

MANAGEMENT AND MISALLOCATION

EVIDENCE FROM MEXICAN FIRMS

AEA

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MOTIVATION

- Vast TFP differences between & within countries and much suggestive evidence that management important in explaining
- US vs. Mexico good example of these differences
- Implement largest ever survey (~24k) of Mexican management practices based on US MOPS method (partner with INEGI, Census Bureau & get 96% response rate)
 - Extend US MOPS as Mex-MOPs has non-manufacturing as well as manufacturing firms
- Present Lucas (1978) management model + frictions (product market power & institutional frictions like size-based regulations).
 - Firm size increases with managerial ability, but this relationship is weaker as degree of frictions increases

SUMMARY

- Mexico has much lower firm size-weighted management scores than US
 - Suggests important misallocation role: well managed Mexican firms find it hard to scale up (cf. Hsieh and Klenow, 2009, 2014)
- Positive Relationship between firm size & management (key moment) systematically **lower** when frictions are **higher**:
- **Indirect friction measures**
 - Cross country (US vs. Mexico)
 - Cross industry (Manufacturing vs. Services)
- **Direct friction measures**
 - Distance from US border (matters for traded manufacturing)
 - City density (matters for Services, which have local markets)
 - Weak local institutions (contract enforcement, crime, corruption)

OUTLINE OF TALK

Data

Misallocation & Management across Countries and Sectors

Misallocation:

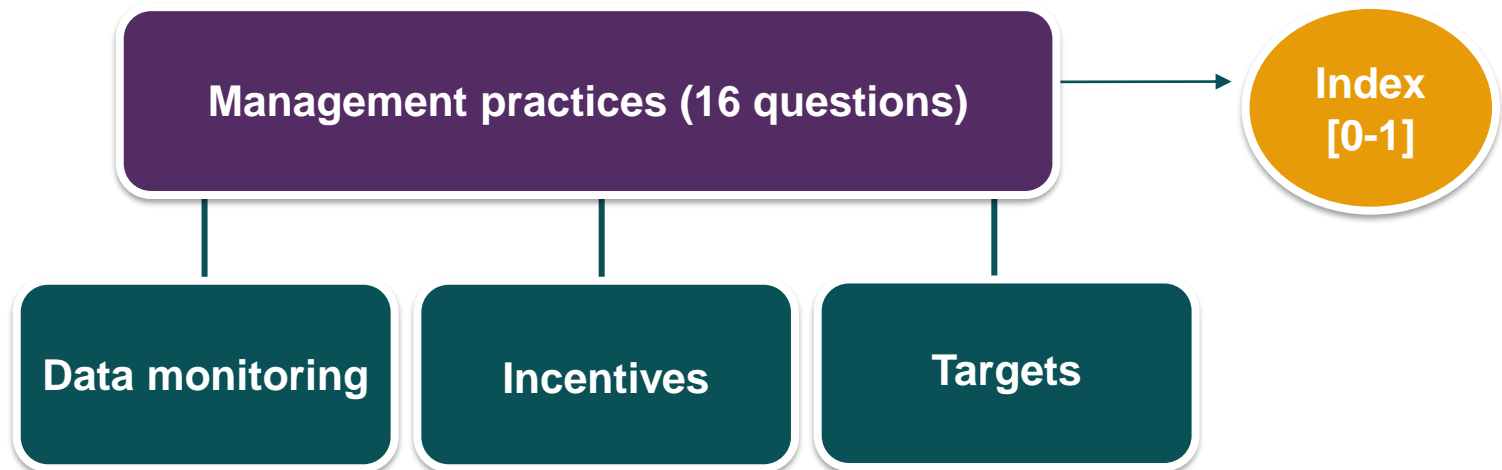
Proximity

Density

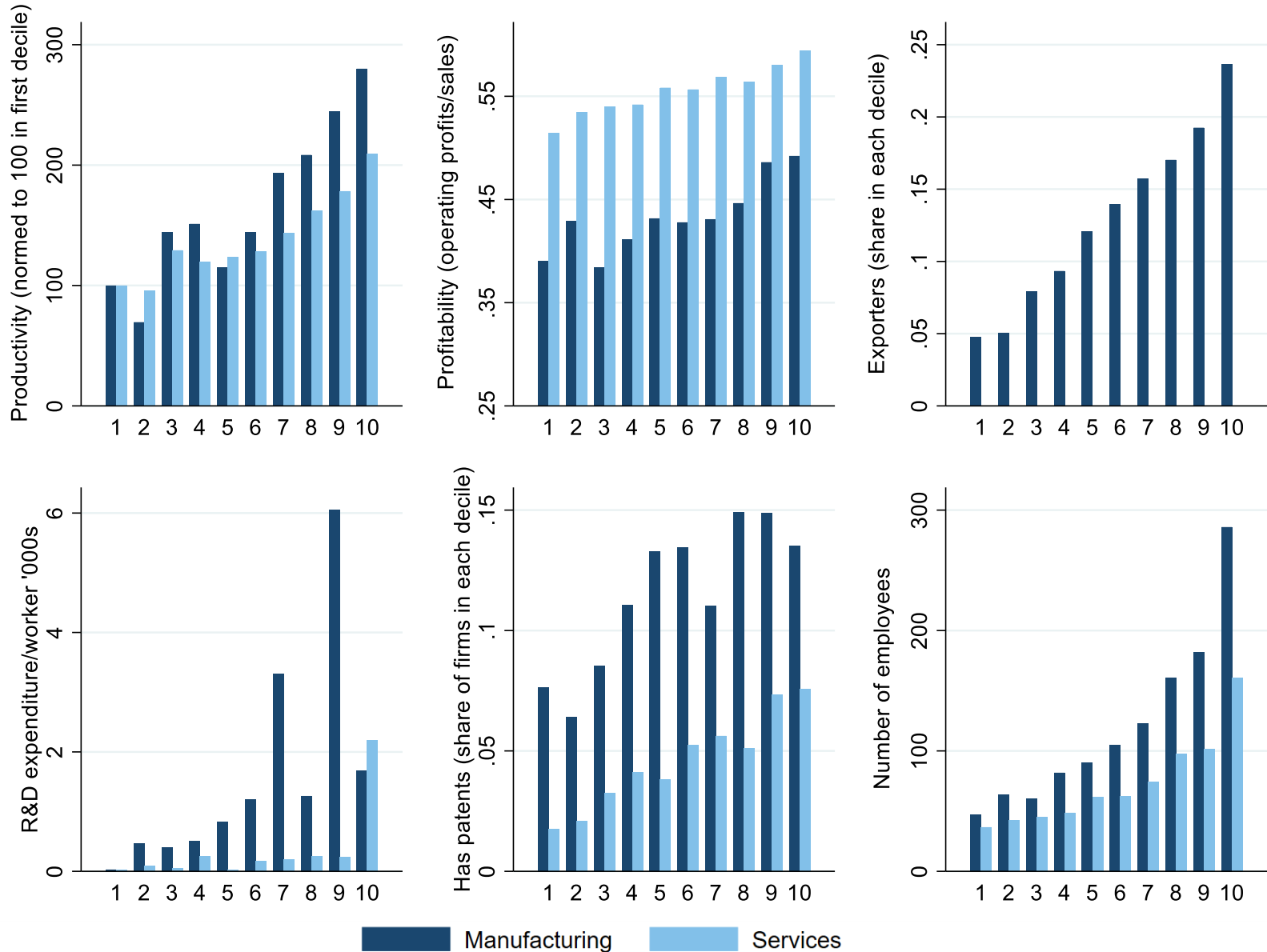
Institutions

DATA

- Questions about “structured management practices” from US MOPS were included for SMEs and big firms.
 - Based on WMS and Bloom and Van Reenen (2007).
 - Copied as closely as possible for manufacturing and adapted for services.

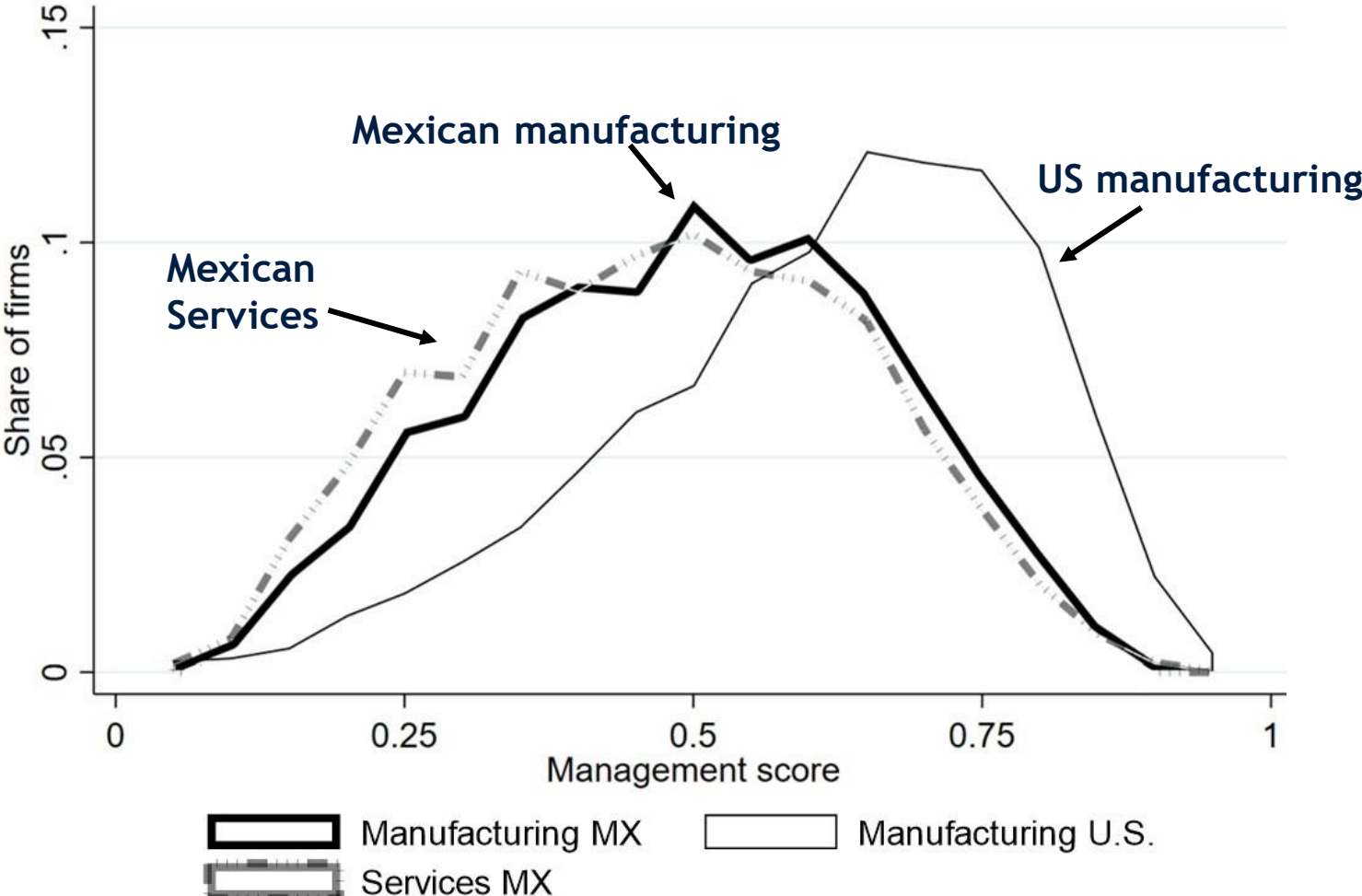


PERFORMANCE INCREASES WITH MANAGEMENT SCORE



Notes: Results for the sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 10,175 Mexican services firms in 2014 and 7,509 in 2017

