Are Management Practices Failing or Aiding the Private Sector in South America?

Marie Hyland

David C. Francis

Jorge Rodriguez Meza

WORLD BANK GROUP

Development Economics

Global Indicators Group

March 2019

Abstract

An expanding body of literature has shown that better management practices can offer significant boosts to firms' productivity; this research illustrates that firms in South America are no exception. Using recent Enterprise Survey data from seven countries in South America (Argentina, Bolivia, Colombia, Ecuador, Paraguay, Peru, and Uruguay), the paper explores the various dimensions and drivers of management practices and analyzes how they are related to productivity. This is an important topic to investigate, given the lagging levels of productivity growth in the region. If

management practices can boost firms' productivity, this may be a cost-effective way to accelerate economic growth. The results show that improved management practices are associated with higher levels of productivity in all countries, and it is the impact of improved management specifically in larger firms that is driving the overall results. Indeed, in some countries, specifically Argentina, Paraguay, and Peru, it is only among larger firms that there is a positive link between management practices and productivity.

This paper is a product of the Global Indicators Group, Development Economics. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/research>. The authors may be contacted at mhyland@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Are Management Practices Failing or Aiding the Private Sector in South America?¹

Marie Hyland, David C. Francis and Jorge Rodriguez Meza

JEL codes: L2, M2, O12, D22, D24

Keywords: Management practices; South America; Firm-level analysis; Productivity

¹ *The authors gratefully acknowledge funding from the World Bank Research and Development Center in Chile*

1. Introduction

Economic growth in the Latin America and Caribbean (LAC) region has slowed significantly since the start of the decade. While there is evidence of an uptick in growth since 2017, driven largely by external factors such as improved commodity prices (Vegh et al., 2018), recent projections forecast an annual growth rate of 1.9 percent for 2018, which is below that of the region's major trading partners—the US and EU, and indeed is below the global average. If this pattern continues going forward, the region's share in the global economy is forecast to decline. What is at the root of this problem? Low productivity growth in addition to low levels of capital accumulation have been highlighted as the principal explanations for the region's poor economic progress (see, for example, Crespi and Zuniga (2012), Pagés (2010) and IDB (2018)). Indeed, the possible causes underlying low productivity in the region are numerous; a recent report by the Inter-American Development Bank (IDB, 2018) notes that factors such as tax administration, labor regulations, and a lack of innovation may all contribute to the problem. What kind of policies could be implemented to boost productivity? While regulatory and institutional reform have an important role to play, in this research we consider policies at the firm level. In the past decade, a growing body of evidence has emerged, pointing to the strong impact that improved management practices can exert on firm-level productivity. It is this link—that between management practices and productivity—that we focus on in this paper, using data from recent Enterprise Surveys of seven countries in the region, namely Argentina, Bolivia, Colombia, Ecuador, Paraguay, Peru and Uruguay.

While acknowledgment of the link between management practices and productivity has been gaining ground in the past decade or so, the concept is not new. Indeed, as far back as the mid-1980s, Gershenberg (1986) noted a shift in focus among policy makers and economists away from the roles that only capital and labor may play in increasing output in less-developed economies, and towards the recognition of the role that management may play in boosting productivity. Much of the more recent research in the area has been pioneered by Bloom and Van Reenen. As outlined in their seminal paper on the topic (Bloom and Van Reenen, 2007), the authors developed a survey instrument to systematically measure management practices of 732 medium-sized manufacturing firms in France, Germany, the United Kingdom and the United States. Their results show that better management practices are associated with higher productivity, profitability and firm survival. Another interesting result that emerges from their analysis is that the management practices of firms in the United States are superior to those in the other countries. However, in all countries there is significant heterogeneity among firms, with a tail of

relatively-poorly managed firms being present in each. The authors find that two factors that have an important impact on management practices are competition and family ownership of firms.

In a subsequent paper, Bloom and Van Reenen (2010), the authors study more closely the drivers of the differences in management practices. Extending their analysis to cover 17 countries across the globe, including both developed and developing countries, the authors confirm their earlier results that better managed firms perform better. Among this expanded group of 17 countries, firms in the US still score the highest, whereas firms in southern Europe (Greece and Portugal) and in developing countries (Brazil, China and India) have, on average, the most poorly-managed firms. The authors find that the following factors contribute towards poor management practices: low product market competition, family ownership, labor market regulations, human capital (education of both managers and workers), and barriers to information that slow the diffusion of improved management practices. The fact that firms in the US are found to have better management practices has important implications for aggregate patterns of productivity growth, as shown in Bloom, Sadun and Van Reenen (2012). The authors find that better management practices account for approximately half the difference in productivity growth between US and EU firms in the 10 years after 1995.

In addition to the positive link between management practices and firm performance, Bloom et al. (2010) find positive impacts for the environment also—better managed firms in the UK are, in addition to being significantly more productive, significantly less energy intensive. However, more recent research by Boyd and Curtis (2014), has shown that the relationship between management and energy intensity is more nuanced in the US, and that a higher “generic” management score does not necessarily imply improved energy performance.

While much of the data on firms’ management practices relate to firms in developed economies, the impact of management practices has been shown to be significant in the developing world also. Bloom et al. (2010) consider the factors that impede the productivity of firms in the developing world and find that poor management practices, a lack of access to finance, and a lack of delegation of decision making (whereby owners do not delegate to managers) all contribute to lower productivity. To take a closer look at the link between management practices and firm productivity in the developing world context, Bloom et al. (2013) conducted an experiment in India in which a randomly-selected set of plants were provided with consultancy services on how to improve their management practices. Their results show that these improved practices increased productivity by 17 percent, relative to the control firms, and led these firms to expand their operations. The main mechanisms that the authors cite that boost productivity are

improvements in quality and efficiency, and reduced levels of inventory. Furthermore, the authors note that the main factor that impedes firms from independently adopting better management practices themselves is barriers to information. In a follow-up paper, Bloom et al. (2018), the authors revisited these manufacturing plants in India and found that plants in the treatment group had dropped approximately half of the management practices that had been introduced as part of the experiment due to turnover of key personnel and managerial time constraints. However, nine years after the experiment was initiated, a gap remained between the management practices of treatment and control plants, and, furthermore, treatment plants continued to perform better. Finally, upon revisiting the plants, the authors found that the utilization of improved management practices had spread across plants within the same firm, but not, however, between firms.

In this paper, we focus on management practices of establishments in the LAC region. An earlier analysis of management practices in four countries in this region (namely, Argentina, Brazil, Chile and Mexico) by Lemos and Scur (2012) showed that firms in Latin America employ poor management practices when compared to firms in Europe and Asia. The authors note that one of the primary reasons for lagging managerial practices is the high prevalence of family owned and run firms in the region. Furthermore, the authors confirm that better management practices are linked to improved productivity, both at the firm and the national level. The positive impact of improved management practices on firm performance in the region is confirmed by Bruhn et al. (2018). Based on evidence from a randomized control trial of small and medium-sized enterprises in Mexico, the authors show that firms that were given access to management consultancy services for one year had higher levels of total factor productivity and return on assets. Using administrative data, the authors also show that, five years after the treatment, those firms that had received consultancy services employed significantly more workers; showing that the impacts of improved management practices endure.

In terms of the long-term impacts of management practices on productivity, recent analysis by Giorcelli (forthcoming) confirms what was found by Bloom et al., 2018 and Bruhn et al., 2018—that the positive impacts of improved management practices are long lasting. Studying Italian firms that received funding for management training trips to the US and more technologically-advanced machinery as part of the *Marshall Plan*, the author finds that both interventions (management training and improved machinery) led to increases in productivity, but that the impacts of management training lasted longer. Furthermore, Giorcelli shows that while in the short run, larger firms benefitted relatively more from management training, over time, firms with fewer than 50 employees benefitted more.

Turning to our own results, data from the Enterprise Surveys reveal notable differences between the management practices of establishments within the LAC region. According to our survey data, establishments in Colombia have the most structured management practices in place, while establishments in Bolivia have the least structured practices (Figure 2). The poor management of establishments that we see, on average, in Bolivia appears to be driven, at least in part, by a number of very badly-managed firms, shown by the longer left tail of the distribution for Bolivia (Figure 3); this echoes the results highlighted by Bloom and Van Reenen in their 2010 paper showing that much of the variation between countries in terms of management practices is due to a tail of poorly-managed firms present in some countries. Our results also show that certain establishment characteristics are important predictors of better management; larger establishments, as well as those that export, have higher management scores. Establishments that recruit their manager from outside the establishment (as opposed to those who promote internally), and establishments with formal workforce training programs in place, also have higher management scores. Furthermore, we confirm what was shown in the seminal Bloom et al. (2007) paper—that better management practices are associated with better outcomes. We show that more structured management practices are associated with higher labor productivity and, for a subset of larger manufacturing establishments, higher total factor productivity also. When we break down the results by each individual country, we find notably different impacts across the seven countries studied—for three of the seven countries analyzed (Argentina, Paraguay and Peru), we find no evidence of a positive relationship between management and labor productivity based on the average across all establishments. However, in Argentina and Paraguay, there does appear to be a positive link for establishments of 50 or more employees, while in Peru the data show that establishments must employ at least 100 workers before a significant relationship between management practices and labor productivity can be detected.

