Management and the Wealth of Nations

John Van Reenen,
Ronald Coase School Professor, LSE
Digital Fellow, MIT IDE

Private Enterprises, Productivity, and Economic Growth (STEG-PEDL Virtual Course)

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Introduction

Measuring Management

Describing Management

What Drives Management

Conclusions

Introduction

- Enormous difference in productivity between firms – "Persistent Performance Differences"

- Management long thought to be an important reason for such differences (Smith, 1776; Walker, 1887; Schumpeter, 1943)

- Last 2 decades have seen huge progress in getting better measures & analyzing management practices

- These have important macro-economic consequences (cross country productivity differences: the Wealth of Nations)

Understanding Growth: Three fundamental sources

- **Innovation:** *Frontier Productivity Growth*
  - Ideas that are new to the world

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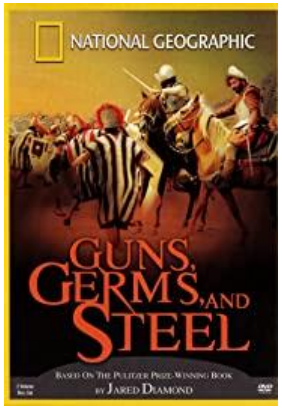

- **Diffusion:** *Catching up to frontier*
  - The spread of these ideas

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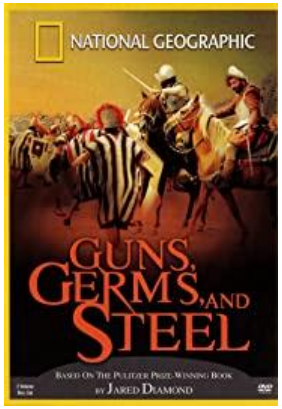

- **Diffusion:** *Catching up to frontier*
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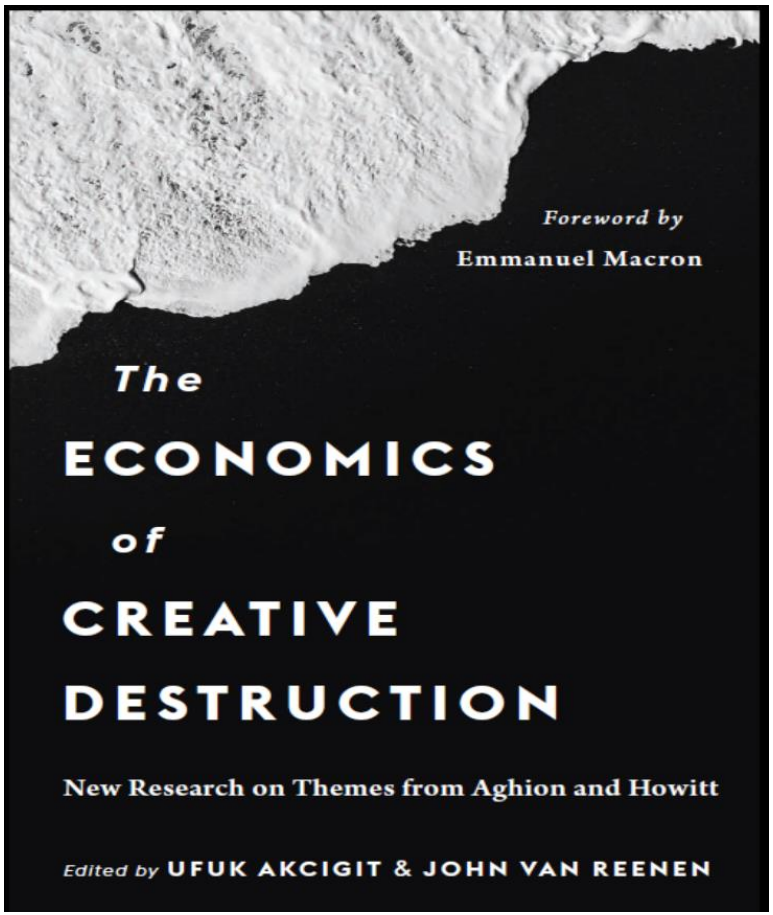
- **Reallocation** Important part of process: innovative & more productive firms displace less efficient (**creative destruction**)

Creative Destruction



NYT Best Sellers List (almost)

Joseph Schumpeter

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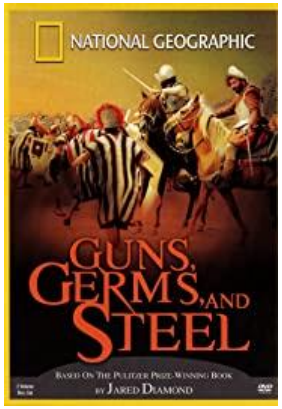

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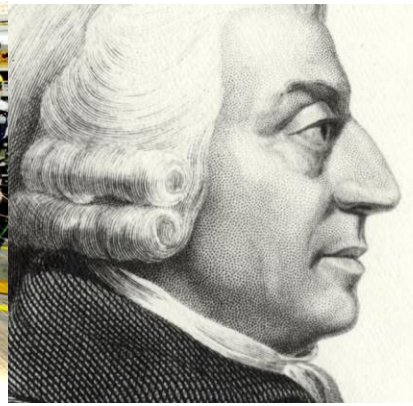
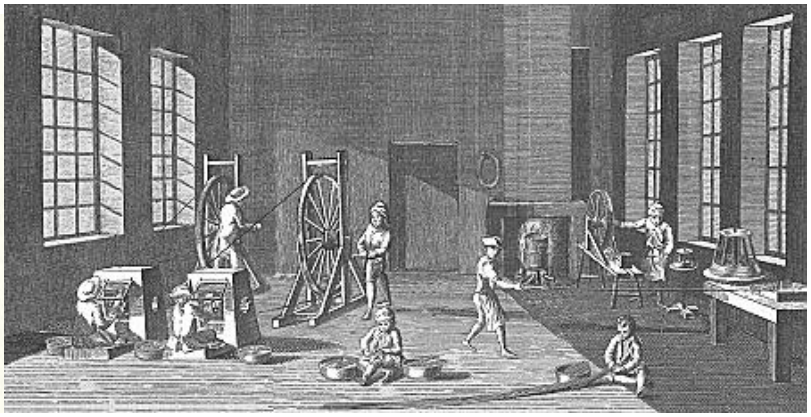
- **All 3 get reflected in macro Total Factor Productivity (TFP)**

TFP is not just “hard technologies”: Management practices also very important

Toyota Plant





Adam Smith and the Pin Factory

TFP is Not by technology alone….

- **Innovations in management,**
  - — Fordist Mass production (1920s)
  - — Sloan's M-form firm (1930s)
  - — Toyota Lean Manufacturing System (1970s)
  - – Global Value Chains; Gig economy (2000s)

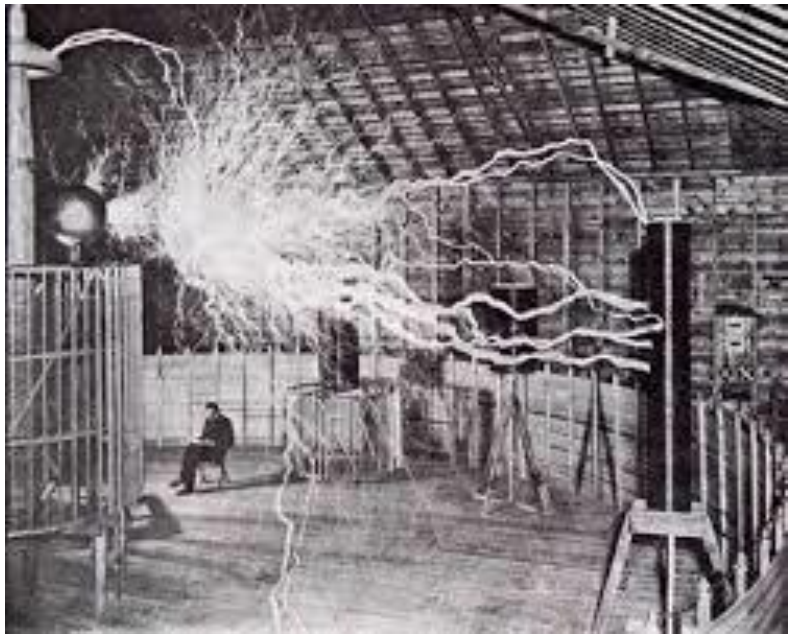
Alfred Sloan

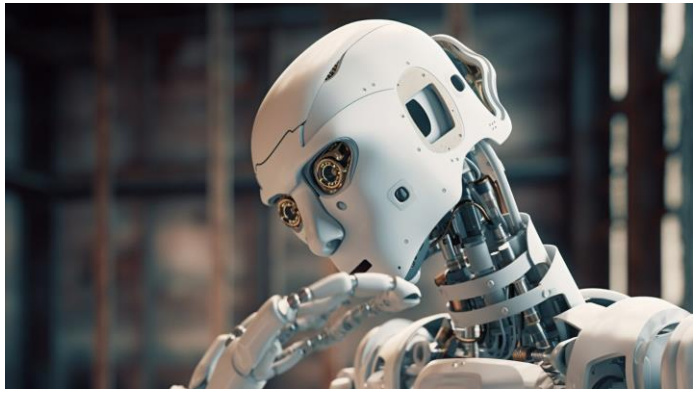
- But diffusion/reallocation likely more important

- Big TFP residual even after controlling for all observable measures of technology

Technology, management & complementarities

- Need to change work organization/management to make best use of innovation (electricity, computers, AI, …)





AI agentic manager-machine interaction (>2020s)?

Technology, management & complementarities

- Econometric work on impact of digital technologies on firm performance also show very heterogeneous impacts (e.g. Stiroh, 2010; Draca et al, 2007; Bronsoler et al., 2022)

- Case studies show that many organizations can invest heavily in technology (e.g. IT in UK NHS) & make little/no return

- Evidence of technology & managerial practice complementarity in productivity. Examples:
  - Bresnahan et al. (2002) US; Atkin et al. (2017); Pakistan; Bloom et al. (2012) EU; Giorcelli (2019) Italy.

But there is still debate on whether management practices really matter

"*No potential driving factor of productivity has seen a higher ratio of speculation to empirical study*".