MANAGEMENT SCORES LOWER & MORE DISPERSED IN MEXICO THAN US. AND SERVICES LAGS EVEN FURTHER



Notes: Plots of sample of 3,707 Mexican manufacturing firms in 2014, 2,936 in 2017, 10,175 Mexican service firms in 2014 and 7,509 in 2017, against the distribution for 32,000 U.S. plants from Bloom et al. (2019)

OUTLINE OF TALK

Data

Misallocation & Management across Countries and Sectors

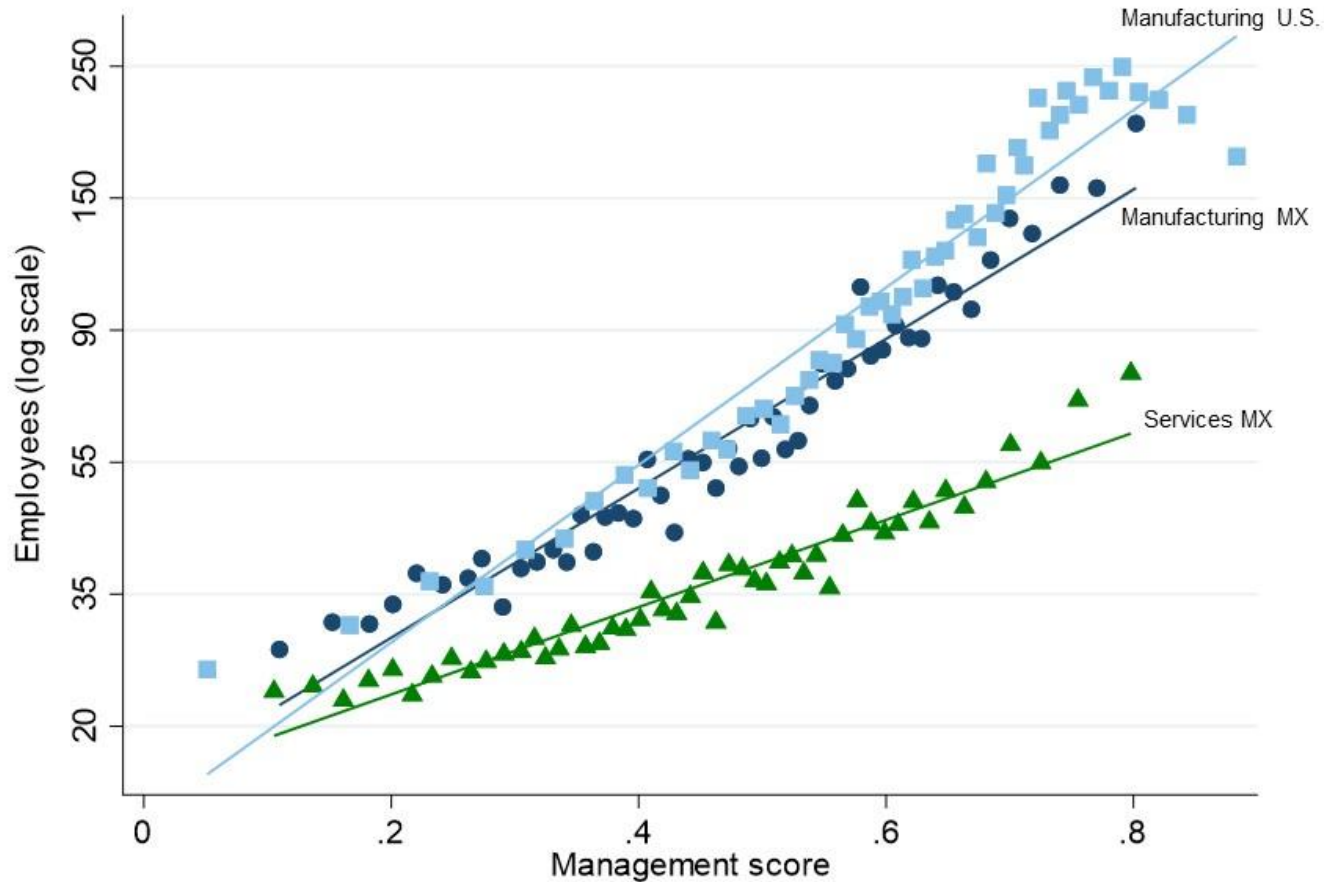
Misallocation:

Proximity

Density

Institutions

FIRM SIZE INCREASES WITH MANAGEMENT BUT LESS IN MEXICO THAN THE US; AND LESS IN SERVICES THAN IN MANUFACTURING



- Manufacturing MX
- ▲ Services MX
- Manufacturing U.S.

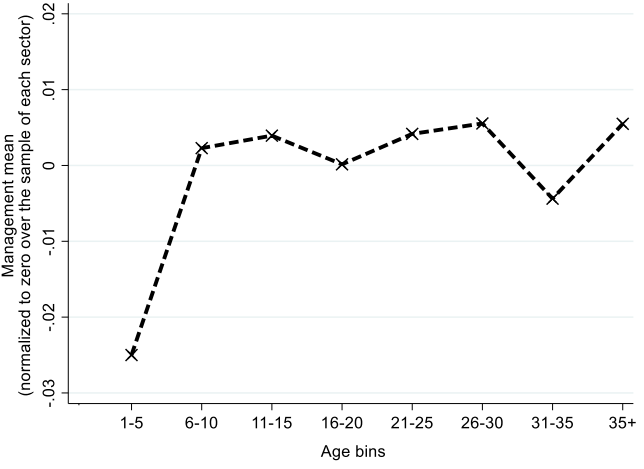
Slope
2.752***
(0.0837)
1.621***
(0.0475)
3.360***
(0.123)

Notes: Bin Scatter from Mexican and U.S. firm-level management data. Samples: 6,643 for Mexican manufacturing; 17,648 for Mexican services; 18,000 for US manufacturing. U.S data from Bloom et al. (2019).

SELECTION MEANS THAT MANAGEMENT INCREASES WITH FIRM AGE IN US MANUFACTURING.

Firm Age and Management score: mean

(a) Manufacturing US

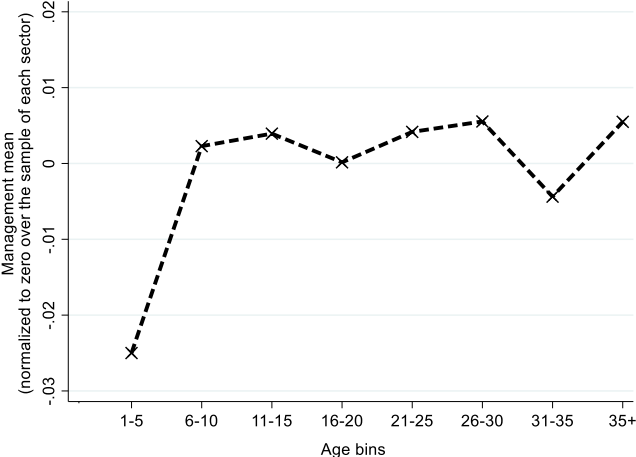


Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017; and 32,000 US manufacturing plants

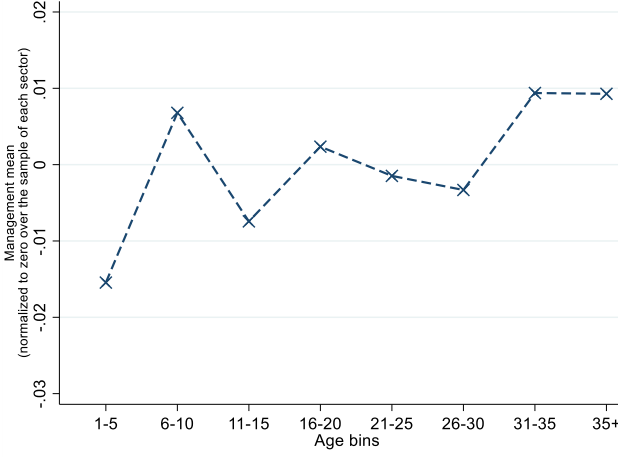
SELECTION MEANS THAT MANAGEMENT INCREASES WITH FIRM AGE IN US MANUFACTURING. BUT THIS RELATIONSHIP IS WEAKER AND SLOWER IN MEXICAN MANUFACTURING, AND ACTUALLY NEGATIVE IN SERVICES

Firm Age and Management score: mean

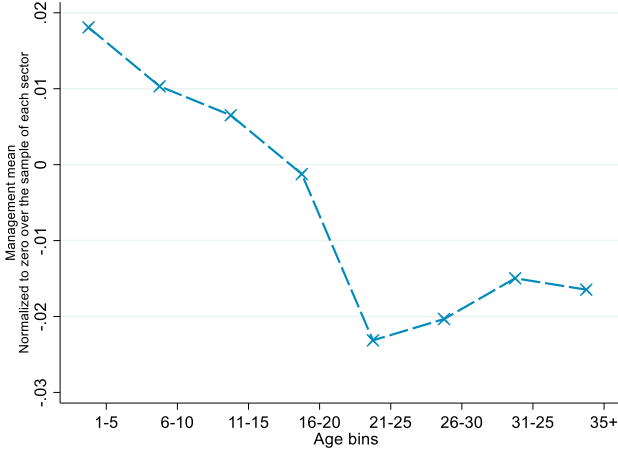
(a) Manufacturing US



(b) Manufacturing MX



(c) Services MX



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017; and 32,000 US manufacturing plants

