

MANAGEMENT IN MEXICO: MARKET SIZE, FRICTIONS, AND MISALLOCATION

International MOPS Workshop

*December 11th, 2019
U.S. Census Bureau*

Nicholas Bloom (Stanford)

Leonardo Iacovone (World Bank)

Mariana Pereira-López (World Bank & Universidad Iberoamericana)

John Van Reenen (MIT)



WORLD BANK GROUP
Trade & Competitiveness

Agenda

I. Motivation

II. Data: ENAPROCE 2015 and 2018

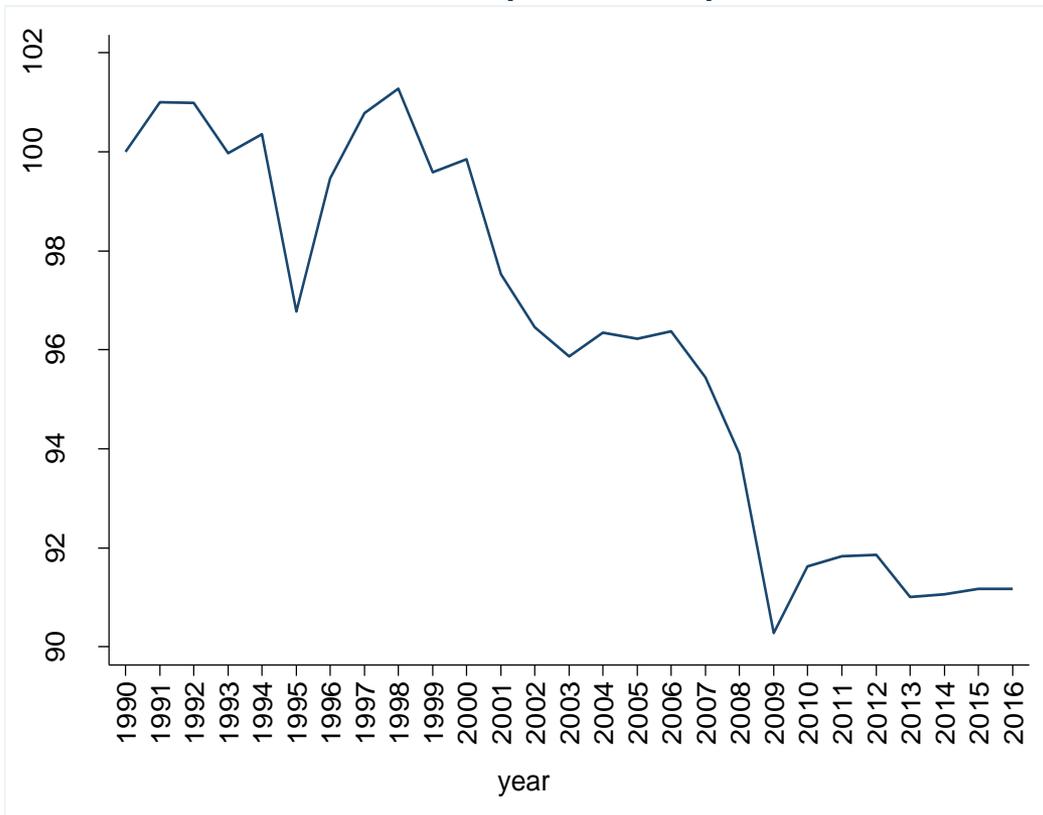
III. Management practices results for Mexico

IV. Conclusions

V. Next steps

MEXICO HAS SHOWN WEAK ECONOMIC PERFORMANCE IN THE LAST TWO DECADES MAINLY DRIVEN BY A PRODUCTIVITY DECLINE

Total Factor Productivity Index, Mexico, 1990-2016 (1990=100)



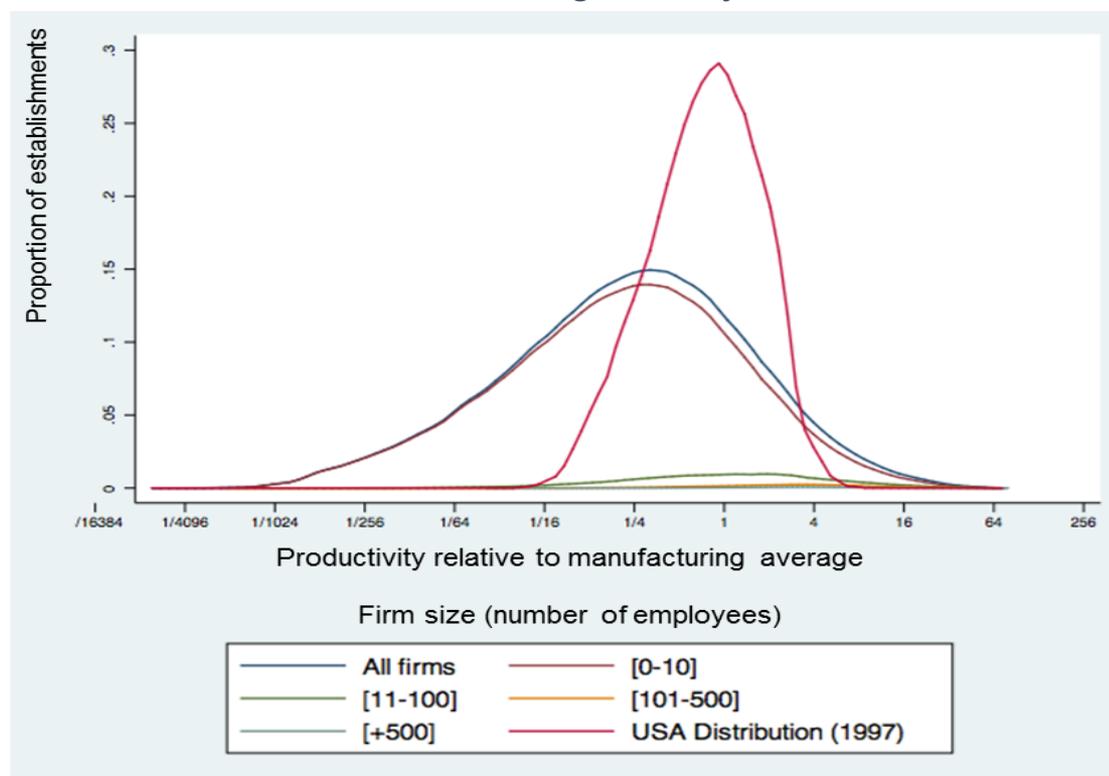
- Need of better data to identify binding constraints that firms in Mexico face.

Source: World Bank staff calculations with data from INEGI.

GREAT AND PERSISTENT DIFFERENCES IN PRODUCTIVITY

These differences are higher in developing countries and account for an important fraction of GDP per capita differences (*Hsieh & Klenow, 2007; Bloom et al., 2010; Hall & Jones, 1999*).

Mexico's manufacturing TFP by size vs. U.S.

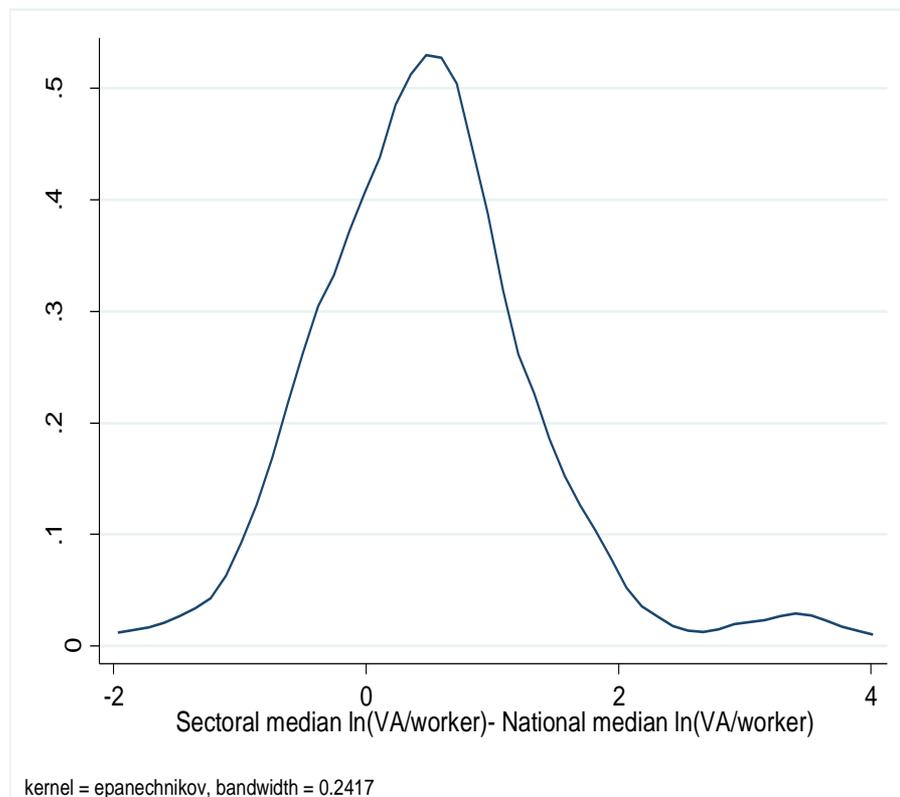


Source: World Bank staff calculations with data from INEGI and Pages (2010)

