American Economic Journal: Macroeconomics 2026, 18(2): 429–456
https://doi.org/10.1257/mac.20220034

Management and Misallocation in Mexico[†]

By Nicholas Bloom, Leonardo Iacovone, Mariana Pereira-López, and John Van Reenen*

Using comprehensive administrative management surveys from Mexico and the United States, we document large management gaps between the two countries, driven by both lower average management quality among Mexican firms and greater misallocation. Compared with the United States, Mexico displays a weaker link between firm size and management quality, especially in the distorted service sector. The size-management gradient is weakest in smaller markets—services in low-population-density regions and manufacturing in locations farther from the United States. It is also attenuated in areas with weaker institutions, including poor contract enforcement, high crime, corruption, and informality. (*JEL* D22, D24, L25, L60, L80, M10, O14)

Economists have long been interested in firms' management and organization as key drivers of productivity and growth. Adam Smith's pin factory focused on the impact of organizational specialization on productivity, while Walker (1887) claimed the single largest driver of business performance was management quality.[1] While this interest in management faded after the 1930s, there has been a resurgence of interest in the last decade, driven by the recent availability of microdata

*Bloom: Stanford University (email: nbloom@stanford.edu); Iacovone: World Bank (email: liacovone@worldbank.org); Pereira-López: World Bank and Universidad Iberoamericana (email: mpereiralopez@worldbank.org); Van Reenen: London School of Economics (email: j.vanreenen@lse.ac.uk). Şebnem Kalemli-Özcan was coeditor for this article. We thank the National Institute of the Entrepreneur (INADEM), the Ministry of Finance (SHCP), the National Bank of Foreign Trade (BANCOMEXT), and the National Financing Institute (NAFIN) for leading and funding this survey and for their comments and suggestions. We also thank the National Institute of Statistics and Geography (INEGI) for implementing the survey. We are grateful to Gerardo Durand, Santiago Ávila, Araceli Martínez-Gama, Fernando De Lira, Gabriel Romero, and Natalia Volkow from INEGI for their support with the data use in compliance with the confidentiality requirements set by the Mexican Laws. Bloom and Van Reenen thank the ESRC for funding through POID. Helpful comments have been received from participants in workshops at the American Economic Association, Census Bureau, Empirical Management Conference, Lazaridis School of Business and Economics, LSE, Society for Economic Dynamics conference, and World Bank. In particular, two anonymous referees, Louise Guillouet, and Diego Restuccia. 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. INEGI, Mexico's official statistical authority, operates under a legal framework that ensures data confidentiality, ethical standards, and respondent protection. Its surveys are governed by the Law on the National System of Statistical and Geographical Information, which sets ethical and methodological standards equivalent to those typically ensured through Institutional Review Board (IRB) approval. Consequently, they do not require separate IRB review.

[†]Go to https://doi.org/10.1257/mac.20220034 to visit the article page for additional materials and author disclosure statement(s).

[1] Walker was the founding president of the American Economic Association and ran the 1870 and 1880 census that formed the basis of his views.

on management (Roberts 2018). However, this work has tended to focus mainly on manufacturing firms in developed countries. This paper presents the first large-scale and nationally representative analysis of management practices in a major developing country, Mexico, covering both manufacturing and service sectors.

Our analysis is based on a novel firm-level survey implemented by the National Institute of Statistics and Geography (INEGI). To ensure survey quality and international comparability, the management part of the survey followed as closely as possible (given the English-to-Spanish translation) the US MOPS 2010 and 2015 surveys (Buffington, Hennessy, and Ohlmacher 2018). The survey was then matched to the census administrative data, providing additional and rich measures of performance, demographics, and other firm and area characteristics.

We find more structured management—that is, more systematic collection and use of data through monitoring, goal-setting, and stronger use of incentives in human resource practices (e.g., over hiring, firing, pay, and promotions)—is associated with superior firm performance (in terms of size, sales, productivity, profitability, and innovation) in both manufacturing and services. This result is robust to a wide variety of checks and controls. While this does not imply any causal relationship, it does suggest these management practices are tightly associated with firm-level performance.[2]

We first document that aggregate Mexican management scores, like productivity, are well below those in the United States. We then focus on whether this is driven by greater market frictions, reflected in the fact that well-managed Mexican firms are unable to reap the returns of their managerial practices in terms of greater scale because of these distortions.

To examine this, we performed a number of tests. First, we show that although firms with higher management scores attain larger size in Mexican manufacturing, the size-management relationship is half as strong as it is in US manufacturing. Moreover, the size-management relationship is much weaker among firms in the services sector than among those in the more competitive and open manufacturing sector.[3] Mexican services are more shielded from international competition (especially since Mexico's accession to GATT in 1986 and NAFTA in 1994) and have greater idiosyncratic regulations than manufacturing.[4]

[2] Below, we discuss randomized control trials around introducing more structured management practices that also seem to find significant performance improvements.

[3] In particular, the regression coefficient of firm log (employment) on the management score is 1.62 in Mexican services, 2.75 in Mexican manufacturing, and 3.36 in US manufacturing. Hence, for every 0.1-point change in the management score, the associated change in firm employment size is over twice as large in US manufacturing as it is in Mexican services.

[4] See Goodwin et al. (2018) and Levy (2018). A recent World Bank report assessing the regulations at the subnational level in various Mexican States (e.g., Mexico State, Tabasco, Oaxaca, etc.) found, for instance, that firms in the retail sector face various types of barriers at entry (e.g., municipal licenses for which there are not clearly established time terms and for which the granting criteria are not fully transparent—for instance, the declaration of "urban impact" can take between one month and six years) and during operations (limitations to use of English placards and promotional boards, renovation of licenses, limitations to the hours in which retailers are allowed to be open, etc.). In the transport sector, the report found that the state law in Tabasco does not allow a private company to propose starting a service to serve a new route, only the government can propose a new route and open a market. Similarly, the state law not only prohibits foreign companies from concessions for local transport services, but even favors local companies against those from other states of Mexico—see Goodwin et al. (2018). Duarte and Restuccia (2010) argue that competition is generally lower in services than manufacturing, and this is a reason for slower convergence.

This comparison across countries and broad sectors is suggestive but coarse. Our second test focuses on market size. A wide class of trade and IO models suggests that allocative efficiency improves with integration and market size (e.g., Melitz 2003). We measure market access (trade costs) by drive times to the US border for manufacturing firms, and by income-weighted population density for services firms. We find that proximity to the US border increases the size-management relationship for manufacturing, which relies heavily on exports to US markets, but has no effect in the services sector. We also find that this improvement in allocative efficiency is driven by the manufacturing industries that are more export intensive. For services, we find that local market size strengthens the size-management relationship, whereas this local market-size indicator has no effect on manufacturing firms. Again, this is consistent with our priors, as allocative efficiency among service firms should be affected by local market size and not international market access.

Our final test focuses on institutional frictions. We measure different aspects of institutional frictions relying on data that measures contract enforcement, crime, government corruption, and informality at the local (municipality) level. We find that allocative efficiency is significantly greater where these institutional frictions are lower.

All three designs: across countries and sectors, across market sizes, and across local institutions, suggest that frictions are a major factor in depressing the performance of the Mexican economy by reducing incentives to improve management quality.

The paper is structured with a detailed description of the data in Section I, including some basic results on management practices and firm performance. We discuss the distribution of Mexican management practices and how they compare with the United States in Section II. Section III focuses on misallocation; the different types of distortions leading to misallocation ("wedges"); and the importance of market frictions, international exposure for manufacturing, and market density for services. Section IV concludes.[5]

Relation to Existing Literature.—We contribute to several strands of the literature. First, we add to the vast and rapidly growing literature on misallocation and aggregate productivity, including Hsieh and Klenow (2009). Several recent studies have specifically focused on extensive misallocation in Mexico as a barrier to aggregate productivity (e.g., Hsieh and Klenow 2014; Misch and Saborowski 2020; and Levy 2018). Methodologically, we focus on the covariance between a measure of fundamental firm capability (management quality) and firm size (as indicated by the allocation of labor, a key input). The original "Olley-Pakes" (1996) covariance term (between productivity and market share) has been found to be a robust measure of misallocation in many parts of the literature, although typically, firm capability has been measured by proxies for Total Factor Productivity (TFP). TFP is often hard to measure (it is a residual), and even

[5] Supplemental Appendices include the translated English version of the survey questionnaire (A), Data Details (B), other empirical results (C), a municipality-level analysis (D), and the model (E).

though it is likely to be correlated with fundamental capabilities,[6] this relationship may be weak. In this paper, we draw on the idea in Lucas (1978), defining capability as management and measure it directly. We also present some comparisons between using management and TFPR as alternative proxies for underlying firm capability and find that they both have independent value.

Second, we relate to the literature on the drivers of management practices. One strand of this has focused on the role of competitive frictions. There are a large number of papers pointing to the importance of competitive pressure for productivity (e.g., the survey by Holmes and Schmitz 2010). One of the mechanisms is that a positive impact of competition on productivity may be due to competition increasing management quality (see Leibenstein 1966 and the survey by Van Reenen 2011). Other strands of literature analyzing drivers of management have focused more on information and learning spillovers (e.g., Cai and Szeidl 2018) and regulations (e.g., Bloom et al. 2019).