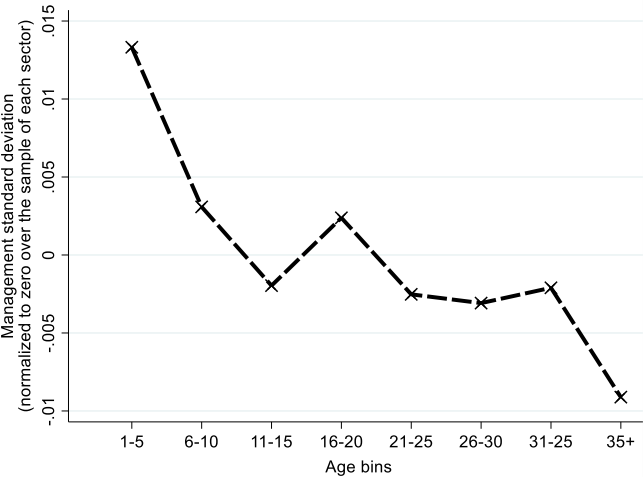
IN US MANUFACTURING, DISPERSION OF MANAGEMENT SCORES DECLINES WITH AGE DUE TO SELECTION. BUT THIS IS NOT THE CASE IN MEXICO

Firm Age and Management score: spread

(a) Manufacturing US

(b) Manufacturing MX

(c) Services MX

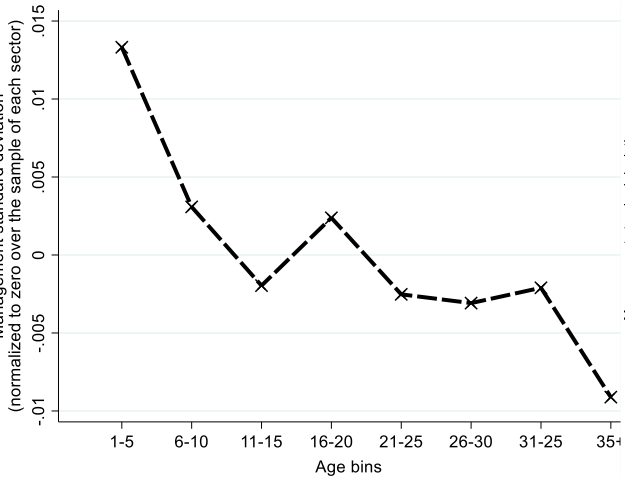


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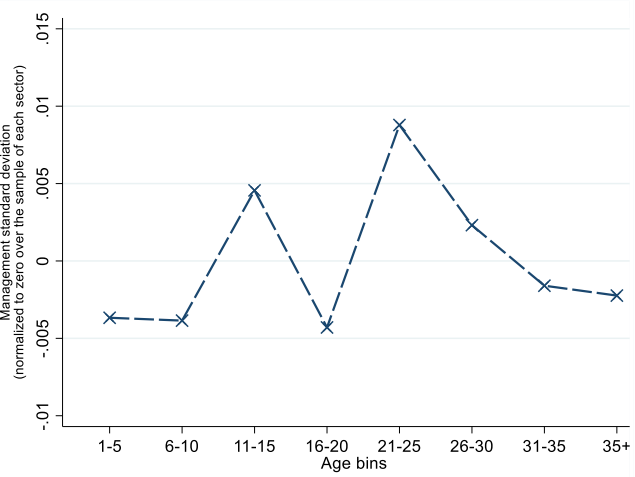
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Firm Age and Management score: spread

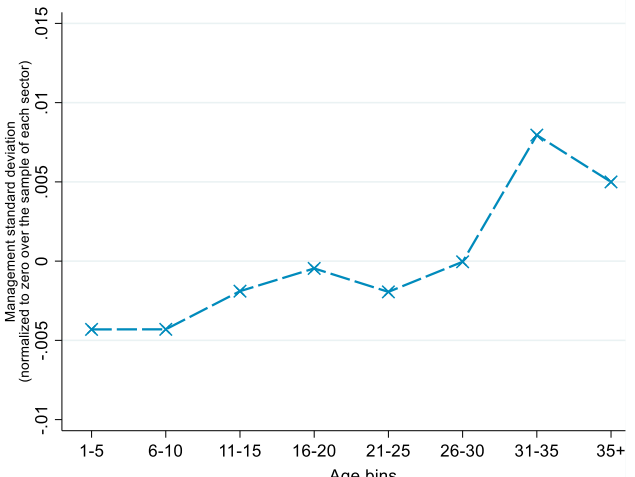
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(b) Manufacturing MX



(c) Services MX



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017; and 32,000 US manufacturing plants

OUTLINE OF TALK

Data

Misallocation & Management across Countries and Sectors

Misallocation:

Proximity to US Border

Density

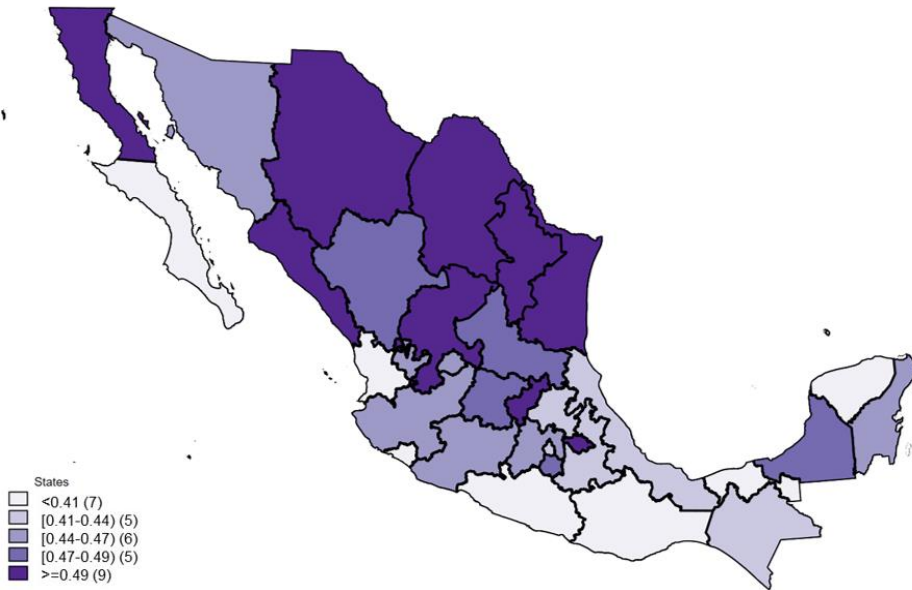
Institutions

REGIONAL PATTERNS IN MANAGEMENT BY MANUFACTURING VS SERVICES

Best management practices in manufacturing are observed in the North, near the U.S. border, while best management in services are observed near the big cities.

Management by state

Manufacturing



Services



* sample of 4,224 Mexican manufacturing plants

* sample of 11,967 Mexican services firms

TO MEASURE CLOSENESS TO THE US MARKET, WE USE DRIVE TIME TO THE BORDER

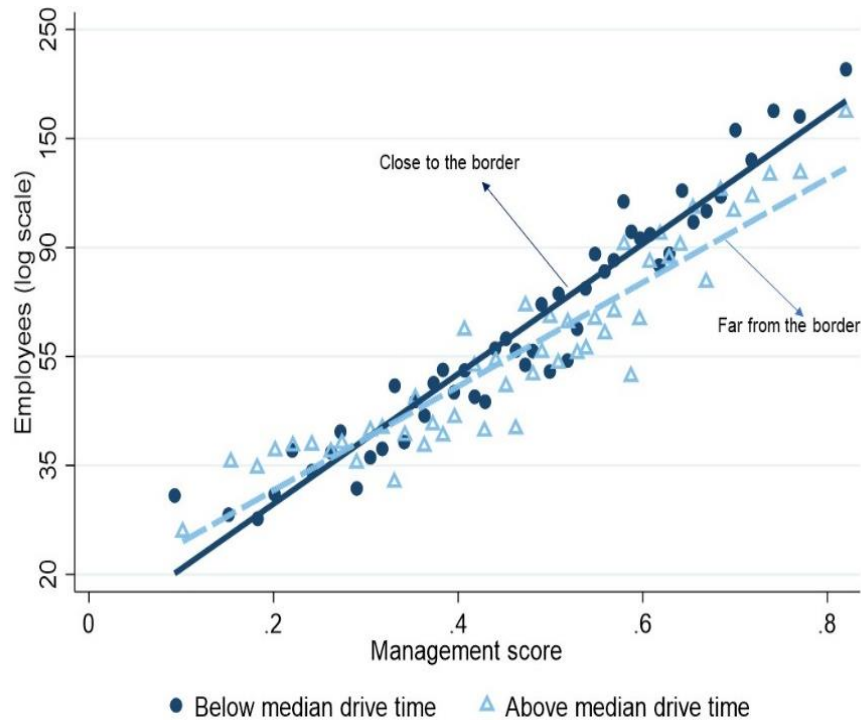
Took three most important border crossings between Mexico and the U.S. and calculated minimum drive time to the border in hours.