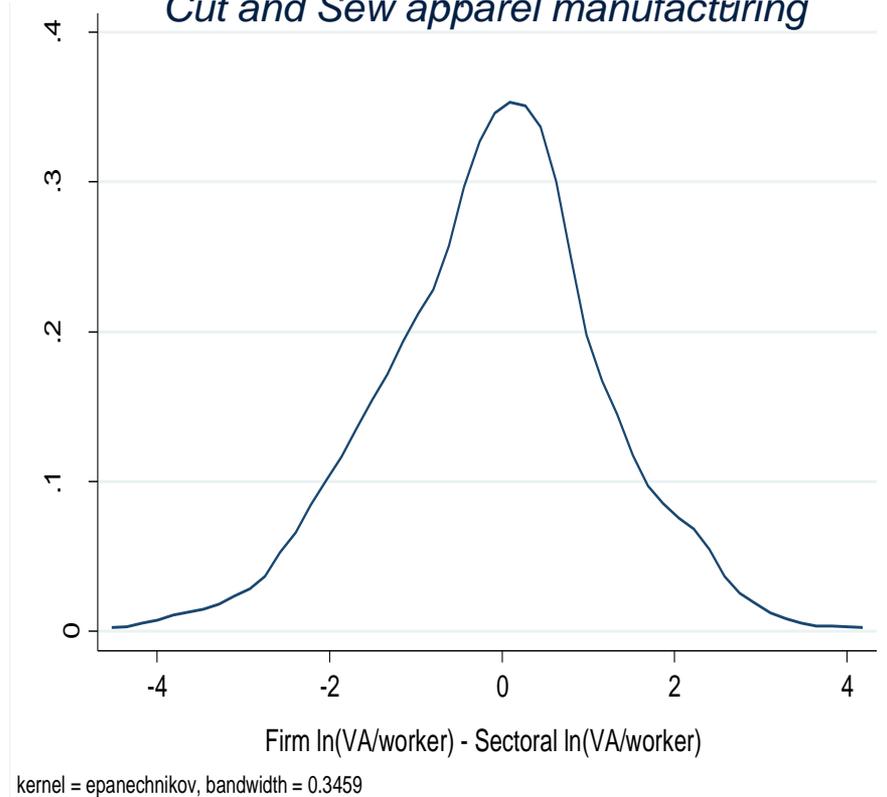
EVEN WITHIN NARROWLY DEFINED SECTORS...

Dispersion in labor productivity between and within sectors

Distance between NAICS 4-digits labor productivity and national labor productivity



*Distance between firm labor productivity and sectoral labor productivity
Cut and Sew apparel manufacturing*



RESEARCH QUESTIONS

- Is the relation between management and performance in Mexico similar to what is observed in other countries?
- What explains better managerial practices among Mexican firms?
- Are drivers of management different in services vs. manufacturing sectors?

ENAPROCE 2015 AND 2018

FIRST OFFICIAL LARGE-SCALE MANAGEMENT SURVEY IN MANUFACTURING AND SERVICES IN A DEVELOPING COUNTRY CONTEXT

- ENAPROCE is fully comparable with the U.S. MOPS
- Statistically representative at the state and sector levels.
- Includes information for 25,456 firms of the manufacturing, and services sectors.
 - A different questionnaire was applied to 9,103 microenterprises.
- The survey was implemented by INEGI (national statistics office), which guaranteed a very low non-response rate (4%).
- The sample framework is the 2014 Economic Census, which allows to match the information with other National high-quality statistical projects.

ENAPROCE 2018: SECOND WAVE DESIGNED AS A PANEL (RESPONSE RATE OF 77%)

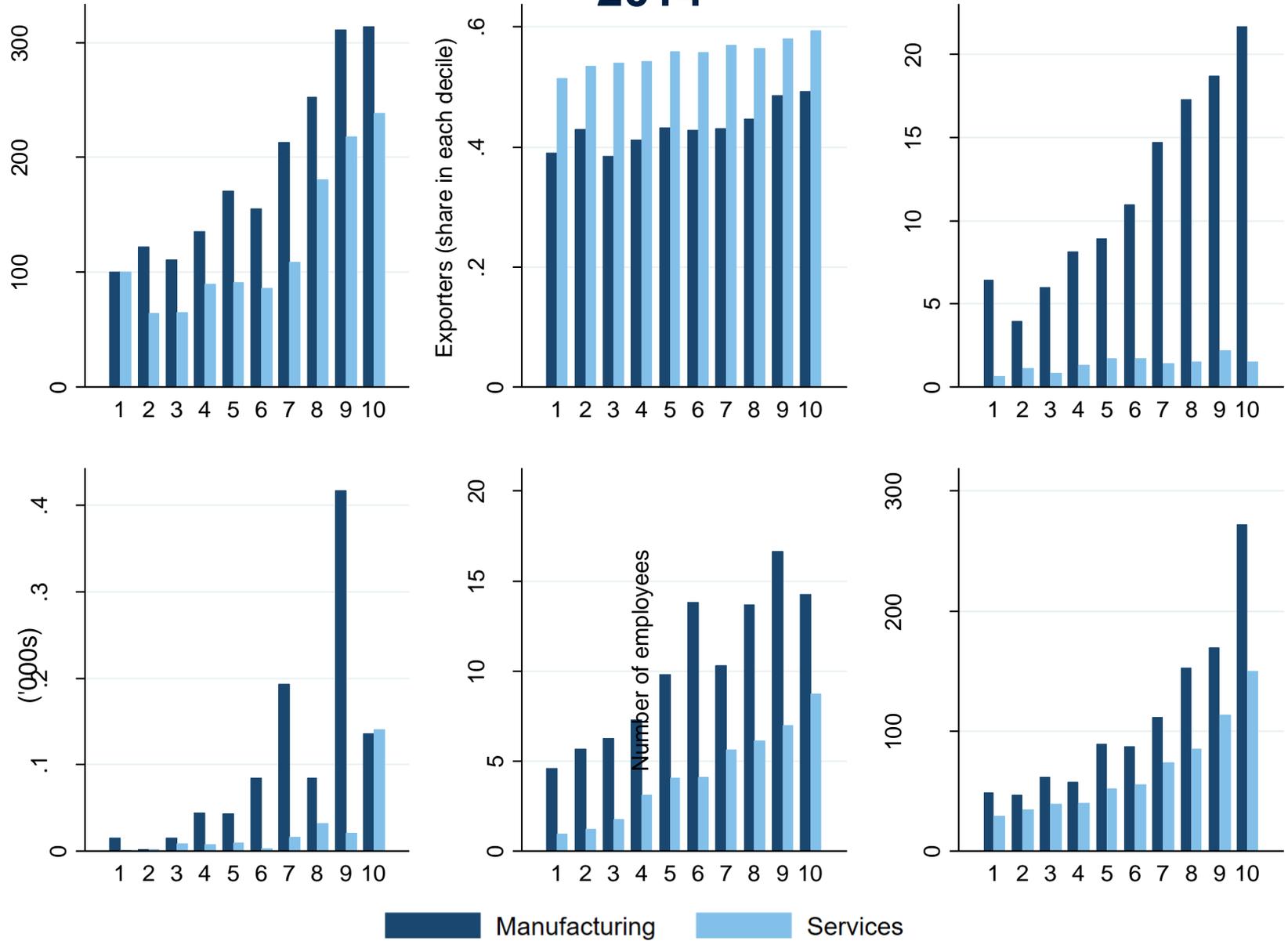
Comparison of samples

	Sample 2015	Sample 2018	Panel
Micro	9,103	3,302	2,768
Small	10,701	14,148	7,841
Medium	3,921	4,738	3,200
Large	1,731	1,740	1,278