Third, we contribute to the large and growing literature on the effects of management on productivity. Early studies used cross-sectional, or occasionally panel data (e.g., Black and Lynch 2001; Cappelli and Neumark 2001; Huselid 1995; and Osterman 1994). These studies tend to find positive associations in the cross-sections, but they tend to disappear in the panel dimension. Another group of studies focuses on smaller numbers of firms, sometimes even looking across sites in a single firm.[7] These "insider econometric" studies tend to find more positive effects of management practices. More recent studies have used randomized control trials and (more rarely) quasi-experiments (Giorcelli 2019), which also tend to find positive results.[8] Bruhn, Karlan, and Schoar (2018) is particularly relevant as it focuses on Mexico and finds that firms that received management consulting exhibited a much stronger job growth over the medium term (2–5 years), though they find heterogeneity in the practices that have a high impact on firm performance. The impact of better management may be both on improving overall productivity and by increasing demand, for example, through reducing the cost of improved product quality or marketing, which also plays a key role in driving firm growth (e.g., Hottman, Redding, and Weinstein 2016; Eslava, Haltiwanger, and Urdaneta 2024).

[6] In the model of Hsieh and Klenow (2009), firm-level revenue-based TFP measures (TFPR) are unrelated to fundamental firm capability, quantity-based TFP (TFPQ) due to the inability to observe firm-level prices. In more general models, however, which allow for fixed costs of labor or adjustment costs, there *is* a correlation between TFPQ and TFPR (Bartelsman, Haltiwanger, and Scarpetta 2013; or Asker, Collard-Wexler, and De Loecker 2014). Nonetheless, the empirical and theoretical issues with TFP make more direct measurement attractive, but the evidence comparing these typically finds TFPQ and TFPR are related (e.g., Foster, Haltiwanger, and Syverson 2008).

[7] For example, Bartel, Ichniowski, and Shaw (2007); Bandiera, Barankay, and Rasul (2005, 2007); Hamilton, Nickerson, and Owan (2003) and Lazear (2000). See Bandiera et al. (2020) for a study focusing on CEOs and performance.

[8] Examples of RCTs include Anderson, Chandy, and Zia (2018); Bloom et al. (2013); Brooks, Donovan, and Johnson (2018); Fryer (2017); Gosnell, List, and Metcalfe (2020); Higuchi, Nam, and Sonobe (2017) Higuchi, Mhede, and Sonobe (2019); Iacovone, Maloney, and McKenzie. (2022); Karlan, Knight and Udry (2015); McKenzie and Woodruff (2014). See McKenzie and Woodruff (2017) for a survey.

I. Measuring Management Practices

We start by describing the basic survey process and then validate our management scores by comparing them to firm performance data.

A. *Sample and Survey Process*

Our data comes from the National Survey on Productivity and Competitiveness of Micro-, Small-, and Medium-size Enterprises in Mexico (ENAPROCE 2015, 2018). This is the first large-scale and representative management survey conducted in Mexico. This was implemented by the National Institute of Statistics and Geography (INEGI 2015, 2018), using the 2014 Economic Census as the sampling frame (INEGI 2014). The data was collected by enumerators visiting in person the physical location of each firm in the survey.[9]

The 2015 survey wave had a sample frame of 4,049,051 firms, from which 26,538 were chosen by random stratification (stratified to yield representative coverage of states and industries). From this, a sample of 25,456 firms responded, a response rate of 96 percent. This extremely high response rate was achieved because of the mandatory nature of the surveys implemented by INEGI and repeated in-person visits by enumerators. The second wave of the survey was implemented in 2018 (three years after the first wave). The panel response rate fell to 90 percent, as some of the firms could not be found or were closed.[10]

The management part of ENAPROCE was designed to replicate the US Census Management and Organizational Practices Survey (MOPS).[11] For manufacturing, it was translated directly from English without any modifications. For services,[12] it was slightly adapted to reflect differences in operations—for example, the question about "problems in the production process" was replaced by a question about "problems with customer service" (see Supplemental Appendix A for an English translation of the service questions). The near exact replication maximized the comparability of Mexican management scores to the US MOPS 2010 and 2015 samples. After data cleaning, we end up with a sample of 16,100 firms with 10 or more employees and 8,497 microenterprises with fewer than 10 employees.[13]

For every firm, a management score was constructed following Bloom et al. (2019). The responses for each of the 16 questions included in the management section are normalized to obtain a score that ranges between zero and one, where the more structured management practices (the ones that are more specific, formal, frequent, or explicit) are associated with a value of one, while the less structured practices obtain a value of zero. The responses located between these two extreme values obtain a fraction depending on the number of categories. Once every

[9] For firms with multiple locations, the enumerators would visit the headquarters (note that 90 percent of the firms are single-site).

[10] Among the 4 percent of firms that did not respond in 2015, 2 percent were due to outright refusals and the other 2 percent were due to firms that had closed down. In 2018 half of the firms that did not respond in 2018 had either closed or could not be located by the census enumerators.

[11] See details on US MOPS surveys at https://www.census.gov/programs-surveys/mops.html.

[12] The definition of sectors (manufacturing and services) is shown in Supplemental Appendix B.

[13] See Supplemental Appendix B for further details on the construction of the sample.

question is scored, we calculate an unweighted average of the 16 questions to construct the management score. We also separate the overall management index into two subindexes assessing monitoring practices versus incentives (i.e., those relating to human resources).[14] Our index of structured management practice is not always "better" or "worse," although, as we shall see, they are strongly correlated with a wide variety of performance measures, and in randomized control trials, their adoption improves performance.[15]

For the case of microenterprises, only four questions from the US MOPS were included in the shorter survey form. The correlation between the management score calculated with this subsample of questions and the overall management score for the non-microenterprises sample is 0.86, indicating that this short score is a reasonable approximation for the overall score. To reduce survey burden, we did not ask microenterprises questions on exports and FDI, so the main part of the analysis drops them, but we show robustness to their inclusion in the Supplemental Appendix.[16]

B. *Management and Firm Performance*

As an initial validation of the data, we compare the management scores to a range of firm performance measures. While this analysis is only correlational, it is helpful for establishing that in Mexico (as in the US), these types of practices are associated with better performance. In Figure 1, we pool the data from the 2015 and 2018 surveys[17] and present various measures of performance by deciles of the management score. Moving from the top left to the bottom right panel, we observe that higher management scores are positively associated with greater labor productivity, profitability (as measured by gross operating profits divided by sales), exporting, R&D expenditure per worker, patenting, and size (as measured by the number of employees).

Table 1 presents some initial estimates of performance regressions, where the dependent variable in the first two columns is log(value added per worker). In column 1, we allow the coefficient on management to be different in manufacturing than in services, and although it is positive and significant in both sectors, it appears to be stronger in the former. However, in column 2, where we also control for capital per worker, human capital (the fraction of employees with degrees and the proportion of white-collar workers), a full set of industry dummies (6-digit

[14] In US MOPS, Bloom et al. (2019) found these two subcomponents of the management score were equally informative for productivity and for size. This remains true in Mexican services. However, for Mexican manufacturing, we found some evidence that the monitoring management subindex was more strongly correlated with productivity and size than the incentives subindex. This is consistent with Bloom and Van Reenen (2007), who found that human resources management was less important in lower-skilled sectors (and Mexico, on average, has lower skills than the United States).

[15] See, for example, Bloom et al. (2013); Friebel et al. (2017); Bruhn, Karlan, and Schoar (2018); Gosnell, List, and Metcalfe (2020); Sandvik et al. (2020); Iacovone, Maloney, and McKenzie (2022); and Cai and Wang (2022).

[16] See Supplemental Appendix Table A3 for the correlation between performance and management practices for microenterprises.

[17] The main results use pooled data for the 2015 and 2018 waves of the survey due to the short period of time between the two waves (three years) and the fact that management is highly persistent, as shown in Supplemental Appendix Figure A3. This makes results including firm fixed effects generally unstable as noise in the management variable dominates the signal (see Section IID for a longer discussion of measurement error).

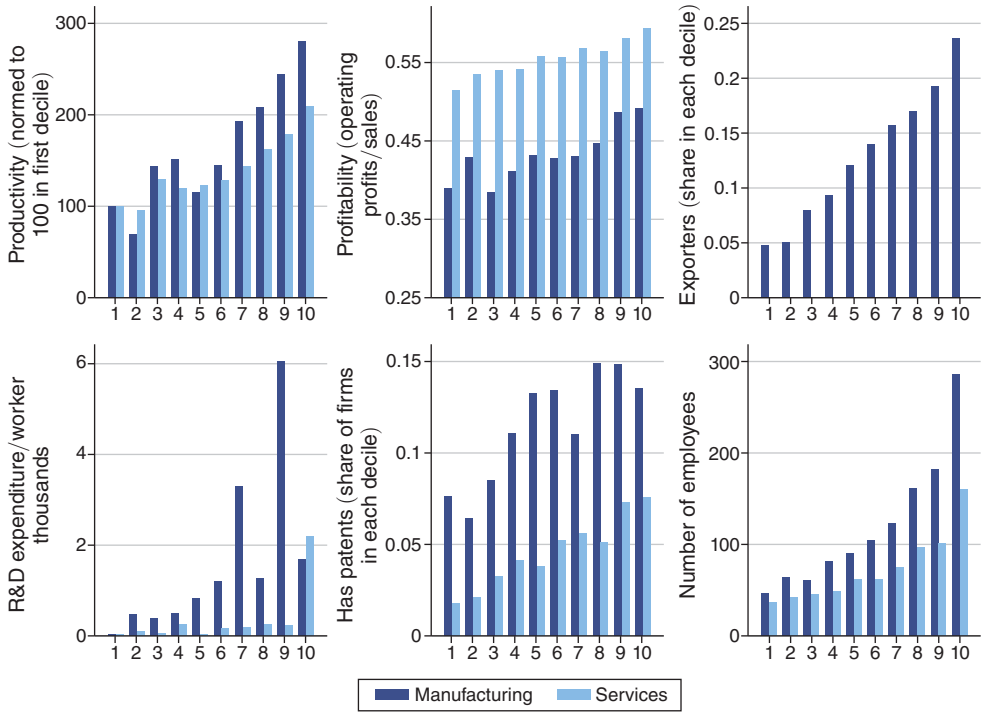

FIGURE 1. FIRM PERFORMANCE AND MANAGEMENT PRACTICES IN MEXICO

Notes: There are 6,643 observations on manufacturing firms and 17,684 observations on service firms. Along the *x*-axis, we measure deciles of the management score.