FOR MANUFACTURING, BEING CLOSER TO THE US BORDER STRENGTHENS THE FIRM SIZE - MANAGEMENT-RELATIONSHIP (GREATER COMPETITION)

Sources of misallocation: Drive time to the border

(a) Manufacturing

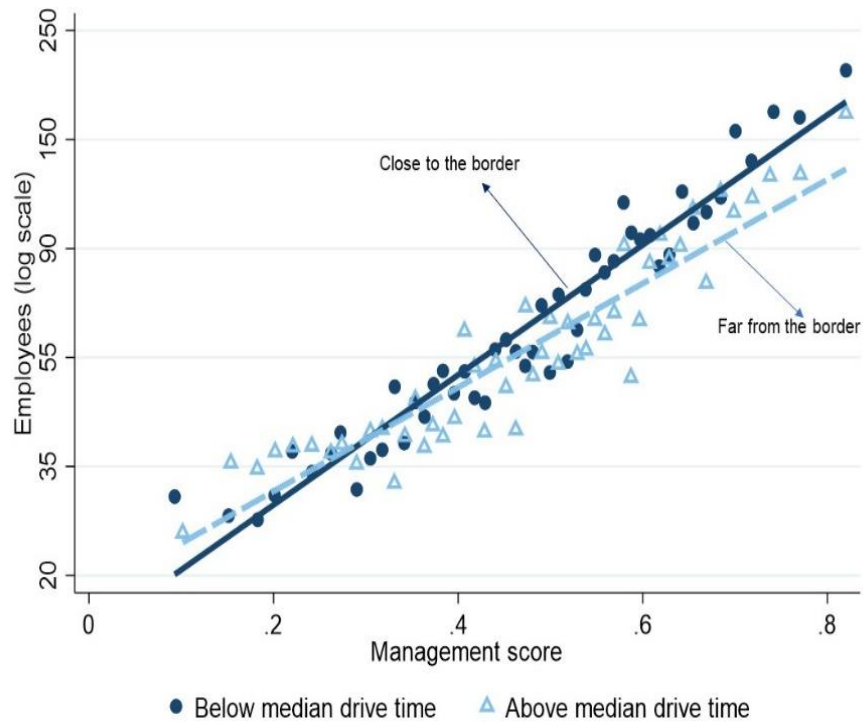


Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014, 2,936 in 2017; 11,967 Mexican services firms in 2014, 7,509 in 2017.

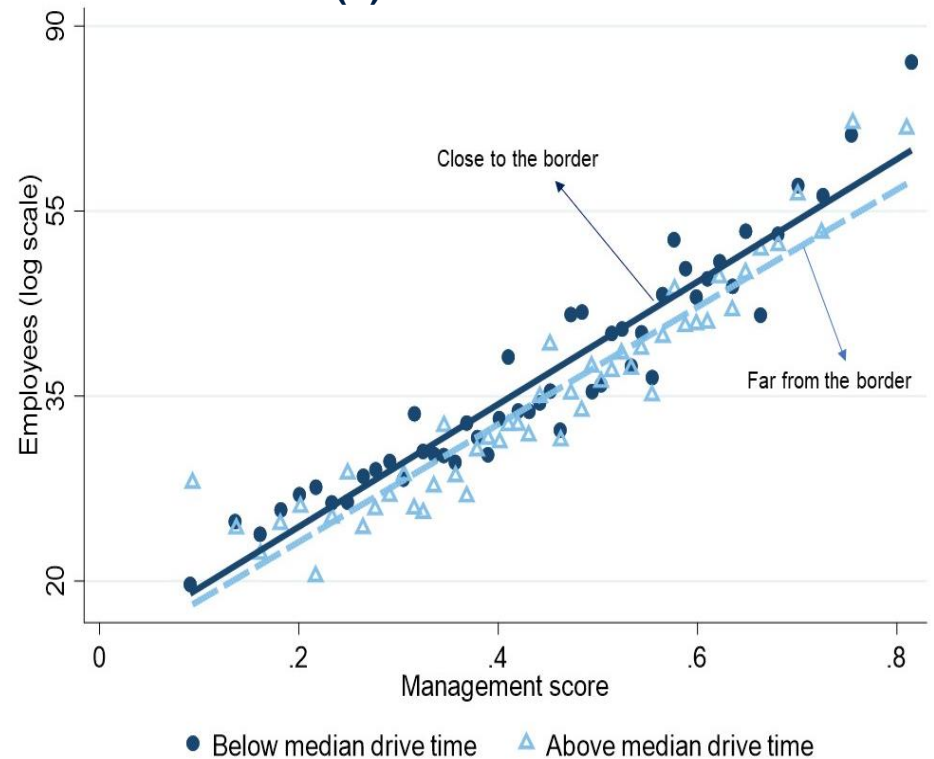
BUT NO RELATIONSHIP FOR SERVICES AS THESE ARE ALMOST ALL LOCALLY TRADED

Sources of misallocation: Drive time to the border

(a) Manufacturing



(b) Services



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014, 2,936 in 2017; 11,967 Mexican services firms in 2014, 7,509 in 2017.

BEING CLOSE TO THE US BORDER STRENGTHENS THE SIZE-MANAGEMENT RELATIONSHIP FOR MANUFACTURING

| Dependent variable=ln(workers) | Drive time to the border | | Exports & drive time |
|---|--------------------------|---------------------|----------------------|
| | (1) Manufacturing | (2) Services | (3) Manufacturing |
| Management score*Share of exports*Drive time below the median | | | 1.970* (1.116) |
| Management score | 1.775*** (0.109) | 1.266*** (0.072) | 1.543*** (0.181) |
| Drive time below the median*Management score | 0.469*** (0.169) | 0.0851 (0.099) | 0.0209 (0.269) |
| Management score*Share of exports | | | 1.498* (0.822) |
| Drive time below median*Share of exports | | | -0.635 (0.561) |
| Market size above the median*Management score | | | |
| 6-digits NAICS | Yes | Yes | Yes |
| Municipality effects | Yes | Yes | Yes |
| Time | Yes | Yes | Yes |
| Observations | 6,643 | 17,684 | 6,643 |

AND THIS IS PARTICULARLY TRUE OF INTERNATIONALLY HEAVILY TRADED SECTORS

| Dependent variable=ln(workers) | Drive time to the border | | Exports & drive time |
|---|--------------------------|---------------------|----------------------|
| | (1) Manufacturing | (2) Services | (3) Manufacturing |
| Management score*Share of exports*Drive time below the median | | | 1.970* (1.116) |
| Management score | 1.775*** (0.109) | 1.266*** (0.072) | 1.543*** (0.181) |
| Drive time below the median*Management score | 0.469*** (0.169) | 0.0851 (0.099) | 0.0209 (0.269) |
| Management score*Share of exports | | | 1.498* (0.822) |
| Drive time below median*Share of exports | | | -0.635 (0.561) |
| Market size above the median*Management score | | | |
| 6-digits NAICS | Yes | Yes | Yes |
| Municipality effects | Yes | Yes | Yes |
| Time | Yes | Yes | Yes |
| Observations | 6,643 | 17,684 | 6,643 |

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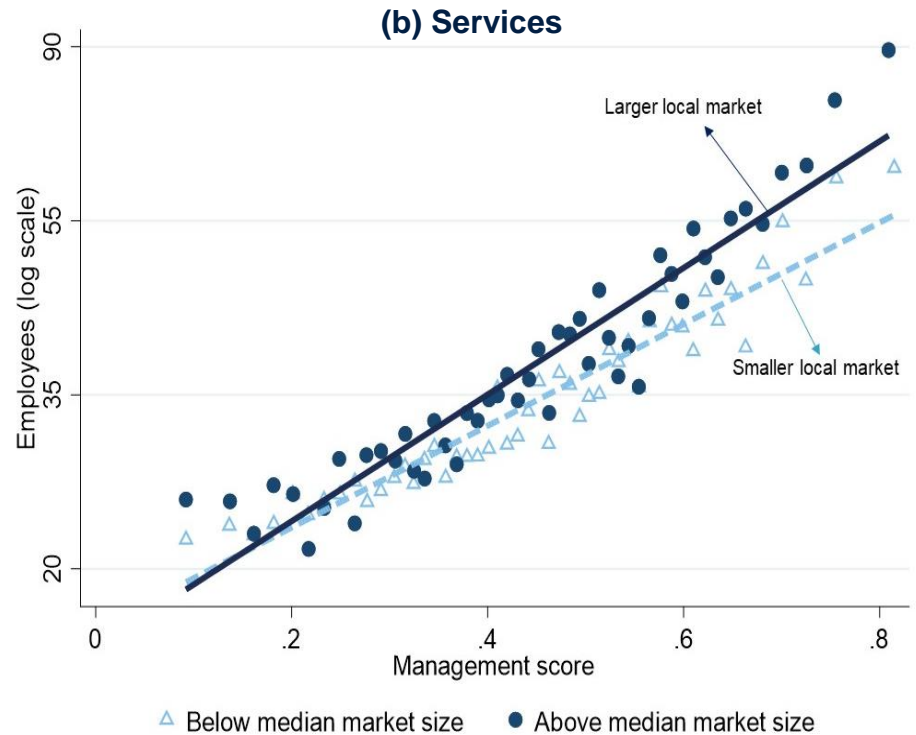
Proximity to US Border

