	0.795***	1.010***	0.830***	0.697***	0.655***
	(0.047)	(0.046)	(0.048)	(0.048)	(0.045)	(0.045)	(0.047)	(0.046)
log(*Paid workers*)	0.653***	0.475***	0.464***		0.496***	0.365***	0.357***	
	(0.026)	(0.026)	(0.027)		(0.026)	(0.026)	(0.026)	
log(*Owner's hours*)	0.351***	0.313***	0.302***		0.260***	0.232***	0.221***	
	(0.020)	(0.019)	(0.019)		(0.019)	(0.018)	(0.018)	
log(*Capital stock*)		0.094***	0.085***			0.072***	0.065***	
		(0.007)	(0.006)			(0.006)	(0.006)	
log(*Inventories*)		0.200***	0.198***			0.148***	0.146***	
		(0.010)	(0.010)			(0.009)	(0.009)	
Owner is male			0.096**				0.130***	
			(0.045)				(0.045)	
Age of owner			−0.005***				−0.006***	
			(0.001)				(0.001)	
Years of education of owner			0.012***				0.011***	
			(0.003)				(0.003)	
Digitspan recall			0.036***				0.034***	
			(0.007)				(0.007)	
Firm age (years)			0.008***				0.007***	
			(0.001)				(0.001)	
Raven test score			0.019***				0.013***	
			(0.004)				(0.004)	
Control coefficients vary by country	No	No	No	Yes	No	No	No	Yes
Sample size	18,146	18,146	18,146	18,146	18,135	18,135	18,135	18,135

Notes. Robust standard errors are in parentheses. Regressions also include dummies for zero or missing values of each control. All regressions include country dummies and country × industry sector dummies. Columns (4) and (8) allow the coefficients on all control variables to vary by country.

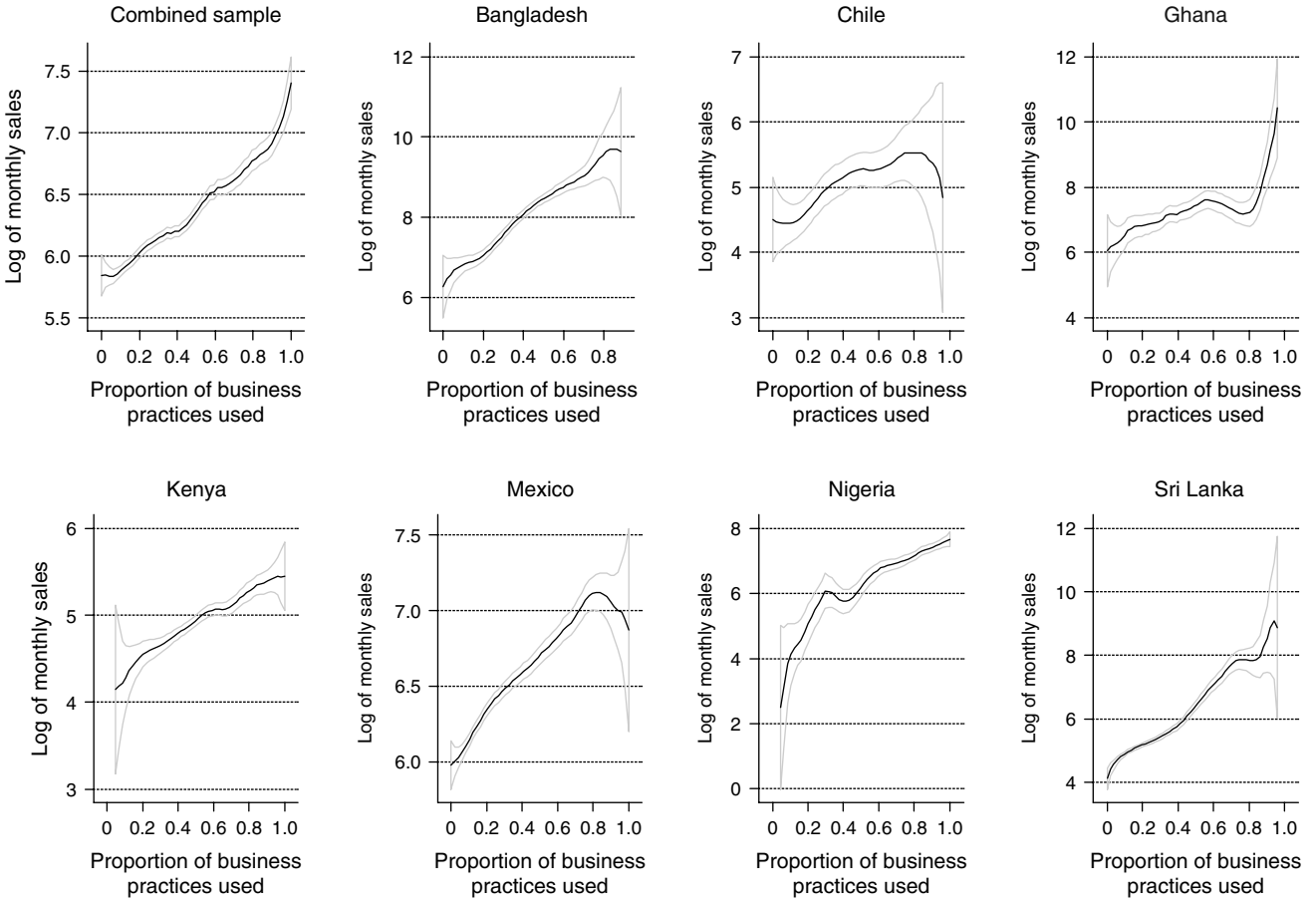
** and *** denote significance at the 5% and 1% levels, respectively.