NAICS), municipality fixed effects, a time dummy, and allow for non-constant returns (by including employment size on the right-hand side), there are no significant differences across the two sectors. Based on the results from column 2, the magnitude of the coefficient of management implies that a movement from the tenth to the ninetieth percentile of the management score is associated with about a 30 percent increase in productivity in both sectors.[18] In column 3, we use Total Factor Productivity (TFPR) as the dependent variable, measured using a Törnqvist index.[19] We again find evidence of a strong and positive relationship between productivity and management practices. Finally, columns 4 and 5 reestimate column 3 but split the sample into manufacturing and services, and confirm that management

[18] If we estimate a regression including fixed effects on the subsample with observations in both waves, the coefficient (standard error) on management falls from 0.377(0.051) in OLS levels to 0.140(0.067) with firm fixed effects. So, although there is still a significant association with fixed effects, it is severely attenuated towards zero.

[19] This is consistent with a translog production function. This is constructed in the same way as Aw, Chung, and Roberts (2000)—see Supplemental Appendix B for more detail. In particular, it is relative to the six-digit industry average for the relevant year.

Table 1—Management Practices and Firm Performance

	Manufacturing and services			Manufacturing	Services
	log(value added per employee)		log(TFP)	log(TFP)	log(TFP)
Dependent variable:	(1)	(2)	(3)	(4)	(5)
Management score	0.9184	0.4937	0.3155	0.2793	0.3155
	(0.1630)	(0.1719)	(0.0806)	(0.0817)	(0.0798)
Manufacturing dummy × management score	0.7992	0.0580	−0.0362		
	(0.2224)	(0.2380)	(0.1205)		
log(capital/employee)		0.1914			
		(0.0159)			
log(employees)		0.2349			
		(0.0335)			
Share white-collar workers		0.0753			
		(0.2539)			
Share of workers with a college degree		0.3661			
		(0.1288)			
Time effects	Yes	Yes	Yes	Yes	Yes
Municipality effects	Yes	Yes	Yes	Yes	Yes
NAICS 6-digits effects	No	Yes	Yes	Yes	Yes
Percent rise from 10th to 90th management percentile					
Manufacturing	120.2	28.9	13.7	13.7	
Services	52.9	25.7	15.7		15.7
Observations	18,251	18,251	18,251	6,598	11,653

Notes: Robust standard errors clustered at the municipality level in parentheses. Other controls included in all columns are municipality effects and a time dummy. Column 2 is a fully-interacted model; that is, it also includes interactions of the manufacturing dummy with all control variables (capital intensity, employees and skills variables, municipality, NAICS 6-digits, and time effects), but these are not shown (so the coefficients are the results for the services sector for these variables). TFP is constructed using a Törnqvist index approach (see Supplemental Data Appendix, section B.3.1). Commerce is excluded as merchandise for resale was not accounted for in the first wave of the survey.

is positively and significantly correlated with productivity in both subsamples with similar coefficients.[20]

In summary, these results show that these management practices are tightly and robustly linked to productivity even when we control for a large range of covariates.[21] Moreover, the relationship in both sign and magnitude looks similar in both the manufacturing and service sectors. While the evidence is not causal, it is consistent with the studies discussed earlier, which rely on more robust identification strategies.

II. Management Practices in Mexico Compared to the United States

We first describe the distribution of management practices and perform basic comparisons with the United States. Then, we analyze misallocation using management as a proxy of firm-level productivity and employment as the key firm size variable.

[20] As a robustness test, we merged our management data with the 2014 Economic Census and constructed the same outcome variables (value added per worker, TFP indexes and profitability), finding very similar results as shown in Supplemental Appendix Table A2.

[21] The analysis of labor productivity for microenterprises (Supplemental Appendix Table A3) shows that management is also informative for these very small firms.

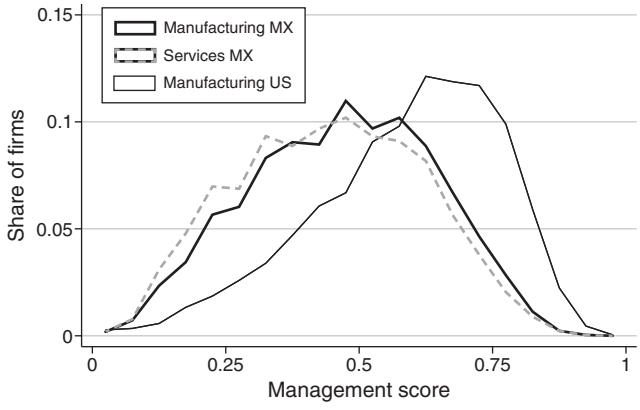

FIGURE 2. MANAGEMENT DISTRIBUTIONS ACROSS FIRMS

Notes: Management score distributions. There are 6,643 observations on Mexican manufacturing firms; 17,684 observations on Mexican services firms; and 32,000 US establishments from Bloom et al. (2019).

A. *The Dispersion of Management Practices across Mexican Firms*

Figure 2 shows how Mexican manufacturing management scores (shown in solid) are more dispersed, a result echoing the wide dispersion of TFP reported for Mexico in Hsieh and Klenow (2014); Levy (2018); and Pages (2010). We also plot the US manufacturing management score (shown in thinner grey), which has both a higher mean (the Mexican mean is 0.47 versus 0.64 for the United States, see Table A1 and Bloom et al. 2019) and a lower variance (the Mexican standard deviation is 0.171 versus 0.152 in the United States). Turning to Mexican services, we find the management score is even lower, with a mean value of 0.44, and marginally more dispersed.[22] This is suggestive of more market frictions in Mexico than in the United States and, within Mexico, relatively greater frictions in services than in manufacturing. One possible explanation is that service sector firms have less exposure to international competition due to lower tradabilty and a greater degree of regulation. Below, we show some evidence consistent with this hypothesis.

If we consider other differences in firm characteristics between the manufacturing and services sectors, we observe that manufacturing companies tend to be larger and older, while workers in the services sector tend to be more educated, with a higher share of workers with a college degree. This is consistent with the analysis of Zahler, Iacovone, and Mattoo (2014) for Chile, in which firms in the service sector tend to be more skill-intensive, while manufacturing firms are larger.[23]

[22] Note there is no US management survey of services; indeed, one of the unique things about the Mexican survey is the coverage of the services sector.

[23] If we split our service sector firms into knowledge-intensive business services (e.g., law, consulting, engineering) and the rest, we find the former comprise 16 percent of firms with almost 60 percent of employees being graduates. In comparison, this is 20 percent of the remaining 84 percent of services, which includes much more traditional activities like retail, wholesale etc.

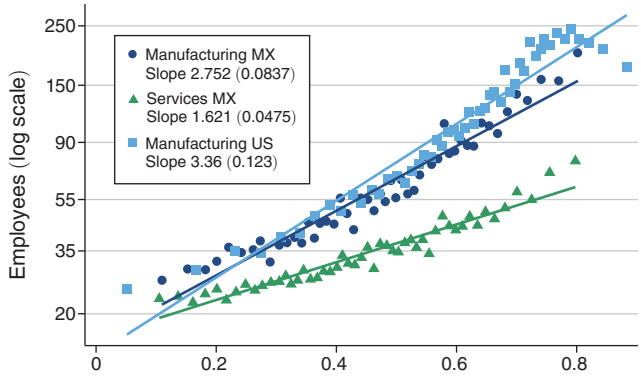

FIGURE 3. REALLOCATION—MANUFACTURING AND SERVICES 2014 AND 2017

Notes: Bin scatter with 50 quantiles from Mexican and US firm-level management data. Lines are OLS regressions for log(employment) on management scores. There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services; and 32,000 US manufacturing plants (Bloom et al. 2019) aggregated into 18,000 firms.

B. *Management and Reallocation across Countries and Industries*

One interpretation of our results so far is that reallocation through market forces is weaker in Mexico than in the United States, especially in the service sector. To investigate this hypothesis, we look at the relationship between firm size and management. In environments where market frictions are lower, we would expect better-managed firms to be relatively larger. We detail a model in Supplemental Appendix E that formalizes this intuition in a simple framework with heterogeneous firms, imperfect product market competition, and regulatory/institutional distortions (modeled as an implicit revenue tax). This delivers the intuitive proposition that firm size (as measured by employment) is increasing with management, but this relationship is attenuated when distortions are higher and/or competition is weaker.