Density

Institutions

FOR SERVICES, BEING IN A DENSE CITY IS WHAT MATTERS

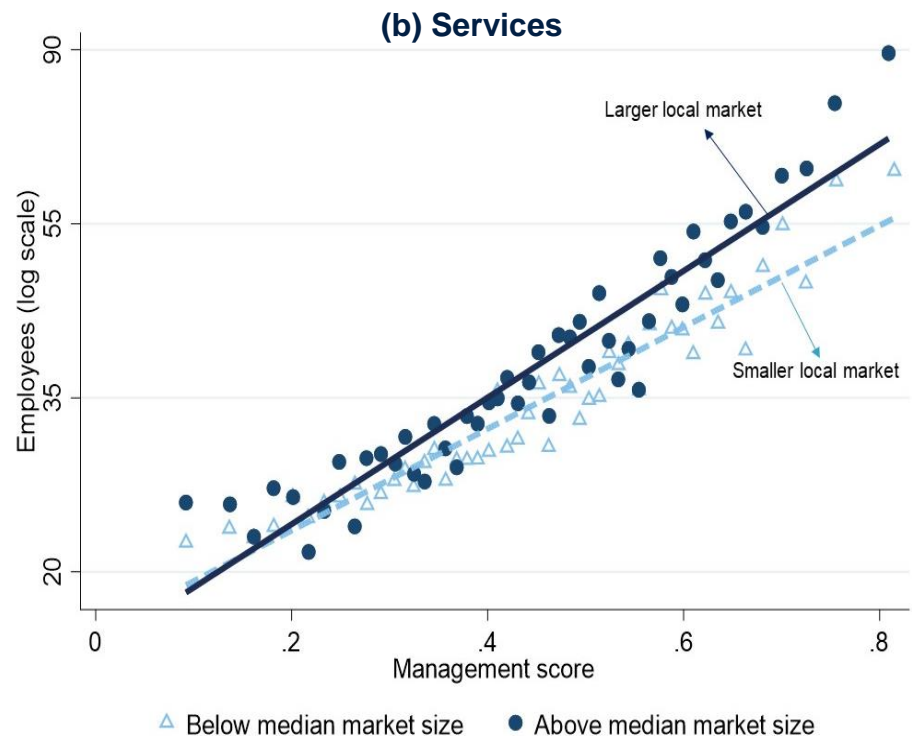
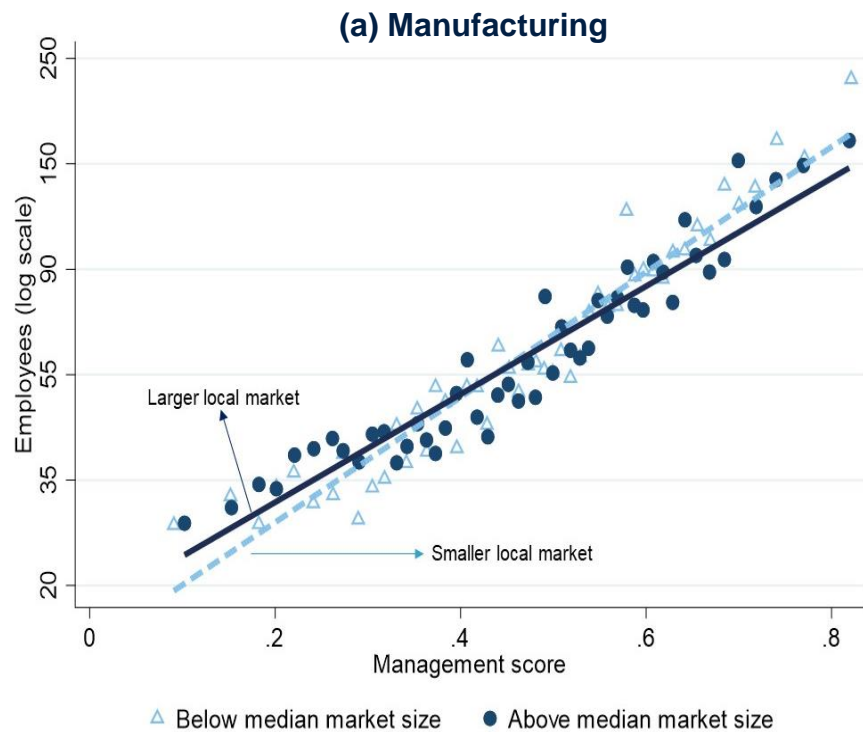
Sources of misallocation: market size



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014, 2,936 in 2017; 11,967 Mexican services firms in 2014, 7,509 in 2017.

WHEREAS FOR MANUFACTURING, CITY SIZE DOES NOT MATTER, AS GOODS ARE TRADED (INTER-) NATIONALLY

Sources of misallocation: market size



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014, 2,936 in 2017; 11,967 Mexican services firms in 2014, 7,509 in 2017.

FOR SERVICES, BEING IN A DENSE CITY IS WHAT MATTERS

| Dependent variable=ln(workers) | Drive time to the border | | Exports & drive time | Market size | |
|---|--------------------------|---------------------|----------------------|---------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| | Manufacturing | Services | Manufacturing | Manufacturing | Services |
| Management score*Share of exports*Drive time below the median | | | 1.970* (1.116) | | |
| Management score | 1.775*** (0.109) | 1.266*** (0.072) | 1.543*** (0.181) | 2.226*** (0.184) | 1.192*** (0.0634) |
| Drive time below the median*Management score | 0.469*** (0.169) | 0.0851 (0.099) | 0.0209 (0.269) | | |
| Management score*Share of exports | | | 1.498* (0.822) | | |
| Drive time below median*Share of exports | | | -0.635 (0.561) | | |
| Market size above the median*Management score | | | | -0.208 (0.219) | 0.324*** (0.108) |
| 6-digits NAICS | Yes | Yes | Yes | Yes | Yes |
| Municipality effects | Yes | Yes | Yes | Yes | Yes |
| Time | Yes | Yes | Yes | Yes | Yes |
| Observations | 6,643 | 17,684 | 6,643 | 6,643 | 17,684 |

OUTLINE OF TALK

Data

Misallocation & Management across Countries and Sectors

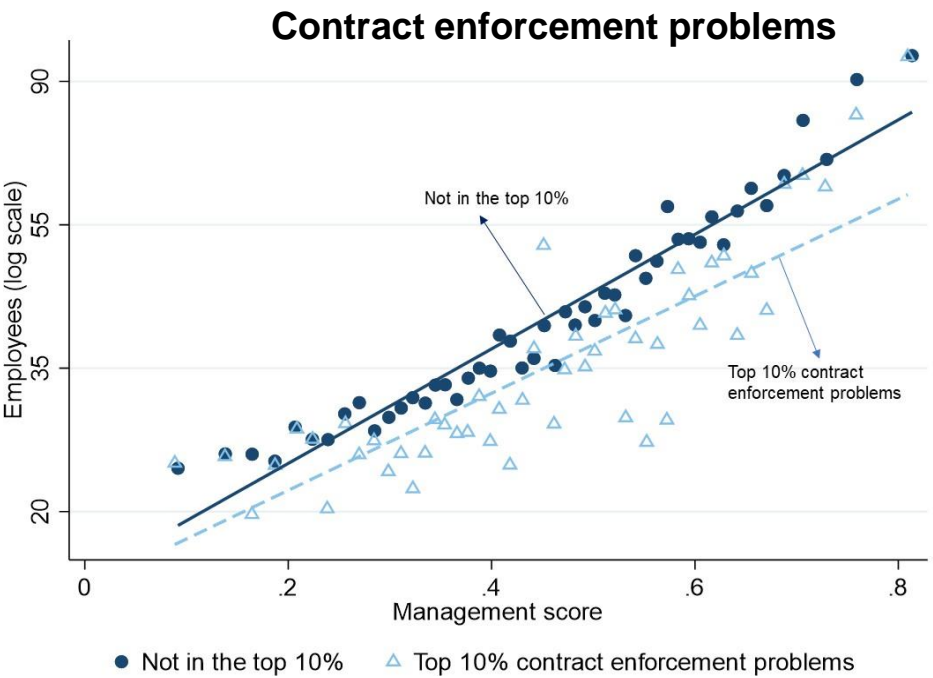
Misallocation:

Proximity to US Border

Density

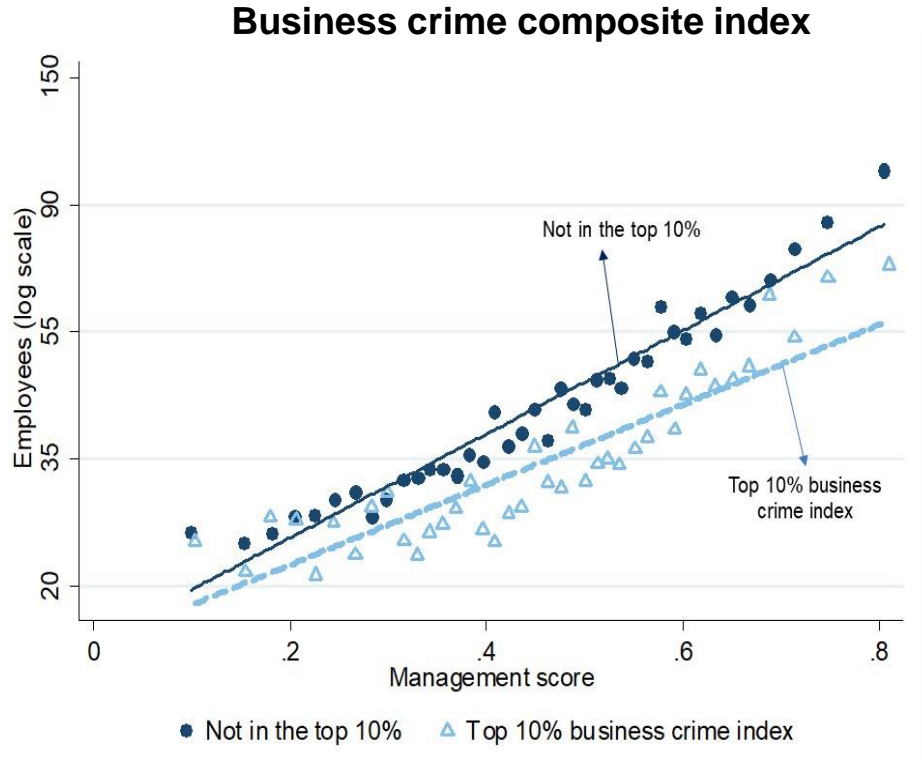
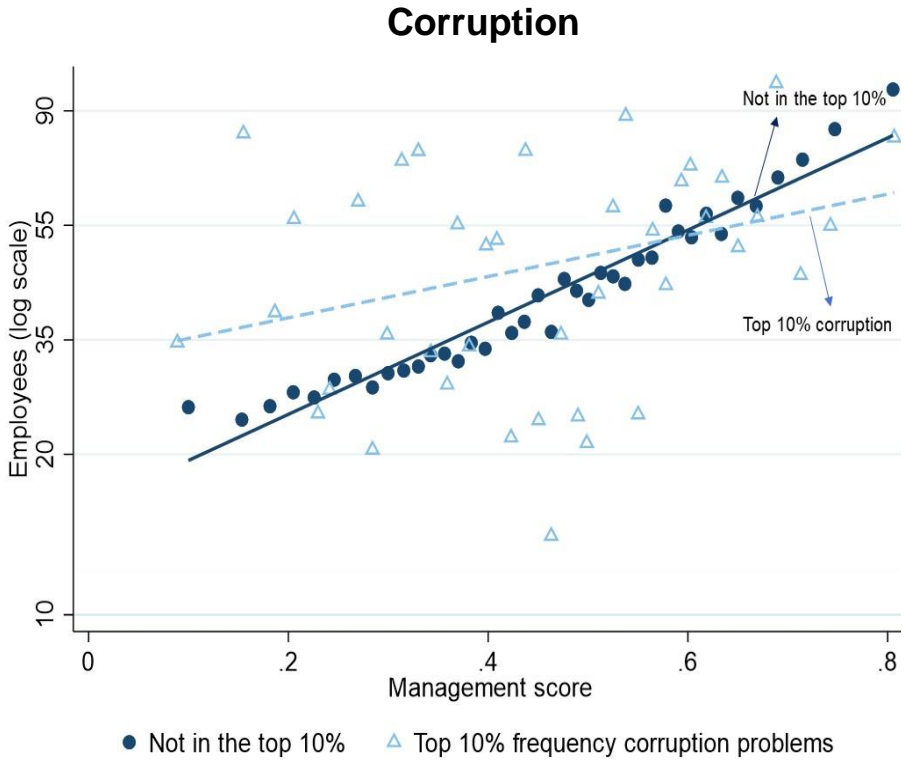
Institutions

LOCAL INSTITUTIONAL FRICTIONS FURTHER WEAKEN THE SIZE-MANAGEMENT RELATIONSHIP



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017.