Chad Syverson (*Journal of Economic Literature*)

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Enron ex-CEO, Jeff Skilling

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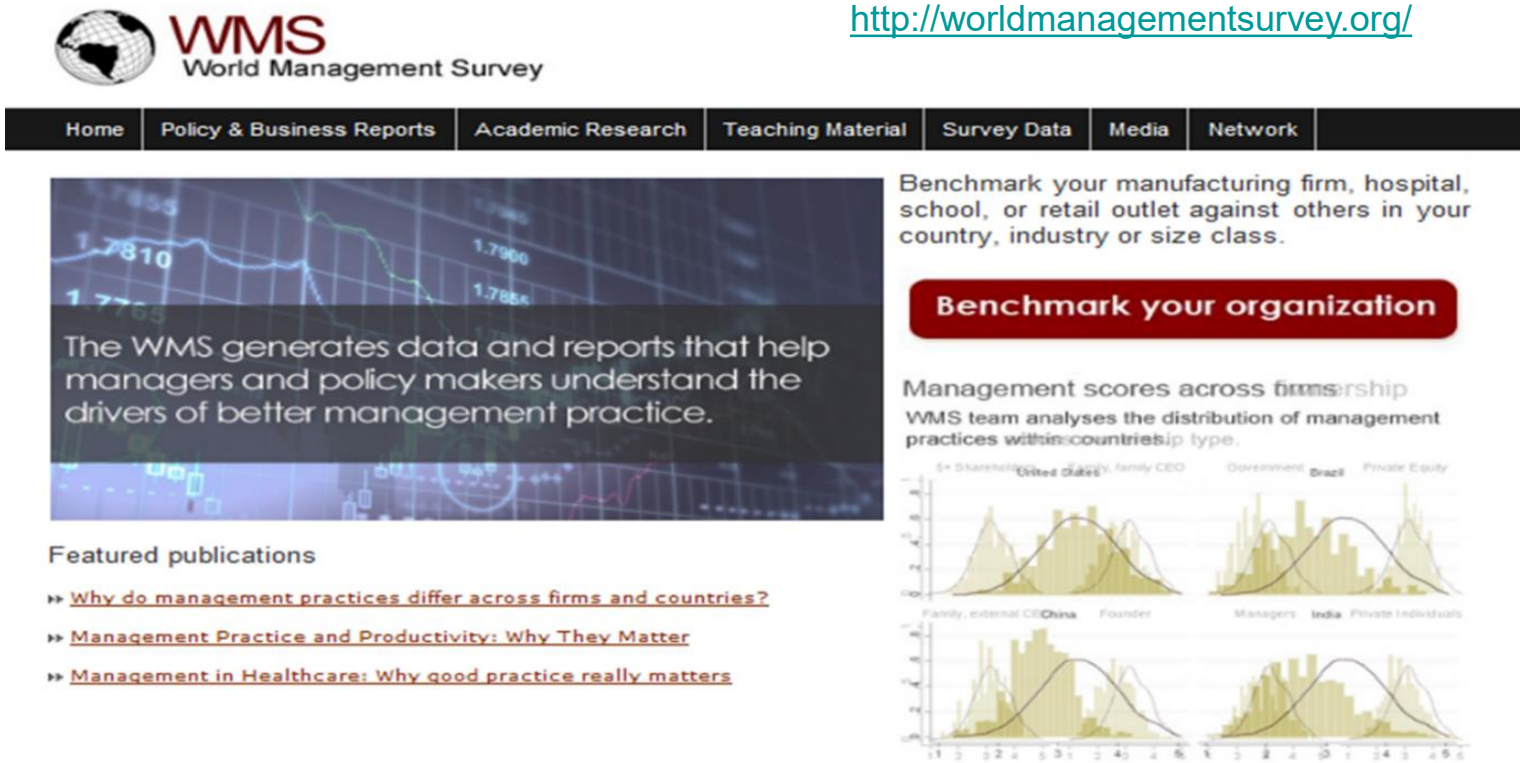
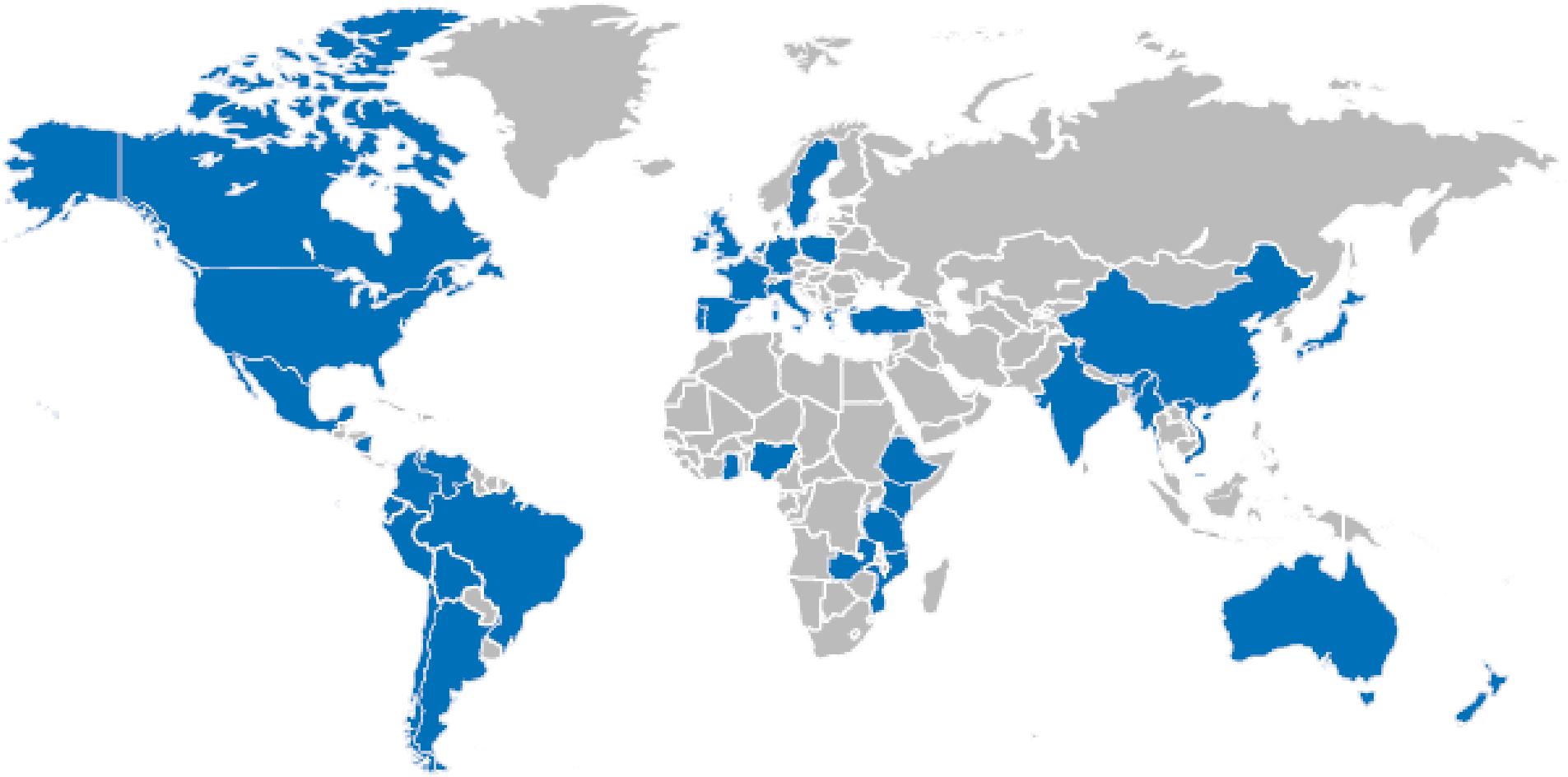
World Management Survey (~25k interviews since 2004, 38 countries)



Medium sized manufacturing firms (50-5,000 workers, median≈250)

Now extended to Retail, Hospitals, Schools, Universities, government, etc.

FIGURE 1: GEOGRAPHIC SCOPE OF THE PROJECT



Note: WMS coverage 2004-2022

WORLD MANAGEMENT SURVEY (WMS); BLOOM & VAN REENEN (2007)

1) Developing management questions (18 dimensions)

- Scorecard for 18 **monitoring** (e.g. lean), **targets & people** (e.g. pay, promotions, retention and hiring). ≈45 minute phone interview of manufacturing plant managers

2) Obtaining unbiased comparable responses (“Double-blind”)

- Interviewers do not know the company’s performance
- Managers are not informed (in advance) they are scored

3) Getting firms to participate in the interview

- Official Endorsement: Bundesbank, Bank of England, RBI, etc.
- Run by 200 MBA types (loud, assertive & business experience)

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Example monitoring question, scored based on a number of questions starting with "*How is performance tracked?*"

Score	(1): Measures tracked do not indicate directly if overall business objectives are being met. Certain processes aren't tracked at all	(3): Most key performance indicators are tracked formally. Tracking is overseen by senior management	(5): Performance is continuously tracked and communicated, both formally and informally, to all staff using a range of visual management tools