We make several distinct contributions to the literature on management practices and productivity. Firstly, while analyses of establishments' management practices have been studied in many countries across the world, in only two of the countries that we study (Argentina and Colombia) can we find evidence of previous research on management practices, and so we are shedding new light on the role of management in five previously unstudied contexts. Secondly, in addition to information on management practices, our data contain detailed information on establishment characteristics, on performance metrics and on the business environment. We can exploit these rich data to more accurately estimate the relationship between management practices and establishments' outcomes, and to test in which contexts management matters most. Finally, the surveys from which our data come are designed to be

representative of each economy's formal private sector, covering establishments with five or more employees, thus our findings are less narrow than many previous analyses, which have tended to focus only on larger manufacturing firms.

The remainder of this paper proceeds as follows: section 2 outlines the methodology used to measure management practices and to analyze the relationship between management and performance; section 3 presents the data and descriptive statistics; section 4 presents the empirical findings; and, finally, section 5 discusses the results and provides some brief concluding remarks.

2. Methodology

2.1 Measuring and scoring management practices

Work to systematically quantify management practices has been pioneered by Bloom and Van Reenen (2007, 2010). The United States Census Bureau adapted the survey questions of Bloom and Van Reenen and in 2010 conducted a wide-scale survey of management practices via the Management and Organizational Practices Survey (MOPS). Based on the MOPS, and in collaboration with Bloom and Van Reenen, these variables have been modified and implemented as part of the standard Enterprise Survey that the World Bank implements throughout the world.

The Enterprise Survey asks about five specific components of management practices, these are as follows: (1) action taken when a problem arose in production or service provision; (2) the number of production or service provision performance indicators monitored; (3) the level of ease or difficulty to achieve production or service provision targets; (4) personnel's knowledge of production or service provision targets; and (5) the basis of managers' performance bonuses. For each component, establishments receive a score between zero and one, where higher scores indicate more structured practices. Take, for example, the component of management practices that examines how establishments respond to problems in production or service provision (action when a problem in production or service provision arose). The least structured practice would be "No action was taken", while the most structured would be "We fixed it and took action to make sure it did not happen again". The individual components can be aggregated into a single average management score, where each establishment's score is an unweighted average of the individual components. A detailed description of how each component was asked and scored can be found in Appendix 1.

2.2 Estimating the relationship between management practices and performance

To test the relationship between establishments' management scores and performance metrics, we run the following OLS regression:

$$y_{i,j,c} = \beta_0 + \beta_{MGT} \cdot MGT_{i,j,c} + \beta \cdot X_{i,j,c} + D_j + D_c + \varepsilon_{i,j,c} \quad (1)$$

Where $y_{i,j,c}$ is the outcome variable—the performance of establishment, i , operating in sector, j , and country, c . In our analysis performance is measured either as an establishment's labor productivity—log of sales per worker, or total factor productivity—the portion of output that is not explained by the amount of inputs used (which, due to data constraints, can be calculated for manufacturing establishments only). $MGT_{i,j,c}$ is the establishment's management practices score, and the coefficient β_{MGT} describes the relationship between management and performance—a positive coefficient indicates that a higher management score is associated with improved performance. $X_{i,j,c}$ represents a vector of establishment-level characteristics that we control for; the variables included in the vector $X_{i,j,c}$ are those that may be related to both management practices and to productivity, and so we include them to disentangle their effects from the impact of management, per se. These are establishment size (measured in terms of the number of employees); exporting status; multinational status; whether the establishment is part of a multi-establishment firm; the establishment's legal status (sole proprietorship, limited liability company, etc.); the top manager's years of experience in the sector; and the gender of the top manager. D_j and D_c represent country and sector dummies respectively and, finally, $\varepsilon_{i,j,c}$ is the error term.

3. Data and descriptive statistics

3.1 World Bank Enterprise Survey data

Our data are from a recent wave of the World Bank Enterprise Surveys (WBES) that were implemented in seven Latin American economies in 2017—Argentina, Bolivia, Colombia, Ecuador, Paraguay, Peru and Uruguay. The WBES are establishment-level surveys of a representative sample of the non-agricultural, non-extractive, formal private economy. The surveys are carried out via face-to-face interviews with owners or top managers of establishments in the manufacturing, services, construction, and transport storage and communications sectors. The surveys, which do not cover informal or micro firms, are carried out using a standardized methodology that ensures representativeness at the country level, and comparability across economies and over time. The WBES covers a wide range of topics including access to finance, corruption, crime, infrastructure, as well as measures of establishments' performance. In recent surveys, several questions have been added to the survey instrument to capture the managerial

practices of establishments; the 2017 data for LAC represent some of the first available results from these newly added questions.

3.2 Description of the sample

As Table 1 shows, establishments differ across the seven countries in many respects. The sample sizes are notably larger in the three largest economies—Argentina, Colombia and Peru, where approximately 1,000 establishments were surveyed. In Argentina, most establishments in the sample are engaged in manufacturing, whereas, in all other economies, the highest proportion of establishments surveyed operate in the other services sector. Establishments are largest (as measured by the number of employees) in Peru, where the average establishment employs 90 workers, and the median establishment employs 20, and smallest in Bolivia (average number of employees is 31, and median is nine). Multinationals have the strongest presence in Ecuador, where 12 percent of establishments are foreign owned, and the weakest presence in Argentina, where only 2.8 percent of establishments are. The most open economy, measured as the proportion of establishments engaged in exporting activity, is Peru where 12 percent of establishments are exporters, whereas the least open economy is Ecuador, where only 3.2 percent of establishments are exporters. Establishments that are part of a larger multi-establishment firm are most prevalent in Colombia (23 percent) and least prevalent in Paraguay (7.5 percent).

The data show heterogeneous levels of female empowerment in the private sector (as measured by the proportion of establishments with a female top manager). In Bolivia, just over 26 percent of establishments are managed by women, whereas only 8 percent of establishments in Argentina are. In Bolivia, establishments are also characterized by highly concentrated ownership structures—here, 45 percent of establishments are sole proprietorships. In Ecuador, on the other hand, in only 1.6 percent of establishments is the ownership concentrated in the hands of a single owner. In all countries, the average establishment employs experienced top managers, with the average number of years of managers' experience being close to, or greater than, 20 years in all countries.

Table 1: Description of the sample

	Argentina	Bolivia	Colombia	Ecuador	Paraguay	Peru	Uruguay
Sample size	991	364	992	361	364	1003	347
Proportion manufacturing (%)	46.64	26.30	29.08	18.49	27.76	43.39	23.07
Proportion retail (%)	16.85	16.96	14.82	21.74	30.09	9.09	28.11
Proportion other services (%)	36.51	56.74	56.10	59.77	42.15	47.51	48.83
Average no. employees	45.28	30.62	54.36	56.17	60.63	89.85	47.22
Median no. employees	14	9	15	15	18	20	14
Proportion foreign owned (%)	2.80	10.23	10.12	11.98	7.65	8.95	9.52
Proportion exporting (%)	6.81	7.49	8.48	3.21	4.59	12.03	10.68
Proportion multi-establishment (%)	10.48	14.88	23.04	11.25	7.47	21.15	15.37
Proportion female managed (%)	7.99	26.31	18.98	22.91	19.59	19.86	10.61
Proportion sole proprietorships (%)	6.26	44.92	4.74	1.62	14.23	9.07	7.90
Average top manager's experience (years)	26.55	20.10	23.95	19.67	22.62	24.19	25.81

Note: Survey weights are applied in the computation of the averages presented above.

3.3 Performance and management

The main metrics we use to measure the performance of the establishments are labor productivity and total factor productivity. Labor productivity represents the monetary value of sales per worker and can be calculated for establishments operating in all sectors. The figures for total factor productivity (TFP), on the other hand, are less intuitive. Our TFP estimates are based on observed monetary values (as opposed to physical units) and are estimated assuming a worldwide common production technology for each 2-digit industry.² The resulting TFP estimates represent the portion of output that is not explained by the amount of inputs utilized and, thus, unlike labor productivity results, TFP estimates are not expressed in monetary terms. TFP may be considered a better measure of efficiency than labor productivity, as it captures the level of efficiency at which all factors of production are utilized to produce output. However, due to the data requirements for the estimation of TFP, it can only be computed for establishments in the manufacturing sector (hence the lower “N” for TFP in Table 2).

Because average productivity figures can be strongly influenced by outliers in the sample, Table 2 below presents both the average and the median values for labor and total factor productivity. Of the seven countries covered, sales per worker are highest in Uruguay, as reflected in both the mean and median

² For an explanation of the TFP estimation using the worldwide Enterprise Survey database see EBRD, EIB, World Bank (2016); page 16.

values. Average labor productivity is lowest in Paraguay, although the median value is lower in Bolivia (where the average is inflated by outliers). In contrast to the figures for labor productivity, mean total factor productivity is highest in Paraguay, although it is third highest here when measured at the median. Average total factor productivity is lowest in Argentina, although the lowest median value is recorded in Bolivia.

Table 2: Productivity by country in 2017

	Argentina	Bolivia	Colombia	Ecuador	Paraguay	Peru	Uruguay
Labor productivity (sales per worker in 2009 US\$) -- all establishments:							
Mean	99,548.50	108,376.60	66,436.85	98,319.01	53,152.62	84,202.32	135,458.40
Median	54,734.67	14,071.38	31,169.38	49,863.20	29,677.77	41,789.34	75,701.70
N	845	287	929	357	312	832	274
Total factor productivity -- manufacturing establishments:							
Mean	2.02	2.34	2.45	2.84	2.91	2.12	2.49
Median	2.08	1.82	2.37	2.57	2.46	2.06	2.86
N	181	53	409	100	39	279	42

Note: Survey weights are applied in the computation of the data presented above

The cumulative distributions of labor productivity (expressed in logs) and total factor productivity are displayed in Figure 1 below. The graph illustrates that there is no clear stochastic dominance among the countries, although the left panel of Figure 1 does show that establishments in Bolivia generally perform poorly in terms of labor productivity, whereas establishments in Uruguay perform well. The right panel of Figure 1 corroborates what was displayed in Table 2—while establishments in Argentina have relatively high labor productivity, their relative performance is less strong according to total factor productivity.