MANAGEMENT PRACTICES RESULTS FOR MEXICO

MANAGEMENT PRACTICES AND FIRMS' PERFORMANCE

2014



Notes: Results for the sample of 3,729 Mexican manufacturing plants and 10,307 services firms

MANAGEMENT PRACTICES AND FIRMS' PERFORMANCE

Dependent Variable:	2014				
	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	0.7709*** (0.0845)	0.3831*** (0.0773)	0.3522*** (0.1015)	0.3816*** (0.1056)	0.3522*** (0.1006)
Manufacturing dummy*Management score	0.7087*** (0.1330)	0.0134 (0.1276)	0.0293 (0.1454)		
log(capital/employee)		0.0790*** (0.0063)			
log(employees)		0.1086*** (0.0165)			
Share white-collar workers		0.5285*** (0.1405)			
Share of workers with a college degree		0.6350*** (0.0650)			
Observations	9406	9406	9406	3,673	5733
6-digits NAICS	No	Yes	Yes	Yes	Yes

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

MANAGEMENT PRACTICES AND FIRMS' PERFORMANCE

Dependent Variable:	2017				
	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	1.0175*** █ (0.0855)	0.3933*** █ (0.0822)	0.2656*** █ (0.0751)	0.2546** █ (0.1117)	0.2656*** █ (0.0745)
Manufacturing dummy*Management score	0.2963** █ (0.1453)	-0.0312 █ (0.1491)	-0.0110 █ (0.1328)		
log(capital/employee)		0.2035*** █ (0.0092)			
log(employees)		0.1384*** █ (0.0155)			
Share white-collar workers		0.0513 █ (0.1142)			
Share of workers with a college degree		0.5827*** █ (0.0660)			
Observations	12795	12795	12795	3603	9192
6-digits NAICS	No	Yes	Yes	Yes	Yes

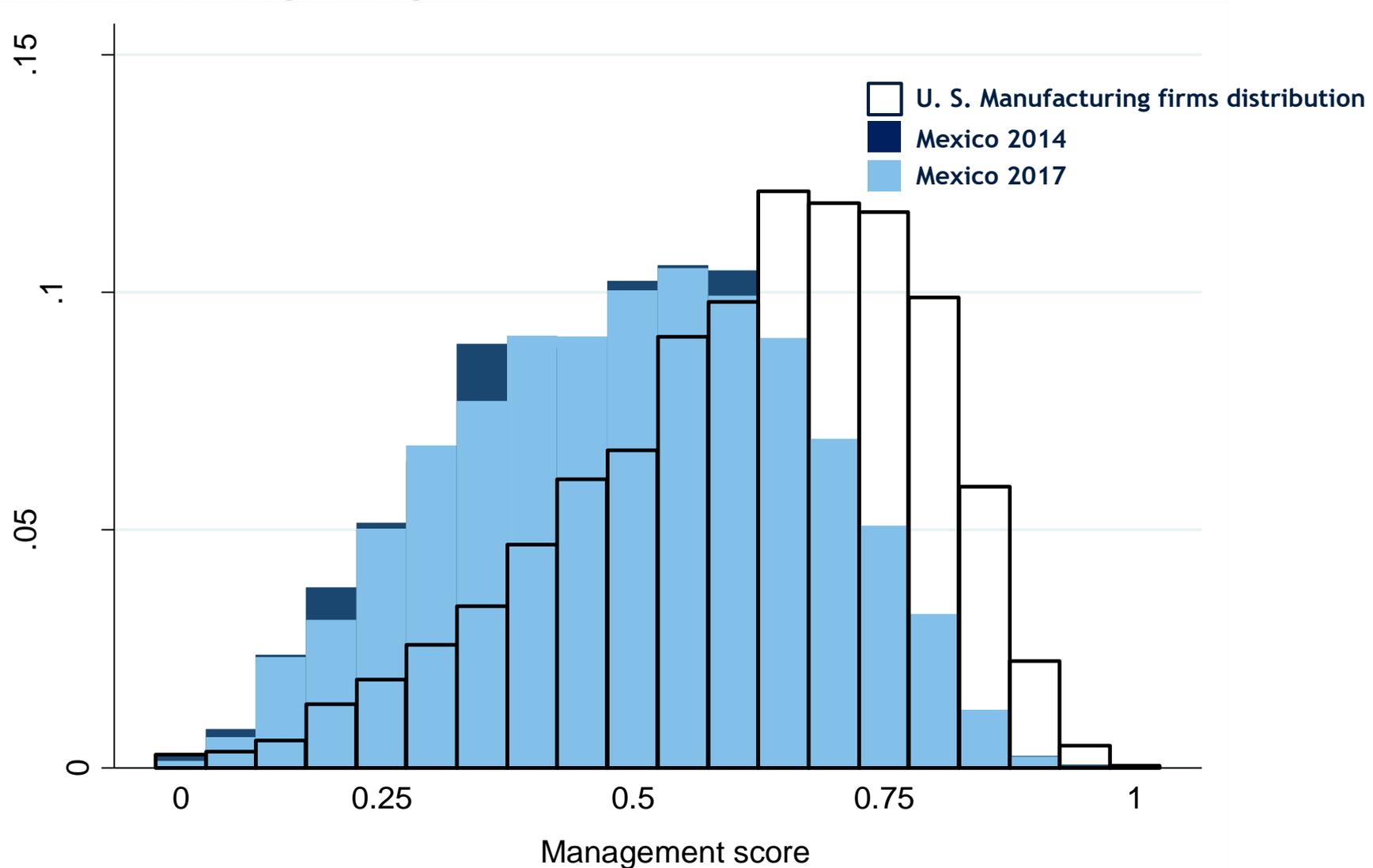
Source: Authors' calculations with data from ENAPROCE 2018, INEGI

MANAGEMENT PRACTICES AND FIRMS' PERFORMANCE

Dependent Variable:	2014, 2017 POOLED				
	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	0.9187*** (0.0615)	0.4064*** (0.0576)	0.3027*** (0.0579)	0.3065*** (0.0755)	0.3124*** (0.0575)
Manufacturing dummy*Management score	0.4668*** (0.0993)	-0.0559 (0.0989)	-0.0295 (0.0971)		
log(capital/employee)		0.2051*** (0.0092)			
log(employees)		0.1370*** (0.0155)			
Share white-collar workers		0.0535 (0.1141)			
Share of workers with a college degree		0.5794*** (0.0661)			
Observations	26427	26427	26427	7276	19151

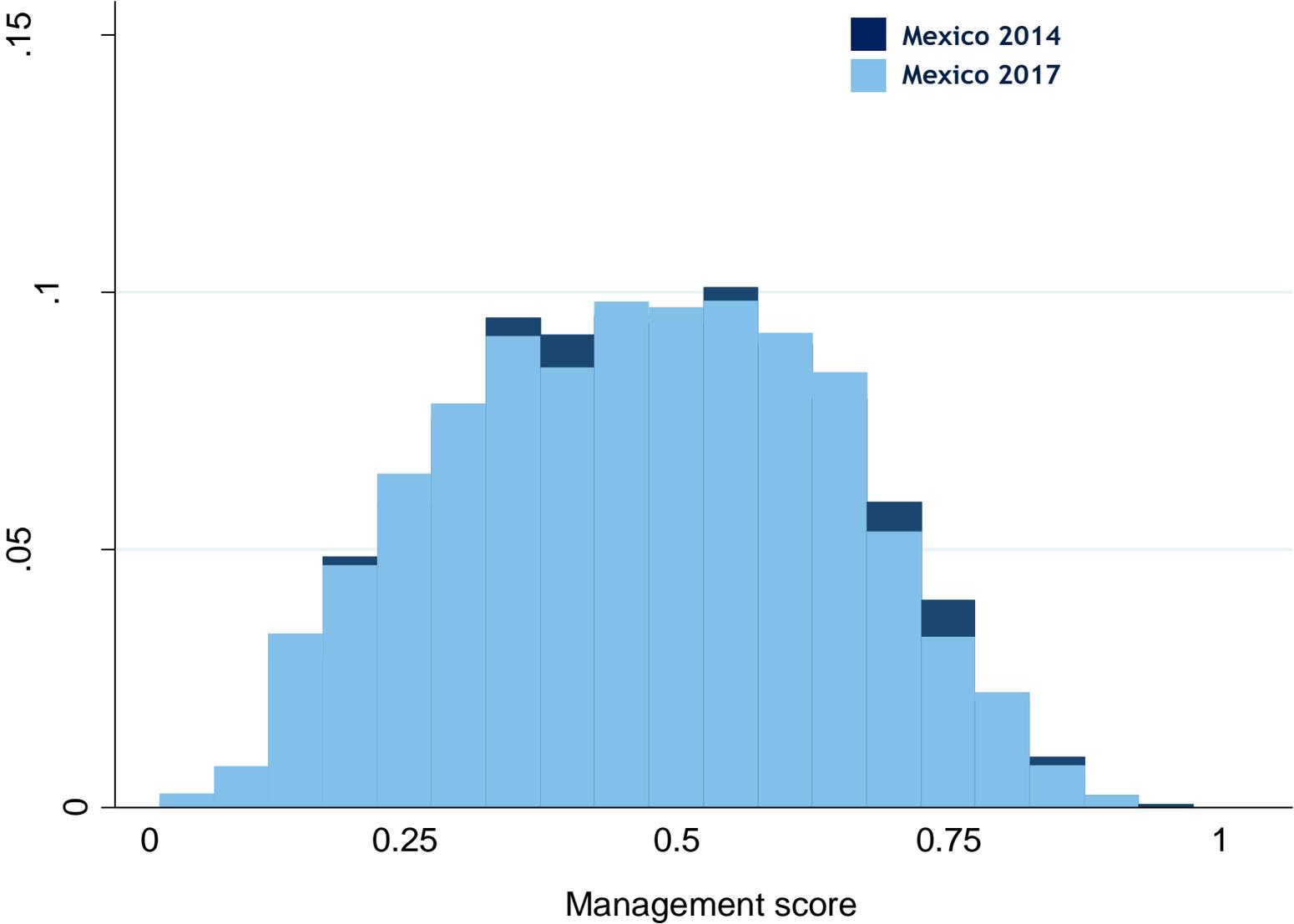
Source: Authors' calculations with data from ENAPROCE 2015 and ENAPROCE 2018, INEGI