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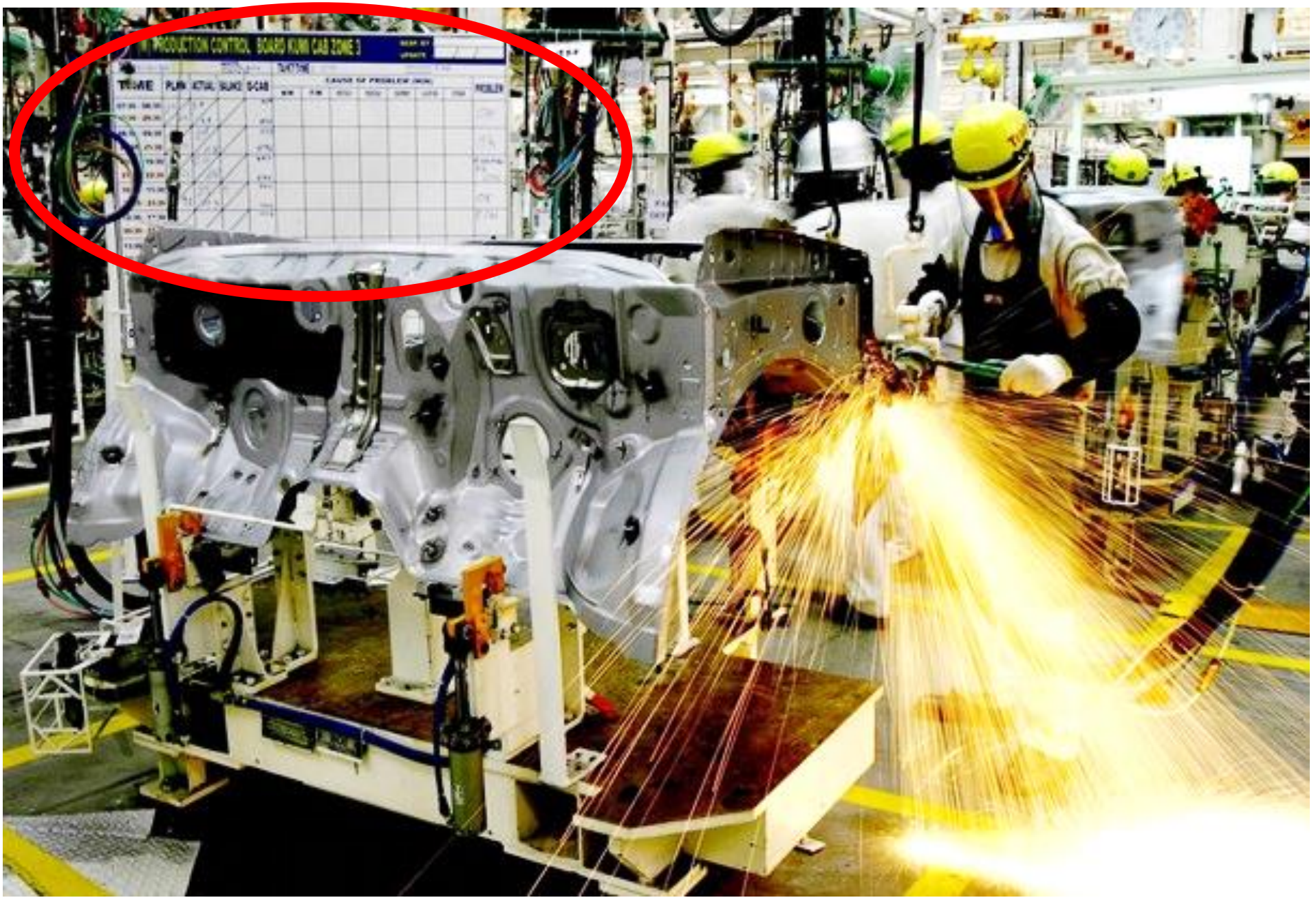
Examples of performance metrics – Car Plant



Examples of a performance metrics – Hospital

MY FAVOURITE QUOTES:

The difficulties of defining ownership in Europe

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Production Manager: “We’re owned by the Mafia”
Interviewer:

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Americans on geography

Interviewer: "How many production sites do you have abroad?

Manager in Indiana, US:

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Interviewer: "How many production sites do you have abroad?

Manager in Indiana, US: "Well…we have one in Texas…"

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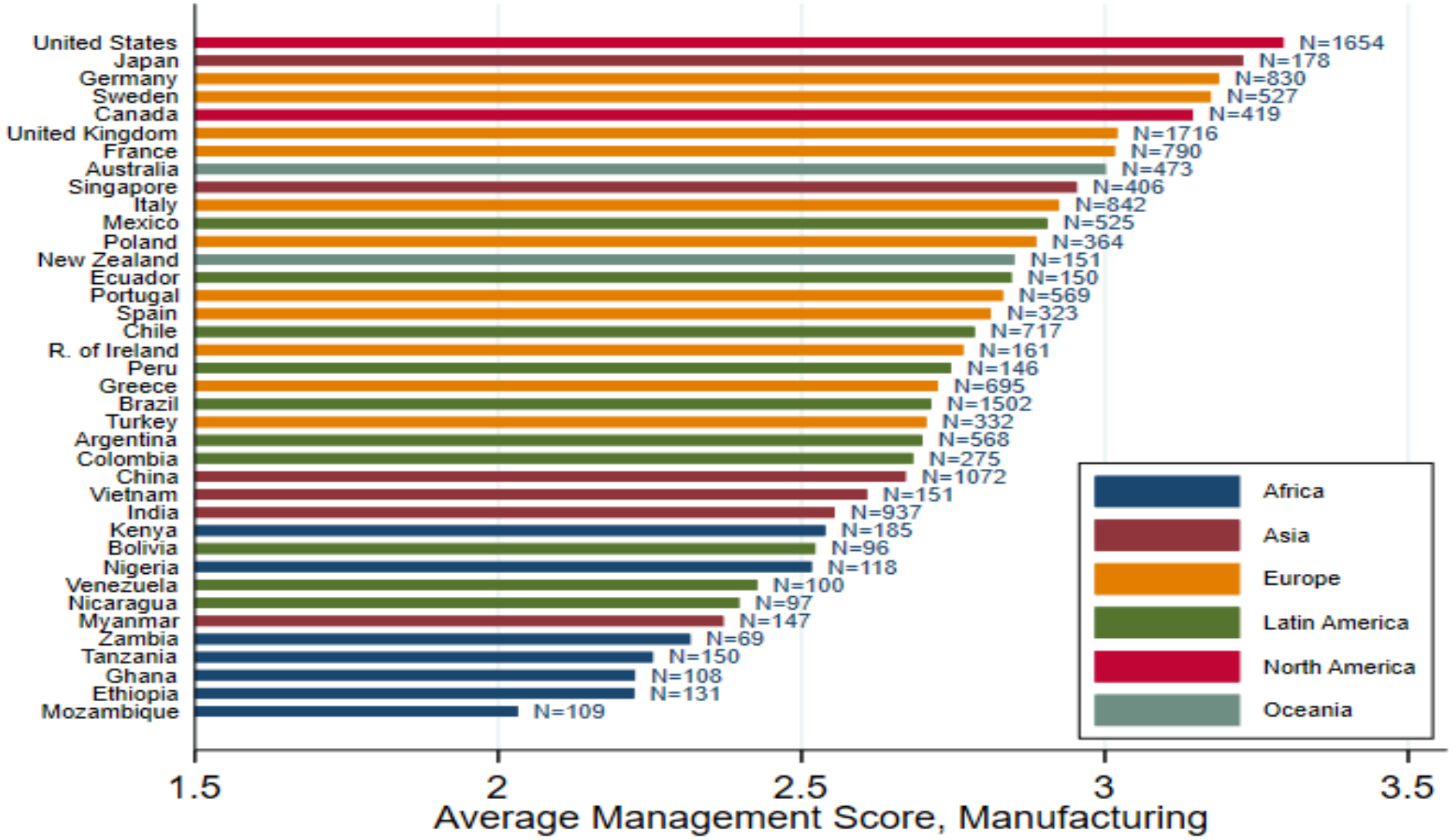
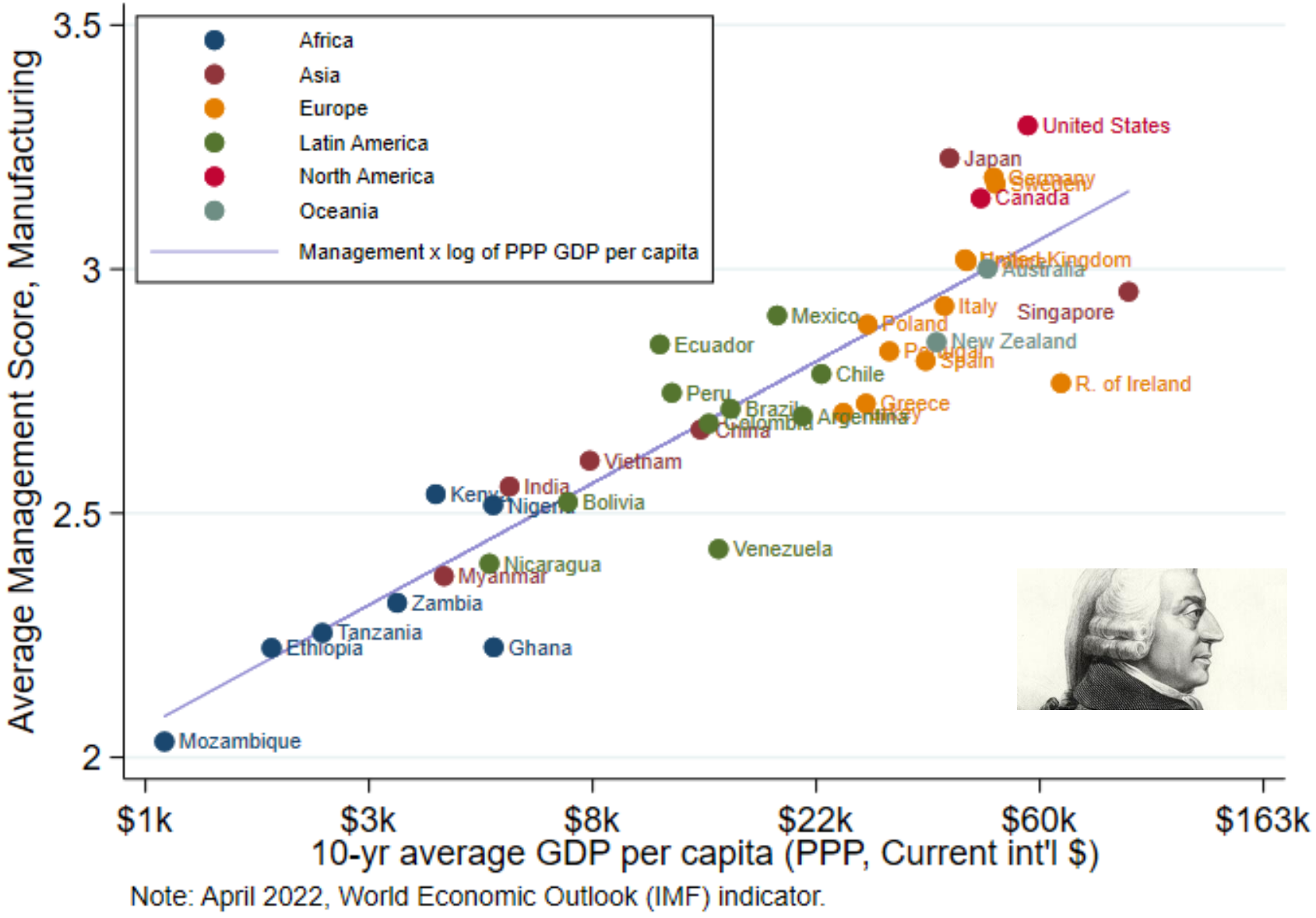
WMS Management Scores across Countries