To confront these ideas with the data, Figure 3 presents the size-management relationship in (i) Mexican services, (ii) Mexican manufacturing, and (iii) US manufacturing.[24] The slope of the regression line of ln(employment) on our management index is 3.4 for US manufacturing, 2.7 for Mexican manufacturing, and 1.6 for Mexican services.[25] This is consistent with the strongest allocative efficiency being in US manufacturing, followed by Mexican manufacturing, and the weakest allocative efficiency occurring in the Mexican service sector.

[24] The figure plots a 50-bin scatter for each of these sectors, with the linear regression line coefficients reported below the graph. Because of census and INEGI disclosure rules, individual data points cannot be disclosed.

[25] Administrative data restrictions mean that it is not possible to pool US and Mexican MOPS and estimate a regression to directly the statistical significance of the differences in slope. But we can use the covariance between management and log(employment), as well as the first and second moments of both variables for the US MOPS. We generated 1,000 replications of random simulated data. We confirm that the manufacturing coefficient in the United States is statistically larger than the Mexican Services coefficient in all replications. Additionally, the US manufacturing coefficient on management always surpasses the Mexican management coefficient in manufacturing.

Table 2—Management Practices and Firm Size

	Manufacturing and services		Manufacturing		Services	
Dependent variable = ln(workers)	(1)	(2)	(3)	(4)	(5)	(6)
Management score	1.621	1.334	2.752	2.098	1.621	1.334
	(0.0574)	(0.0511)	(0.133)	(0.0893)	(0.0574)	(0.0507)
Manufacturing dummy × management score	1.131	0.765				
	(0.145)	(0.0966)				
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Municipality effects	No	Yes	No	Yes	No	Yes
NAICS 6-digits effects	No	Yes	No	Yes	No	Yes
Skills control	No	Yes	No	Yes	No	Yes
Observations	24,327	24,327	6,643	6,643	17,684	17,684
R^2	0.169	0.368	0.176	0.420	0.086	0.280

Notes: Robust standard errors clustered at the municipality level in parentheses. All columns include a time dummy. Other controls included, depending on the column, are 6-digit NAICS effects, municipality effects, and skills (measured as the share of workers with a college degree). Column 2 is a fully interacted model; that is, it also includes interactions of the manufacturing dummy with all control variables (skills, municipality, NAICS 6-digits, and time effects), but these are not shown (so the coefficients are the results for the services sector for these variables).

These relationships are confirmed within the Mexican data in a firm-level regression with ln(*Workers*) as the dependent variable (the employment size of the firm). The most general equation we estimate is

$$(1)\quad \log(Workers)_{it} = \beta_1 Management_{it} + \beta_2(Manuf_s \times Management_{it}) + \beta_3 \mathbf{Z_{it}} + \mathbf{\Phi}(Manuf_i \times \mathbf{Z_{it}}) + \delta_s + u_{it},$$

where *Management* is the management score of firm i in year t, *Manuf* is a manufacturing dummy, δ_s are 6-digit NAICS industry dummies and the vector $\mathbf{Z_{it}} = Skills_{it} + \rho_m + \psi_t$ with $Skills_{it} =$ the share of employees with a college degree, ψ_t a time dummy and ρ_m a set of municipality dummies.

Consistent with Figure 3, column 1 of Table 2 shows that the coefficient on management in services is 1.6, while for manufacturing, it is significantly higher at 2.752 ($2.752 = 1.621 + 1.131$). Column 2 controls for education, municipality, industry, and time dummies, and again finds that the interaction of management and manufacturing (β_2) is significantly positive. Columns 3 through 6 repeat the analysis but split the samples into manufacturing and services and confirm the result of a stronger management-size relationship in manufacturing.[26]

[26] Running reverse regressions gives similar results. Additionally, if we construct the "Olley-Pakes" covariance moments specific to each industry (i.e., the covariance of the relative employment share with the relative management score with a NAICS6-year pair), we confirm that the average covariance is significantly larger in manufacturing than in services (p-value = 0.022). As shown in Table 2, the management score has greater explanatory power for manufacturing, as the R^2 is significantly higher—nearly double or 1.5 times larger, depending on the specification—than for services. These R^2 values also exceed those observed when using TFPR as the explanatory variable instead of management (Supplemental Appendix Table A13). Additionally, using a Oaxaca-Blinder decomposition, we find that while managerial differences (endowments) contribute to explaining size differences between manufacturing and services, the returns (coefficients) play a much larger role (Supplemental Appendix Table A14).

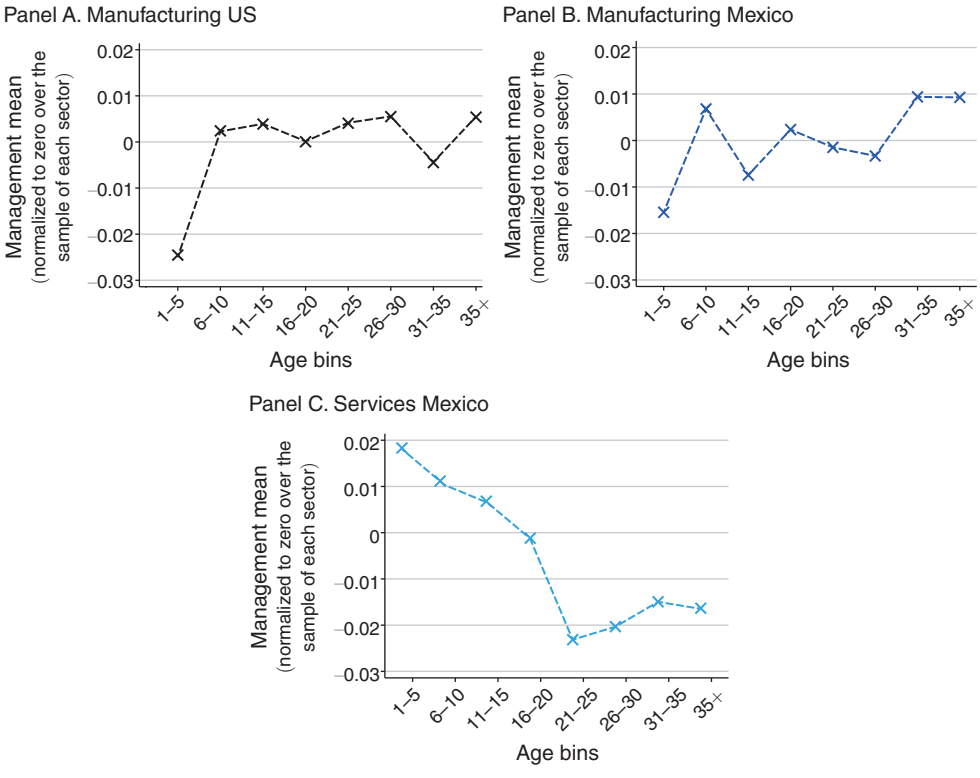

FIGURE 4. AGE AND MANAGEMENT SCORE: MEAN

Notes: The mean and variance of management score as a function of firm age. There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services; and 32,000 US manufacturing plants.

Another piece of evidence pointing to the existence of greater misallocation in Mexico, especially in the services sector, is the relationship between management and firm age that we again show separately for US manufacturing, Mexican manufacturing, and Mexican services in Figure 4.[27] Here, each age bin plots the average management score in deviations from each sample mean. Dynamic reallocation implies that older firms should have higher management scores, as the initially poorly managed firms should have exited the market at a younger age or improved their management quality as they aged. Consistent with this, we see in panel A that older American manufacturing firms have higher management scores, with the implied "shakeout" being particularly strong over the first five years. Similarly, there is an upward slope in panel B between management and age in Mexican manufacturing firms, albeit slightly weaker than in the United States. In principle, this could also be due to learning as

[27] A potential concern about this analysis could be that age might not be a dimension over which the sample of the management survey is representative. Therefore, in Supplemental Appendix Figure A6, we compare the distribution by age of the ENAPROCE sample with the one for the "overlapping sample" from the census (i.e., census firms complying with the restriction on size (over 10 employees) and sectors (mainly dropping government related sectors, education and finance) in our ENAPROCE sample. We find the samples are highly comparable. Furthermore, exit rates are quite comparable between both samples (see Supplemental Appendix Table A5).

firms get better with age. What is striking is that in panel C, there is actually a negative gradient between management scores and age in Mexican firms in the service sector. This suggests the absence of strong selection effects in Mexican services.[28]

Figure 4 is consistent with Hsieh and Klenow (2014), who argue that the size-age relationship is an indicator of greater misallocation in Mexico than in the United States.[29]

A further piece of evidence is shown in Figure 5. If selection is important, we would expect that the variance of management across firms falls in older cohorts, as the worst-managed tail is selected out. This is certainly the case in US manufacturing in panel A, where the standard deviation falls sharply in older age bins. By contrast, in panel B, for Mexican manufacturing, the spread of practices within each age bin is *not* decreasing. Finally, in panel C, for Mexican services, the spread of management practices is actually *rising* with age.

We also consider some more dynamic indicators of misallocation in Supplemental Appendix Table A4, which shows that employment growth (exit) is more strongly positively (negatively) related to management in manufacturing than services. The same stronger dynamic relationship in manufacturing also shows up for productivity, with growth and exit more closely connected for manufacturing than for service sector firms.

To summarize, we have shown that the reallocation of economic activity to better-managed firms appears (i) weaker in Mexico than in the United States and (ii) weaker in Mexican services than in Mexican manufacturing. We see this when looking at the size-management correlation and the relationship between firm age and the first moment (mean) and second moment (variance) of management. We also see this when looking at dynamic moments such as the relationship between exit (or growth) and management.