this range. This is particularly the case for the smaller Chilean sample. In all cases we see strong positive, and reasonably linear, relationships. Firms with better business practices have higher sales on average. Second, in Figure A1 of the online appendix we reestimate column (8) of Table 2, allowing for nonlinearity in the association with business practices by including nine dummy variables for different business practice ranges instead of the linear term. The relationship is fairly linear, showing, if anything, slightly increasing returns to business practices. We therefore proceed with a linear specification for the remainder of the paper for ease of interpretation.

In Table A2 of the online appendix we examine the robustness of our results to alternative methods of aggregating the business practices. We do this for the subsample of observations with no missing business practice data, since principal components drops observations in which one or more business practices are missing.[9] We see from the foot of Table A2 that the estimated change in log sales from a one-standard-deviation change in the business practice measure is robust to how business practices are aggregated, and we get a positive and strongly significant association in all cases. Table A3 of the online appendix examines the association between business practices and productivity country by country. Panel A shows labor productivity, and panel B, total factor productivity. We see positive and significant associations with labor productivity in all countries and positive associations with total factor productivity in all countries, which are statistically significant in six out of seven countries (the exception being Ghana, which has a relatively small sample size). Therefore our results are not being driven by any one country or by the method of aggregation.

Our specifications in Table 2 are similar to those in the first few columns of Table 3 of Bloom et al. (2016). It is therefore of interest to compare the magnitude of association of outcomes with business practices in our sample to the associations of outcomes with management practices in their sample. In their equivalent of column (1), a one-standard-deviation increase in their management practices score is associated with a 42.6% increase in labor productivity, while in their equivalent of column (4), a one-standard-deviation increase in management is associated with a 17.1% increase in total factor productivity. These are similar

Figure 4. Local Linear Regressions of Log Sales on Business Practices



Notes. Epanechnikov kernel with bandwidth of 0.05 used for local linear regressions. Log monthly sales are in terms of U.S. dollar sales at market exchange rates. The business practices score is the proportion of 26 business practices (described in the online appendix) that are used by firms. Shown around each fitted line are 95% confidence intervals. Samples sizes are 18,383 (combined sample), 1,724 (Bangladesh), 148 (Chile), 321 (Ghana), 3,413 (Kenya), 8,594 (Mexico), 1,725 (Nigeria), and 2,458 (Sri Lanka) and are for the first round of data with business practices in each study.

in magnitude to our estimated effect sizes of 35% and 22%, respectively.[10]

3.3. Association of Business Practices with Business Subcomponents

Table 3 separates our overall business practice measure into the four subcomponent indices: marketing, buying and stock control, record-keeping, and financial planning. Column (1) shows that each component has a positive and significant association with labor productivity. Columns (2) and (3) show this is also true for total factor productivity. Column (6) shows that it is the record-keeping and marketing practices that have the strongest associations with profits, conditional on input use and owner and firm characteristics. This is also the case if we consider standardized impacts. A one-standard-deviation (0.46) increase in record-keeping practices is associated with a 0.16–0.19 increase in profits and sales based on columns (6) and (3); a one-standard-deviation (0.37) increase in marketing practices is associated with a 0.07–0.08 increase in profits and sales; a one-standard-deviation (0.28) increase in financial planning practices is associated with a 0.02–0.03 increase in sales and profits; and a one-standard-deviation (0.58) increase in the buying and stock-keeping practices is associated with a 0.04 increase in sales and 0.003 reduction in profits.

Table A4 in the online appendix presents the coefficients from estimating Equation (2) separately for each practice and finds that 25 out of the 26 practices have a statistically significant positive correlation with labor productivity (the exception being whether they run out of stock frequently).