COMPARED TO THE U.S., MEXICO LAGS BEHIND IN MANUFACTURING MANAGERIAL SKILLS AND PRACTICES ARE WIDELY DISPERSED



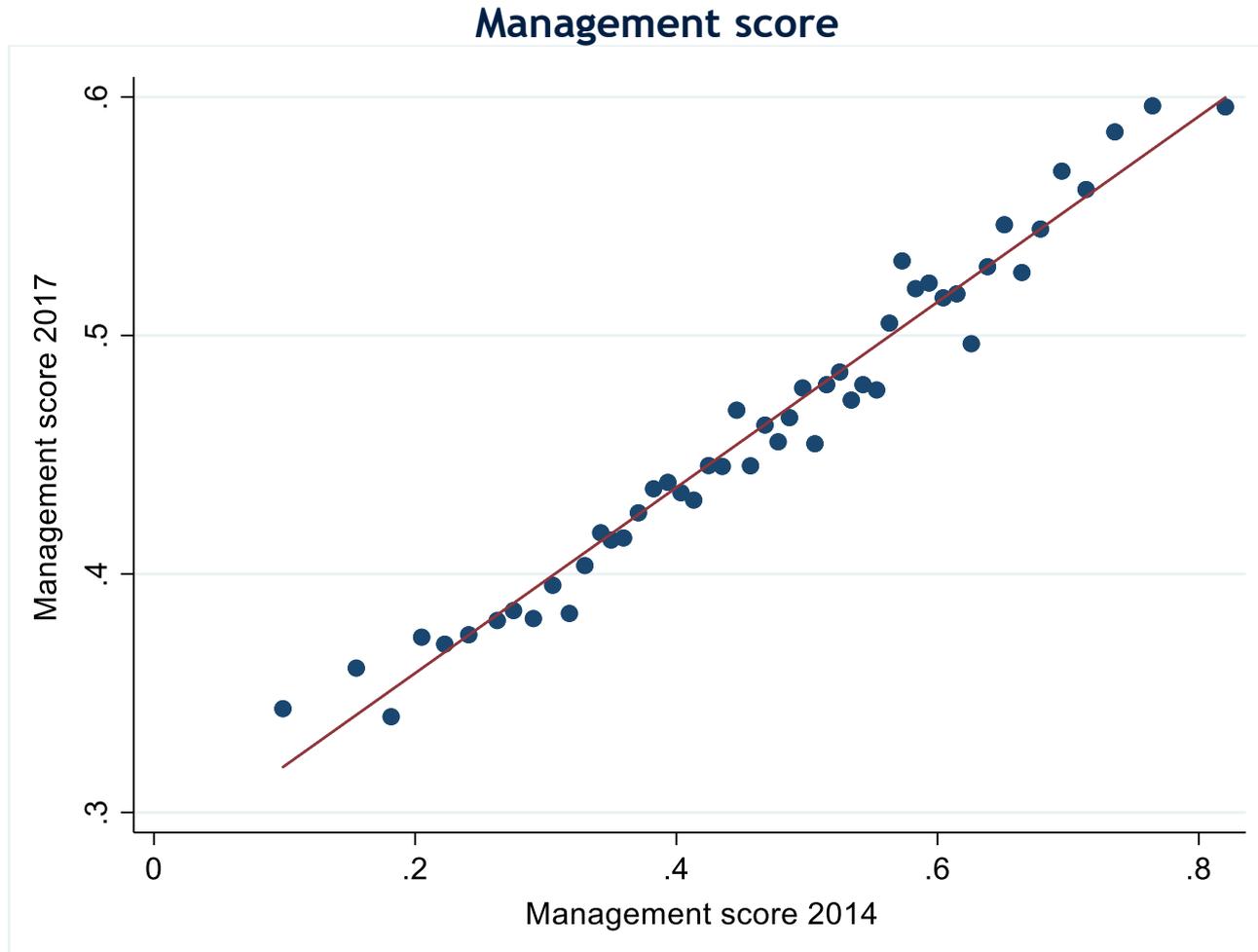
Notes: Plots of sample of 3,729 Mexican manufacturing firms in 2014, 3,620 in 2017 against the distribution for 32,000 U.S. plants from Bloom et al. (2019)

AND MANAGEMENT SCORES ARE EVEN LOWER FOR SERVICES



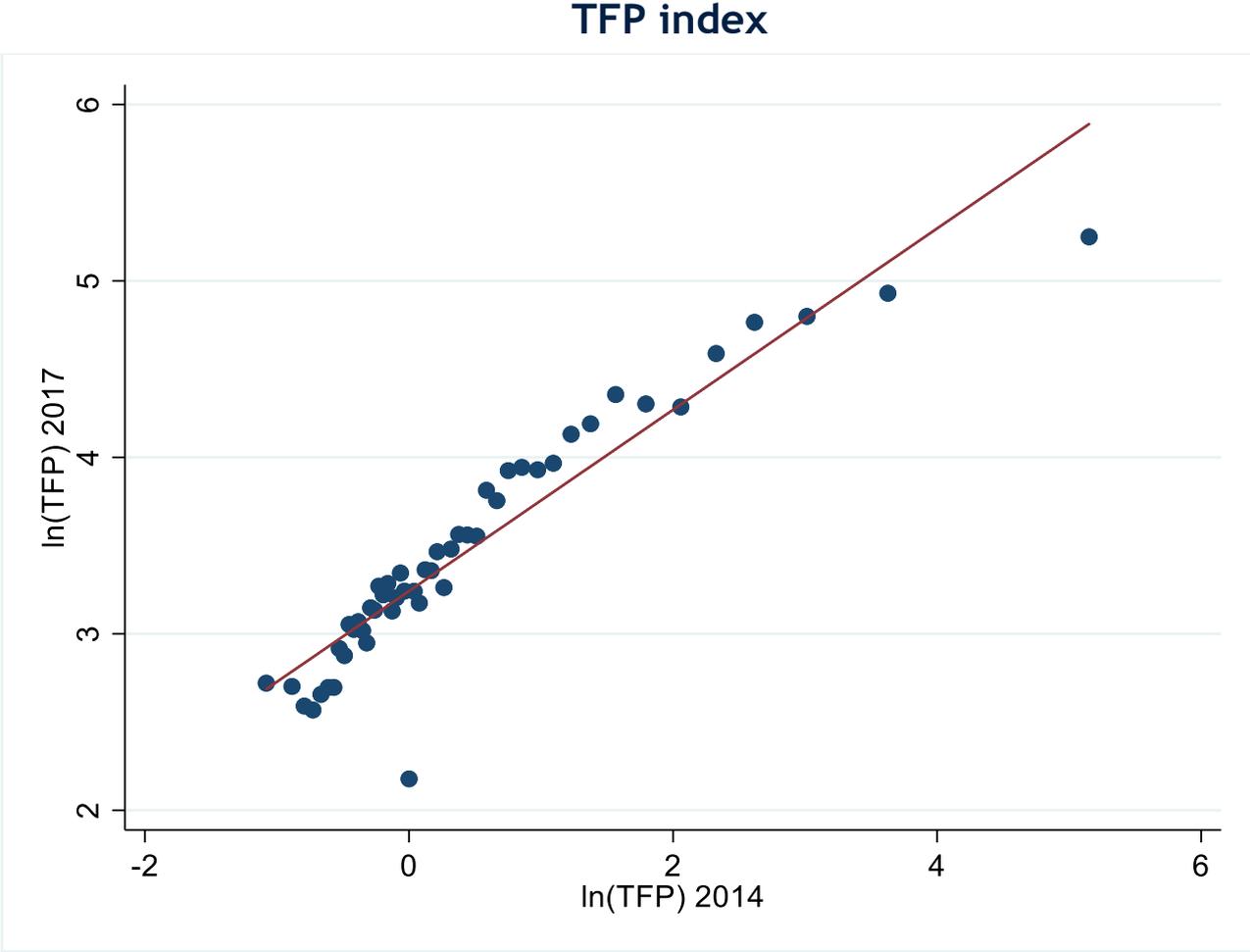
Notes: Plots of sample of 10,307 Mexican service firms in 2014, and 7,469 in 2017.