C. *Misallocation and Aggregate Management*

How much does misallocation matter? We consider a simple semi-parametric re-weighting approach in the style of DiNardo, Fortin, and Lemieux (1996)—henceforth, DFL. Imagine a counterfactual where we "assign" to firms in the services sector the same degree of reallocation as Mexican manufacturing by fixing the firm management score distribution, but reallocating job shares across this distribution to the same extent as exists in manufacturing. Intuitively, since more employment

[28] What might explain the *decrease* in the average management score with age? Lower or no selection in Mexican services might explain the relative flatness of the management-age profile in services compared to manufacturing, but not the reversal in gradient. One possibility is that there are cohort effects whereby younger firms embody more modern management practices. In the absence of selection, older firms would exhibit, on average, worse management scores due to these cohort effects. The greater exit of poorly managed firms overwhelms these cohort effects for manufacturing, but not for services (we show below that there is greater exit for worse-managed service firms in Mexico, but this dynamic selection is weaker than in manufacturing).

[29] It is also consistent with the observation that Levy (2018) makes about observing higher misallocation in the services sector, as the productivity gap for firms within this sector is higher than in manufacturing. Additionally, when we regress the TFP index over age groups, productivity appears to decrease over age groups for services, starting at 16 years of age. This is not the case in manufacturing. See an unconditional depiction of this relationship for both sectors in Supplemental Appendix Figure A9. Similar results are observed for value added per worker in Supplemental Appendix Figure A7. Supplemental Appendix Figures A8 and A10 show the variance of these variables over age groups.

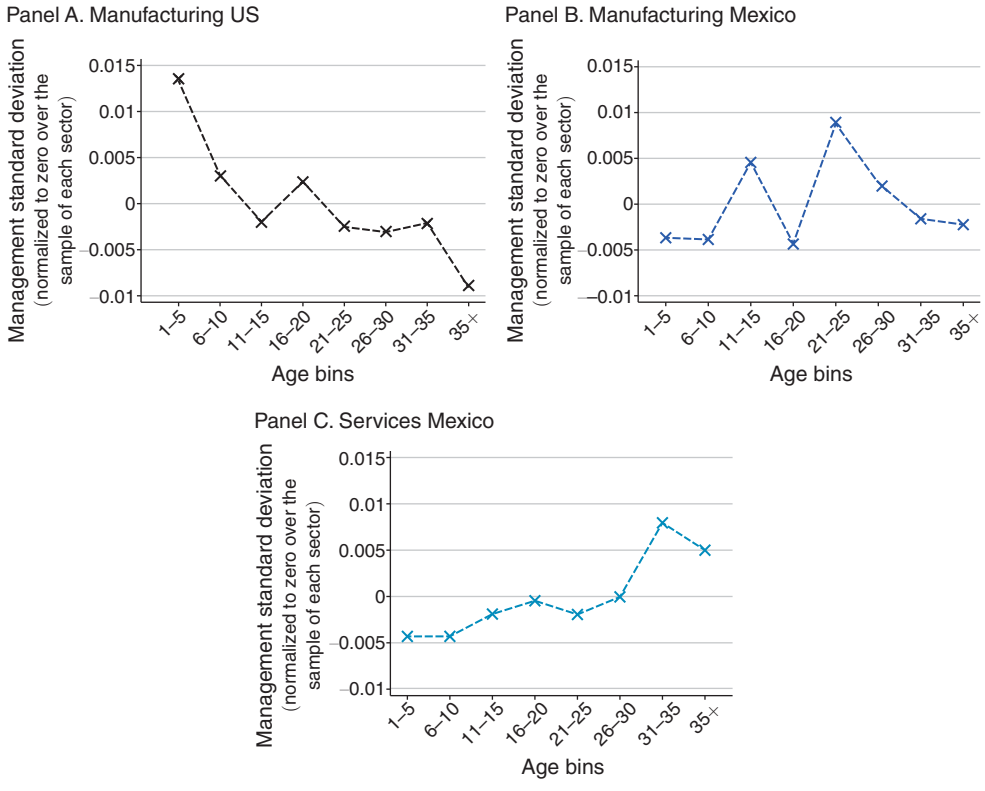

FIGURE 5. AGE AND MANAGEMENT SCORE: SPREAD

Notes: The mean and variance of management score as a function of firm age. There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services; and 32,000 US manufacturing plants.

is allocated to the relatively better-managed firms in the sector, this will raise the size-weighted average management score.

To implement this, we split the services sector into 20 quantile bins and calculate the fraction of employment in the 20 quantiles of the manufacturing firm distribution. The unweighted mean management in the service sector is 0.446, which rises to 0.520 when weighted by firm employment size in services. The difference of 0.074 shows substantial reallocation toward better-managed firms in the service sector, albeit less so than in manufacturing.[30] Re-weighting by manufacturing shares implies an increase in the weighted management score in services of 0.039 (from 0.520 to 0.559). Using results from column 1 of Table 1, such an increase in management is associated with an increase in labor productivity of 3.6 percent or (using the last column of Table 1) an increase in TFP of 1.2 percent. These might seem like small amounts, but consider that the GDP of the Mexican service sector was US$762 billion in 2019. This implies a growth in output of between $27.4 and $9.1 billion due to reallocation. These are, of course, crude calculations rather than a

[30] The equivalent increase between unweighted and size-weighted management mean is 0.091 in manufacturing.

full general equilibrium model (see Bartelsman, Haltiwanger, and Scarpetta (2013), for an attempt in this direction).

D. *Measurement Error in Management as an Explanation of the Results?*

Management is not easy to measure, so a reasonable concern is whether measurement error could be driving our results. If management is measured more accurately in the United States than in Mexico, and more accurately for manufacturing than for services, could this explain the greater explanatory power of management for size? Certainly, measurement error exists. For example, using independent measures of the same US MOPS survey, Bloom et al. (2019) show that around 45 percent of the variance in management score could be measurement error. TFP is also subject to substantial measurement error, of course, with estimates often higher than this. Indeed, one concern with the Hsieh and Klenow (2009) result of greater misallocation outside the United States is related precisely to the fact that statistical standards (i.e., cleaning and imputations) are different in India, China, and Mexico than in the United States.

We doubt that management error can fully explain our results for a number of reasons. In terms of the United States versus Mexico comparison, the wording of the survey tool is identical, and if anything, implementation was stricter in Mexico (face-to-face rather than online). In terms of the services versus manufacturing comparison, again, not only was the survey identical, but also note that the association of productivity with management was statistically the same in services and manufacturing in Table 1. If measurement error in management were greater in services, we would have expected instead the coefficient to be attenuated more toward zero in services.

In the next section, we will use some more refined measurement of frictions, finding direct evidence in favor of variations in frictions explaining these differences in reallocation, making a measurement error explanation of our results more unlikely.

III. Misallocation in Mexico: Frictions and Wedges

A. *Proximity to the US Border*

Why Proximity Matters (for Manufacturing Firms).—One striking finding in the data is the importance of proximity to the United States for the management practices in Mexican manufacturing firms. In particular, panel A of Figure 6 highlights how the US bordering states, which contain *maquiladoras*— the Mexican firms particularly focused on US exports and part of North American value chains—have the highest management scores.

There are several reasons why proximity to the United States might matter. Our main hypothesis is that being closer to Mexico's main export market will expand market size and strengthen competitive pressure on Mexican firms, raising their management quality. In other words, proximity reduces market frictions, raising management through a selection effect (the worst managed firms exit) and potentially an incentives effect (e.g., fear of losing some or all market share increases managerial effort). An implication of this hypothesis is that proximity should matter much more

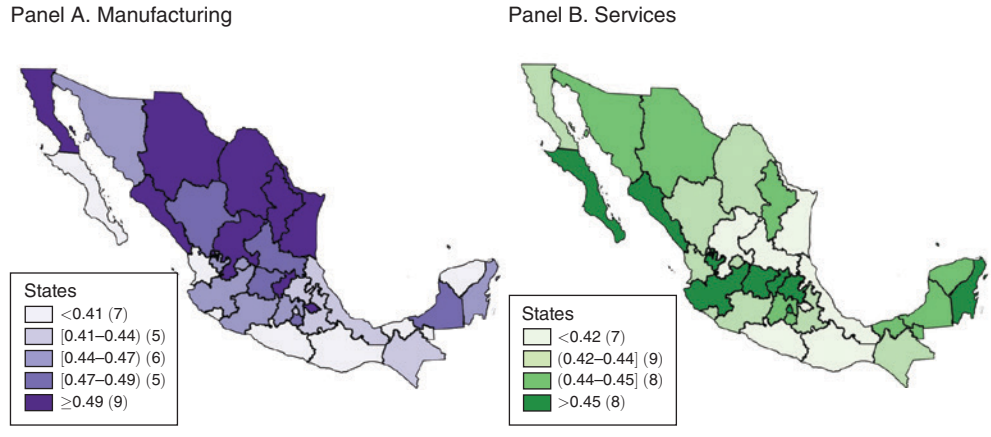

FIGURE 6. MANAGEMENT SCORES BY STATE

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services. Authors' calculations with data from ENAPROCE 2015 and 2018, INEGI.

for firms that are more exposed to international trade with the United States. For example, it should be much stronger for manufacturing firms (which generally trade internationally) than for service firms (which generally trade locally). A corollary of this is that within manufacturing, the proximity effect should be more important for export-intensive industries compared to those that are not so exposed to trade.