3.4. Association of Business Practices with Firm Survival and Firm Growth

Table 4 uses our panel data to examine the extent to which baseline business practices help predict subsequent firm survival and firm growth.[11] Columns (1)–(4) use data from Kenya, Nigeria, and Sri Lanka and look at survival over one year. Column (5) uses only the Sri Lanka data to examine a longer-term horizon of

Table 3. Cross-Sectional Associations with Index Subcomponents

	Log sales			Log profits		
	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of marketing practices used	0.310***	0.229***	0.195***	0.302***	0.246***	0.209***
	(0.036)	(0.035)	(0.035)	(0.034)	(0.034)	(0.034)
Proportion of buying and stock control practices used	0.112***	0.086***	0.072**	0.025	0.005	−0.006
	(0.034)	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)
Proportion of record-keeping practices used	0.574***	0.459***	0.409***	0.479***	0.394***	0.344***
	(0.035)	(0.034)	(0.034)	(0.033)	(0.033)	(0.033)
Proportion of financial planning practices used	0.152***	0.136***	0.109***	0.117***	0.104***	0.078**
	(0.039)	(0.038)	(0.038)	(0.037)	(0.036)	(0.036)
log(*Paid workers*)	0.654***	0.476***	0.466***	0.497***	0.367***	0.359***
	(0.026)	(0.026)	(0.027)	(0.026)	(0.026)	(0.026)
log(*Owner's hours*)	0.351***	0.313***	0.302***	0.260***	0.232***	0.221***
	(0.020)	(0.019)	(0.019)	(0.019)	(0.018)	(0.018)
log(*Capital stock*)		0.092***	0.084***		0.071***	0.064***
		(0.007)	(0.007)		(0.006)	(0.006)
log(*Inventories*)		0.200***	0.198***		0.149***	0.147***
		(0.010)	(0.010)		(0.009)	(0.009)
Owner is male			0.100**			0.134***
			(0.045)			(0.045)
Age of owner			−0.005***			−0.006***
			(0.001)			(0.001)
Years of education of owner			0.012***			0.011***
			(0.003)			(0.003)
Digitspan recall			0.035***			0.033***
			(0.007)			(0.007)
Firm age (years)			0.008***			0.007***
			(0.001)			(0.001)
Raven test score			0.019***			0.013***
			(0.004)			(0.004)
Sample size	18,102	18,102	18,102	18,089	18,089	18,089

Notes. Robust standard errors are in parentheses. Regressions also include dummies for zero or missing values of each control. All regressions include country dummies and industry sector dummies.

** and *** denote significance at the 5% and 1% levels, respectively.

5.5 years. We see from column (1) that baseline business practices do positively and significantly predict one-year survival. A one-standard-deviation improvement in business practices is associated with a 1.3-percentage-point higher likelihood of survival, in a context where, on average, only 8.8% of firms exit in one year. Baseline practices may be correlated with other aspects of owner ability that we do not measure, but we note that the practices continue to significantly predict survival even after conditioning on initial employment levels (column (2)) and on owner and firm characteristics (column (3)). They do, however, lose their significance once we condition on baseline sales and profitability (column (4)), suggesting that one of the main channels in helping firms survive is through making them more profitable. Column (5) shows that our business practice measure also predicts survival over longer periods—a one-standard-deviation increase in baseline practices is associated with 2.2-percentage-point higher survival rates over a 5.5-year horizon.

Columns (6)–(8) show that there is a strong positive association between initial business practices and subsequent sales growth (conditional on survival).[12] Sales growth here is measured as the change in log sales. This positive association holds over the 1-year horizon (columns (6) and (7)) and in our Sri Lankan sample over the 5.5-year horizon (column (8)). A one-standard-deviation increase in business practices is associated with 7% higher growth over one year (column (7)) and with 15% higher growth over 5.5 years (column (8)).

3.5. Discussion of Business Training Experimental Literature

The above analysis shows that there exists a strong positive association between our measure of business practices and business performance and growth. To show that this relationship is causal, we would ideally experimentally change business practices and measure their impact on firm growth. A growing experimental literature, summarized in McKenzie and Woodruff (2014), has attempted to do this. However, much of this