INSTITUTIONAL FRICTIONS FURTHER WEAKEN THE SIZE-MANAGEMENT RELATIONSHIP



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017.

OUTLINE OF TALK

Data

Misallocation & Management across Countries and Sectors

Misallocation:

Proximity to US Border

Density

Institutions

ROBUSTNESS TESTS AND OTHER RESULTS

Robustness

- Using performance information from the Economic Census, does not change the results on management and performance.
- Management is also informative of microenterprises labor productivity.
- Changing the set of controls, our results do not change.
- Taking only those firms that only have one establishment does not change the results.
- Using continuous variables for competition frictions and institutional weakness, our results do not change.

Other results

- Management is positively correlated with employment growth and negatively associated with firm exit.
- Firms with FDI and external managers are better managed than family owned with family CEOs.
- Firms investing more in training tend to be significantly better managed.

CONCLUSIONS

- Largest ever management survey in Mexico – M-MOPS. High management scores positively associated with performance
- Mexican management scores have a lower mean than their U.S. equivalent and a greater dispersion.
- Size-management relationship as indicator of misallocation. Much lower in environments where frictions greater
 - Cross country
 - Cross sectors (manufacturing vs Services)
 - Using Direct measures (border proximity; city size/density; institutional frictions)
- Counterfactual of reducing misallocation in Mexican Services to those in manufacturing could raise Mexican GDP by \$34 billion

CONCLUSIONS

- Measuring frictions:
 - Greater frictions in Mexico than US
 - Within Mexico, greater frictions in services than in manufacturing (competition and regulation)
 - For manufacturing, greater frictions as distance to the US border increases (proximity increases competition)
 - For services, greater frictions in less dense cities (lower competition)
 - Greater frictions when institutions are weak as indicated by poor contract enforcement, high crime, or high corruption
- **All** of these friction indicators weaken the association of size and management

APPENDIX

SIMPLE MODEL

- Lucas (1978): Firms with higher managerial ability (M) produce with labor, L , with Span of Control problems ($\alpha < 1$):

$$Q_i = M_i L_i^\alpha$$

- Monopolistic competition (markup, μ)
- Profits reflect institutional frictions (e.g. size-contingent regulations) modelled as implicit tax, $\tau \geq 1$

$$\Pi_i = (P_i Q_i)^{\frac{1}{\tau}} - W L_i$$

- **Key Result**

$$\log L_i = \kappa' + \frac{1}{d - \alpha} \log M_i$$

Firm size (employment) increases with management, but this relationship decreases with the degree of frictions ($d(\mu, \tau) \geq 1$) from product market power (μ) and regulations (τ)

GREAT SURVEY! NON RESPONSE+ATTRITION RATE IS <4%...OF WHICH 2% DUE TO FIRM DEATH



ENCUESTA NACIONAL SOBRE PRODUCTIVIDAD Y COMPETITIVIDAD DE LAS MIPYMES CUESTIONARIO PARA LAS EMPRESAS PYMES (MANUFACTURAS)

Este cuestionario deberá ser devuelto a más tardar el día _____ de _____ de 2015.

→ CONFIDENCIALIDAD Y OBLIGATORIEDAD

Conforme con las disposiciones de la Ley del Sistema Nacional de Información Estadística y Geográfica en vigor:

Artículo 37. “Los datos que proporcionen para fines estadísticos los informantes del Sistema a las Unidades en términos de la presente Ley, serán estrictamente confidenciales y bajo ninguna circunstancia podrán utilizarse para otro fin que no sea el estadístico”.

Artículo 38. “Los datos e informes que los informantes del Sistema proporcionen para fines estadísticos y que provengan de registros administrativos, serán manejados observando los principios de confidencialidad y reserva, por lo que no podrán divulgarse en ningún caso en forma nominativa o individualizada, ni harán prueba ante la autoridad judicial o administrativa, incluyendo la fiscal, en juicio o fuera de él”.

Artículo 45. “Los informantes del Sistema estarán obligados a proporcionar, con veracidad y oportunidad, los datos e informes que les soliciten las autoridades competentes para fines estadísticos, censales y geográficos, y prestarán apoyo a las mismas”.

EMPRESA MANUFACTURERA

Es la unidad económica y jurídica que bajo una entidad propietaria o controladora, puede estar constituida por uno o varios establecimientos que operan bajo la misma denominación o razón social, como son: oficinas, agencias, terminales, talleres, etcétera.

Los datos asentados en este cuestionario deben corresponder solamente a esta empresa e incluir todas las actividades que realice.

Los directores, administradores, gerentes, representantes o encargados de la unidad económica son solidariamente responsables de la información asentada en los documentos autorizados o suscritos por ellos.

THE RELATIONSHIP BETWEEN FIRM SIZE AND MANAGEMENT IS STRONGER IN MANUFACTURING THAN IN SERVICES

| Dependent variable=ln(workers) | Pooled regression | | | | | |
|--------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Manufacturing | | Manufacturing | | Services | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Management score | 1.622*** (0.0475) | 1.380*** (0.0453) | 2.752*** (0.0837) | 2.219*** (0.0807) | 1.621*** (0.0475) | 1.380*** (0.0452) |
| Manufacturing dummy*Management score | 1.131*** (0.0967) | 0.834*** (0.0918) | | | | |
| 6-digits NAICS | No | Yes | No | Yes | No | Yes |
| Region | No | Yes | No | Yes | No | Yes |
| Time | Yes | Yes | Yes | Yes | Yes | Yes |
| Skills control | No | Yes | No | Yes | No | Yes |
| Observations | 24,327 | 24,327 | 6,643 | 6,643 | 17,684 | 17,684 |

Notes: Robust standard errors clustered at the firm level in parentheses. * Significant at the 10% level, ** 5% level, *** 1% level. 5 regional dummies included in all regressions. Column (2) also includes interactions of the manufacturing dummy with skills variables but these are not shown. Skills are measured as the share of workers with a college degree.

GROWTH IN OUTPUT DUE TO REALLOCATION IS NON-TRIVIAL

Service sector: Magnitudes of reallocation

| | Unweighted mean (A) | Employment-weighted mean (B) | (B-A) | Semi-parametric reweighting (manufacturing) (C) | (C-B) | VA/worker increase (C-B) | TFP increase (C-B) |
|-----------------------|------------------------|---------------------------------|-------|---|-------|-----------------------------|-----------------------|
| Management score mean | 0.446 | 0.520 | 0.074 | 0.559 | 0.039 | 4.50% | 2.20% |

Notes: Analysis based on a simple semi-parametric re-weighting approach in the style of DiNardo, Fortin and Lemieux (1996).

We split services into twenty quantile bins of the manufacturing score and calculate the fraction of employment in each bin for both manufacturing and services.

The equivalent magnitude for (B-A) in the manufacturing sector is 0.091.

MANAGEMENT PRACTICES AND FIRMS' PERFORMANCE

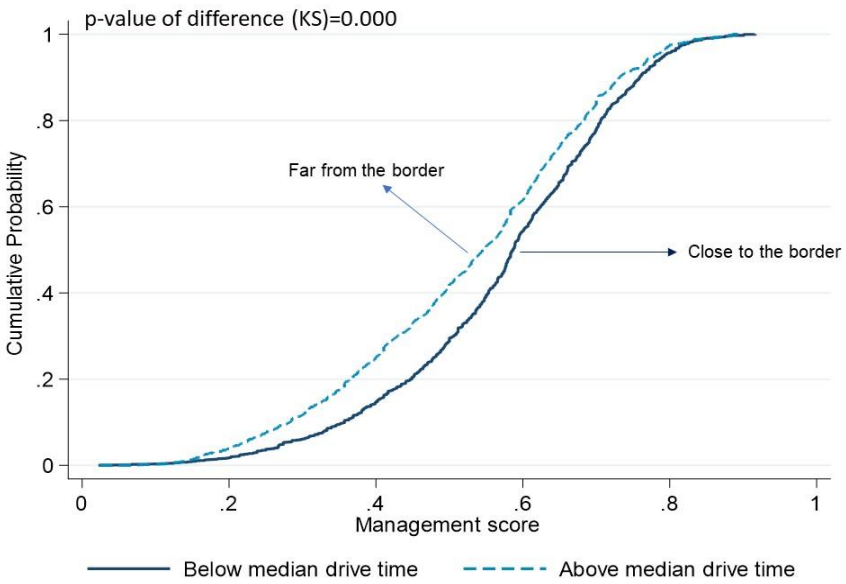
| Dependent Variable: | Manufacturing and services | | | Manufacturing | Services |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| | log(Value Added per Employee) | log(TFP) | log(TFP) | log(TFP) | log(TFP) |
| Management score | 1.1375*** (0.1379) | 0.5674*** (0.1468) | 0.3466*** (0.0739) | 0.3301*** (0.0826) | 0.3466*** (0.0738) |
| Manufacturing dummy*Management score | 0.8102*** (0.2213) | -0.0346 (0.2447) | -0.0165 (0.1106) | | |
| log(capital/employee) | | 0.1800*** (0.0135) | | | |
| log(employees) | | 0.2589*** (0.0302) | | | |
| Share white-collar workers | | 0.0499 (0.1937) | | | |
| Share of workers with a college degree | | 0.3654*** (0.1165) | | | |
| % rise from 10 th to 90 th management percentile | <i>Manufacturing</i> | 144.7 | 27.7 | 16.4 | 16.4 |
| | <i>Services</i> | 69.6 | 30.1 | 17.5 | 17.5 |
| Observations | | 18,251 | 18,251 | 18,251 | 6,598 11,653 |