RESULTS FROM ENAPROCE 2018 ARE VERY SIMILAR TO ENAPROCE 2015



Source: Authors' calculations with data from ENAPROCE 2015 and ENAPROCE 2018, INEGI

RESULTS FROM ENAPROCE 2018 ARE VERY SIMILAR TO ENAPROCE 2015



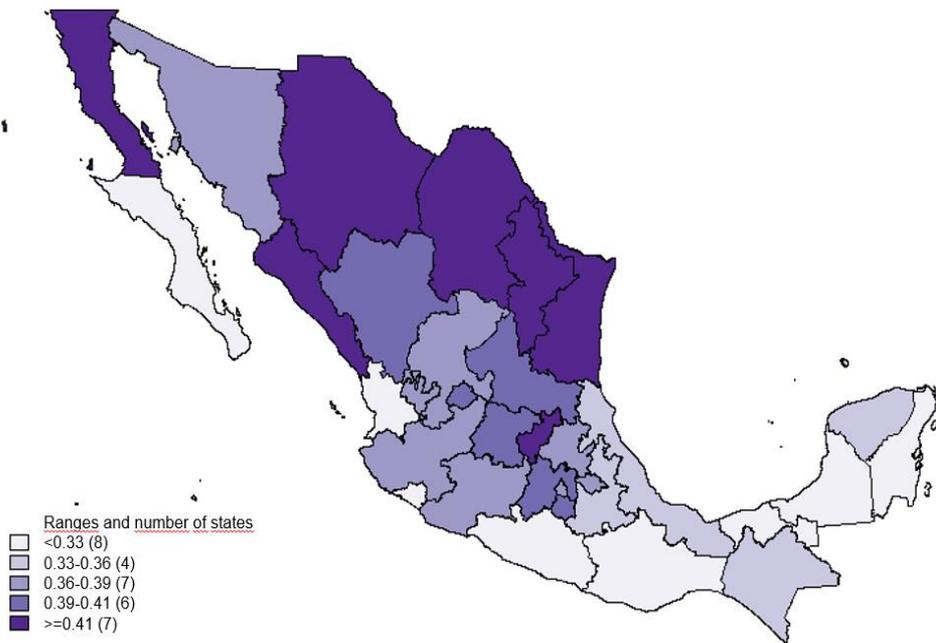
Source: Authors' calculations with data from ENAPROCE 2015 and ENAPROCE 2018, INEGI

MANAGEMENT PRACTICES' REGIONAL PATTERNS DIFFER ACROSS SECTORS...

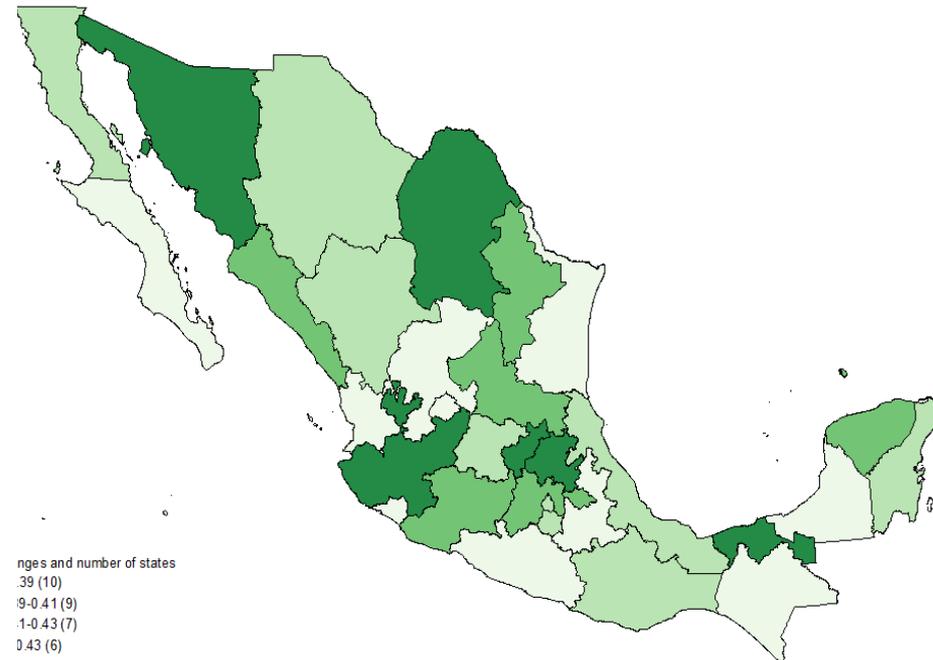
Best management practices in manufacturing are observed in the North, near the U.S. border, while best management in services are observed near the big cities.

Management by state 2014

Manufacturing



Services



* sample of 3,729 Mexican manufacturing firms

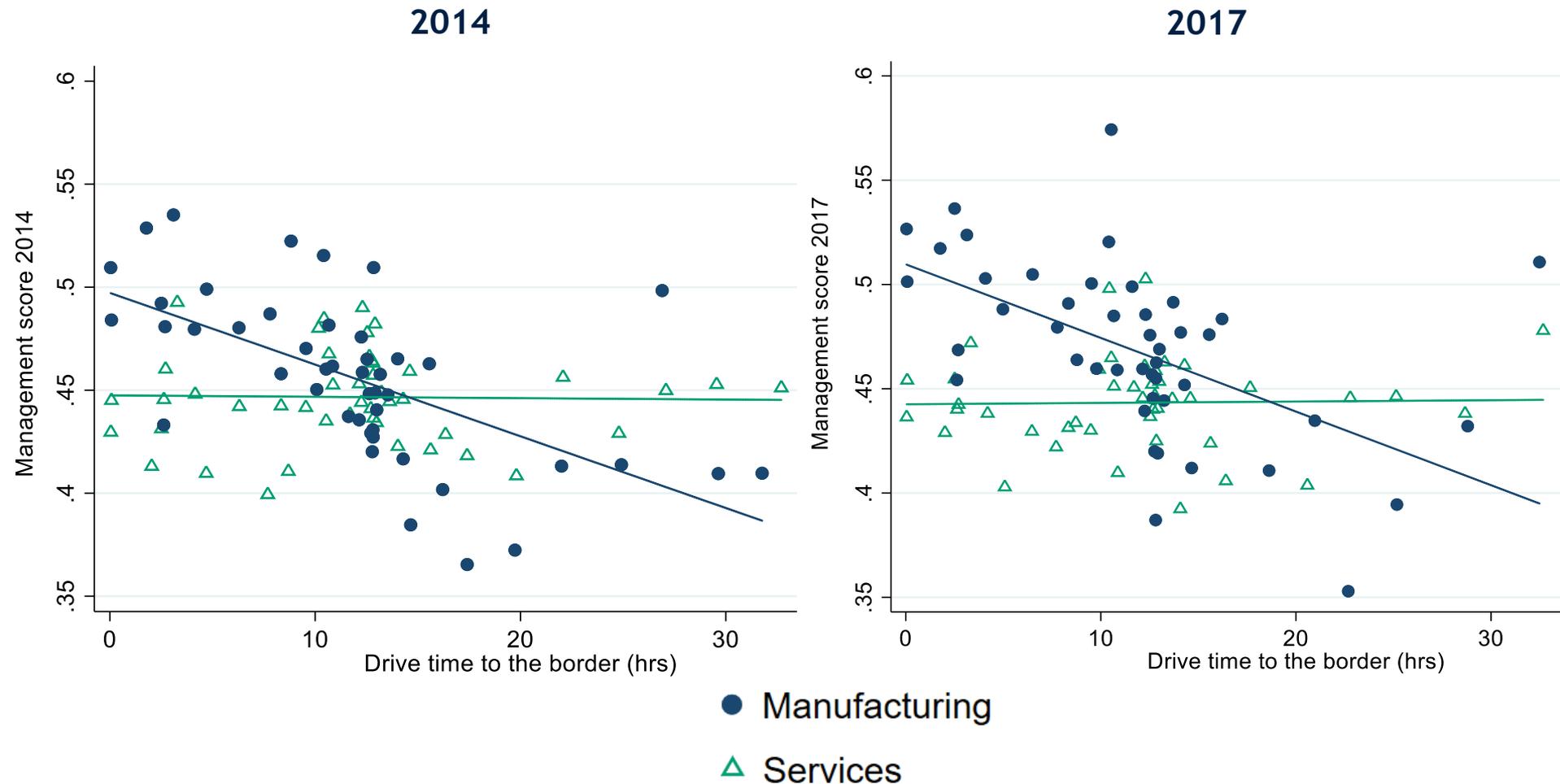
* sample of 10,307 Mexican services firms