Figure 1: Cumulative productivity distributions

Note: Survey weights are applied in the computation of the data presented above

In section 1, we outlined concerns that have been raised at the macro level that productivity growth has been lagging in the region, and the micro data from the WBES provide further justification of these concerns. Table 3 shows the evolution of labor productivity and total factor productivity across the seven countries covered in our analysis, for the three rounds of WBES data that are available for these countries. While average labor productivity increased from 2006 to 2010, it subsequently declined in 2017; for the median establishment, there was a minor increase between 2010 and 2017. Total factor productivity also increased from 2006 to 2010, but subsequently declined—this holds at both the mean and the median values.

Table 3: Evolution of productivity

	Labor productivity (sales per worker in 2009 US\$)		Total factor productivity	
	Mean	Median	Mean	Median
2006	40,834.38 [37,144.52; 44,524.23]	30,115.93 [27,224.56; 32,333.8]	2.34 [2.22; 2.46]	2.22 [2.04; 2.33]
2010	61,021.07 [40,803.56; 81,238.57]	40,045.05 [35,577.81; 45,986.21]	2.76 [2.59; 2.93]	2.54 [2.38; 2.72]
2017	50,029.06 [42,930.46; 57,127.66]	41,843.06 [38,414.61; 46,530.6]	2.43 [2.26; 2.59]	2.31 [2.13; 2.43]

Notes: Survey weights are applied in the computation of the data presented above. Lower and upper bound 95 percent confidence intervals are presented in brackets.

Turning next to establishments' management practices, the data from the 2017 Enterprise Surveys show that, based on the average management score, establishments in Colombia perform best, while management practices appear to be, on average, worst in Bolivia; this is displayed in Figure 2.

Figure 2: Average management scores presented from best to worst

Note: Survey weights are applied in the computation of the data presented above

The pattern displayed in Figure 2 (Colombia best and Bolivia worst) appears to hold across the distribution of establishments' management, and not just on average, as illustrated in Figure 3 below. The distribution of management practices displayed in Figure 3, confirms a result noted by Bloom and Van Reenen (2007, 2010) that low average management scores at the country level can be driven by poorly performing firms in the left tail of the distribution. The thicker left tail in the distribution for Bolivia is clear in the graph below.

Figure 3: Distribution of average management scores

Note: Survey weights are applied in the computation of the averages presented above.

Turning to the individual management practices, Table 4 shows that, in Colombia, establishments perform relatively well across most components of management measured in the survey. In general, establishments in all countries display high levels of proactiveness when it comes to responding to problems, but poor structures for the allocation of bonuses. Looking specifically at the issue of managers' bonuses, where a higher score is given to establishments where management bonuses are based on the managers' own performance, as opposed to broader company-wide metrics, establishments across the region receive low scores. Indeed, the data show that, on average 67 percent of establishments indicate that they do not pay bonuses to managers.³

³ As noted in Appendix 1, firms who indicated that they did not know what the basis of managers' performance bonuses was are assigned a value of zero—the same value as those firms that indicate that they do not provide bonuses.

Table 4: Average management practice scores by country

	Argentina	Bolivia	Colombia	Ecuador	Paraguay	Peru	Uruguay
Average aggregate score	0.52	0.46	0.59	0.53	0.55	0.56	0.51
Responding to problems	0.73	0.62	0.82	0.81	0.80	0.79	0.78
No. of performance indicators monitored	0.47	0.32	0.55	0.44	0.54	0.48	0.38
Level of difficulty of targets	0.78	0.77	0.74	0.63	0.75	0.82	0.78
Personnel's knowledge of targets	0.42	0.43	0.61	0.59	0.36	0.51	0.48
Basis of managers' bonuses	0.22	0.17	0.21	0.19	0.31	0.20	0.14

Note: Survey weights are applied in the computation of the data presented above

4. Empirical findings

In this section we first consider which establishment characteristics are significant predictors of better management practices, and then examine the relationship between management practices and performance.

4.1 Characteristics related to better management practices

Certain establishment characteristics are consistently associated with better management practices—large establishments, exporting establishments, and foreign-owned establishments have more structured practices in place. These facts are consistent with patterns observed in the US and other countries.⁴ That there is a difference by size category is not surprising as some of the practices measured are more applicable to larger establishments. For example, one could expect smaller establishments to monitor fewer performance metrics and to have less structured forms of incentive pay. Additionally, large establishments are more likely to have access to the necessary resources and to have sufficient scale to enable them to employ better managers. One could also expect foreign-owned establishments to be better managed, firstly, because they are generally larger, and also because, as an earlier study by Bloom and Van Reenen (2010) has shown, when multinational enterprises enter a new country, they often transplant their (better) management practices from abroad. In addition to this, better managed establishments may be more attractive to foreign investors and thus more likely to have become foreign-owned. Similarly, exporting establishments are more likely to implement better management practices

⁴ See, for example, the results presented by Bloom and Van Reenen (2010), Lemos and Scur (2012) and Bloom et al. (2014).

than non-exporting establishments as foreign markets not only expose them to greater competition, but also to greater access to information and practices that can be assimilated into their operations.

Since size, exporting status, and foreign ownership are all likely to be correlated, it is interesting to ask: which establishment characteristics are significant predictors of better management? Columns (1) to (6) of Table 5 below display the relationship between several individual establishment characteristics and average management score, accounting for sector and location of operation. The results in column (7) show which individual characteristics remain significant after taking the other characteristics into account.

Table 5: Determinants of management practices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Y = Management score							
Log(size)	0.0424***						0.0345***
	(0.0031)						(0.0035)
Exporter		0.0008***					0.0004***
		(0.0002)					(0.0002)
Foreign owned			0.0003**				-0.0001
			(0.0002)				(0.0002)
Sole proprietorship				-0.0006***			-0.0002
				(0.0002)			(0.0001)
Offers formal training					0.0008***		0.0004***
					(0.0001)		(0.0001)
Externally-recruited manager						0.0321***	0.0228**
						(0.0101)	(0.0099)
Constant	0.3931***	0.5188***	0.5284***	0.5347***	0.4860***	0.5096***	0.3705***
	(0.0267)	(0.0230)	(0.0230)	(0.0227)	(0.0230)	(0.0241)	(0.0275)
Observations	4,398	4,419	4,418	4,422	4,391	4,387	4,337
R-squared	0.1768	0.1215	0.1078	0.1159	0.1462	0.1127	0.2068
All results include two-digit industry dummies, country and region (within country) fixed effects.							

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

Table 5 confirms that larger establishments have more structured management practices in place (column (1)), a relationship that holds even after accounting for all other characteristics (column (7)). The table also shows that exporting establishments have higher average management scores (columns (2) and (7)). On average, foreign-owned establishments also have higher scores (column (3)), but this relationship is not significant once other variables are accounted for (column (7)), which suggests that it is the other characteristics associated with being foreign owned (such as exporting status, or size), and not the effect of foreign ownership itself, which results in higher management practices among these establishments.

Column (4) of Table 5 shows that sole proprietorships have worse management practices, which is in line with the results of Lemos and Scur (2012, 2018) who find that family-owned firms have significantly lower management scores. Column (5) shows that establishments that offer formal training to their workers, unsurprisingly, have better management practices in place. This echoes the findings of Bloom and Van Reenen (2010) who show that firms that use human capital more intensively (as proxied by more educated workers) are better managed. Interestingly, the significance of the relationship between sole proprietorship and management practices disappears once other characteristics are accounted for, but the relationship between formal training and management is more robust to the inclusion of other controls (column (7)). Finally, column (6) suggests that establishments who recruited their manager from outside the establishment (as opposed to those who promoted internally) have better management practices—a relationship that also holds after controlling for other establishment characteristics (column (7)).

4.2 Management practices and productivity

Across countries in both the developing and developed world, studies have shown that there are positive and significant returns to improved management practices. Furthermore, research by Bloom et al. (2013) has shown particularly strong positive impacts in some developing-world contexts. Our results based on seven countries in Latin America confirm that there is indeed a significant relationship between improved management practices and productivity.

To examine the relationship between management practices and productivity, we estimate the model described in equation (1) on the establishments surveyed; the results of this regression using labor productivity as the outcome variable are presented in table 6 below. Column (1) shows that there is a positive and significant link between an establishment's *average* management score and its sales per worker. It also illustrates which other establishment characteristics are, *ceteris paribus*, associated with higher labor productivity; namely size (bigger establishments have higher labor productivity), foreign ownership, exporting status, and less concentrated ownership structures (relative to sole proprietorships, all other legal forms have higher average labor productivity).

Table 6 also presents the results of the relationship between each of the individual practices and labor productivity. Column (2) of table 6 shows that there is a positive and significant relationship between the component of management practices that describes how establishments respond to problems and labor productivity. On the other hand, the survey data reveal no significant relationship between the number of performance metrics monitored (column (3)), nor the difficulty of targets (column (4)) and labor

productivity—while in both cases the coefficients are positive, they are not statistically significant. However, column (5) shows that the component of management practices that deals with the communication of targets to personnel is significantly associated with higher labor productivity. This suggests that it is not the number, nor the difficulty of targets that motivates workers to achieve better outcomes, but the communication of the targets throughout an establishment's workforce and not just to the upper echelons of management. Finally, column (6) shows that there is no significant link between the basis of managers' performance bonuses and labor productivity. The absence of a link between bonuses and performance is surprising, as previous analyses based on Chinese data by Kato and Long (2006), Lin, Shen, and Su (2011), and Feng, and Johansson (2017) all found a positive and significant relationship between executive pay and firm performance.