Source: Authors' calculations with data from ENAPROCE 2015, INEGI

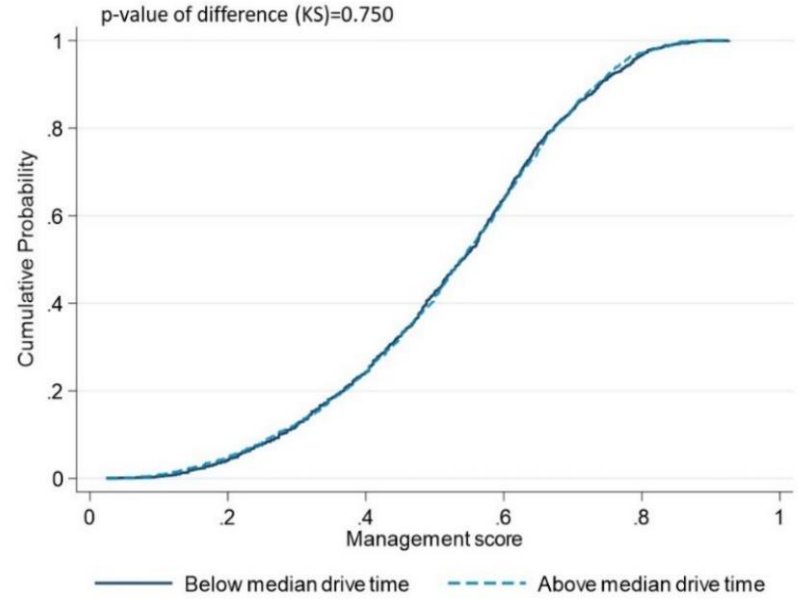
MANUFACTURING FIRMS LOCATED CLOSER TO THE BORDER ARE BETTER MANAGED, WHILE FOR SERVICES THERE ARE NO SIGNIFICANT DIFFERENCES

CDFs Management score drive time to the border

(a) Manufacturing



(b) Services

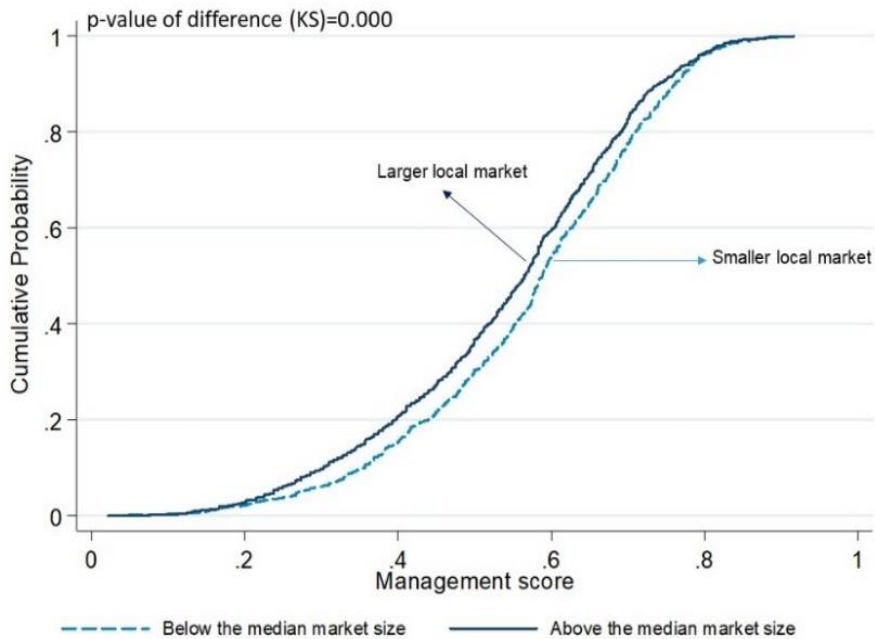


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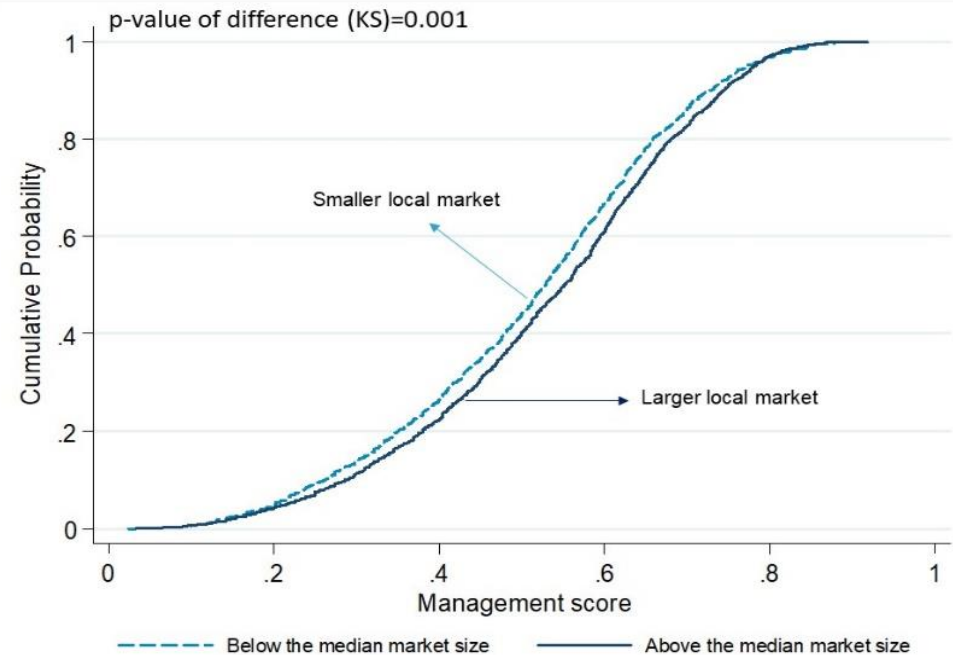
SERVICES FIRMS IN LARGER MARKETS ARE BETTER MANAGED

CDFs Management score market size

(a) Manufacturing



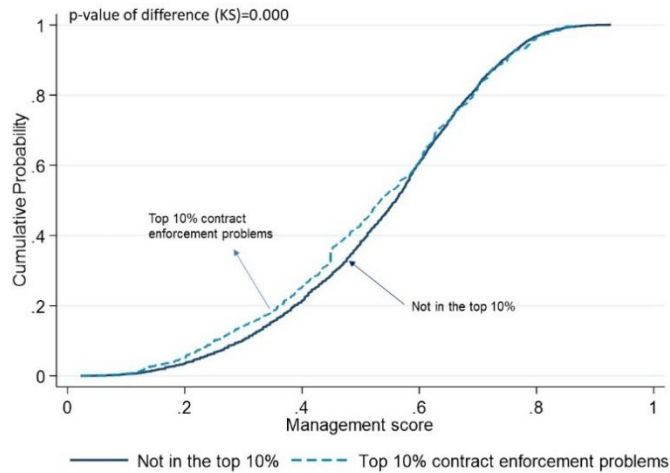
(b) Services



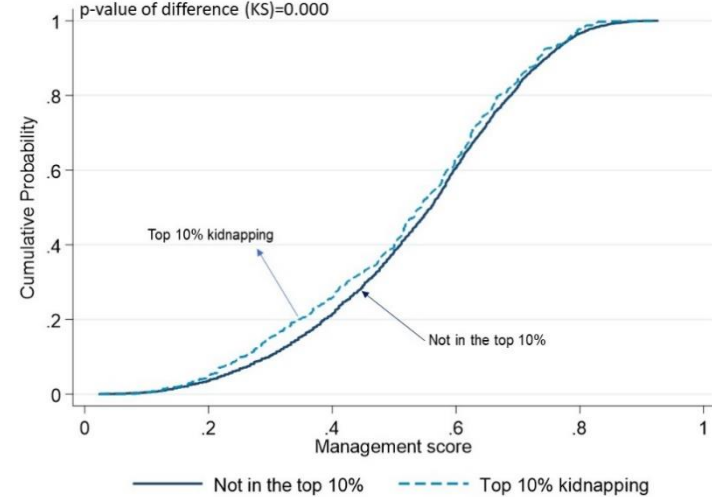
Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014, 2,936 in 2017; 11,967 Mexican services firms in 2014, 7,509 in 2017.