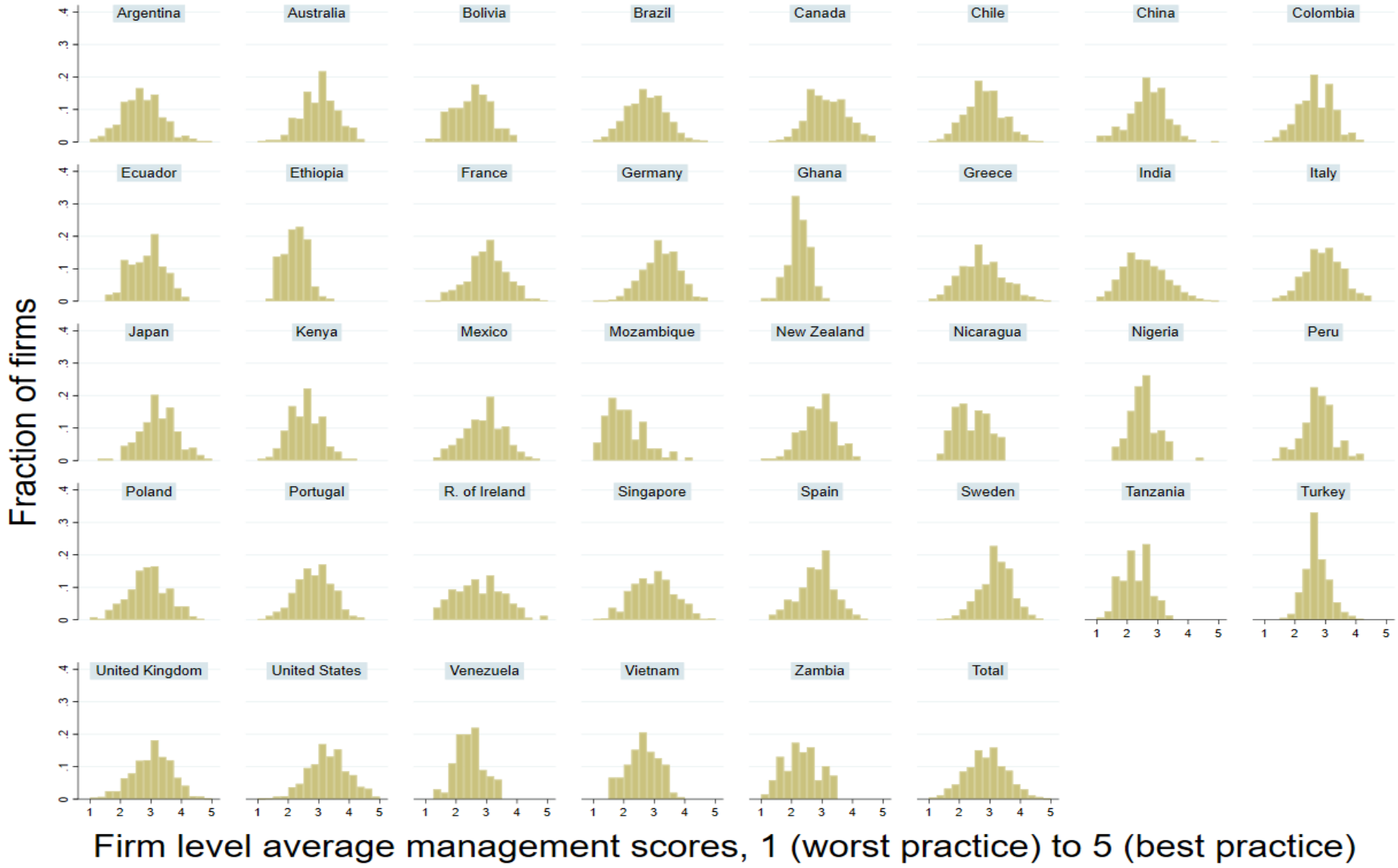


Note: Unweighted average management scores; # interviews in right column (total = 17,783); all waves pooled (2004-2022)

Average management scores across countries are strongly correlated with GDP per capita



Management also varies heavily within countries



Source: Bloom et al (2024)

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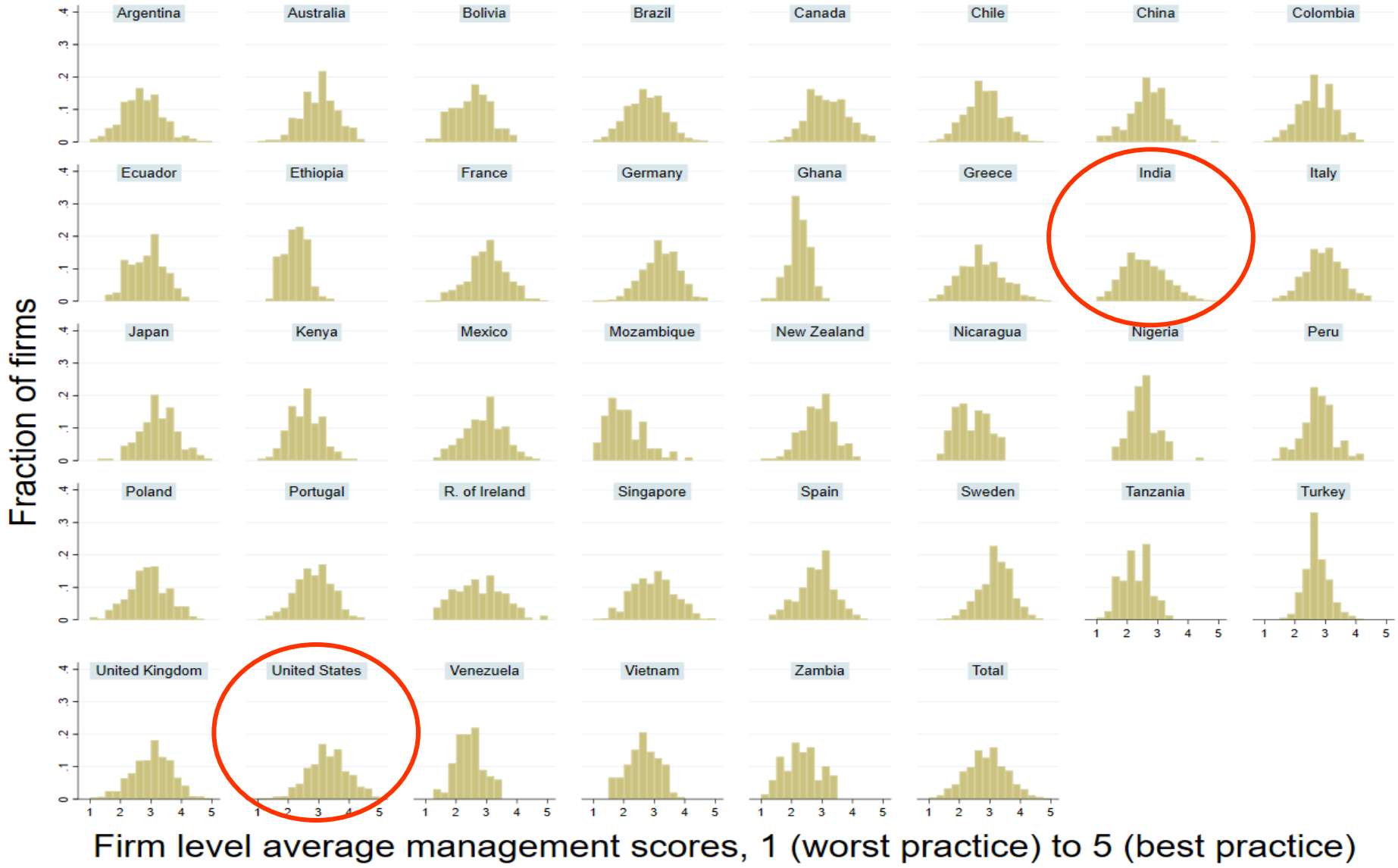
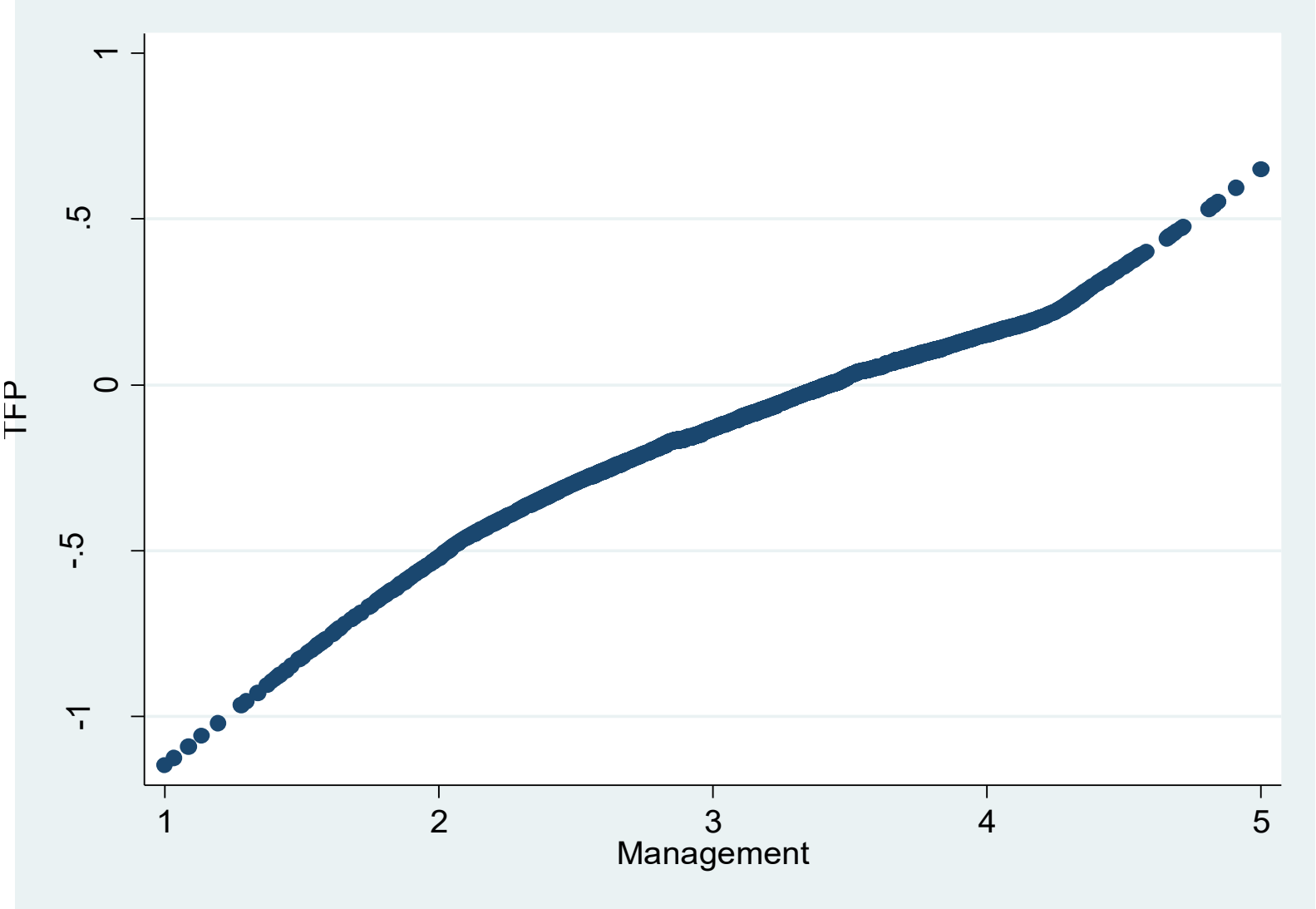