Table 4. Baseline Business Score and Survival Dynamics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1-year survival	1-year survival	1-year survival	1-year survival	5.5-year survival	1-year sales growth	1-year sales growth	5.5-year sales growth
Baseline business practices score	0.055***	0.039**	0.038**	0.022	0.110**	0.476***	0.277***	0.556***
	(0.017)	(0.017)	(0.016)	(0.017)	(0.053)	(0.087)	(0.089)	(0.196)
Baseline log(Paid workers)		0.025***	0.015**	0.011	−0.019		0.110**	−0.025
		(0.007)	(0.007)	(0.007)	(0.015)		(0.043)	(0.088)
Male			0.028***	0.023**			0.142***	
			(0.010)	(0.010)			(0.052)	
Owner's age at baseline			0.002***	0.002***			−0.004**	
			(0.000)	(0.000)			(0.002)	
Owner's years of education			−0.001	−0.001			0.034***	
			(0.001)	(0.001)			(0.006)	
Digitspan recall			0.000	−0.000			−0.010	
			(0.002)	(0.002)			(0.011)	
Age of firm at baseline			0.003***	0.003***			0.001	
			(0.001)	(0.001)			(0.002)	
Raven test score			0.003***	0.003***			0.013**	
			(0.001)	(0.001)			(0.006)	
Baseline log sales				0.005*		−0.697***	−0.760***	−0.798***
				(0.003)		(0.015)	(0.017)	(0.035)
Baseline log profits				0.006*			0.079***	
				(0.003)			(0.018)	
Sample size	7,016	7,016	7,015	6,847	1,413	5,689	5,629	1,152
Mean of dependent variable	0.912	0.912	0.912	0.913	0.874	0.394	0.392	0.483

Notes. Marginal effects from probit estimation shown in columns (1)–(5), regression estimates in columns (6)–(8). Robust standard errors are in parentheses. Columns (1)–(4) and (6) and (7) are data from Kenya, Nigeria, and Sri Lanka. Columns (5) and (8) are from Sri Lanka only. All specifications include sector and country dummies, as well as controls for missing values of the control variables where needed. Sector is defined as manufacturing, trade, services, or other for columns (1)–(5) and defined at the detailed country × sector level for columns (6)–(8).
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

literature has struggled to find significant impacts of business training on firm performance. This raises the question of whether the strong associations we see in our data are inconsistent with experimental results and therefore suggest that we are not capturing a causal phenomenon.

To examine this, we use the fact that three of our data sets were collected as part of business training experiments. The first three rows of Table 5 show the effects on business practices of the ILO Start-and-Improve-Your-Business (SIYB) and Get Ahead training programs in two of our Sri Lankan subsamples and our Kenyan sample. The first column shows the measured effect of training on business practices. In all three experiments, the treatment effect on our business practices measure is between 0.04 and 0.06. In all three cases, the effect is highly statistically significant but of modest magnitude, implying that the owners undertake an additional 1 to 1.5 practices after training. The next two columns present the 95% confidence intervals for the treatment effects on log sales and log profits one year after this training, taken from the three studies. All of the confidence intervals contain zero except for profits in the sample of Sri Lankan men. These results are consistent with the general struggle in the literature to find significant impacts of training on sales and profits. In the final two columns we use the coefficients from columns (4) and (8) of Table 2 to predict changes in profits and sales, given the change in business practices that the training causes. We see that the regressions from Table 2 predict only a 3%–4% increase in sales and profits in each study. All six of these estimates lie well within the confidence intervals of the estimated treatment effects, taken from the studies themselves. This partly reflects the fact that the standard errors in these studies are large. The narrowest—profits in the Kenyan study—spans 0.16. Given the coefficient in column (8) of Table 2, this range is equivalent to a change in 6 of the 26 practices, more than four times what we actually observe in the experiment.

Although most other business training evaluations have not measured business practices in as comprehensive a way as our measures, the evidence summarized in McKenzie and Woodruff (2014) shows that other existing training programs have generally also only increased the use of good business practices of around six or seven percentage points, or 0.1 to 0.2 standard deviations. This contrasts with the experimental

Table 5. Reconciling Our Results with Experimental Estimates

Sample	Training program	Treatment effect on business practices	95% confidence interval for treatment effect on		Implied effect from association in Table 2	
			log(*Sales*)	log(*Profits*)	log(*Sales*)	log(*Profits*)
Sri Lankan women	ILO SIYB five-day course	0.058*** (0.016)	[−0.23, +0.15]	[−0.12, +0.17]	0.046	0.038
Sri Lankan men	ILO SIYB five-day course	0.056*** (0.010)	[−0.06, +0.17]	[+0.01, +0.18]	0.045	0.037
Kenyan women	ILO GET Ahead five-day course	0.042*** (0.007)	[+0.00, +0.18]	[−0.01, +0.16]	0.033	0.028
Related studies						
Chilean unemployed (Martínez et al. 2013)	MESP: three weeks intensive training +3 months mentoring (+grant)	0.180***		[+0.08, +0.79]		0.12
South African firms (Anderson-Macdonald et al. 2014)	Business Bridge: 80 hours over 2 months	0.260***	[+0.18, +1.39]	[−0.00, +1.36]	0.21	0.17