Table 6: Determinants of labor productivity

Y = Log (sales per worker)						
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management score	0.537*** (0.205)	0.266* (0.147)	0.0744 (0.116)	0.143 (0.107)	0.287*** (0.0939)	-0.0940 (0.0970)
Log(size)	0.0911*** (0.0352)	0.101*** (0.0338)	0.106*** (0.0340)	0.111*** (0.0338)	0.104*** (0.0341)	0.116*** (0.0342)
Age	-0.000704 (0.00192)	-0.000728 (0.00191)	-0.000919 (0.00191)	-0.000843 (0.00193)	-0.00110 (0.00191)	-0.00103 (0.00191)
Foreign owned	0.00646*** (0.00169)	0.00652*** (0.00169)	0.00643*** (0.00170)	0.00646*** (0.00167)	0.00639*** (0.00163)	0.00642*** (0.00166)
Multi-establishment	-0.104 (0.101)	-0.0984 (0.101)	-0.101 (0.101)	-0.0981 (0.101)	-0.105 (0.0997)	-0.0994 (0.101)
Exporter	0.00584*** (0.00198)	0.00616*** (0.00197)	0.00603*** (0.00200)	0.00605*** (0.00193)	0.00586*** (0.00186)	0.00615*** (0.00194)
Top manager's experience	0.00309 (0.00251)	0.00326 (0.00250)	0.00343 (0.00252)	0.00332 (0.00254)	0.00318 (0.00250)	0.00352 (0.00252)
Female top manager	-0.000211 (0.00101)	-0.000233 (0.00102)	-0.000239 (0.000987)	-0.000330 (0.00101)	-0.000379 (0.000995)	-0.000327 (0.00101)
Legal status (ref cat = sole proprietorship):						
Publicly listed company	0.00638*** (0.00215)	0.00639*** (0.00213)	0.00651*** (0.00215)	0.00647*** (0.00218)	0.00664*** (0.00212)	0.00661*** (0.00215)
Limited Liability Company	0.00730*** (0.00133)	0.00721*** (0.00135)	0.00748*** (0.00133)	0.00741*** (0.00133)	0.00722*** (0.00132)	0.00744*** (0.00134)
Partnership	0.0113*** (0.00262)	0.0109*** (0.00265)	0.0110*** (0.00257)	0.0109*** (0.00268)	0.0111*** (0.00260)	0.0108*** (0.00262)
Limited Partnership	0.00749*** (0.00149)	0.00747*** (0.00152)	0.00774*** (0.00146)	0.00768*** (0.00147)	0.00737*** (0.00144)	0.00771*** (0.00147)
Other	0.00517 (0.00316)	0.00510* (0.00295)	0.00526* (0.00309)	0.00512 (0.00317)	0.00437 (0.00320)	0.00507* (0.00308)

Constant	9.490***	9.518***	9.670***	9.584***	9.629***	9.690***
	(0.209)	(0.216)	(0.204)	(0.236)	(0.209)	(0.211)
Fixed effects	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	3,774	3,774	3,774	3,774	3,774	3,774
R-squared	0.348	0.346	0.344	0.345	0.350	0.344

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

Table 7 below presents the results of the regression of management practices on establishments' total factor productivity and only for manufacturing firms.⁵ Column (1) of Table 7 shows that, on average across all manufacturing establishments, there is no significant relationship between the average management score and total factor productivity. In terms of the other establishment-level characteristics, Table 7 shows that only establishment size is significantly associated with total factor productivity, with larger establishments being more productive. Turning to the individual management practices, column (3) below presents some weak evidence of a negative relationship between the number of performance metrics monitored and total factor productivity, suggesting that more is not always better. On the other hand, column (5) confirms what was shown in Table 6 above, that communicating performance targets throughout the establishment is associated with higher productivity.

Table 7: Determinants of total factor productivity (TFP) in manufacturing establishments

	Y = Total factor productivity					
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management score	0.210	-0.121	-0.205*	0.0842	0.260***	0.115
	(0.211)	(0.141)	(0.108)	(0.130)	(0.0962)	(0.0941)
Log(size)	0.110***	0.124***	0.136***	0.119***	0.107***	0.114***
	(0.0314)	(0.0308)	(0.0310)	(0.0304)	(0.0308)	(0.0309)
Age	-0.000736	-0.000854	-0.00107	-0.000926	-0.000561	-0.000750
	(0.00221)	(0.00220)	(0.00221)	(0.00220)	(0.00220)	(0.00221)
Foreign owned	-0.000205	-0.000245	5.14e-06	-0.000185	-0.000285	-0.000166
	(0.00140)	(0.00140)	(0.00140)	(0.00140)	(0.00140)	(0.00139)
Multi-establishment	-0.162	-0.162	-0.163	-0.163	-0.161	-0.165
	(0.108)	(0.109)	(0.110)	(0.108)	(0.107)	(0.109)
Exporter	0.000459	0.000545	0.000774	0.000549	0.000239	0.000545
	(0.000979)	(0.00103)	(0.00101)	(0.00102)	(0.000981)	(0.00100)
Top manager's experience	-0.00244	-0.00207	-0.00198	-0.00222	-0.00295	-0.00220
	(0.00273)	(0.00271)	(0.00268)	(0.00271)	(0.00270)	(0.00268)
Female top manager	0.00147	0.00151	0.00138	0.00148	0.00139	0.00147
	(0.00110)	(0.00107)	(0.00103)	(0.00109)	(0.00112)	(0.00106)

⁵ Note that Table A.3 in the appendix displays the results of the labor productivity estimation, restricting the sample to only manufacturing firms to ensure comparability with the results displayed in Table 7. The overall patterns do not change from the results for all firms displayed in Table 6.

Legal status (ref cat = sole proprietorship):						
Publicly listed company	0.000498	0.000778	0.000691	0.000687	0.000400	0.000483
	(0.00195)	(0.00195)	(0.00198)	(0.00193)	(0.00207)	(0.00194)
Limited Liability Company	0.00106	0.00118	0.00101	0.00112	0.000851	0.00105
	(0.00124)	(0.00126)	(0.00125)	(0.00123)	(0.00124)	(0.00127)
Partnership	-0.00506	-0.00470	-0.00505	-0.00510	-0.00511	-0.00477
	(0.00307)	(0.00328)	(0.00335)	(0.00312)	(0.00317)	(0.00314)
Limited Partnership	-0.000435	-0.000239	-0.000428	-0.000358	-0.000798	-0.000362
	(0.00118)	(0.00120)	(0.00117)	(0.00116)	(0.00120)	(0.00118)
Other	-0.00100	-0.000924	-0.00179	-0.00106	-0.00183	-0.000994
	(0.00307)	(0.00314)	(0.00323)	(0.00312)	(0.00289)	(0.00313)
Constant	1.802***	1.958***	1.942***	1.814***	1.869***	1.878***
	(0.238)	(0.259)	(0.249)	(0.244)	(0.239)	(0.246)
Fixed effects	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	1,089	1,089	1,089	1,089	1,089	1,089
R-squared	0.801	0.801	0.802	0.800	0.804	0.801

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

It is possible that some of the individual management practices are likely to result in higher levels of productivity in larger establishments only. For example, there may be diminishing returns to the number of performance targets monitored in smaller enterprises; similarly, in smaller enterprises the question regarding the basis of performance bonuses may be less relevant. As such, the relationship between management and productivity is estimated separately for larger establishments (those with 50 or more employees). The results are displayed in Table 8 (which presents an abridged version of the results; the full results tables can be found in Appendix 2); Panel A of Table 8 shows that the relationship between the average management score and labor productivity is stronger for larger establishments (the coefficient on the average management score increases from 0.537 for all firms to 0.735 for large firms, although the difference is not statistically significant at 95 percent confidence level). Looking at the effect of the individual management practices on labor productivity, columns (2) through (6) of Table 5 show no significant effects, although the lack of statistical significance is likely to be due, in part, to a reduced sample size.

Turning to the total factor productivity results for establishments with 50 or more employees, Panel B of Table 8 shows that the effect of the average management score on total factor productivity results is of much greater magnitude for these establishments—the coefficient increases from 0.21 to 0.87 and becomes statistically significant. Furthermore, for this subset of larger establishments, there is a link between total factor productivity and the component of management that measures establishments' response to problems in production, and the component that represents the basis of managers'

performance bonuses. For this sub-sample of larger establishments, however, the relationship between total factor productivity and knowledge of targets, while remaining positive, is no longer statistically significant.

Table 8: The relationship between management practices and productivity in large establishments (50+ employees)

Panel A: Y = Labor productivity						
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management variable	0.735**	0.0373	-0.0384	-0.160	0.378	0.270
	(0.287)	(0.323)	(0.249)	(0.258)	(0.240)	(0.167)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	1,402	1,402	1,402	1,402	1,402	1,402
R-squared	0.307	0.300	0.300	0.301	0.312	0.306
Panel B: Y = Total factor productivity						
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management variable	0.872**	0.603**	-0.0484	-0.146	0.228	0.476***
	(0.357)	(0.242)	(0.173)	(0.186)	(0.164)	(0.144)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	459	459	459	459	459	459
R-squared	0.800	0.799	0.794	0.794	0.796	0.803

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions. All regressions control for establishment characteristics.