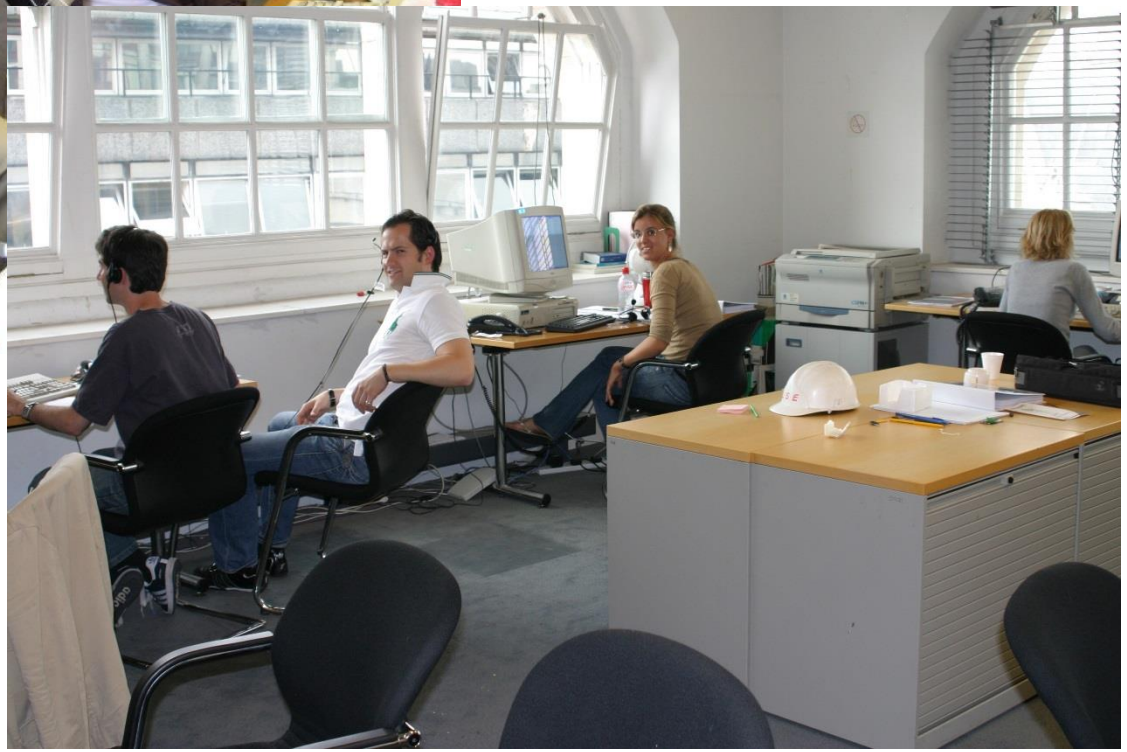
Source: Bloom et al (2024)

Firm productivity strongly & positively correlated with management scores



Management is an average of all 18 questions (set to sd=1). TFP residuals of sales on capital, labor, skills controls plus a full set of SIC-3 industry, country and year dummies controls. N=8314

One Problem with WMS is scale – we've collected ~25k interviews over ~20 years like this…



To get 35k in one quick wave we'd need this

Survey run with the US Census Bureau (MOPS)

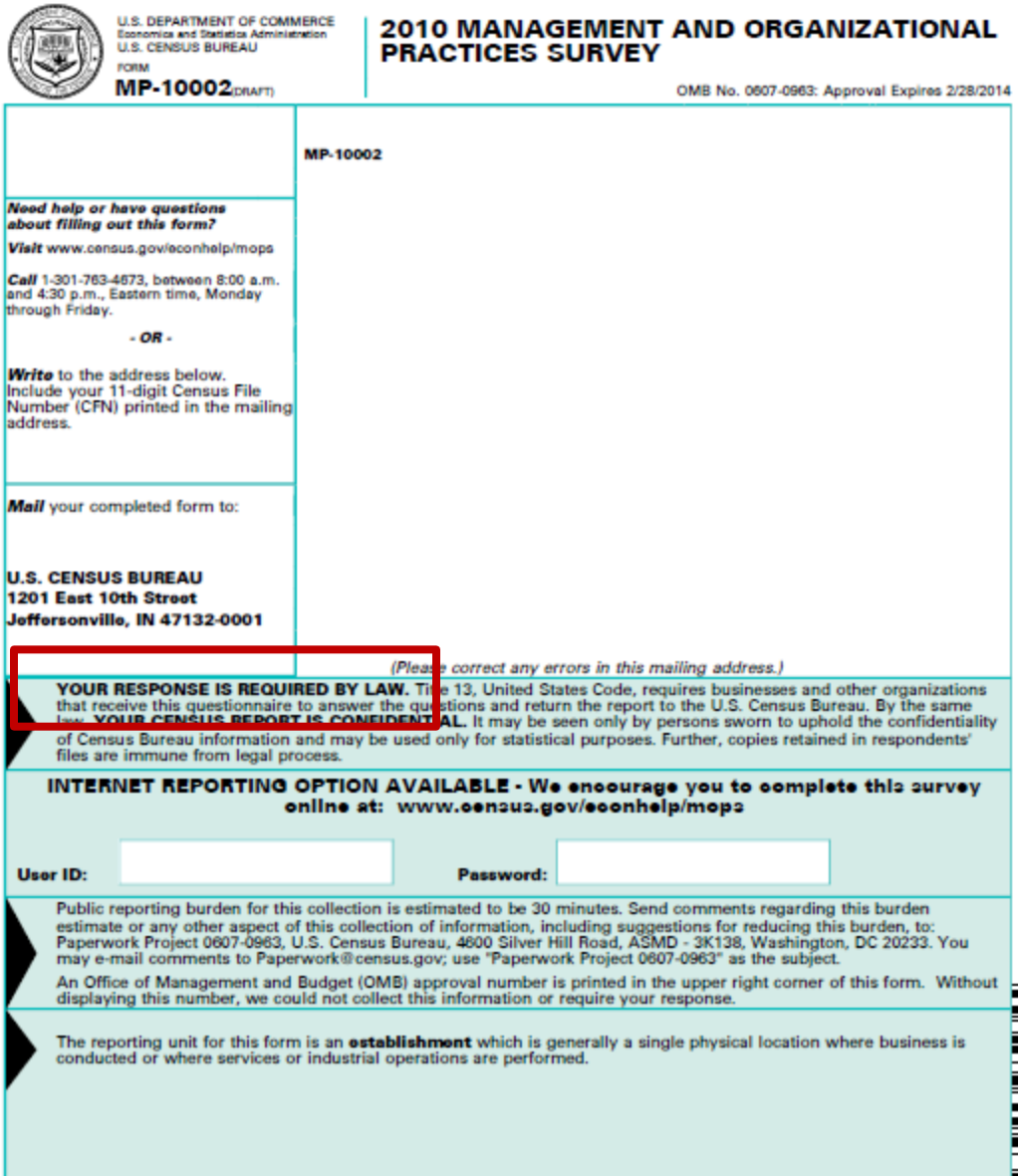
1st Wave delivered in 2011 to ~50k manufacturing plants (US ASM) asks about practices in 2010 and 2005.

2nd Wave covers 2015 & 2010 practices

3rd Wave covers 2021 practices.