An alternative hypothesis on why proximity might matter for management is that being closer to the United States raises management through learning. This might be because of faster flows of information on managerial best practices, and/or through the managerial labor market, with American managers working in Mexican firms. Note that this hypothesis is based primarily on labor markets that are geographical in nature; there is no obvious reason why it should be different for sectors that are more or less exposed to trade. We shall test this idea directly by looking for heterogeneity in the proximity to the US effect across industries with different degrees of international exposure to trade.

A third hypothesis, popular in international economics, is that higher trade with the United States could benefit Mexican firms through the use of higher-quality intermediate inputs (e.g., De Loecker et al. 2016). Consistent with this, we show that all our proximity results also raise productivity. But it is less clear why better intermediate inputs would raise management quality.[31] This is one reason why having access to management data is an advantage over just using productivity data: It enables us to help disentangle the mechanisms through which trade effects on productivity may be occurring.

In panel B of Figure 6, we reproduce panel A for services. In contrast to manufacturing, areas near the United States do *not* have systematically higher management scores. Instead, the service sector shows the highest management scores in locations

[31] Service inputs could help as discussed in the previous mechanism—e.g., easier access to the managerial labor market or better consultants. Trade and management are discussed in more detail in Bloom et al. (2018).

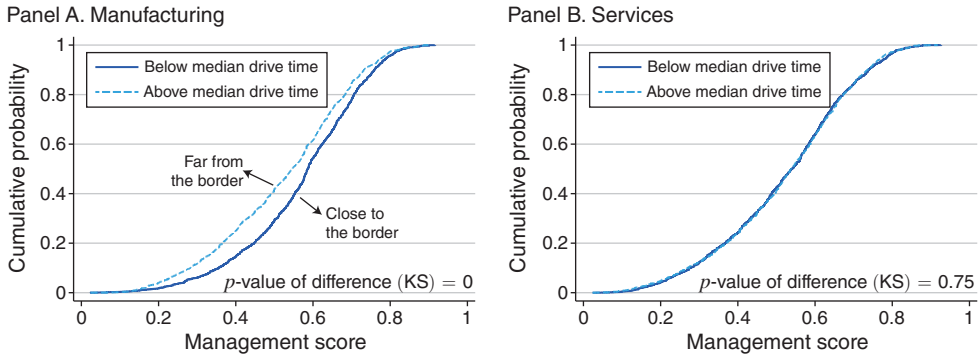

FIGURE 7. CDFs MANAGEMENT SCORE DRIVE TIME TO THE BORDER

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services. CDFs are weighted by firm employment size.

close to the largest Mexican cities (i.e., Mexico City, Guadalajara, Querétaro, and Monterrey). One interpretation of this, which we will pursue in the next subsection, is that it is not a connection with international markets but *local* market size and competition that is much more important for service firms (who typically sell non-tradable outputs and are more locally oriented) than manufacturing firms.

Evidence on Proximity.—To measure the geographical proximity of Mexican firms to US markets, we calculate the drive time, measured in hours, between the municipality where the firm is located and the closest of the three main border crossings between Mexico and the United States (i.e., Tijuana, El Paso, and Nuevo Laredo). Given that the exact location of each firm is not disclosed for confidentiality reasons, we calculate the centroid of each municipality and then calculate the time between this and each of the three border crossings.[32]

Our results indicate that the relationship between management and proximity differs across these two broad sectors, as the drive time to the border matters for firms in manufacturing, but not for those in services. As shown in Figure 7,[33] where we present the CDFs of management across groups of drive time to the border, management score is higher among firms with a drive time to the border below the median, that is, closer to the border.[34]

Figure 8, panel A, shows that although there is a positive relationship between firm size and management, the gradient is steeper for firms closer to the border, indicating stronger forces of selection. The same is not true for services, where the slope

[32] We use Open Street Map to calculate the distances by using the command "osrmtime" in STATA. Similar results can be obtained from using GoogleMaps. An analysis of the municipalities is shown in Supplemental Appendix D.

[33] Figure 7 is weighted by employment size. In Supplemental Appendix Figure A11, we present the unweighted results, which are similar.

[34] We use drive time below the median as our measure of proximity instead of the continuous variables, as it allows us to compare the differences easily and visually between firms closer to the border and the rest. If we use the continuous variable for drive-time, the regression results are very similar (Supplemental Appendix Table A8).

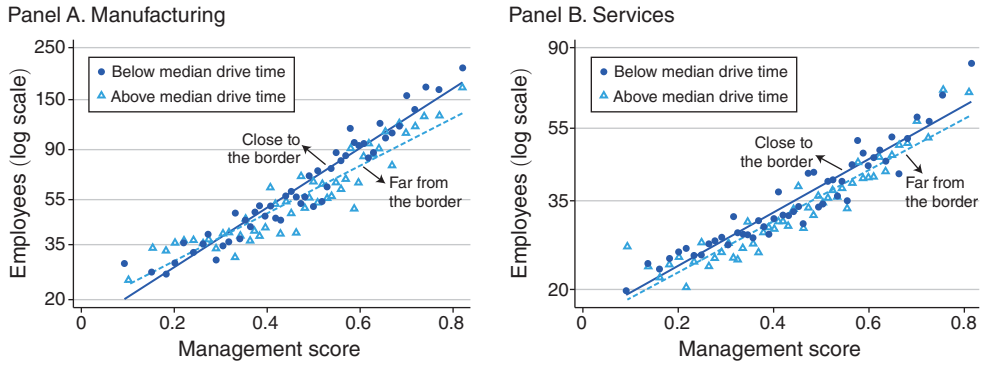

FIGURE 8. SOURCES OF MISALLOCATION: DRIVE TIME TO THE BORDER

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services.

is similar regardless of the distance to the US border. This suggests that proximity to US markets increases both the mean management score and its covariance with size for Mexican manufacturing firms.

We show these results in a regression framework of the following form:

$$(2)\quad \log(Workers)_{it} = \gamma_{1,j} Management_{it} + \gamma_{2,j}(FRICTION_m \times Management_{it}) + \gamma_{3,j}\mathbf{Z_{it}} + \delta_s + u_{it},$$

where $j \in \{Manuf, Services\}$, indicating that we estimate equation (2) separately for the manufacturing and service sectors, and *FRICTION* indicates the type of frictions we are considering, which is an indicator of distance to the US border. In subsequent subsections, we consider alternative measures of friction, such as local market size and institutional barriers (such as contract enforcement). One could consider our estimates of equation (1) in the previous section as a special case of equation (2), where we used the manufacturing versus services contrast (or the United States versus Mexico contrast) as our measure of *FRICTION*.

Column 1 of Table 3 shows that for manufacturing firms located close to the US border, management is positively and highly significantly related to size (as usual). However, we also identify a significantly positive coefficient on the interaction between management and proximity to the border, indicating that the covariance between size and management is much stronger for firms closer to the border. In column 2, we repeat the same specification for service firms, which shows a positive relationship between size and management, but no significant interaction with proximity. This is a placebo test and is consistent with our priors that distance to the US border should not matter for service firms, whose outputs are generally non-tradable.

Column 3 of Table 3 subjects the results to a tougher test. If it really is the closeness to the US export market that drives the results in column 1, we would expect the interaction to be stronger for export-intensive industries. Industries that

Table 3—Sources of Misallocation: Competition and Market Size

	Drive time to the border		Exports and drive time	Market size	
	Manufacturing	Services	Manufacturing	Manufacturing	Services
Dependent variable = ln(workers)	(1)	(2)	(3)	(4)	(5)
Management score × industry export share × drive time below the median			1.970 (1.116)		
Management score	1.775 (0.109)	1.266 (0.0724)	1.544 (0.181)	2.226 (0.183)	1.192 (0.0633)
Drive time below the median × management score	0.469 (0.170)	0.0851 (0.0994)	0.0209 (0.269)		
Management score × industry export share			1.498 (0.822)		
Drive time below median × industry export share			−0.636 (0.562)		
Market size above the median × management score				−0.208 (0.219)	0.324 (0.108)
Time effects	Yes	Yes	Yes	Yes	Yes
Municipality effects	Yes	Yes	Yes	Yes	Yes
NAICS 6-digits effects	Yes	Yes	Yes	Yes	Yes
Observations	6,643	17,684	6,643	6,643	17,684

Notes: Robust standard errors clustered at the municipality level in parentheses. All regressions include NAICS 6-digit effects, municipality effects, and time dummies. Drive time is measured by the distance from the centroid of the firm's municipality to the US border. Market size is income-adjusted population density in the metropolitan area. See Supplemental Appendix B for details.

are not export intensive are more like the service firms in column 2. We build a NAICS 6-digit industry-level indicator of the export share of sales and include the triple interaction of an industry-level variable of export intensity with the management × proximity variable (as well as the pairwise interactions). Consistent with our main hypothesis, there is a positive and (weakly) significant coefficient on this triple interaction.[35]

Supplemental Appendix C investigates a number of robustness tests. For example, we drop all firms owned by foreign companies and further control for interactions between proximity and market size with other variables correlated with management (capital, share of white-collar workers, and education), and the results do not materially change. We also show how closeness to the US border affects unweighted average management practices (reflecting selection on the extensive margin), as shown in Figure 7, as well as discontinuity designs of being right at the border.