The results discussed thus far suggest that improved management practices are associated with higher productivity, and that their impact is concentrated among larger establishments. These are based on combining the data for all countries, which may mask some important differences in how effective these practices can be in different contexts. The seven countries analyzed differ in terms of their level of development (Bolivia, for example, is, according to World Bank classifications, a lower-middle income economy, while Argentina is classified as high income), their industry composition (in Argentina, 46 percent of establishments are engaged in manufacturing; compared to 18 percent in Ecuador where the service industry dominates) and their institutional environments (Peru ranked number 68 out of 190 countries in the 2019 Doing Business report, while Bolivia was much farther down the rankings at 156). All these aspects, as well as many others, could impact the effectiveness of management practices.

Table 9 below considers the relationship between improved management practices and labor productivity in each of the seven countries separately. It shows that a significant relationship exists between the average management score and sales per worker in Bolivia, Colombia, Ecuador and Uruguay. However, in

Argentina, Paraguay and Peru, there is no significant impact of improved management. In terms of total factor productivity, the results are much weaker – there is only a positive and (weakly) significant relationship between management and total factor productivity in Ecuador. However, as total factor productivity is only measured for the manufacturing sector, the sample sizes in Table 10 are small, which may make it difficult to estimate a statistically meaningful effect. In Bolivia, the relationship between management practices and total factor productivity is negative, but this estimate is based on a small sample size (only 52 establishments).

Table 9: Management and labor productivity by country

Y = Labor productivity							
	Argentina	Bolivia	Colombia	Ecuador	Paraguay	Peru	Uruguay
Average management score	-0.155	1.395**	0.728**	1.328**	0.149	-0.0908	1.118**
	(0.320)	(0.564)	(0.325)	(0.540)	(0.408)	(0.303)	(0.472)
Log(size)	0.117**	0.272**	0.0612	-0.00375	0.168***	0.0621	-0.147*
	(0.0580)	(0.136)	(0.0571)	(0.134)	(0.0603)	(0.0515)	(0.0871)
Age	-0.000779	0.00108	0.00605	0.00236	-0.00958**	-0.00770*	0.00290
	(0.00388)	(0.00724)	(0.00391)	(0.00483)	(0.00462)	(0.00456)	(0.00299)
Foreign owned	0.0106***	0.0137***	0.00528**	0.00300	0.00472**	0.00590*	-0.000494
	(0.00371)	(0.00475)	(0.00206)	(0.00196)	(0.00204)	(0.00303)	(0.00232)
Multi-establishment	-0.0214	-0.294	-0.106	0.200	-0.269	0.183	-0.325**
	(0.205)	(0.303)	(0.125)	(0.323)	(0.188)	(0.156)	(0.163)
Exporter	0.00235	0.0150***	0.00319*	0.00364	0.00483	0.00166	0.00809***
	(0.00165)	(0.00419)	(0.00189)	(0.00461)	(0.00354)	(0.00118)	(0.00293)
Top manager's experience	0.00656	-0.00644	0.00262	0.00755	0.00752	0.000836	-0.00441
	(0.00570)	(0.00901)	(0.00504)	(0.00781)	(0.00513)	(0.00554)	(0.00675)
Female top manager	-0.000338	-0.00197	-0.00159	0.00230	3.08e-05	-6.34e-05	-0.00471*
	(0.00165)	(0.00266)	(0.00166)	(0.00171)	(0.00167)	(0.00132)	(0.00254)
Legal status (ref cat = sole proprietorship):							
Publicly listed company	0.00854**	0.0149**	0.00830*	0.00661	0.00146	0.00697***	0.00922*
	(0.00413)	(0.00647)	(0.00469)	(0.00865)	(0.00373)	(0.00263)	(0.00543)
Limited Liability Company	0.00423*	0.0117***	-5.36e-05	0.00981	0.00518**	0.00191	0.00867***
	(0.00235)	(0.00433)	(0.00158)	(0.00834)	(0.00256)	(0.00137)	(0.00262)
Partnership	0.00210	0.0115	0.00585	0.0183*	0.00809	0.00525**	0.0143***
	(0.00536)	(0.0119)	(0.00410)	(0.00953)	(0.00562)	(0.00250)	(0.00286)
Limited Partnership	0.00371	0.00685**	-0.000576	0.00959	0.00339	-0.00102	0.00362
	(0.00232)	(0.00332)	(0.00173)	(0.00838)	(0.00256)	(0.00150)	(0.00276)
Other	0.000357		0.00978***				-0.00280
	(0.00351)		(0.00298)				(0.00315)
Constant	9.732***	7.111***	9.371***	8.403***	8.854***	9.906***	10.08***
	(0.321)	(0.439)	(0.317)	(0.944)	(0.343)	(0.285)	(0.417)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects						

Observations	830	281	920	355	307	818	263
R-squared	0.188	0.687	0.312	0.277	0.272	0.356	0.505

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

Table 10: Management and total factor productivity by country

Y = Total factor productivity							
	Argentina	Bolivia	Colombia	Ecuador	Paraguay	Peru	Uruguay
Average management score	0.211	-2.112*	0.315	0.784*	-1.097	-0.100	1.772
	(0.649)	(1.186)	(0.324)	(0.422)	(1.086)	(0.268)	(1.379)
Log(size)	0.00505	0.448***	0.101**	0.131*	0.120	0.0170	-0.172
	(0.113)	(0.153)	(0.0475)	(0.0709)	(0.131)	(0.0454)	(0.184)
Age	-0.00657	-0.0177	0.00192	0.00142	0.000679	0.00372	-0.00543
	(0.00612)	(0.0138)	(0.00331)	(0.00347)	(0.00956)	(0.00328)	(0.00421)
Foreign owned	0.000963	0.000116	-0.00348*	-0.00291*	-0.00658	0.00215	0.00353
	(0.00384)	(0.00614)	(0.00202)	(0.00151)	(0.00775)	(0.00182)	(0.00316)
Multi-establishment	-0.706**	-0.935*	0.161	-0.121	-0.955**	0.0677	0.197
	(0.271)	(0.476)	(0.140)	(0.237)	(0.435)	(0.143)	(0.434)
Exporter	0.00598*	0.0143	-0.000603	0.00213	0.00310	0.000875	0.00124
	(0.00315)	(0.0165)	(0.00189)	(0.00142)	(0.00448)	(0.00108)	(0.00366)
Top manager's experience	0.00369	0.0337	0.000542	-0.00202	-0.00510	-0.00965**	-0.000723
	(0.00573)	(0.0317)	(0.00412)	(0.00628)	(0.00702)	(0.00428)	(0.0171)
Female top manager	0.00634*	-0.0191**	-0.00103	0.00239	0.00403	0.000363	0.00917
	(0.00337)	(0.00828)	(0.00121)	(0.00175)	(0.00329)	(0.00132)	(0.00555)
Legal status (ref cat = sole proprietorship):							
Publicly listed company	0.00133	0.0245**	0.00119	-0.00663	0.00726	0.000509	-0.00268
	(0.00414)	(0.00905)	(0.00823)	(0.00580)	(0.00619)	(0.00243)	(0.00767)
Limited Liability Company	0.00933***	-0.00196	-0.00208	-0.00371	0.00726	0.000501	0.00262
	(0.00337)	(0.00334)	(0.00171)	(0.00332)	(0.00587)	(0.00172)	(0.00524)
Partnership	0.00143		-0.00628	-0.00249	0.0126		
	(0.00548)		(0.00666)	(0.00481)	(0.00972)		
Limited Partnership	0.00467	-0.000218	-0.000619	-0.00429	0.00469	-0.00130	-0.00748
	(0.00288)	(0.00507)	(0.00197)	(0.00324)	(0.00498)	(0.00204)	(0.00501)
Other	-0.00102		0.000149				
	(0.00452)		(0.00243)				
Constant	1.118***	2.277***	1.769***	1.494***	1.677**	2.816***	3.143***
	(0.310)	(0.434)	(0.272)	(0.366)	(0.628)	(0.421)	(1.026)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects						
Observations	180	52	406	98	38	275	40
R-squared	0.776	0.893	0.841	0.908	0.962	0.813	0.899

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

It is worth investigating further the results for Argentina, Paraguay and Peru where, unlike other countries, there appears to be no relationship between average management scores and labor productivity. A closer inspection of the data reveals that, in these countries, the impact of management practices on labor productivity kicks in once establishments reach a certain size. In Argentina and Paraguay, management practices are significantly related to labor productivity for larger firms (those with 50 or more employees). In Peru, the effect sets in for establishments that are larger still—while there is no relationship between management practices and productivity for establishments with 50 or more workers, there is a positive and significant relationship for establishments employing 100 or more workers; these relationships are displayed in **Error! Reference source not found.**Table 11 below.

Overall, Table 11 shows that the impact of management practices in different sized establishments is not homogenous across the seven countries. While there is a general pattern of better management having a greater impact in larger establishments, the results for the largest establishments are not always statistically significant (likely due to small sample sizes in some countries). Also notable is the negative impact on the largest establishments in Bolivia. However, this result is based on a sample of only 63 establishments. Furthermore, a closer look at this result reveals that the negative effect is being driven by establishments with 100+ employees that are operating in the services sector, of which there are only 29; thus, we would caution against putting too much emphasis on this result.