Quick to fill out - and mandatory - so ~70-80% of plants responded

Extensive cognitive tests



U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

FORM
MP-10002 (DRAFT)

2010 MANAGEMENT AND ORGANIZATIONAL PRACTICES SURVEY

OMB No. 0607-0963: Approval Expires 2/28/2014

MP-10002

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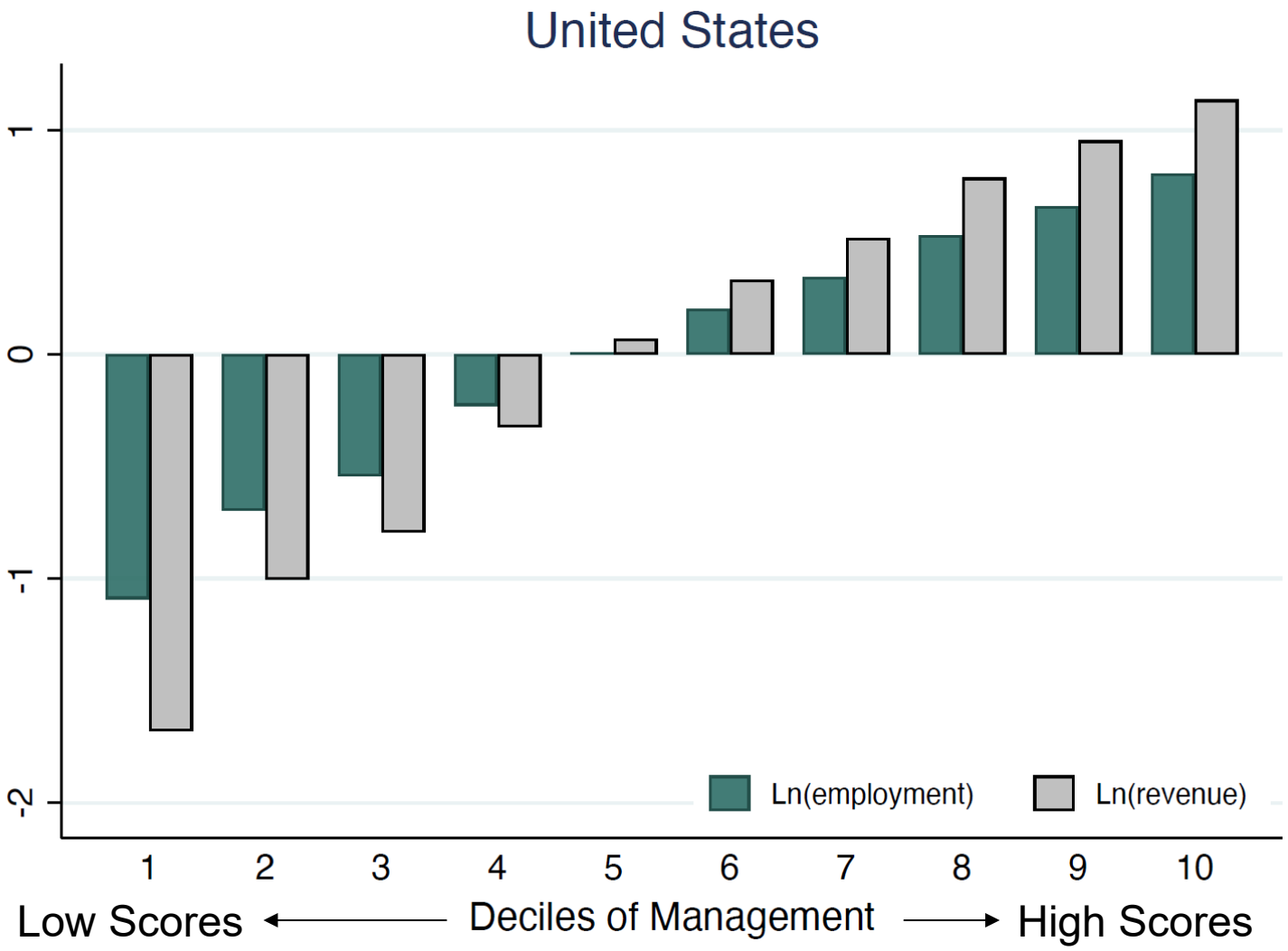
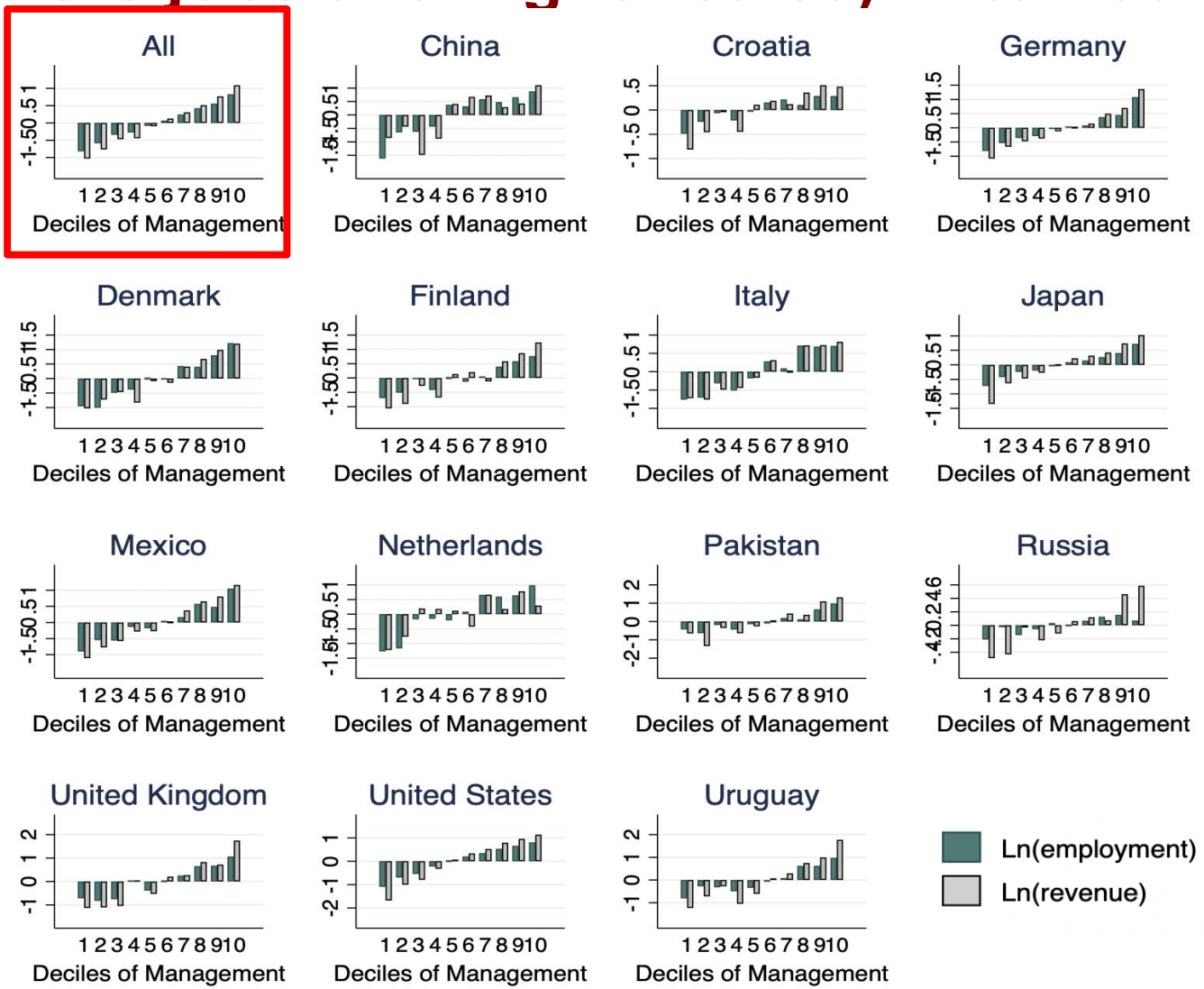
10002012

Businesses with high MOPS management scores are larger (more jobs & higher sales): Example of USA



Notes: The x-axis divides firms into deciles of their management score. The vertical axis gives the natural logarithm of the mean level of employment (and of revenue) in each of these bins relative to overall country specific mean. Number of observations about 35,000

Businesses with higher MOPS scores are larger (both more jobs and higher sales): International



Notes: The x-axis divides firms into country-specific deciles of their management score. The vertical axis gives the natural logarithm of the mean level of employment (and of revenue) in each of these bins. Number of observations for each country in the original datasets (manufacturing sector only): China = 1,986; Croatia = 314; Denmark = 743; Finland = 582; Germany = 1,927; Italy = 1,122; Japan = 10,081; Mexico = 3,729; Netherlands = 377; Pakistan = 11,159; Russia = 978; UK = 1,329; US = 35,000; Uruguay = 550

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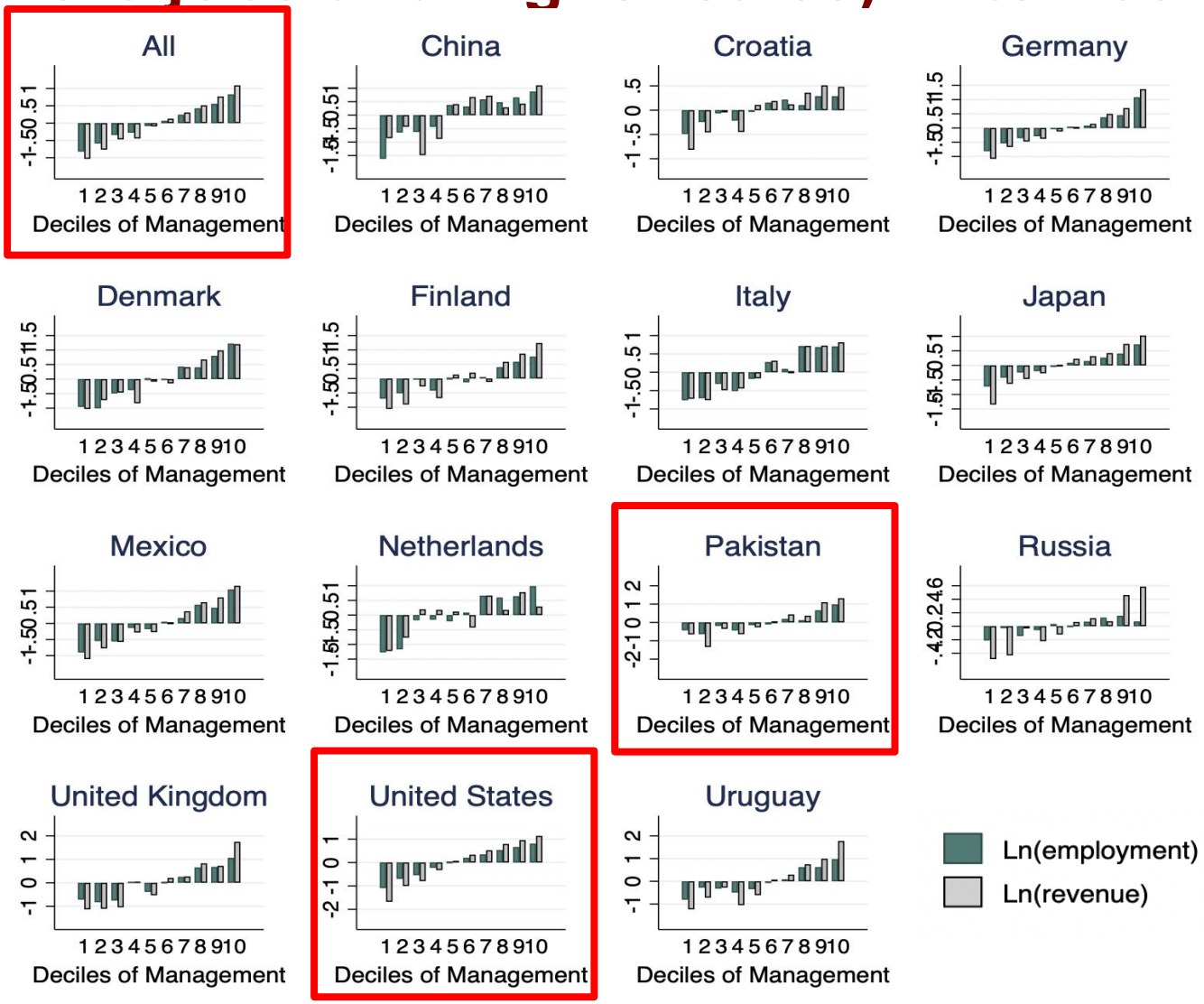