Notes. Treatment effects on log sales and log profits for Sri Lankan women taken from Table 3 of de Mel et al. (2014). Treatment effects for Sri Lankan men and Kenyan women calculated approximately one year after training. Implied effects from association in Table 2 are calculated by multiplying the treatment effect on business practices by the coefficient in column (4) (sales) and column (8) (profits) from Table 2. Chile estimates: estimated effect on business practices calculated as 4.493/25 from Table 4 of Martínez et al. (2013); estimated effect on log profits approximated by change in self-employment income relative to control mean. South African estimates: estimated effect on business practices calculated from marketing treatment as average of effect sizes on each of 30 practices measured; effect on profits and sales approximated by percentage change in levels relative to control means.

evidence on management practices in large firms provided in Bloom et al. (2013a), in which intensive consulting resulted in a 37.8-percentage-point increase in management practice use.

The bottom two rows of Table 5 summarize two recent studies that have used more intensive training programs and also found larger impacts on business practices, using measurement tools based on our survey instrument. The control group data from Martínez et al. (2013) provide the Chile data used in our paper. In their experiment, they find an approximate 0.18 increase in the business practice score, which is about four times as large as in the ILO training experiments. This results in a statistically significant increase in business income. Our associations from Table 2 would again yield an estimated treatment effect within their confidence interval.[13] Anderson-Macdonald et al. (2014) use a 10-week course in South Africa and obtain average increases in business practices of 26 percentage points. From Table 2 we would predict that this would lead to 17%–21% increases in profits and sales. These predictions are lower than their point estimates but lie within the confidence intervals for their estimated effects.

Taken together, we therefore view the experimental evidence on business training as being consistent with the strong associations we find between business practices and firm performance. The reason most business training studies struggle to find effects is that relatively short training courses do not lead to much of a change in business practices, leaving the studies with limited power for measuring impacts on sales and profits.

4. What Explains the Variation in Business Practices Across Firms?

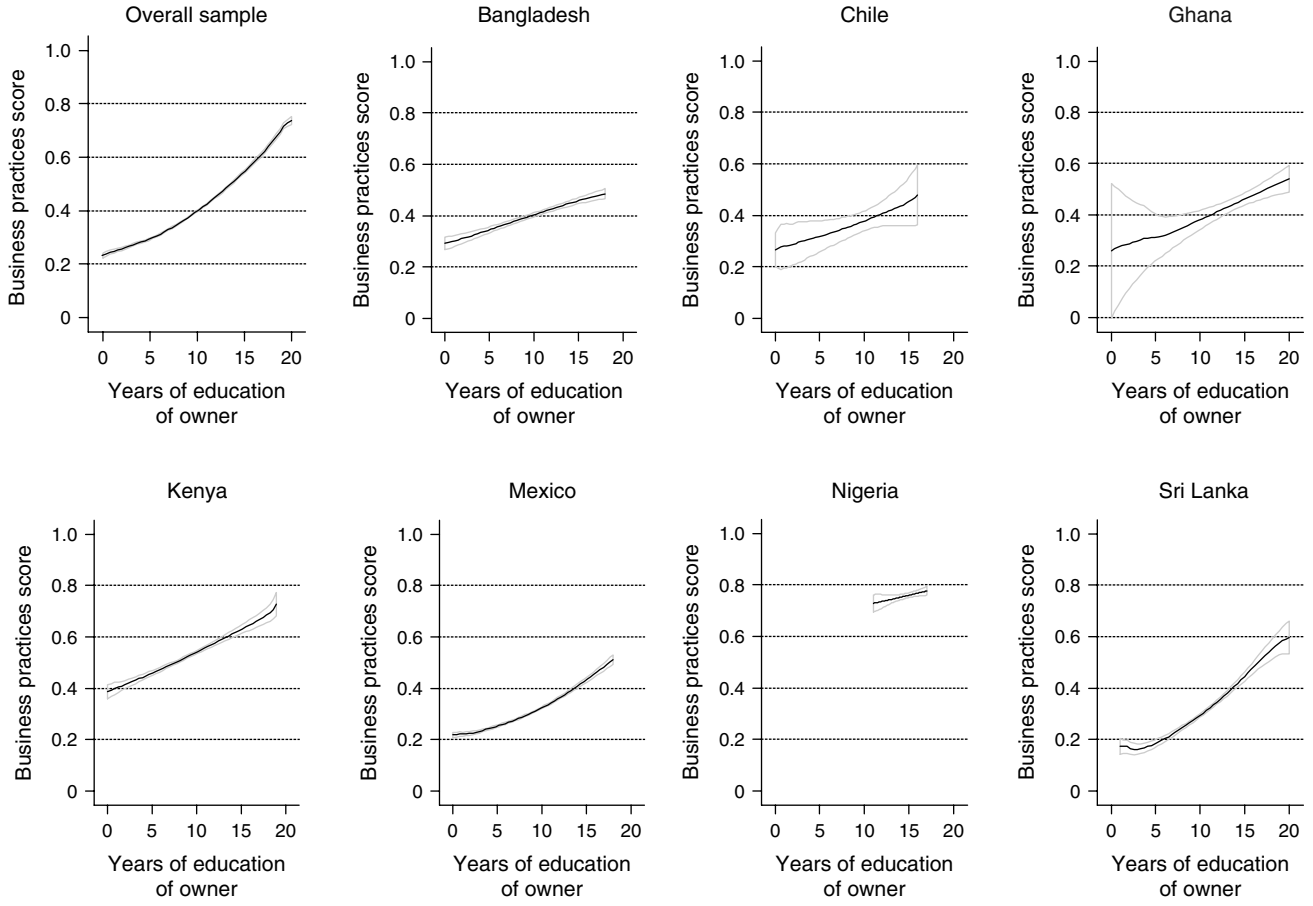
We have found that there is large variation within countries in terms of the business practices used by small firms and that these differences are strongly correlated with firm performance and survival. This raises the question of what causes business practices to vary so much across firms. We consider several key factors, examining the extent to which factors identified as explaining differences in management practices among larger firms also play a role in determining business practices among small firms.