B. *Local Market Size*

We have established that the distance to the US market is a factor that matters for management practices of Mexican manufacturing companies and interpreted this as reflecting competitive pressures from the integration with the larger and

[35] We calculate exports at the sector-level variable, as we consider it to be more exogenous. Yet, if we use the firm-level exporter status in the interaction, the results do not change (See Supplemental Appendix Table A10). We discuss additional robustness tests for this variable in Supplemental Appendix C.

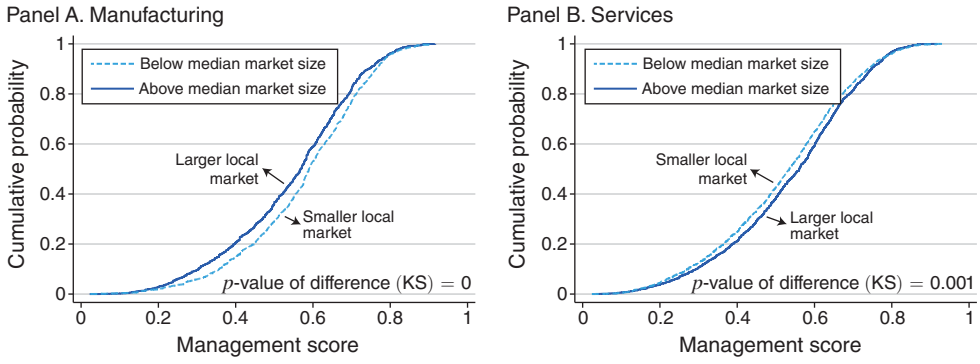

FIGURE 9. CDFs MANAGEMENT SCORE MARKET SIZE

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services.

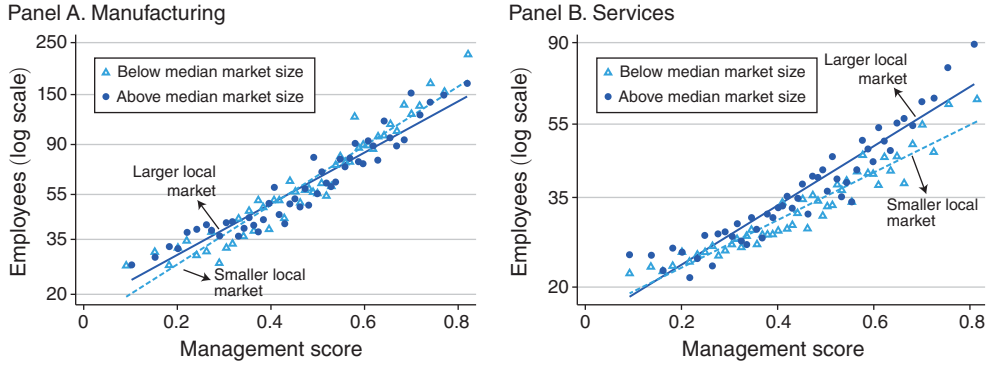

FIGURE 10. SOURCES OF MISALLOCATION: MARKET SIZE

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services. CDFs are weighted by firm employment size.

more demanding US market. An implication of this hypothesis is that for service sector firms, whose competition is mainly local, it should be the size of the local market that influences managerial practices. In the presence of sunk costs of entry, a larger market size can sustain more firms and so engender more local competition (for example, see Bresnahan and Reiss, 1991; Syverson, 2004, and Aghion et al., 2018).

We measure market size at the level of metropolitan areas by population density multiplied by average income. Figure 9 shows that local market size *does* matter for services firms but does *not* for manufacturers (indeed, the relationship is reversed for manufacturing firms).[36] As shown in panel B of Figure 10, market reallocation

[36] Figure 9 is weighted by employment size, but the results are qualitatively similar if unweighted (Supplemental Appendix Figure A12).

appears to improve with market size for services firms, but is not observed for manufacturing firms.

We put these results in a regression framework in the last two columns of Table 3. In the final column for services, the interaction between market size and management is positive and significant, suggesting greater pressures for reallocation in the denser cities. By contrast, in column 4, this interaction is insignificant for the manufacturing sector.[37]

We subjected these results to many robustness tests in Supplemental Appendix C. There, we show that there is also a relationship of density with unweighted management suggesting selection on the extensive margin. We also show that the results are robust using alternative measures of city size, productivity measures instead of management, and dropping very large cities like Mexico City and Nuevo Leon.

Given the heterogeneous nature of services, we considered various ways to disaggregate the sector more finely (see Supplemental Appendix Table A6). For example, we distinguished tradable (e.g., consultancy, advertising, legal, etc.) from non-tradable services following Nayyar, Hallward-Driemeier, and Davies (2021). Consistent with our results we found that non-tradable services (which are the majority) had a large and significant coefficient on the market size and management interaction, whereas the tradable services had a small and insignificant coefficient (so looked like the manufacturing sector). A similar pattern was observed using Knowledge-Intensive Services ("KIBS" defined according to Eurostat 2019), which looked more like manufacturing (as they typically traded across borders and therefore exposed to a larger than local market), whereas non-KIBS follows more the pattern of non-tradable services results. A similar pattern was observed using drive times: KIBS and tradable services behave more like manufacturing firms.

C. *Institutional Frictions and Misallocation*

As Restuccia and Rogerson (2017) argue, misallocation can be the result of different types of distortions (wedges), which can be divided into three groups. First, statutory distortions, including the regulatory framework. Second, discretionary distortions made by the government, which include the case of government corruption. Finally, there are the market frictions that we covered in the previous sections. These distortions not only contribute to the misallocation of resources, but also have potentially large effects on the productivity distribution. These distortions affect how productivity relates to size, particularly in developing countries, which, consequently, tend to exhibit a larger proportion of smaller firms (Bento and Restuccia, 2017).

One important friction in Mexico is contract enforcement (see Levy 2018, and Misch and Saborowski 2020). Boehm and Oberfield (2020) argue that this has a strong effect on value chains primarily through the costs of sourcing inputs. We test the relationship of misallocation with this wedge in a regression framework in

[37] These results are robust to dropping all controls (Supplemental Appendix Table A7) and/or using continuous variables instead of binary indicators (Supplemental Appendix Table A8). For example, the interaction of management with a continuous drive time measure in an equivalent of column 1 of Table 3, has a coefficient of −0.064 and a standard error of 0.017.

Table 4—Sources of Misallocation: Institutional Environment

Dependent variable = ln(workers)	Top 10% share firms contract enforcement problems (1)	Top 10% kidnapping (2)	Top 10% share firms with gov. corruption problems (3)	Top 10% business crime composite index (4)	Top 10% informality municipality (5)
High level × management score	−0.256	−0.258	−1.044	−0.401	−0.329
	(0.139)	(0.135)	(0.170)	(0.125)	(0.199)
High level	−0.093	0.124	0.268	0.194	−0.141
	(0.068)	(0.065)	(0.080)	(0.075)	(0.056)
Management score	1.605	1.557	1.590	1.612	1.578
	(0.058)	(0.053)	(0.056)	(0.039)	(0.056)
Share of firms in municipalities with high-level	9.58%	7.13%	8.72%	8.76%	12.82%
Time effects	Yes	Yes	Yes	Yes	Yes
Municipality effects	Yes	Yes	Yes	Yes	Yes
NAICS 6-digits effects	Yes	Yes	Yes	Yes	Yes
Observations	24,327	24,327	24,327	24,327	24,327

Notes: Robust standard errors clustered at the municipality level in parentheses. Data on difficulties to enforce contracts and on whether firms face government corruption was obtained from the National Survey on Regulatory Quality and Government Impact on Enterprises (ENCRIGE) 2016 (INEGI 2016a). To construct these variables, we used the questions on (a) whether the firms in ENCRIGE experienced problems in terms of contract enforceability, (b) the frequency of corruption practices in their state (highly frequent and frequent). Kidnapping data were obtained from administrative records on crime, which were calculated at the municipality level. The business crime composite index was calculated as the top 10 percent of the average of the standardized shares of corruption problems, kidnapping, and problems with contract enforcement. Data on informality were obtained from the 2014 Economic Census using the definition by Busso, Fazio, and Levy (2012) and Levy (2018) based on contributions to social security. Informality was calculated at the municipality level.

column 1 of Table 4 by using information from the National Survey on Regulatory Quality and Government Impact on Enterprises (ENCRIGE) 2016 (INEGI 2016a). As shown in the table, firms in the top decile of municipalities with contract enforcement problems have a lower slope of log(employment) on the management score. This indicates that, in the presence of poor regulatory frameworks, better-managed firms tend to be relatively smaller.

Second, we test the case of high levels of crime. As noted by Dell, Feigenberg, and Teshima (2019), violence in Mexico has escalated in the past decade. In 2017, Mexico was ranked as the second-deadliest conflict zone in the world. Crime can affect business operations, investment, and growth, as it increases costs for firms due to the need to invest in crime prevention, represent direct losses, alter hours of business operation, and impact behavior to hide revenues. According to the National Survey of Business Victimization (ENVE in Spanish), one-fifth of firms were forced to reduce their hours of operation due to crime (INEGI 2016b). Considering the prevalence of crime in Mexico, we analyze firms located in municipalities with high crime (top decile) using administrative records of kidnapping, which often targets wealthy executives or their families, from the Ministry of the National System of Public Security. The results show that firms in municipalities with high levels of crime tend to have a weaker relationship between size and management, consistent with the hypothesis that crime contributes to misallocation. In column 2 of Table 4, the coefficient of the interaction between management and kidnapping is significantly negative.