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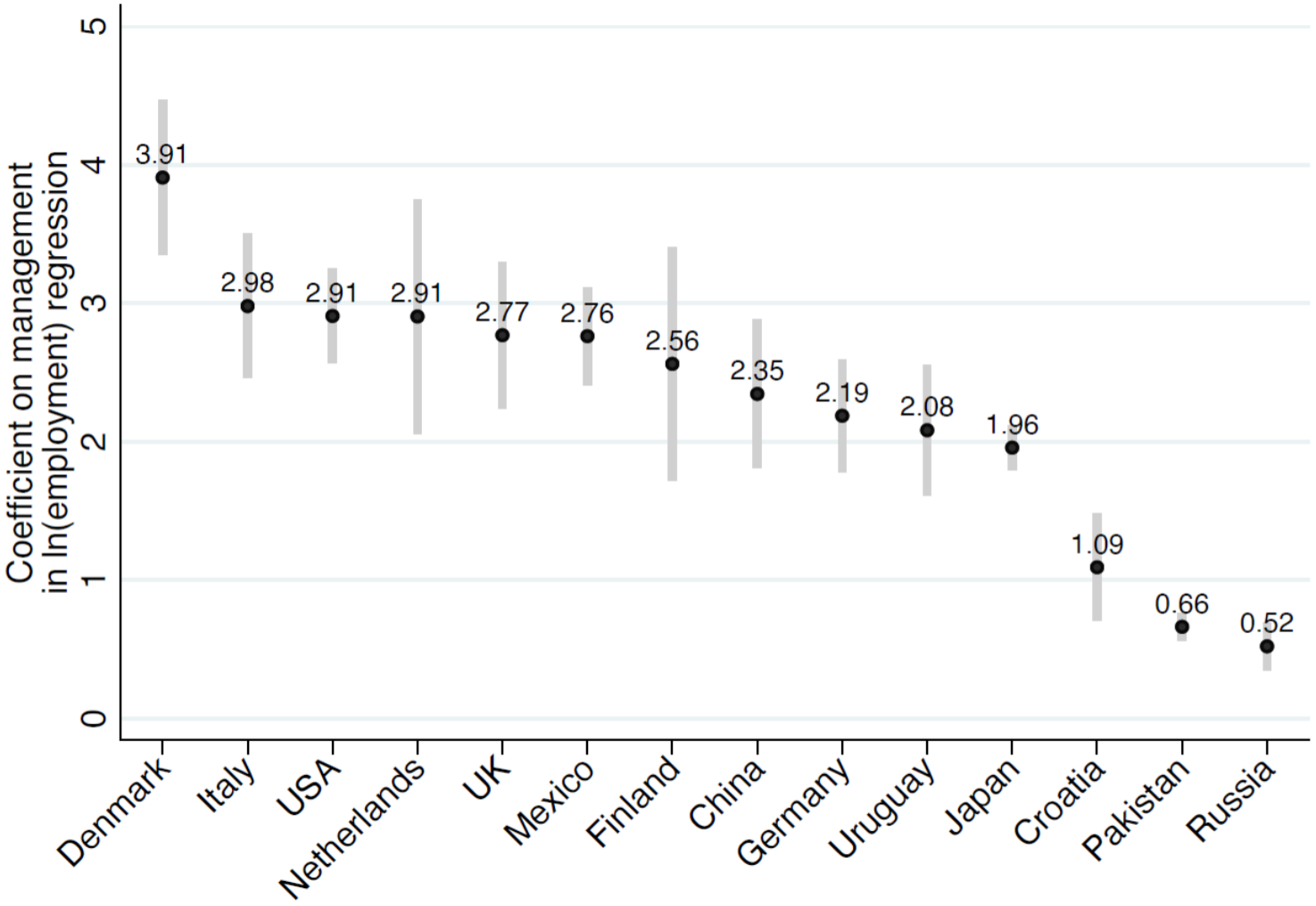
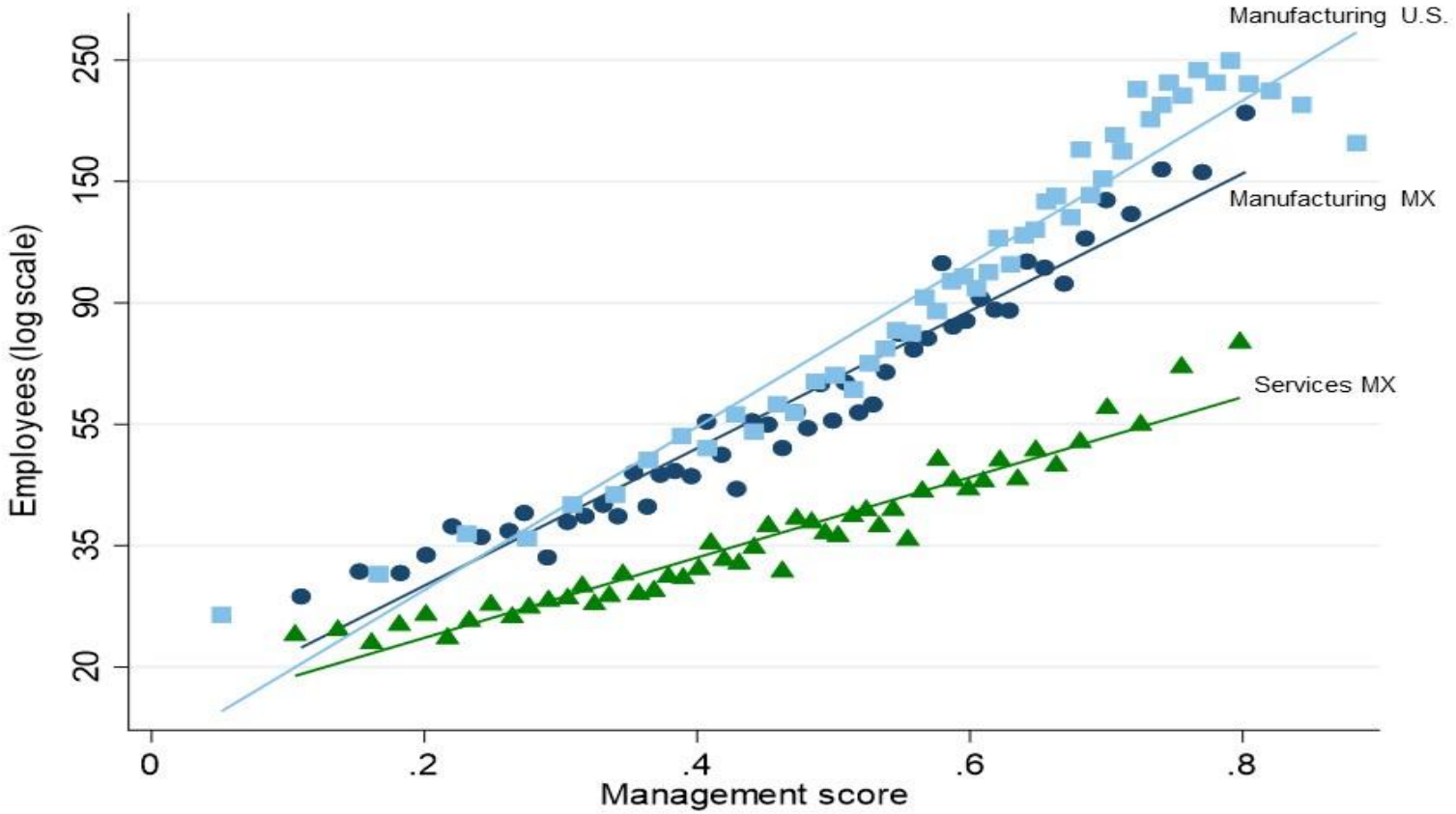
Better managed firms find it harder to achieve scale in many countries (e.g. Denmark vs. Pakistan)



Notes: Each circle is the coefficient on a country specific OLS regression of log firm employment size on management. The regression was run on 20 observations per country, using the average employment and average management score within each vingtile. 95% confidence bands are also shown. Number of observations for each country in the original datasets (manufacturing sector only): China = 1,986; Croatia = 314; Denmark = 743; Finland = 582; Germany = 1,927; Italy = 1,122; Japan = 10,081; Mexico = 3,729; Netherlands = 377; Pakistan = 11,159; Russia = 978; UK = 1,329; US = 35,000; Uruguay = 550.

Firm Size increases with management, but less so in Mexico than US, & much less in services than in manufacturing



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 3,707 Mexican manufacturing plants in 2014 and 2,936 in 2017; 10,175 Mexican services firms in 2014 and 7,509 in 2017; and 32,000 US manufacturing plants which have been aggregated into 18,000 firms for this analysis.

Source: Bloom, Iacovone, Pereira-López & Van Reenen (2026)

ARE THESE CORRELATIONS BETWEEN PERFORMANCE AND MANAGEMENT CAUSAL?

Many management practices have an important causal effect on firm performance

Randomized Control Trials: e.g., Blader et al (2019), Bloom et al (2013, 2019); Brooks et al (2018); Bruhn et al (2018, JPE); Cai & Szeidl (2018, QJE); Custódio et al (2020); Fryer (2017); Gosnell et al (2020,JPE); Higuchi et al (2019);Iacovone et al (2022, ReStud); Karlan et al (2015)

Quasi-experiments: Giorcelli (2019); Huber et al (2020); Bandiera et al (2005, 2007); Bianchi & Giorcelli (2022)

THIS IS ALL SUGGESTIVE OF PRODUCTIVITY PERSPECTIVE

- Firms with higher management scores have higher productivity, profits, and market value
- Firms with higher management scores are also larger, grow more quickly and are less likely to exit.
  - This generates growth through reallocation
  - In an efficient market, businesses with better management practices/higher productivity are able to grow larger as they offer better prices/quality
  - But if there are many frictions, even well managed high TFP firms will find it difficult to reach their optimal scale
  - Frictions can be of many sorts – market imperfections (product , labor, financial, etc.); corruption, weak rule of law, low trust, etc.