IN LOCATIONS WITH MORE INSTITUTIONAL WEAKNESSES, MANAGEMENT PRACTICES TEND TO BE WORSE

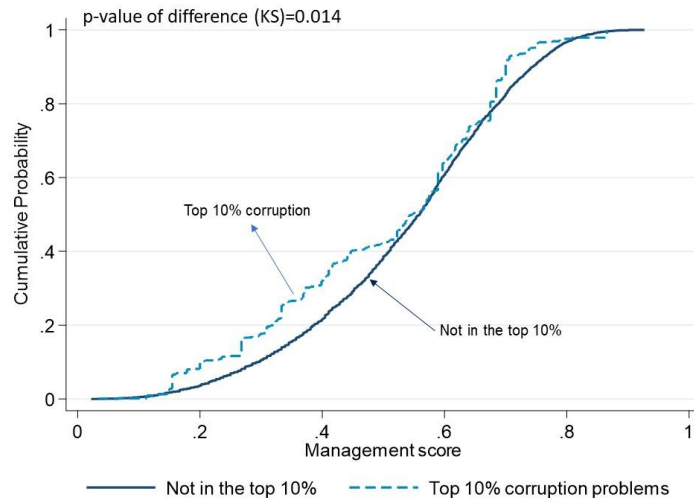
(a) Contract enforcement problems



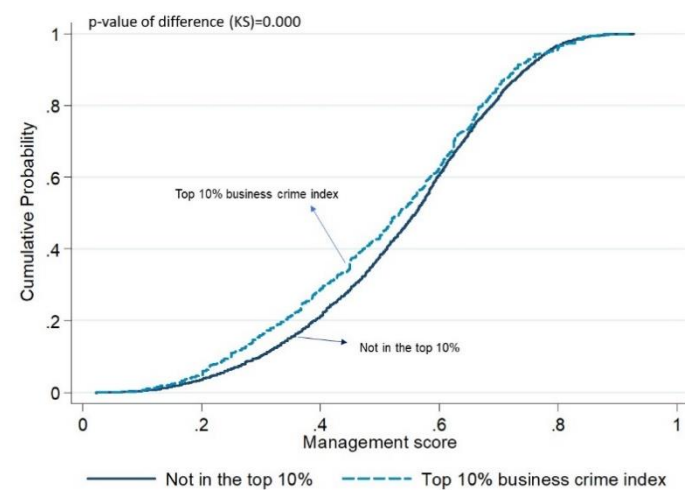
(b) Kidnapping



(c) Corruption

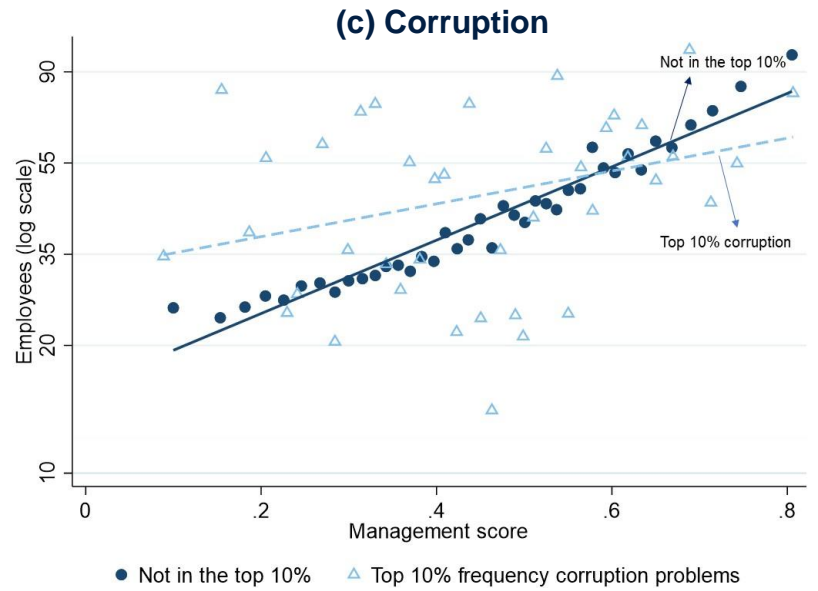
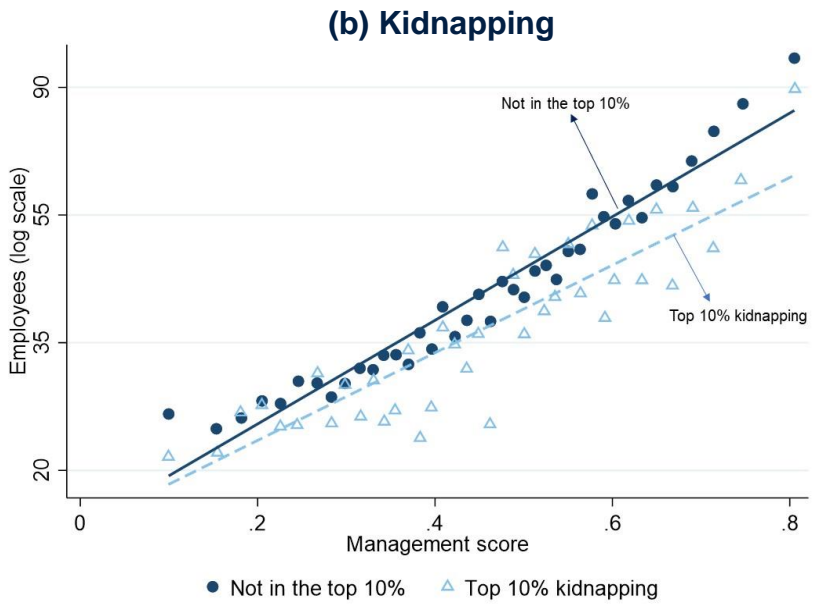


(d) Business crime composite index



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017. *Weighted by size

THESE WEDGES FURTHER CONTRIBUTE TO MISALLOCATION



Notes: Plots of sample of 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 11,967 Mexican services firms in 2014 and 7,509 in 2017.

RESULTS ON PERFORMANCE DO NOT CHANGE IF WE USE PERFORMANCE DATA FROM THE CENSUS

| | Manufacturing | | | Services | | |
|--|-------------------------------|-----------------------|-----------------------|-------------------------------|------------------------|-----------------------|
| | (1) | (2) | (3) | (5) | (6) | (7) |
| | log(Value Added per Employee) | | log(TFP) ¹ | log(Value Added per Employee) | | log(TFP) ¹ |
| Management score | 0.905*** (0.0940) | 0.322*** (0.100) | 0.0910** (0.0457) | 0.433*** (0.0715) | 0.280*** (0.0692) | 0.0535 (0.0407) |
| log(capital/employee) | | 0.0851*** (0.0103) | | | 0.0451*** (0.00545) | |
| log(employees) | | 0.104*** (0.0177) | | | 0.0913*** (0.0155) | |
| Share of workers with a college degree | | 0.400*** (0.149) | | | 0.0330 (0.0642) | |
| 6-digits NAICS | No | Yes | Yes | No | Yes | Yes |
| Observations | 3,808 | 3,808 | 3,808 | 7,286 | 7,286 | 7,286 |

MANAGEMENT IS ALSO INFORMATIVE OF MICROENTERPRISES' PERFORMANCE

| | Microenterprises (manufacturing and services) | |
|--|---|-----------------------|
| | (1) | (2) |
| | log(Value Added per Employee) | |
| Management score | 1.016*** (0.0474) | 0.315*** (0.0461) |
| log(capital/employee) | | 0.124*** (0.00454) |
| log(employees) | | 0.139*** (0.0256) |
| Share white-collar workers | | -0.334*** (0.0492) |
| Share of workers with a college degree | | 0.232*** (0.0429) |
| % rise from 10 th to 90 th management percentile | 88.7 | 21.8 |
| 6-digits NAICS | No | Yes |
| Time | Yes | Yes |
| Observations | 11,655 | 11,655 |

MANAGEMENT IS POSITIVELY CORRELATED WITH EMPLOYMENT GROWTH AND NEGATIVELY CORRELATED WITH FIRM EXIT

| Dependent variable: | Employment growth (annualized) | | | Exit (annualized) | | |
|---------------------|--------------------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | (1) Manufacturing | (2) Services | p-value difference | (3) Manufacturing | (4) Services | p-value difference |
| | Panel (a) | | | | | |
| Management | 0.164*** (0.0226) | 0.092*** (0.0156) | 0.008 | -0.047*** (0.0084) | -0.025*** (0.0054) | 0.028 |
| R ² | 0.016 | 0.004 | | 0.009 | 0.002 | |
| Observations | 3307 | 8900 | | 3,707 | 10,175 | |
| | Panel (b) | | | | | |
| ln(VA/employee)* | 0.038*** (0.0039) | 0.030*** (0.0036) | 0.142 | -0.009*** (0.0015) | -0.005*** (0.0013) | 0.026 |
| R ² | 0.032 | 0.015 | | 0.014 | 0.003 | |
| Observations | 3307 | 5137 | | 3,707 | 5,878 | |

ALTERNATIVE DEFINITION OF INSTITUTIONAL WEAKNESSES

| Dependent variable=ln(workers) | (1) Top 5% share firms contract enforcement problems | (2) Top 5% kidnapping | (3) Top 5% share firms with gov. corruption problems | (4) Top 5% Business crime composite index |
|--|--|-----------------------------|--|--|
| Management score | 1.593*** (0.0571) | 1.546*** (0.0520) | 1.590*** (0.0557) | 1.588*** (0.0379) |
| High level*Management score | -0.287* (0.148) | -0.189 (0.173) | -1.044*** (0.170) | -0.320* (0.1860) |
| Share of firms in municipalities with high-level | 4.67% | 4.11% | 3.30% | 3.73% |
| 6-digits NAICS | Yes | Yes | Yes | Yes |
| Municipality effects | Yes | Yes | Yes | Yes |
| Time | Yes | Yes | Yes | Yes |
| Observations | 24,214 | 24,214 | 24,214 | 24,214 |

SIMPLE MODEL MANAGEMENT AND FRICTIONS

Assumptions:

- Heterogeneous firms
- Imperfect product market competition
- Monopolistic competition with Dixit-Stiglitz preferences
- Input markets are competitive (firms face common equilibrium wage, W)
- Regulatory/institutional distortions (modelled as an implicit revenue tax)

Production function for firm i in an industry, following Lucas (1978) span of control model:

$$Q_i = M_i L_i^\alpha$$

Where:

Q =output, L =labor, M =managerial quality

$\alpha < 1$, degree of managerial overload -> decreasing returns to scale

Iso-elastic product demand function:

$$Q_i = B P_i^{-\eta}$$

Where:

B =demand shifter, P = product price, $\eta > 1$ =consumer price-sensitivity

Profits for a firm are:

$$\Pi_i = (P_i Q_i)^{\frac{1}{\tau}} - W L_i$$

$\tau \geq 1$ = implicit tax on revenues

Maximizing and solving:

$$l_i = \kappa + \frac{1}{d - \alpha} m_i - \frac{\alpha}{d - \alpha} w$$

where $\kappa = \frac{\frac{1}{\eta^\tau} b + \ln \alpha + \ln \left(\frac{\eta - 1}{\tau \eta} \right)}{1 - \alpha \left(\frac{\eta - 1}{\tau \eta} \right)}$, $d = \frac{\tau}{\left(1 - \frac{1}{\eta} \right)}$ and $\mu = \frac{P}{c} = \frac{1}{\left(1 - \frac{1}{\eta} \right)}$ is the firm's price-cost margin that increases as competition falls.

d is a composite of frictions from the product market (i.e., monopoly power indexed by μ) and/or from regulatory/institutional distortions (τ). In the absence of frictions $d = 1$.

Proposition 1. $\frac{\partial l_i}{\partial m_i} > 0$ *Better Managed firms will be larger*

Proof. The elasticity of log employment size, l with respect to management quality, m is $\frac{\partial l}{\partial m_i} = \frac{1}{d-\alpha}$. Since $d \geq 1$ and $\alpha < 1$, this is positive.

Proposition 2. $\frac{\partial^2 l_i}{\partial m_i \partial d} < 0$. *The impact of management quality on firm employment size is decreasing in the degree of frictions.*

Proof. This can be directly seen from Proposition 1. The magnitude of the employment-management elasticity is decreasing with the size of frictions, d .

Corollary. $\frac{\partial^2 l_i}{\partial m_i \partial \mu} < 0$ and $\frac{\partial^2 l_i}{\partial m \partial \tau} < 0$. Increases in firm market power (falls in η cause a rise in margins μ) and increases in distortions τ) reduce the elasticity of employment with respect to managerial quality. As frictions increase, the impact of better management on firm size, although remaining positive, will decline.