TO MEASURE HOW WELL ARE FIRMS CONNECTED TO THE U.S. 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.



MANUFACTURING FIRMS LOCATED CLOSER TO THE U.S BORDER HAVE BETTER MANAGEMENT



Source: Authors' calculations with data from ENAPROCE 2015 and ENAPROCE 2018, INEGI

MANUFACTURING FIRMS LOCATED CLOSER TO THE U.S BORDER HAVE BETTER MANAGEMENT

Dependent variable: Management score	Whole sample		Firms existed before 1990		Dependent variable: log(TFP)	
	Manufacturing and services (1)	(2)	Manufacturing (3)	Services (4)	Manufacturing (5)	Services (6)
2014						
Manufacturing dummy	0.0501*** (0.0117)	.				
Drive time to border (hrs)	-0.0001 (0.0004)	0.0003 (0.0005)	-0.0036** (0.0014)	-0.0002 (0.0006)	-0.0135** (0.0054)	-0.0008 (0.0050)
Manuf. Dummy*Drive time	-0.0034*** (0.0008)	-0.0020** (0.0010)				
Share white-collar workers		0.0765*** (0.0179)				
Share workers with college		0.0564*** (0.0095)				
ln(capital/employee)		0.0043*** (0.0006)				
6-digits NAICS	No	Yes	No	No	No	No
Region	No	Yes	No	No	No	No
Observations	13,632	13,632	1,173	2,285	3673	5733

Source: Authors' calculations with data from ENAPROCE 2015

MANUFACTURING FIRMS LOCATED CLOSER TO THE U.S BORDER HAVE BETTER MANAGEMENT

Dependent variable: Management score	Whole sample		Firms existed before 1990		Dependent variable:	
	Manufacturing and (1)	(2)	Manufacturing (3)	Services (4)	Manufacturing (5)	Services (6)
2014, 2017 pooled regression						
Manufacturing dummy	0.0571*** (0.0056)	-0.0748*** (0.0264)				
Drive time to border (hrs)	-0.0000 (0.0002)	0.0009** (0.0003)	-0.0033*** (0.0008)	-0.0003 (0.0005)	-0.0053* (0.0028)	0.0015 (0.0063)
Manuf. Dummy*Drive time	-0.0035*** (0.0005)	-0.0027*** (0.0009)				
Share white-collar workers		0.0211* (0.0122)				
Share workers with college		0.0618*** (0.0068)				
ln(capital/employee)		0.0050*** (0.0006)				
Dummy 2017=1	0.0010 (0.0019)	0.0014 (0.0019)	0.0013 (0.0064)	-0.0012 (0.0050)	2.3548*** (0.0207)	2.4201*** (0.0231)
6-digits NAICS	No	Yes	No	No	No	No
Region	No	Yes	No	No	No	No
Observations	24,214	24,214	2108	3783	5838.000	8044.000

Source: Authors' calculations with data from ENAPROCE, INEGI

THIS RELATIONSHIP APPEARS TO BE DRIVEN BY ACCESS TO THE U.S. MARKET...

2014								
Dependent variable: Management score	Manufacturing					Dependent variable: log(TFP)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Drive time to border (hrs)	-0.0035*** ▲ (0.0008)	-0.0014 ▲ (0.0010)	-0.0005 ▲ (0.0012)	-0.0003 ▲ (0.0011)	0.0005 ▲ (0.0013)	-0.0013 ▲ (0.0072)	0.0012 ▲ (0.0075)	
Share of exports*Drive time =1 if any participation of FDI		-0.0077** ▲ (0.0032)	-0.0072** ▲ (0.0034)	-0.0084** ▲ (0.0035)	-0.0134** ▲ (0.0064)	-0.0733*** ▲ (0.0221)	-0.0558* ▲ (0.0325)	
Share white-collar workers				▲ 0.0284 ▲ (0.0267)	▲ 0.0593 ▲ (0.0477)		-0.5096*** ▲ (0.1774)	
Share workers with college				▲ 0.0866*** ▲ (0.0213)	▲ 0.1110*** ▲ (0.0274)		▲ 0.5483*** ▲ (0.1530)	
ln(capital/employee)				▲ 0.0058*** ▲ (0.0013)	▲ 0.0042** ▲ (0.0017)			
6-digits NAICS	No	No	No	Yes	Yes	No	Yes	
Region	No	No	Yes	Yes	Yes	Yes	Yes	
Observations	3,727	3,727	3,727	3,727	3,727	3,727	3,727	

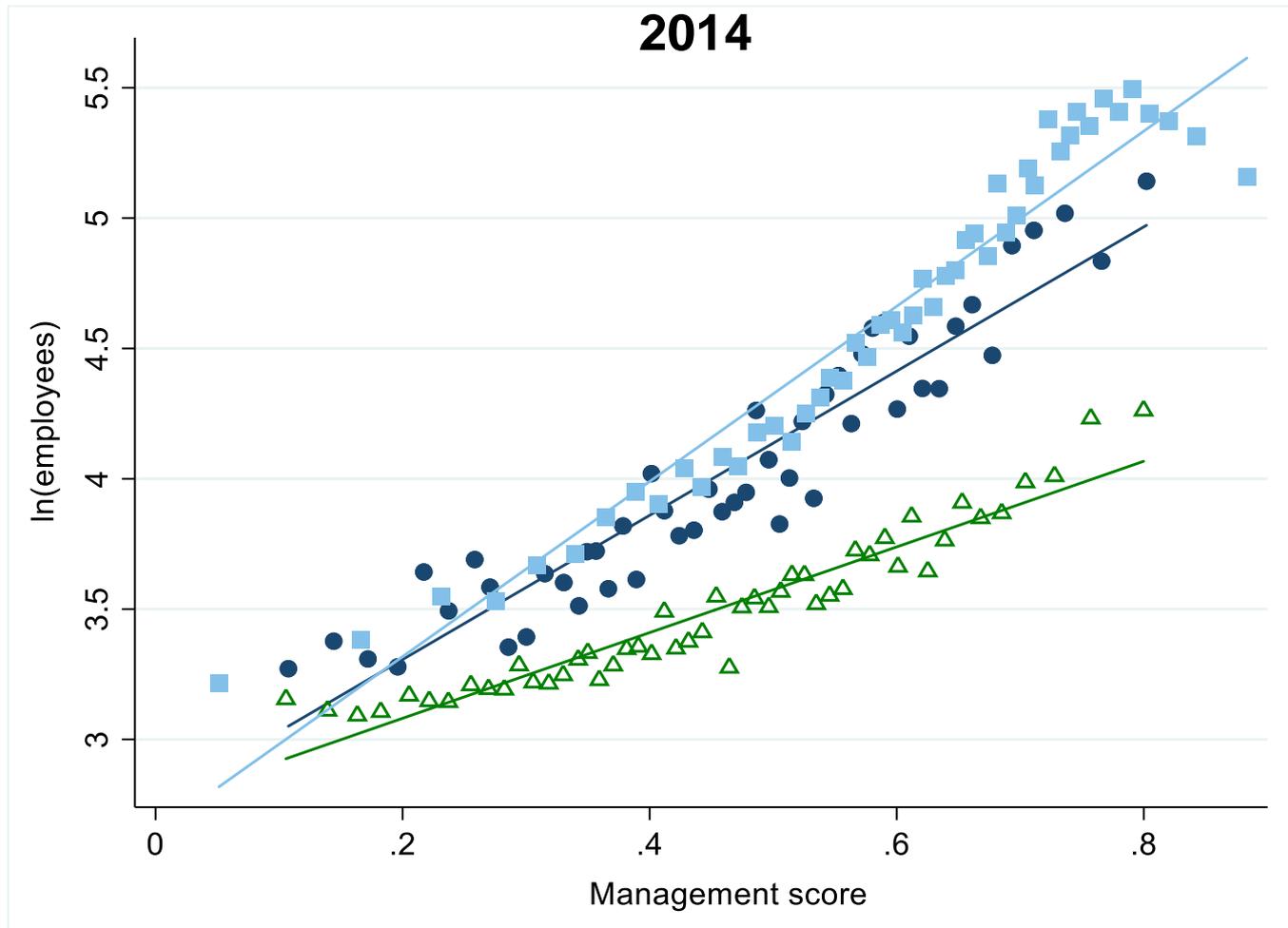
Source: Authors' calculations with data from ENAPROCE 2015, INEGI