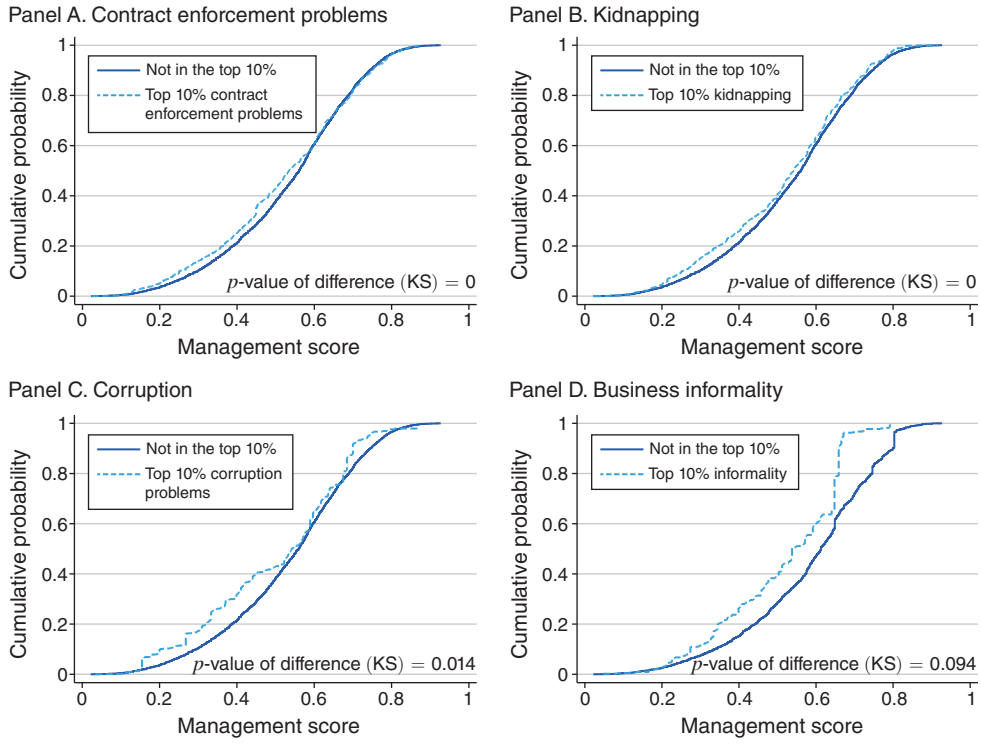

FIGURE 11. CDFs MANAGEMENT SCORE ACCORDING TO INSTITUTIONAL STRENGTHS

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services. CDFs are weighted by firm employment size.

Third, corruption is a pervasive problem in Mexico, as according to the Corruption Perception Index of Transparency International, Mexico is ranked in 130th place out of 180 countries. Using information from ENGRIGE regarding the perceptions of government corruption, column 3 of Table 4 shows a negative and significant sign of the interaction between management and high corruption.

We construct a composite business crime index merging information on contract enforcement, kidnapping, and corruption. To do this, we standardize each indicator (share of firms with contract enforcement problems, kidnapping rate, and share for firms that report corruption), take their average, and define the top 10 percent of municipalities based on this average composite index.[38]

For all of these business contract-problem and crime measures, as shown in the CDFs depicted in Figure 11, we observe that firms located in the municipalities most affected by crime (top 10 percent) and weak contract enforcement exhibit

[38] All results in Table 4 are robust to using other reasonable thresholds (e.g., using the top 5 percent instead of the top 10 percent of municipalities, as shown in Supplemental Appendix Table A12).

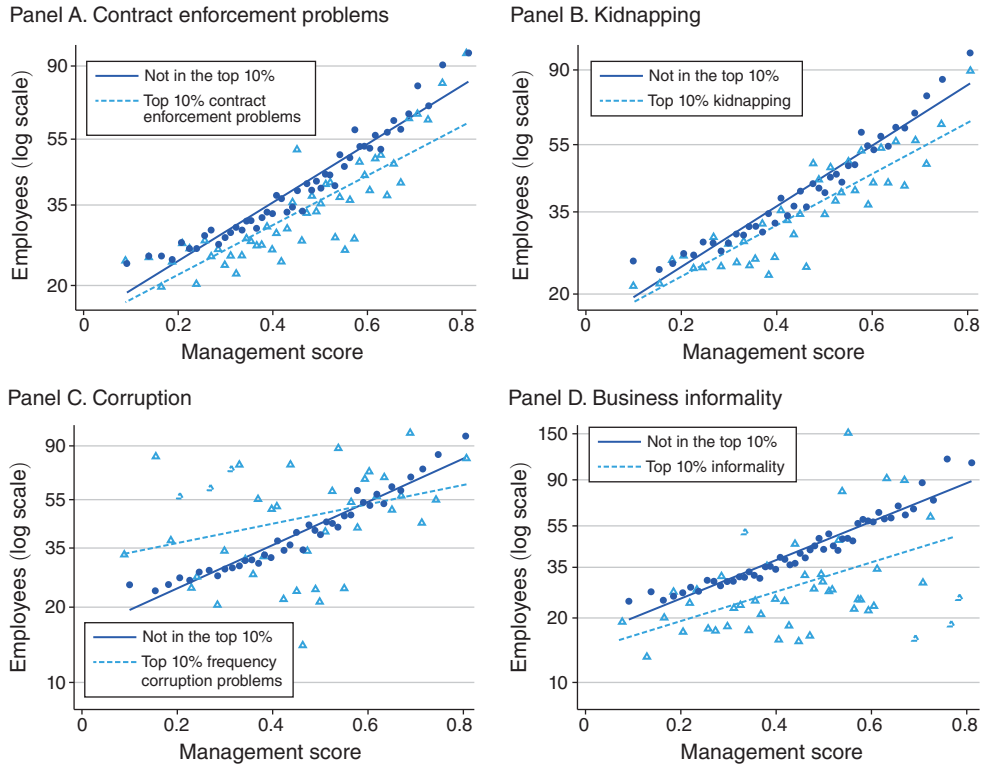

FIGURE 12. SOURCES OF MISALLOCATION: INSTITUTIONAL STRENGTHS

Notes: There are 6,643 observations on Mexican manufacturing; 17,684 observations on Mexican services.

worse management practices.[39] The regression results from Table 4 are confirmed in Figure 12, where we observe that firms in the top 10 percent of these contract-problem and crime measures have a flatter slope in the relationship between management practices and size.

Finally, over half of Mexico's employment is informal (55.1 percent in 2023, according to the National Employment Survey) and, according to the definition by Busso, Fazio, and Levy (2012) and Levy (2018), 90 percent of the establishments in the 2019 Economic Census were informal. Informal firms could distort firms' growth in at least two ways. First, they tend to be less productive and capture resources that could otherwise be allocated to more productive firms, leading to the survival of firms that should have exited. Secondly, they could compete with formal firms and, therefore, limit their growth. Using data from the 2019 Economic Census, we identify all firms contributing with less than 18 percent of their payroll to social security (as in Busso, Fazio, and Levy 2012; Levy 2018). Then, we use the employment-weighted

[39] Figure 11 uses weights, but we test the unweighted version in Supplemental Appendix Figure A13, and the results do not change.

share of informal firms in each municipality to identify the top decile of municipalities with high levels of informality. As shown in column 5 of Table 4, the interaction between management and high informality is negative and significant.

In summary, we have provided evidence consistent with the hypothesis that institutional frictions such as contract enforcement, crime, corruption, and informality all explain the higher level of misallocation in Mexico, by making it hard for well-managed firms to grow and reach their optimal size.

IV. Conclusions

We have analyzed management practices in a new manufacturing and services firm-level survey in Mexico. First, we confirm that more structured management is positively associated with superior firm performance (higher productivity, profitability, innovation, size, and exporting) in both the manufacturing and services sectors. This is the first time that these relationships have been confirmed in a large-scale survey, also for firms in the services sector.

Mexican management scores have a lower mean than their US equivalents and a greater dispersion. One explanation for this is that market frictions are higher in Mexico, particularly in services that are less exposed to international trade. We document that reallocation, as measured by the relationship between size and management quality (and firm age versus management quality), is weaker in Mexican manufacturing than in US manufacturing, and is weaker still in Mexican services. A counterfactual exercise indicates that improving market reallocation in the Mexican services sector to the level we see in the manufacturing sector could raise GDP by US$27.4 billion.

To investigate more deeply the factors that drive misallocation, we examine the relationship between firm size and management using several observable measures of frictions. First, we use insights from the trade literature and look at the role of market size. For manufacturing, proximity to the United States (as measured by drive time between our Mexican firms and the US border) is likely to matter most. We found that for manufacturing firms (especially in export-exposed industries), the size-management relationship was particularly strong when this proximity was high. By contrast, for Mexican manufacturing plants in less export-exposed industries, there was a weaker effect of proximity, and for service firms, there was no effect. Instead, for Mexican service firms, we found that local market competition mattered. Metropolitan areas with larger markets had a strong size-management relationship with service firms but did not for manufacturers, who tend to sell their goods beyond the limits of the local metropolitan area (i.e., nationally or internationally). Finally, we turned to institutional factors and found that the size-management relationship was weaker in areas with low contract enforcement, greater corruption, worse crime and high rates of informality.

These results imply that competitive and regulatory reforms in Mexico and other middle-income countries could have important effects on raising productivity, allocation, and material well-being. Making US market access worse through increasing border frictions, by contrast, will damage management quality and productivity, and ultimately well-being.

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