Table 11: Average management practices and labor productivity regressions, results by size and country

Y = Log (sales per worker)			
	All establishments	50+ employees	100+ employees
Argentina:			
Management score	-0.1552	1.0555**	0.4521
	(0.3201)	(0.4102)	(0.4956)
Observations	830	313	213
Bolivia:			
Management score	1.3954**	-0.6812	-2.1176***
	(0.5644)	(0.8818)	(0.7495)
Observations	281	89	63
Colombia:			
Management score	0.7284**	0.2383	0.6420
	(0.3248)	(0.6446)	(0.6505)
Observations	920	333	199
Ecuador:			
Management score	1.3279**	1.7688	1.4715
	(0.5401)	(1.1223)	(1.2315)
Observations	355	118	73
Paraguay:			
Management score	0.1489	1.1925*	1.1238

	(0.4081)	(0.6600)	(1.1238)
Observations	307	136	94
Peru:			
Management score	-0.0908	-0.0584	1.3459**
	(0.3032)	(0.6178)	(0.5818)
Observations	818	313	205
Uruguay:			
Management score	1.1181**	1.5504**	2.1498**
	(0.4724)	(0.7493)	(0.9753)
Observations	263	100	67

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions. All regressions control for establishment characteristics.

In addition to looking at difference across size and country, it is interesting to consider what other factors may impact an establishment's ability to benefit from improved management practices. **Error! Reference source not found.** Table 12 below shows that the premia associated with improved management differs by the degree of technological or knowledge intensity of the sector in which the establishment operates.⁶ The results show no significant benefit from improved management practices in low-tech sectors, while in medium and high-tech sectors there is a positive and significant relationship between improved management and labor productivity. Considering total factor productivity, it appears that only establishments operating in high-tech sectors benefit from improved management practices, although this result is based on a small sample size (only 39 establishments).

Table 12: Management and productivity, results by degree of technological / knowledge intensity

	Y = Labor productivity			Y = Total factor productivity		
	Low tech	Med tech	High tech	Low tech	Med tech	High tech
Management score	0.2887	1.0963***	2.2762**	-0.0544	0.1696	2.6269***
	(0.2483)	(0.2843)	(1.0712)	(0.2061)	(0.3133)	(0.4846)
Log size	0.1200***	0.1564***	0.1506	0.1601***	0.0400	-0.0747
	(0.0353)	(0.0505)	(0.1636)	(0.0428)	(0.0461)	(0.1023)
Age	0.0002	0.0006	-0.0129	-0.0061**	0.0072*	-0.0219***
	(0.0023)	(0.0030)	(0.0095)	(0.0024)	(0.0038)	(0.0061)
Foreign owned	0.0064***	0.0037	0.0021	0.0005	-0.0001	0.0001
	(0.0019)	(0.0024)	(0.0077)	(0.0017)	(0.0022)	(0.0034)
Multi-establishment	-0.1262	0.1614	-0.2686	-0.2381*	-0.0483	0.7363*
	(0.1033)	(0.1658)	(0.5338)	(0.1339)	(0.2055)	(0.3938)
Exporter	0.0086***	0.0037**	-0.0062	-0.0008	0.0023	0.0040
	(0.0026)	(0.0015)	(0.0042)	(0.0012)	(0.0015)	(0.0032)

⁶ Sectors are classified as technologically or knowledge intensive sectors in accordance with the definition used by Eurostat, which is based on the ratio, at the sector level, of expenditure on research and development (R&D) to value added. For further details see https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:High-tech_classification_of_manufacturing_industries, and [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_\(KIS\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_(KIS)).

Top manager's experience	0.0033	0.0006	0.0094	0.0014	-0.0023	0.0118
	(0.0029)	(0.0045)	(0.0120)	(0.0030)	(0.0050)	(0.0180)
Female managed	0.0002	-0.0028**	-0.0015	0.0009	0.0013	-0.0070**
	(0.0011)	(0.0012)	(0.0077)	(0.0013)	(0.0013)	(0.0031)
Legal status (ref cat = sole proprietorship):						
Publicly listed company	0.0051**	0.0041	0.0387***	0.0011	0.0030	
	(0.0024)	(0.0037)	(0.0039)	(0.0020)	(0.0034)	
Limited Liability Company	0.0074***	0.0027	0.0055	0.0005	0.0019	0.0006
	(0.0015)	(0.0019)	(0.0055)	(0.0014)	(0.0023)	(0.0025)
Partnership	0.0111***	0.0064	0.0028	-0.0075**	-0.0001	0.0073
	(0.0031)	(0.0080)	(0.0164)	(0.0038)	(0.0059)	(0.0044)
Limited Partnership	0.0076***	0.0045***	0.0035	-0.0013	0.0003	
	(0.0017)	(0.0017)	(0.0058)	(0.0013)	(0.0024)	
Other	0.0053	0.0023		0.0061***	-0.0046	
	(0.0049)	(0.0027)		(0.0020)	(0.0032)	
Constant	9.0352***	11.7948***	8.2938***	1.5757***	3.1828***	1.4354
	(0.2662)	(0.3490)	(0.8951)	(0.1908)	(0.4745)	(1.0406)
Observations	2,821	633	165	702	348	39
R-squared	0.3904	0.4198	0.6559	0.8672	0.7710	0.7186
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions.

Another important driver of productivity is innovation, which may be related to management. Indeed, it has been shown by Sadun et al. (2017) that well-managed firms invest more in R&D and hold more patents. In terms of whether management practices may be more or less effective than technological innovations, Giorcelli (forthcoming) shows that in a sample of Italian manufacturing firms, the positive impact of improved management practices was longer-lasting than that of more technologically-advanced equipment, and that improved management and better equipment were in fact complementary. We can compare the relative impacts of improved management practices and innovation by examining both variables in a single model. The results displayed in panel A of table 13 below show that, on average across all firms, both have a positive and significant impact on labor productivity. However, for larger enterprises (those employing 50 or more workers), when we control for management practices and innovation together, only management is significantly linked to higher output per worker. Looking at the impact of both management practices and innovation on total factor productivity, panel B of table 13 shows that, on average across all firms, more innovation is related to higher total factor productivity, but better management is not. However, for larger firms the pattern flips, and it is better management, and not innovation, that is associated with higher total factor productivity.

Table 13: Management, innovation and productivity

	All firms	50+ employees
Panel A: Labor productivity		
Management score	0.459**	0.684**
	(0.206)	(0.278)
Innovation	0.242**	0.186
	(0.0960)	(0.301)
Observations	3,766	1,089
R-squared	0.353	0.802
Panel B: Total factor productivity		
Management score	0.165	0.871**
	(0.212)	(0.355)
Innovation	0.182**	0.00813
	(0.0908)	(0.190)
Observations	1,396	459
R-squared	0.310	0.800

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Survey weights are used in all regressions. All regressions control for establishment characteristics.

4.3 Addressing endogeneity

The results discussed so far account for the sector and location of operation, as well as several establishment characteristics that may be related to both management and performance (such as age, number of employees, foreign ownership, and legal form). However, based on these results it is hard to say whether better management practices lead to more efficient use of resources and, thus, higher productivity, or whether better performing establishments have access to greater resources that enable them to recruit better managers. This can be investigated by looking at the sub-sample of establishments that have externally-recruited managers (i.e., managers who had experience in the sector before joining the establishment), as opposed to those who were promoted to manage from within the establishment. As column (1) of Table 13 shows, externally-recruited managers have higher management scores, even after taking into account sector, location and a range of establishment-level characteristics (this was also shown in Table 5). However, columns (2) and (3) of Table 13 show that having an externally-recruited manager does not lead to greater labor productivity or total factor productivity. This is the first indication that the improved performance of better managed establishments is not due to a link between performance and the ability to recruit better managers from outside the establishment.

Table 14: Effect of an externally-recruited manager on management practices score and productivity

	(1) Y = Management score	(2) Y = Log labor productivity	(3) Y = Total factor productivity
Externally-recruited manager	0.0216** (0.0108)	0.0180 (0.0840)	-0.0340 (0.0821)
Log(size)	0.0393*** (0.00360)	0.111*** (0.0343)	0.120*** (0.0301)
Age	-0.000157 (0.000270)	-0.000781 (0.00203)	-0.00108 (0.00236)
Foreign owned	-4.02e-05 (0.000159)	0.00644*** (0.00166)	-0.000203 (0.00141)
Multi-establishment	0.00696 (0.0117)	-0.0974 (0.101)	-0.158 (0.109)
Exporter	0.000524*** (0.000161)	0.00610*** (0.00194)	0.000558 (0.00102)
Top manager's experience	0.000175 (0.000401)	0.00316 (0.00260)	-0.00175 (0.00296)
Female top manager	-0.000161 (0.000110)	-0.000291 (0.00102)	0.00147 (0.00107)
Legal status (ref cat = sole proprietorship):			
Publicly listed company	4.54e-05 (0.000235)	0.00649*** (0.00217)	0.000600 (0.00193)
Limited Liability Company	0.000208 (0.000157)	0.00742*** (0.00134)	0.00111 (0.00123)
Partnership	-0.000817** (0.000328)	0.0108*** (0.00260)	-0.00487 (0.00312)
Limited Partnership	0.000336** (0.000163)	0.00770*** (0.00146)	-0.000319 (0.00116)
Other	0.000360 (0.000440)	0.00505 (0.00310)	-0.00113 (0.00325)
Constant	0.358*** (0.0293)	9.683*** (0.212)	1.892*** (0.250)
Fixed effects	Two-digit industry dummies, and country and region (within country) fixed effects		
Observations	4,317	3,774	1,089
R-squared	0.196	0.344	0.800
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1			

As an additional check on our results, the analysis is run separately for those establishments with externally-recruited managers, and those establishments without. Figure 4 shows that the effect of management practices on productivity does not differ between those establishments that externally-recruited their managers and those that did not. In terms of the effect on labor productivity (left panel), the impact of management practices is positive in both cases; in terms of TFP (right panel), the impact of management practices is only statistically significant for those establishments that did *not* externally recruit their managers (further evidence that the source of endogeneity that we are concerned about is

not impacting our results), but the difference between the two groups of establishments is not statistically significant.