WHILE THE SIZE OF THE LOCAL MARKET MATTERS FOR FIRMS IN THE SERVICES SECTOR

Dependent variable: Management score	2014							
	All		Manufacturing	Services	Manufacturing	Services	Dependent variable: log(TFP)	
	(1)	(2)	(3)	(4)	(5)	(6)	Manufacturing	Services
Services dummy	-0.210*** (0.0436)	-0.196*** (0.0680)						
ln(MA population density*average income)	-0.00768 (0.0055)	-0.00589 (0.00422)	-0.00589 (0.00430)	0.00498** (0.00220)			0.0240 (0.0243)	0.0619*** (0.0189)
Services dummy*ln(MA pop. density*av. income)	0.0137*** (0.00297)	0.0109** (0.00466)						
Small urban area					<i>Baseline</i>	<i>Baseline</i>		
Medium urban area					0.00811 (0.0118)	0.00851 (0.00652)		
Metropolitan area					-0.00166 (0.0113)	0.0194*** (0.00691)		
Large Metropolitan Area					-0.0240* (0.0124)	0.0188** (0.00759)		
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6-digits NAICS	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13997	13843	3707	10136	3707	10136	3707	10136

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

SIZE INCREASES WITH MANAGERIAL PRACTICES IN MEXICO BUT LESS SO THAN IN THE US ...EVIDENCE OF MISALLOCATION?



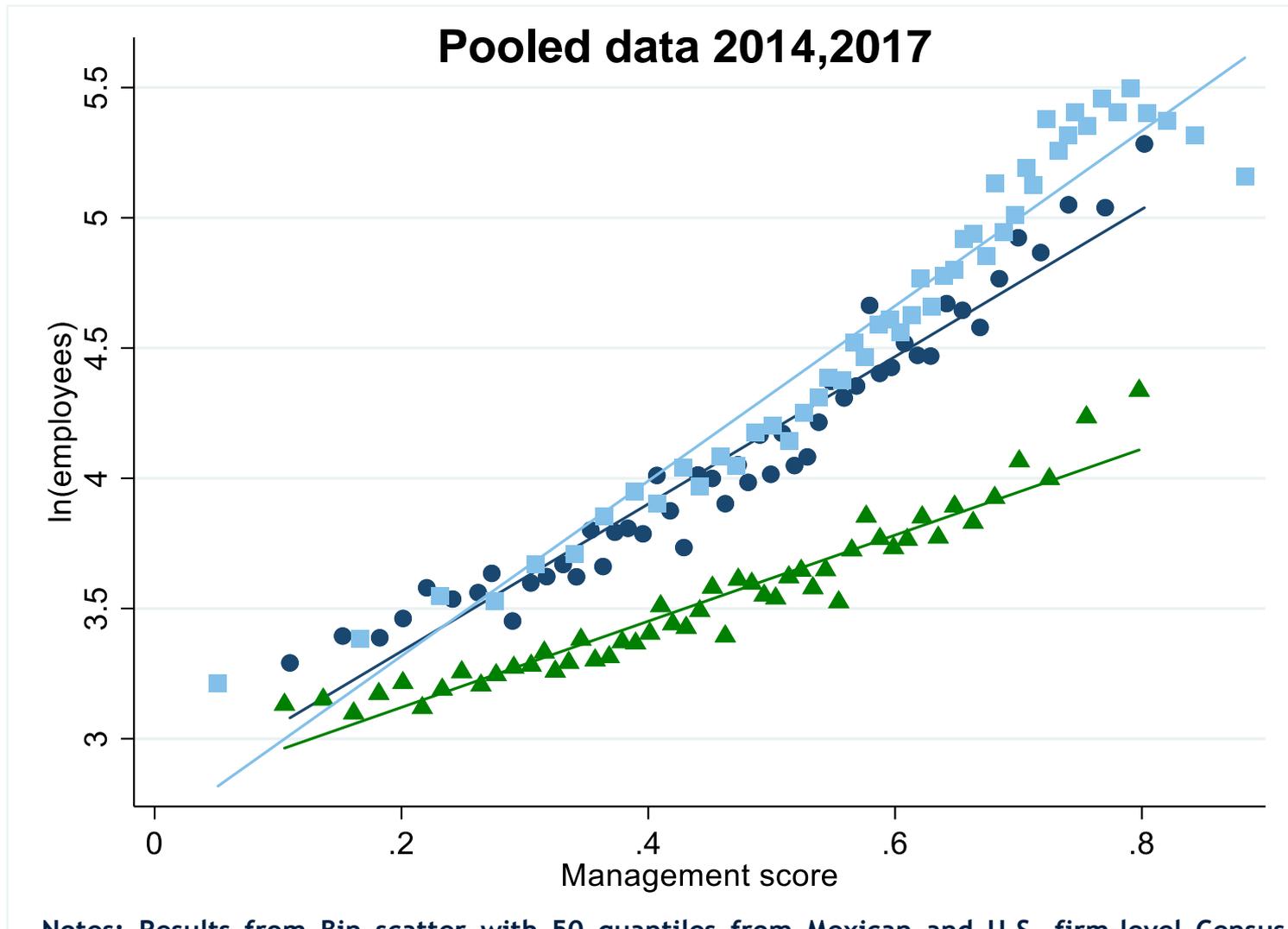
Notes: Results from Bin scatter with 50 quantiles from Mexican and U.S. firm-level Census management data. U.S data described in Bloom et al. (2018). Regression results reported for log(employment) on management score across the 50 bins. Samples 3,729 Mexican manufacturing plants, 10,307 Mexican services firms, and 32,000 US manufacturing plants which have been aggregated into 18,000 firms for this analysis.

SIZE INCREASES WITH MANAGERIAL PRACTICES IN MEXICO BUT LESS SO THAN IN THE US ...EVIDENCE OF MISALLOCATION?