4.1. Human Capital

In small firms the business practices used are to a large extent implemented by the firm owner. Without intermediate levels of management and workers, we expect the human capital of the owner to play a key role in determining which business practices are used. We have seen that our business practice measures retain significance even after controlling for multiple measures of human capital, suggesting that it is not that business practices are simply capturing owner ability. But it does seem likely that more educated and more able owners will find it easier to learn and adopt good business practices.

Figure 5 shows local linear regressions of business practices on years of schooling for the combined sample and country by country. We see a strong positive association. The association is weakest in Nigeria, where most of the sample has postsecondary education. The first column of Table 6 examines this

Figure 5. Local Linear Regressions of Business Practices on Education



Notes. Epanechnikov kernel with bandwidth of 5 used for local linear regressions. The business practices score is the proportion of 26 business practices (described in the online appendix) that are used by firms. Shown around each fitted line are 95% confidence intervals. Samples sizes are 20,136 (combined sample), 1,724 (Bangladesh), 158 (Chile), 3,332 (Ghana), 3,513 (Kenya), 10,005 (Mexico), 1,725 (Nigeria), and 2,661 (Sri Lanka) and are for the first round of data with business practices in each study.

association in more detail, also controlling for owner gender, age, country, and business sector, as well as for two other measures of human capital: Digitspan recall and Raven test score. These latter two measures are both measures of analytical and cognitive ability, and they were only collected in some countries (see Table 1). We see that business practices tend to be better in male-owned firms and do not vary with the age of the owner. Conditional on this, each year of education is associated with a 1.2-percentage-point increase in business practices: thus, a one-standard-deviation increase in education is associated with a 0.20-standard-deviation increase in business practices. Digitspan recall and Raven test both have positive and significant associations as well, but the magnitudes are smaller: a 1-standard-deviation increase in either measure is associated with a 0.03–0.08 increase in business practice scores, conditional on the other variables in this regression. Formal education therefore appears to have a stronger association than innate ability in explaining the practices used.

4.2. Family History of Entrepreneurship

Evidence from higher-income countries indicates that children of self-employed parents are more likely to become self-employed themselves. Dunn and Holtz-Eakin (2000) find that the effect parents' self-employment on occupational choice remains large even after controlling for wealth levels, suggesting that the transition of human capital from parent to child is the most important channel for the intergenerational effect. Motivated by this, in the second column of Table 6 we examine whether owners whose parents were business owners have different business practices. We see that both having a father who owned a business and having a mother who owned a business are positively associated with business practices. This provides support for the idea that parents who are business owners transmit human capital relevant to running a business to their children.

4.3. Firm Size

Finally we examine whether larger firms have better business practices. The causation here may go both

Table 6. Which Factors Are Associated with Higher Business Practices?

Dependent variable: *Business practices score*				
Years of education of owner	0.012***			0.011***
	(0.000)			(0.000)
Digitspan recall	0.010***			0.009***
	(0.001)			(0.001)
Raven test score	0.003***			0.003***
	(0.001)			(0.001)
Owner is male	0.026***	0.029***	0.026***	0.008
	(0.007)	(0.007)	(0.007)	(0.007)
Age of owner	−0.001***	−0.002***	−0.003***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Father owned a business		0.016***		0.011**
		(0.005)		(0.005)
Mother owned a business		0.015***		0.011**
		(0.006)		(0.005)
1 to 4 paid workers			0.101***	0.088***
			(0.005)	(0.005)
5 to 9 paid workers			0.143***	0.120***
			(0.009)	(0.008)
10 to 14 paid workers			0.172***	0.143***
			(0.010)	(0.010)
15 to 20 paid workers			0.190***	0.157***
			(0.014)	(0.014)
21+ paid workers			0.235***	0.194***
			(0.014)	(0.013)
Owners started business themselves				0.018***
				(0.007)
Sample size	20,162	20,162	20,162	20,162

Notes. Robust standard errors are in parentheses. All regressions also control for sector, for country, and for missing values of the control variables where needed.