Figure 4: Relationship between management and productivity, internally- versus externally-recruited managers

5. Conclusions

Despite some promising recent developments in some countries in the region, the fact remains that productivity in South America has not grown at the rates seen in other developing economies; between 1960 and 2017, annual total factor productivity growth in emerging Asian economies was 0.97 percent, while in the LAC region it contracted by 0.11 percent. This has important implications for economic growth and poverty reduction – income per capita in emerging Asian economies increased from 11 to 58 percent of the US level, while in the LAC region, the increase in per capita income relative to the US over the same period was from 20 to 24 percent.⁷ If firms' productivity can be boosted by improved management practices, this may be a cost-effective way of accelerating economic growth and boosting prosperity. Previous studies have shown that improving the management practices of firms in the developing world can have large positive impacts on productivity, and that one reason for which better management practices are not more widely-used is that managers are unaware of them. This suggests that simply

⁷ IDB, 2018.

educating managers on how to improve practices in their firms may have beneficial impacts that extend beyond the firm. Our results show that the most robust relationship between management practices and productivity is in larger establishments; this suggests that, in order to achieve the greatest returns, efforts to improve management practices, specifically the components analyzed here, should focus on larger establishments.

With regards to the smaller establishments—where we find no evidence that improved management practices boost performance, we may need to consider alternative metrics of managerial capacity. Research by McKenzie and Woodruff (2015) found that when alternative measures of managerial practices were used (including, marketing practices, stock keeping and financial planning), a significant relationship between management in micro and small firms and their performance did indeed exist. Furthermore, an evaluation of the effectiveness of managerial training programs in enterprises with fewer than 50 employees, carried out by Campos et al. (2017) in Togo, showed that while a traditional training program had no impacts on performance, a psychology-based personal initiative training program increased firm profits by 30 percent. Further evidence of the need to think beyond standard interventions when it comes to small firms is provided by Brooks et al. (2018), who found that for female microentrepreneurs in Kenya, whereas a formal management training program had no impacts on profitability, mentoring by an experienced entrepreneur from a woman's own community increased the profitability of microenterprises by, on average, 20 percent. Thus, an emerging body of evidence points to the fact that while standard management practices may be associated with performance in larger enterprises, there is a need to be more innovative when thinking about how improvements in management practices may boost the performance of smaller enterprises.

A final conclusion that can be drawn from our results, and which is supported by a wider body of evidence, is that when considering the impacts of managerial practices on firm performance, context matters—not all management practices can be expected to be equally effective in all settings. Our results show that across different countries within the same region, the returns to improved management practices are highly heterogeneous. This may suggest that the institutional environments in which firms operate impacts the efficacy of managerial practices, a finding which merits further investigation in future work.

References

- Bloom, N., Brynjolfsson, E., Foster, L., Jarmin, R., Patnaik, M., Saporta Eksten, I. and Van Reenen, J., 2014. IT and Management in America. CEPR Discussion Paper No. DP9886
- Bloom, N., Eifert, B., Mahajan, A., McKenzie, D. and Roberts, J., 2013. Does management matter? Evidence from India. *The Quarterly Journal of Economics*, 128(1), pp.1-51.
- Bloom, N., Mahajan, A., McKenzie, D. and Roberts, J., 2010. Why do firms in developing countries have low productivity? *American Economic Review*, 100(2), pp.619-23.
- Bloom, N., Mahajan, A., McKenzie, D. and Roberts, J., 2018. Do management interventions last? evidence from India. The World Bank.
- Bloom, N., Sadun, R. and Van Reenen, J., 2012. Americans do IT better: US multinationals and the productivity miracle. *American Economic Review*, 102(1), pp.167-201.
- Bloom, N. and Van Reenen, J., 2007. Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122(4), pp.1351-1408.
- Bloom, N. and Van Reenen, J., 2010. Why do management practices differ across firms and countries? *Journal of Economic Perspectives*, 24(1), pp.203-24.
- Brooks, W., Donovan, K. and Johnson, T., 2018. Mentors or Teachers? Microenterprise Training in Kenya. *American Economic Journal: Applied Economics*, 10(4), pp. 196-221.
- Campos, F., Frese, M., Goldstein, M., Iacovone, L., Johnson, H. C., McKenzie, D. and Mensmann, M., 2017. Teaching personal initiative beats traditional training in boosting small business in West Africa. *Science*, 357(6357), pp. 1287-1290.
- Crespi, G., & Zuniga, P., 2012. Innovation and productivity: evidence from six Latin American countries. *World Development*, 40(2), pp. 273-290.
- European Bank for Reconstruction and Development, European Investment Bank, and The World Bank (2016). *What's Holding Back the Private Sector in MENA? Lessons from the Enterprise Survey*. Washington, DC: The World Bank.
- Feng, X. and Johansson, A.C., 2017. CEO incentives in Chinese state-controlled firms. *Economic Development and Cultural Change*, 65(2), pp.223-264.
- Gershenberg, I., 1986. Labor, Capital, and Management Slack in Multinational and Local Firms in Kenyan Manufacturing. *Economic Development and Cultural Change*, 35(1), pp.163-178.
- Giorcelli, M., forthcoming. The Long-Term Effects of Management and Technology Transfers. *The American Economic Review*.
- IDB, 2018. A mandate to grow: 2018 Latin American and Caribbean Macroeconomic Report.
- Kato, T. and Long, C., 2006. Executive compensation, firm performance, and corporate governance in China: Evidence from firms listed in the Shanghai and Shenzhen Stock Exchanges. *Economic development and Cultural change*, 54(4), pp.945-983.

Lemos, R. and Scur, D., 2012. Management practices, firm ownership, and productivity in Latin America. CAF Working Paper No. 2012/07.

Lemos, R. and Scur, D., 2018. All in the Family? CEO Choice and Firm Organization. CEP Discussion Paper No 1528.

Lin, C., Shen, W. and Su, D., 2011. Executive pay at publicly listed firms in China. *Economic Development and Cultural Change*, 59(2), pp.417-436.

McKenzie, D. and Woodruff, C., 2016. Business Practices in Small Firms in Developing Countries. *Management Science*.

Pagés-Serra, C., 2010. The Age of Productivity: Transforming Economies from the Bottom Up (No. 31278). Inter-American Development Bank.

Sadun, R., Bloom, N. and Van Reenen, J., 2017. Why Do We Undervalue Competent Management? *Harvard Business Review*, September-October issue, pp.120–127.

Vegh, C. A., Vuletin, G., Riera-Crichton, D., Friedheim, D., Morano, L. and Camarena, J. A., 2018. Fiscal Adjustment in Latin America and the Caribbean: Short-Run Pain, Long-Run Gain? LAC Semiannual Report; April 2018. Washington, DC: World Bank. World Bank.

Appendix 1: Scoring management practices

The Enterprise Surveys ask questions on five separate components of management practices.

Component 1: Responding to problems

Question: Over the last complete fiscal year, what best describes what happened at this establishment when a problem in the production process or provision of services arose?

Response	Score
We fixed it but did not take further action	0.333
We fixed it and took action to make sure it did not happen again	0.667
We fixed it and took action to make sure that it did not happen again, and had a continuous improvement process to anticipate problems like these in advance	1
No action was taken	0
Don't know	0

Component 2: Number of performance indicators monitored

Question: Over the last complete fiscal year, how many production or service provision performance indicators were monitored at this establishment?

Response	Score
1-2 production performance indicators	0.333
3-9 production performance indicators	0.667
10 or more production performance indicators	1
No production performance indicators	0
Don't know	0

Component 3: Level of ease or difficulty to achieve targets

Question: Over the last complete fiscal year, how easy or difficult was it for this establishment to achieve its production or service provision targets? Examples of production or service provision targets are: production, quality, efficiency, waste, on-time delivery.

Response	Score
Possible to achieve without much effort	0.2
Possible to achieve with some effort	0.6
Possible to achieve with normal amount of effort	0.8
Possible to achieve with more than normal effort	1
Only possible to achieve with extraordinary effort	0.4
Don't know	0

Component 4: Personnel's knowledge of targets

Question: Over the last complete fiscal year, who was aware of the production or service provision targets at this establishment?

Response	Score
Only senior managers	0
Most managers and some workers	0.333
Most managers and most workers	0.667
All managers and most workers	1
Don't know	0

Component 5: Basis of managers' performance bonuses

Question: Over the last complete fiscal year, what were managers' performance bonuses usually based on?

Response	Score
No performance bonuses	0
Their company's performance as measured by targets	0.25
Their establishment's performance as measured by targets ⁸	0.5
Their team or shift performance as measured by targets	0.75
Their own performance as measured by targets	1
Don't know	0
Does not apply	0

Note that the question on performance bonuses was asked in two ways: to approximately half of the firms surveyed, the exact options above were presented; whereas, to the remaining firms, a filter question was asked first about whether performance bonuses were used, followed by a second question on the basis of bonuses. This was done to test whether the way in which the question was asked impacted the results. The results show that firms that were not asked the filter question were less likely to indicate "No performance bonuses"; while 75% of firms responded "No" when asked the filter question ("Does this establishment offer performance bonuses to management?"), only 58% responded "No performance bonuses" when the filter question was not posed.

While our baseline results are based on assigning a score of zero to those firms who answer "Don't know", all our results are robust to coding "Don't know" responses as missing. The results of this robustness test are available upon request from the authors.