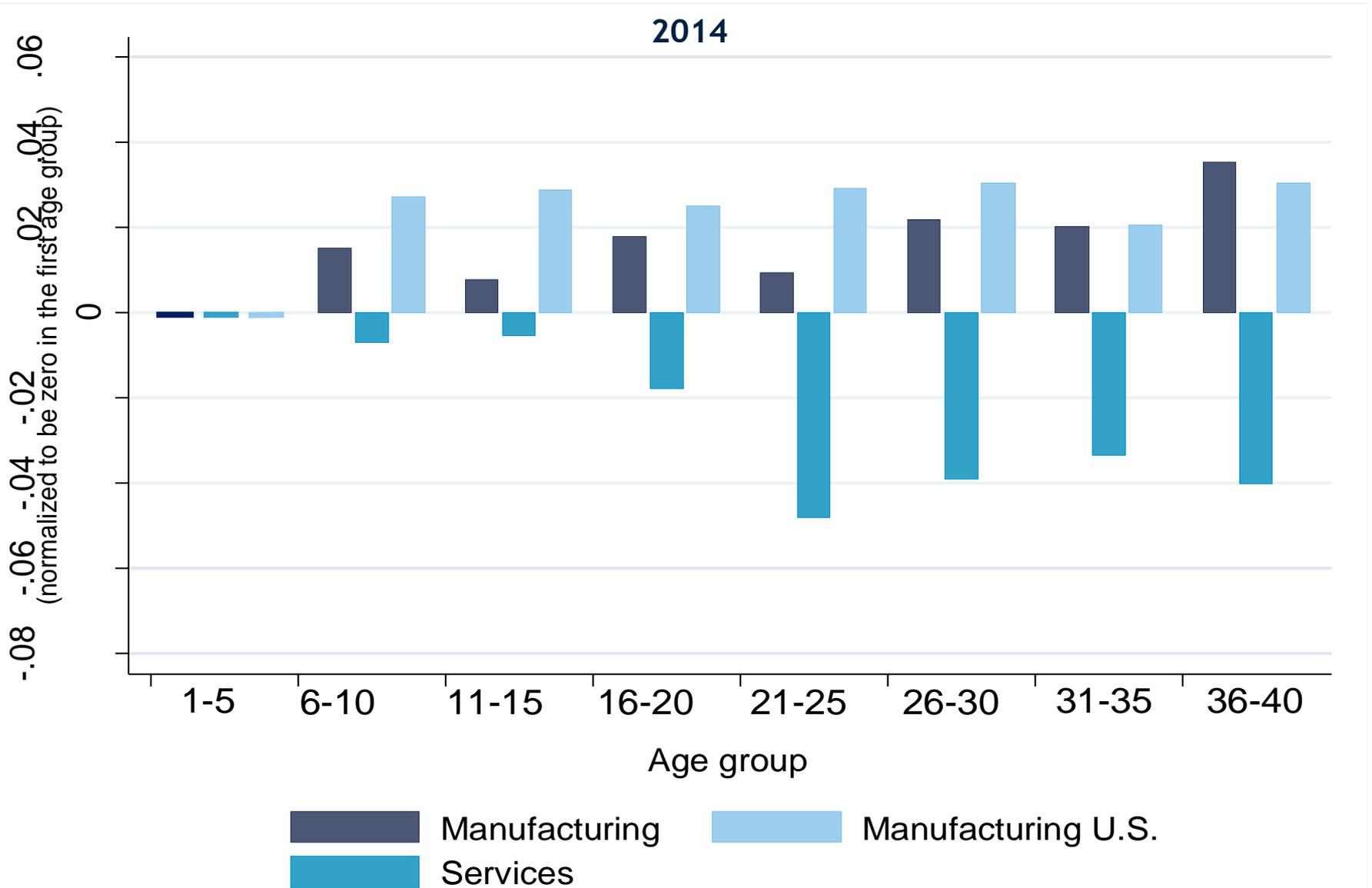
Notes: Results from Bin scatter with 50 quantiles from Mexican and U.S. firm-level Census management data. U.S. data described in Bloom et al. (2018). Regression results reported for $\log(\text{employment})$ on management score across the 50 bins. Samples 3,620 Mexican manufacturing plants, 7,469 Mexican services firms, and 32,000 US manufacturing plants which have been aggregated into 18,000 firms for this analysis.

SIZE INCREASES WITH MANAGERIAL PRACTICES IN MEXICO BUT LESS SO THAN IN THE US ...EVIDENCE OF MISALLOCATION?



Notes: Results from Bin scatter with 50 quantiles from Mexican and U.S. firm-level Census management data. U.S data described in Bloom et al. (2018). Regression results reported for log(employment) on management score across the 50 bins. Samples 7,349 Mexican manufacturing plants, 17,776 Mexican services firms, and 32,000 US manufacturing plants which have been aggregated into 18,000 firms for this analysis.

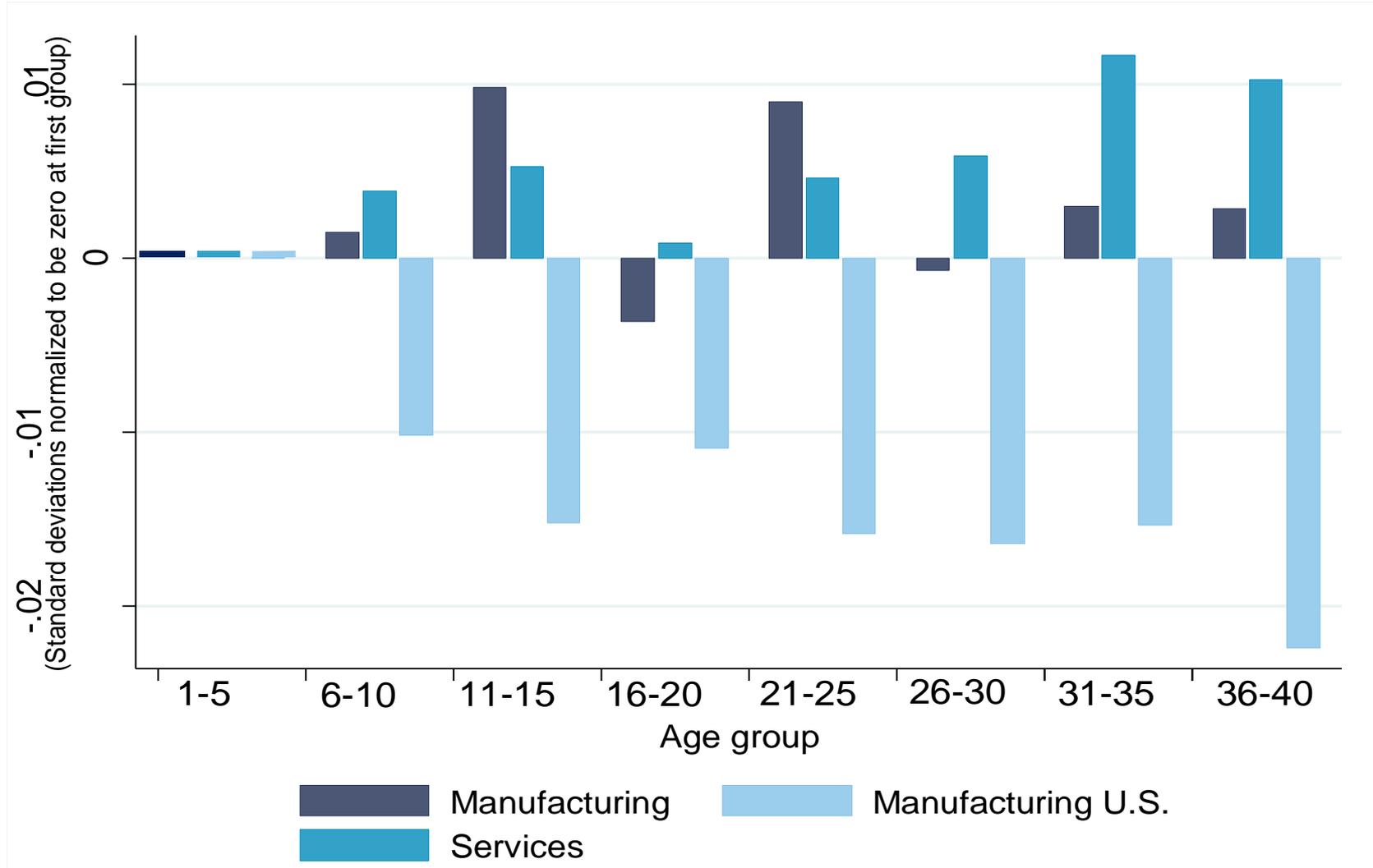
OLDER SERVICES FIRMS ARE NOT BETTER MANAGED WHILE MANUFACTURING FIRMS ARE...MORE EVIDENCE OF MISALLOCATION?



Notes: Plots of sample of 3,729 Mexican manufacturing firms, 10,307 Mexican services firms and 32,000 US manufacturing plants

MANAGEMENT DISPERSION DOES NOT DECREASE WITH AGE, ESPECIALLY IN THE CASE OF SERVICES

2014



Notes: Plots of sample of 3,729 Mexican manufacturing plants, 10,307 services firms and 32,000 US manufacturing plants

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.
- Controlling for capital-per-worker and size, our results do not change.
- Taking only those firms that only have one establishment does not change the results.
- Excluding most industrialized states does not change the results.

Other results

- 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

- More structured management is positively associated with superior firm performance (higher productivity, profitability, innovation, size, and exports).
- Distance to the US market is a crucial driver for management in the manufacturing sector, especially for those sectors that are more export oriented, but not for services.
- Local market size only seems to matter for managerial performance of firms in the services sector.
- Size increases with managerial capabilities but at a much lower pace than the one observed in U.S. -> Misallocation?
- Older firms in the services sector are not better managed and dispersion does not decrease with age, which reinforces the misallocation hypothesis...
- Competitive and regulatory reforms in Mexico could have important positive effects on welfare. Making US market access worse will damage management, productivity and wellbeing.

NEXT STEPS

- Continue validating the results from 2015 with the 2018 survey.
- Analyze survival and management using data from the 2018 (separating firms that closed from non-respondents).