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

ways: Firms with better practices will sell more and be able to grow larger—consistent with the results for sales growth we show in Table 4—in the end, hiring more employees. But being larger may also allow owners to hire specialists to perform some of the functions we measure (such as record-keeping) and give the owner more time for strategic planning and marketing rather than day-to-day operations. The third column of Table 6 shows that larger firms do have better business practices. A firm with one to four paid workers has a 0.101 higher business practices score than a firm with no workers, and the coefficients increase with each category of firm size, so that a firm with 21 or more workers has a 0.235 (almost one standard deviation) higher business practice score than a firm with no workers.

The last column of Table 6 considers all these factors together. We continue to see positive associations between better business practices and human capital, having parents who owned a business, and firm size.

5. Conclusions

Micro- and small enterprises are the predominant form of economic activity in low- and middle-income countries. There is broad recognition that the microenterprise sector is highly heterogeneous, with some owners drawn by opportunities to create a business and others drawn by the necessity to scrape out a living. Aspirations and education have been the viewed as the main underlying sources of heterogeneity. We show that the enterprises are also differentiated by the quality of the business practices they employ and that business practices have effects on enterprise outcomes that are independent of the effects of basic human capital.

Our index of business practices is designed to be easily implemented in closed-end field surveys and is customized to microenterprises. Most of our data are self-reported, but we show that the reports of owners are highly correlated with measures from independent auditors visiting the businesses and spending several hours asking open-ended questions about practices. Using data from seven countries, we show that the index of business practices is highly correlated with enterprise heterogeneity in the cross section. Owners implementing better business practices have higher sales, profits, labor productivity, and total factor productivity. Moreover, better business practices are associated with higher rates of firm survival and substantially higher rates of sales growth. This association of business practices with firm outcomes is not only statistically significant but also economically meaningful. A one-standard-deviation improvement in business practices is associated with an increase of 35% in labor productivity and 22% in total factor productivity—relationships similar to those found for large firms in Bloom et al. (2016).

The correlation between business practices and business outcomes raises the obvious question of whether the correlations we find in the data line up with causation. That is, can practices be improved with training or consulting, and if so, do the improved practices lead to improved firm outcomes? A growing literature tests the effectiveness of training programs that aim to improve management of small enterprises. The literature generally shows insignificant effects of training on firm outcomes. But our data show that the failure to find significant effects is explained by the fact that the training programs have only a very modest effect on improvement of business practices. The changes in sales and profits predicted by cross-sectional data for the given changes in business practices are all well within the confidence limits for increases in sales and profits found in the experimental literature. Our findings thus point to the need for more intensive training programs that have larger effects on business practices.

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Endnotes

[1] Bloom et al. (2012) and Bloom et al. (2016) extend the sample to large firms in developing countries. Bloom et al. (2013b) administer a closed-end survey to a subsample of the U.S. Annual Survey of Manufacturers, which includes firms with fewer than 10 workers. Figures 6 and 7 show that management practices are correlated with size even for firms with 10 employees.

[2] For example, Hsieh and Olken (2014, p. 93) note that "about 90 percent of firms in Mexico employ less than 10 workers. In India and Indonesia, the fraction of firms with less than 10 workers is almost visually indistinguishable from 100 percent," while McKenzie (2015) reports 99.6% of firms in Nigeria have fewer than 10 workers.

[3] Calderón et al. (2013) and Anderson-Macdonald et al. (2014) are recent exceptions, each showing more substantial growth following microenterprise training.

[4] Four of the questions on financial planning were not asked in Kenya and Nigeria.

[5] We exclude the firms in Sri Lanka and Kenya that were assigned to receive business training treatments for this part of the analysis in order to examine the stability of practices in the absence of an intervention intended to change these practices: the correlation falls slightly to 0.56 if we include treated firms.

[6] In panel data reported in Bloom et al. (2016), three-year resurvey rates of (usually) the same manager indicate one-year correlations of approximately 0.90 in their sample of large firms (Bloom 2015).

[7] About 2.4% of respondents report sales of zero, and 3.9% report negative or zero profits. We exclude these from the regressions reported in the body of the paper. We think this is likely the proper treatment because, for example, there are many observations with zero sales but positive profits. However, we find almost identical results when we define the left-hand-side variable as $\log(sales + 1)$ and $\log(profits + 1)$.