Appendix 2: Additional results

Table A.1: Management practices and labor productivity in establishments with 50 or more employees

	Y = Labor productivity					
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management variable	0.735**	0.0373	-0.0384	-0.160	0.378	0.270

⁸ Note that a single company may be comprised of multiple establishments and, thus, a company is a larger entity than an establishment.

Log(size)	(0.287) 0.0852 (0.0895)	(0.323) 0.112 (0.0913)	(0.249) 0.116 (0.105)	(0.258) 0.113 (0.0920)	(0.240) 0.0950 (0.0838)	(0.167) 0.103 (0.0868)
Age	-0.00214 (0.00254)	-0.00221 (0.00252)	-0.00216 (0.00257)	-0.00219 (0.00257)	-0.00191 (0.00266)	-0.00195 (0.00253)
Foreign owned	0.00632*** (0.00191)	0.00660*** (0.00194)	0.00663*** (0.00193)	0.00664*** (0.00192)	0.00631*** (0.00192)	0.00662*** (0.00188)
Multi-establishment	0.284** (0.140)	0.294** (0.143)	0.296** (0.141)	0.298** (0.142)	0.274** (0.134)	0.308** (0.143)
Exporter	0.00287** (0.00129)	0.00318** (0.00132)	0.00323** (0.00130)	0.00320** (0.00133)	0.00292** (0.00131)	0.00311** (0.00131)
Top manager's experience	0.000701 (0.00449)	0.00122 (0.00440)	0.00117 (0.00445)	0.00162 (0.00470)	0.000809 (0.00445)	0.000925 (0.00446)
Female top manager	0.000213 (0.00156)	7.55e-06 (0.00151)	-1.77e-05 (0.00152)	-4.29e-05 (0.00150)	0.000245 (0.00167)	-4.64e-05 (0.00148)
Legal status (ref cat = sole proprietorship):						
Publicly listed company	0.00206 (0.00339)	0.00208 (0.00336)	0.00205 (0.00335)	0.00222 (0.00334)	0.00217 (0.00348)	0.00203 (0.00325)
Limited Liability Company	0.000610 (0.00289)	0.000565 (0.00287)	0.000536 (0.00285)	0.000646 (0.00285)	0.000540 (0.00293)	0.000604 (0.00277)
Partnership	0.00499 (0.00480)	0.00482 (0.00482)	0.00488 (0.00488)	0.00512 (0.00485)	0.00532 (0.00476)	0.00569 (0.00486)
Limited Partnership	0.00234 (0.00318)	0.00223 (0.00316)	0.00220 (0.00312)	0.00230 (0.00317)	0.00204 (0.00319)	0.00247 (0.00310)
Other	-0.00368 (0.00529)	-0.00300 (0.00522)	-0.00282 (0.00522)	-0.00227 (0.00531)	-0.00289 (0.00523)	-0.00193 (0.00517)
Constant	10.43*** (0.586)	10.69*** (0.533)	10.73*** (0.561)	10.82*** (0.496)	10.65*** (0.581)	10.64*** (0.576)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	1,402	1,402	1,402	1,402	1,402	1,402
R-squared	0.307	0.300	0.300	0.301	0.312	0.306

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A.2: Management practices and total factor productivity in establishments with 50 or more employees

	Y = Total factor productivity					
	(1) Average score	(2) Response to problems	(3) No. of metrics monitored	(4) Difficulty of targets	(5) Knowledge of targets	(6) Basis of bonuses
Management variable	0.872** (0.357)	0.603** (0.242)	-0.0484 (0.173)	-0.146 (0.186)	0.228 (0.164)	0.476*** (0.144)
Log(size)	-0.0693	-0.0495	-0.0214	-0.0221	-0.0393	-0.0293

Age	(0.0572)	(0.0591)	(0.0613)	(0.0620)	(0.0615)	(0.0611)
	-0.00202	-0.00267	-0.00241	-0.00236	-0.00226	-0.00202
	(0.00236)	(0.00223)	(0.00234)	(0.00233)	(0.00232)	(0.00242)
Foreign owned	-0.000539	-0.000282	-0.000138	-0.000127	-0.000257	-0.000176
	(0.00164)	(0.00165)	(0.00169)	(0.00167)	(0.00164)	(0.00160)
Multi-establishment	-0.159	-0.155	-0.142	-0.140	-0.138	-0.143
	(0.140)	(0.140)	(0.135)	(0.138)	(0.135)	(0.147)
Exporter	0.00101	0.00125	0.00126	0.00112	0.000962	0.00111
	(0.00134)	(0.00131)	(0.00134)	(0.00136)	(0.00137)	(0.00139)
Top manager's experience	-0.00509	-0.00489	-0.00470	-0.00433	-0.00543	-0.00453
	(0.00415)	(0.00404)	(0.00397)	(0.00411)	(0.00406)	(0.00414)
Female top manager	-0.000504	-0.000642	-0.000464	-0.000636	-0.000648	-0.000681
	(0.00175)	(0.00186)	(0.00182)	(0.00180)	(0.00181)	(0.00170)
Legal status (ref cat = sole proprietorship):						
Publicly listed company	-0.00425	-0.00512	-0.00431	-0.00433	-0.00409	-0.00382
	(0.00354)	(0.00356)	(0.00362)	(0.00359)	(0.00361)	(0.00347)
Limited Liability Company	-0.00273	-0.00327	-0.00268	-0.00266	-0.00252	-0.00225
	(0.00255)	(0.00246)	(0.00254)	(0.00251)	(0.00257)	(0.00248)
Partnership	-0.0108***	-0.0121***	-0.0111***	-0.0107***	-0.0105***	-0.00862**
	(0.00367)	(0.00341)	(0.00354)	(0.00350)	(0.00377)	(0.00342)
Limited Partnership	-0.00676**	-0.00768***	-0.00701**	-0.00682**	-0.00683**	-0.00526*
	(0.00289)	(0.00283)	(0.00294)	(0.00288)	(0.00291)	(0.00280)
Other	-0.00493	-0.00647*	-0.00416	-0.00370	-0.00405	-0.00199
	(0.00337)	(0.00338)	(0.00336)	(0.00337)	(0.00337)	(0.00333)
Constant	2.793***	2.833***	3.199***	3.293***	3.094***	2.944***
	(0.480)	(0.489)	(0.413)	(0.431)	(0.424)	(0.410)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	459	459	459	459	459	459
R-squared	0.800	0.799	0.794	0.794	0.796	0.803

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A.3: Management practices and labor productivity in manufacturing firms

	Y = Labor productivity					
	(1)	(2)	(3)	(4)	(5)	(6)
	Average score	Response to problems	No. of metrics monitored	Difficulty of targets	Knowledge of targets	Basis of bonuses
Management variable	0.847*** (0.230)	0.522*** (0.175)	0.148 (0.116)	0.252** (0.127)	0.258*** (0.0922)	0.102 (0.123)
Log(size)	0.173*** (0.0342)	0.183*** (0.0345)	0.196*** (0.0342)	0.205*** (0.0335)	0.202*** (0.0334)	0.202*** (0.0335)
Age	-0.00471** (0.00196)	-0.00477** (0.00198)	-0.00534*** (0.00195)	-0.00556*** (0.00192)	-0.00540*** (0.00192)	-0.00542*** (0.00190)

Foreign owned	0.00363*** (0.00122)	0.00386*** (0.00126)	0.00355*** (0.00120)	0.00397*** (0.00118)	0.00361*** (0.00121)	0.00377*** (0.00120)
Multi-establishment	-0.0180 (0.0979)	-0.00805 (0.0966)	-0.0280 (0.101)	-0.0310 (0.101)	-0.0228 (0.101)	-0.0285 (0.101)
Exporter	0.00285*** (0.000957)	0.00333*** (0.000964)	0.00317*** (0.00100)	0.00322*** (0.000952)	0.00306*** (0.000949)	0.00327*** (0.000961)
Top manager's experience	0.00498* (0.00286)	0.00528* (0.00286)	0.00549* (0.00289)	0.00546* (0.00290)	0.00533* (0.00286)	0.00571** (0.00286)
Female top manager	-0.00209* (0.00111)	-0.00211* (0.00108)	-0.00219** (0.00111)	-0.00228** (0.00114)	-0.00231** (0.00114)	-0.00229** (0.00112)
Publicly listed company	0.00697*** (0.00225)	0.00702*** (0.00223)	0.00741*** (0.00224)	0.00735*** (0.00226)	0.00745*** (0.00228)	0.00719*** (0.00227)
Limited Liability Company	0.00348*** (0.00130)	0.00357*** (0.00131)	0.00390*** (0.00131)	0.00375*** (0.00132)	0.00364*** (0.00132)	0.00375*** (0.00133)
Partnership	0.00400 (0.00364)	0.00377 (0.00377)	0.00384 (0.00360)	0.00311 (0.00369)	0.00384 (0.00367)	0.00373 (0.00370)
Limited Partnership	0.00287** (0.00124)	0.00294** (0.00124)	0.00335*** (0.00126)	0.00313** (0.00127)	0.00299** (0.00126)	0.00318** (0.00125)
Other	0.00423 (0.00277)	0.00411 (0.00285)	0.00473* (0.00278)	0.00425 (0.00294)	0.00373 (0.00270)	0.00417 (0.00276)
Constant	9.835*** (0.195)	9.792*** (0.206)	10.10*** (0.174)	9.975*** (0.188)	10.09*** (0.177)	10.16*** (0.173)
Fixed effects:	Two-digit industry dummies, and country and region (within country) fixed effects					
Observations	1,915	1,915	1,915	1,915	1,915	1,915
R-squared	0.505	0.503	0.494	0.496	0.499	0.494

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1