[8] Of the 18,146 firms with sales and business practices data in columns (1) and (2) of Table 2, 210 (1.6%) are missing data on paid workers, 51 (0.3%) are missing data on owner's hours, and 337 (1.9%) are missing data on capital stock. Inventories were not asked in the Mexico survey and so are missing for 8,662 firms, of which only 77 are from other countries.

[9] Note that this drops the entire samples from Mexico, Nigeria, and Kenya where one or more of the business practice questions were not asked.

[10] Note that the standardized effect sizes are much smaller in Bloom and Van Reenen (2007), which has a much smaller spread of management practices over which to draw inferences.

[11] Note in our survival probits that we control for industry classification at the level of manufacturing, trade, and services, so that the probit does not drop observations from industries with small numbers of firms in our sample and in which all the firms survive or all fail.

[12] Since sales growth can be noisy, for robustness we also considered sales growth truncated at the 5th and 95th percentiles, and using this truncated growth measure also results in a positive and statistically significant association.

[13] Note that their intervention combined the training with a grant, and they are unable to separate the effect of training from that of the grant. This may explain why our estimated effect based on Table 2 is near the bottom of a confidence interval for their effect size.

References

Altonji J, Elder T, Taber C (2005) Selection on observed and unobserved variables: Assessing the effectiveness of Catholic schools. *J. Political Econom.* 113(1):151–184.

Anderson-Macdonald S, Chandy R, Zia B (2014) The impact of marketing (versus finance) skills on firm performance: Evidence from a randomized controlled trial in South Africa. Working paper, London Business School, London.

Bloom N (2015) Personal correspondence by email with the authors, December 21, 2015.

Bloom N, Van Reenen J (2007) Measuring and explaining management practices across firms and countries. *Quart. J. Econom.* 112(4):1351–1408.

Bloom N, Sadun R, Van Reenen J (2012) The organization of firms across countries. *Quart. J. Econom.* 127(4):1663–1705.

Bloom N, Sadun R, Van Reenen J (2016) Management as a technology? NBER Working Paper 22327, National Bureau of Economic Research, Cambridge, MA.

Bloom N, Eifert B, Mahajan A, McKenzie D, Roberts J (2013a) Does management matter? Evidence from India. *Quart. J. Econom.* 128(1):1–51.

Bloom N, Brynjolfsson E, Foster L, Jarmin R, Saporta-Eksten I, Van Reenen J (2013b) Management in America. Center for Economic Studies Working Paper 13-01, U.S. Census Bureau, Washington, DC.

Borgenvall M, Jarskog H, Murray B, Karlstedt C (1999) *Improve Your Business: Basics* (International Labour Office, Geneva).

Bresnahan TF, Brynjolfsson E, Hitt L (2002) Information technology, workplace organization, and the demand for skilled labor: Firm-level evidence. *Quart. J. Econom.* 117(1):339–376.

Calderón G, Cunha JM, De Giorgi G (2013) Business literacy and development: Evidence from a randomized controlled trial in rural Mexico. NBER Working Paper 19740, National Bureau of Economic Research, Cambridge, MA.

de Mel S, McKenzie D, Woodruff C (2014) Business training and female enterprise start-up, growth, and dynamics: Experimental evidence from Sri Lanka. *J. Development Econom.* 106(January):199–210.

Dunn T, Holtz-Eakin D (2000) Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. *J. Labor Econom.* 18(2):287–305.

Easton G, Jarrell S (1998) The effects of total quality management on corporate performance: An empirical investigation. *J. Bus.* 71(2):253–307.

Hsieh C-T, Olken B (2014) The missing "missing middle." *J. Econom. Perspect.* 28(3):89–108.

Ichniowski C, Shaw K, Prennushi G (1997) The effects of human resource management practices on productivity: A study of steel finishing lines. *Amer. Econom. Rev.* 87(3):291–313.

Martínez C, Puentes E, Ruiz-Tagle J (2013) Micro-entrepreneurship training and asset transfers: Short term impacts on the poor. Working paper, University of Chile, Santiago, Chile. http://works.bepress.com/claudia_martinez_a/5.

McKenzie D (2015) Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. Working paper, World Bank, Washington, DC.

McKenzie D, Woodruff C (2014) What are we learning from business training evaluations around the developing world? *World Bank Res. Observer* 29(1):48–82.

Osterman P (2000) Work reorganization in an era of restructuring: Trends in diffusion and effects on employee welfare. *ILR Rev.* 53(2):179–196.

Taylor F (1911) *Principles of Scientific Management* (Harper & Brothers, New York).