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What determines management practices?

1. “Design” or “Contingency” Perspective
2. Productivity Perspective

Design Perspective

- Standard Organizational Economics:
  - Firms optimize management practices to the environment
  - Principal - Agent theory

- **Example:** Performance pay in Holmstrom & Milgrom (1987). Focus on magnitude of β in linear total remuneration (w) contract:
  - $w = \alpha + \beta p$ where p is some signal of performance, $\alpha \geq 0$, $\beta \geq 0$
  - Degree of performance pay (β) is lower when :
    - Signal is noisy
    - Agent is more risk averse
    - Environment is highly uncertain

Comments on Design Perspective

- Clearly firms are making management decisions & this is likely to be influenced by environment

- But difficult to create experiments that induce different types of adoption.

- Literature more successful at looking at *impact* of changes in management practices (like performance pay) than in *determinants*.

Examples of contingency

- Bloom & Van Reenen (2007) show how in WMS data firms specialize in types of management practice depending on environment

- Group WMS practices into “people” (pay, promotion, firing, hiring) vs. “monitoring/targets” (collecting and using information)

- Industries with **high human capital & high rates of innovation** have relatively higher intensity of **people management**

- Industries with high **physical capital intensity** have relatively higher intensity of **targets/monitoring management**

Contingency – people management more prevalent than monitoring in high R&D, high human capital, less capital-intensive sectors

	People Management (P)	Monitoring &Targets (MT)	Relative People (P-MT)	Relative People (P-MT)
Countries	All	All	All	OECD
Measure	US SIC4	US SIC4	US SIC4	KLEMS SIC2
ln(K/L)	-0.000	0.096***	-0.125***	-0.126***
	(0.014)	(0.016)	(0.019)	(0.037)
R&D Intensity	0.031	-0.125*	0.201***	0.721**
	(0.062)	(0.072)	(0.074)	(0.306)
ln(%degree)	0.139***	0.123***	0.011	0.070***
	(0.008)	(0.007)	(0.010)	(0.019)
Observations	13,681	13,681	13,681	4,855

Notes: "People management" is the index for all questions in questions 13 – 18 (i.e. take the average of these z-scores and then z-score this index) and "Monitoring and targets" are all the remaining questions. US SIC4 from NBER Bartelsman-Gray data, KLEMS is country by SIC2 industry specific.
Source: Bloom, Sadun & Van Reenen (2017, table 6) "Management as a Technology"

What determines management practices?

- **"Productivity Perspective**
  - Some core management practices will raise output in most environments
  - Management is like an intangible capital in the production function
  - But why don't all firms adopt the best management practices? This parallels a question in technological diffusion

General perspective on why seemingly beneficial management practices are not adopted (Jan Rivkin, 2000)

1. Not knowing firm has poor management practices
2. Knowing that management is poor, but not knowing how to change
3. Knowing firm is poorly managed & what do, but weak incentives to change (economics focus)
4. Knowledge & strong incentives but political problems within firm (relational contracts)

So why does management vary across countries and firms?

Some factors that seem important. Illustrate using WMS & MOPs (see Bloom et al, 2014, JEEA for summary)

- **Product Market Competition**
- Family firms
- Multinationals
- Labor market regulations
- Education
- Information

Theories of Competition and Management

- **Selection (positive)**
  - Poorly managed/low TFP firms more likely to exit. And even if they survive have lower market shares.
- **Incentives (ambiguous)**
- **Positive**: Agency issues (e.g. Hart, 1983)
    - Bankruptcy threat stronger & this can align incentives between managers and shareholders (Schmidt, 1997)
    - Greater competition implies that reduction in marginal costs (from managerial effort) has bigger effect on market shares (Raith, 2003).
- **Negative**: "Schumpeterian" lower price cost margins ex-post, less incentive to invest in management ex-ante
  - Like innovation models, theory has ambiguous predictions over Management (e.g. Aghion et al., 2005, argue for inverted U)

Most Studies find competition has positive effect on TFP

Surveys in Holmes & Schmitz (2010); Van Reenen (2011); De Loecker & Goldberg (2014, Annual Review). ***Examples:***

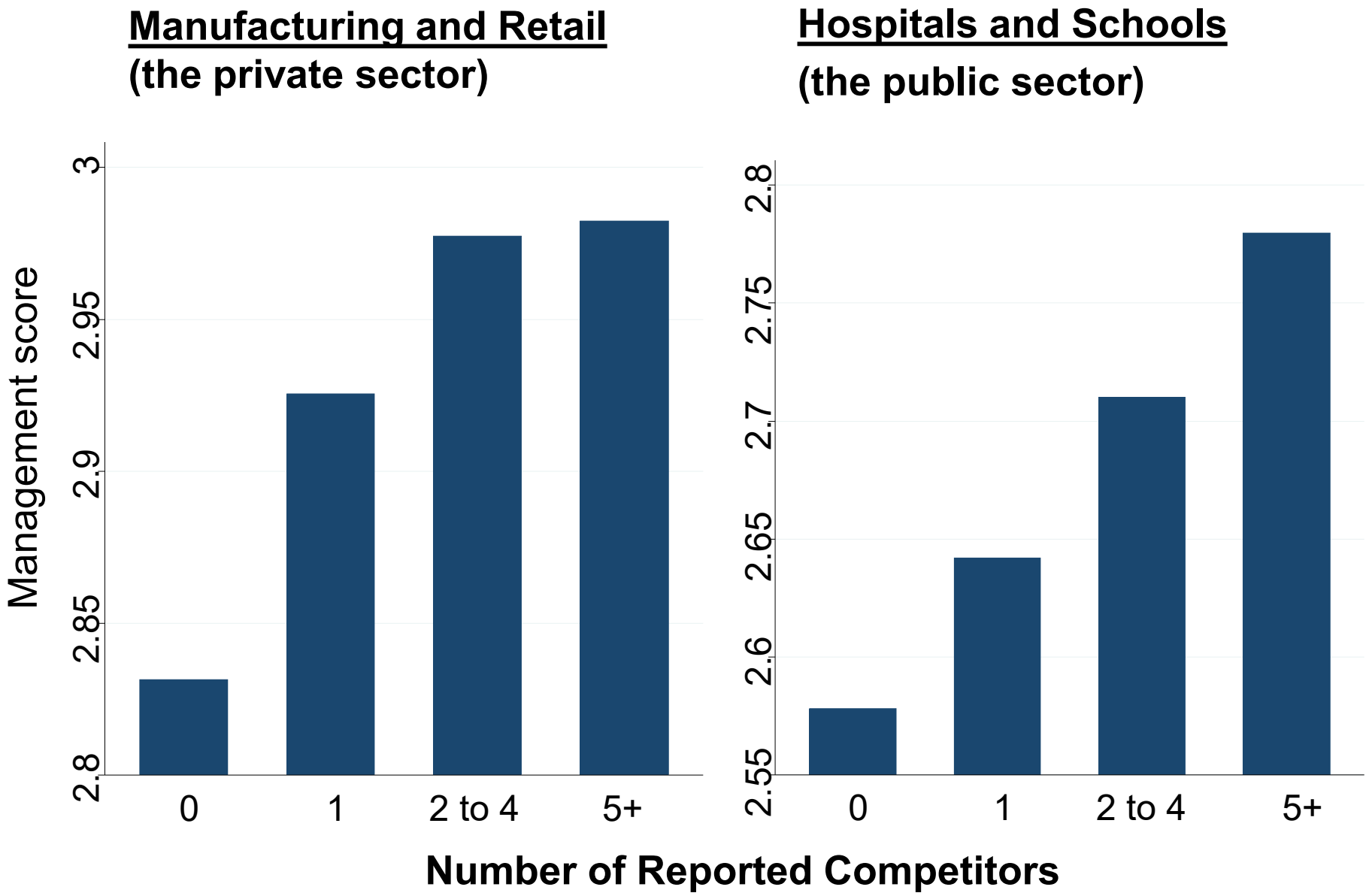
Nickell (1996, JPE) shows changes in competition lead to faster TFP growth within a panel of firms

Syverson (2004, JPE) on US concrete industry. More competitive markets had higher average levels of TFP & less dispersion.

Trade Reforms (big lit.): Pavcnik (2002, REStud). Generally positive, stress between firm reallocation (Melitiz, 2003).

Olley-Pakes (1996, ECMA) Deregulation of telecom equipment

Competition Appears Linked to Better Management in WMS



Sample of 9469 manufacturing and 661 retail firms (private sector panel) and 1183 hospitals and 780 schools (public sector panel). Reported competitors defined from the response to the question “How many competitors does your [organization] face?”

Changes in competition & improved management (WMS & similar correlations in MOPS)

TABLE 4: COMPETITION AND MANAGEMENT

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Management						
(1-Lerner)	0.990***	1.751***				
	(0.366)	(0.443)				
Import Penetration			0.398**	0.830**		
			(0.170)	(0.327)		
Import Penetration - China					2.090**	2.204*
					(0.972)	(1.137)
Observations	8,630	8,630	8,630	8,630	8,630	8,630
Size- weight the regressions?	n	y	n	y	n	y

Notes: Includes SIC-3 industry * country dummies, firm-size, public and interview noise (interviewer, time, date & manager characteristic) controls. Clustered by industry*country

Source: Bloom, Sadun & Van Reenen (2017)

Other competition natural experiments look at management directly as well as TFP

- **Chinese trade:** Growth of Chinese exports by industry using WTO accession natural experiment where quotas fell dramatically in textiles & apparel (Bloom, Draca and Van Reenen, 2016, ReStud)
- **Findings**
  - Increase in productivity, innovation and management quality (WMS)
  - Improvements a combination of within firm effect AND selection effects
  - Some differences across countries: e.g. Autor et al, 2020 on US. See Shu & Steinwender, 2019, survey
- In WMS more generally, reducing competitive frictions (tariffs, regulations, etc.) causes reallocation towards better managed firms

Other competition natural experiments looking at management directly as well as performance

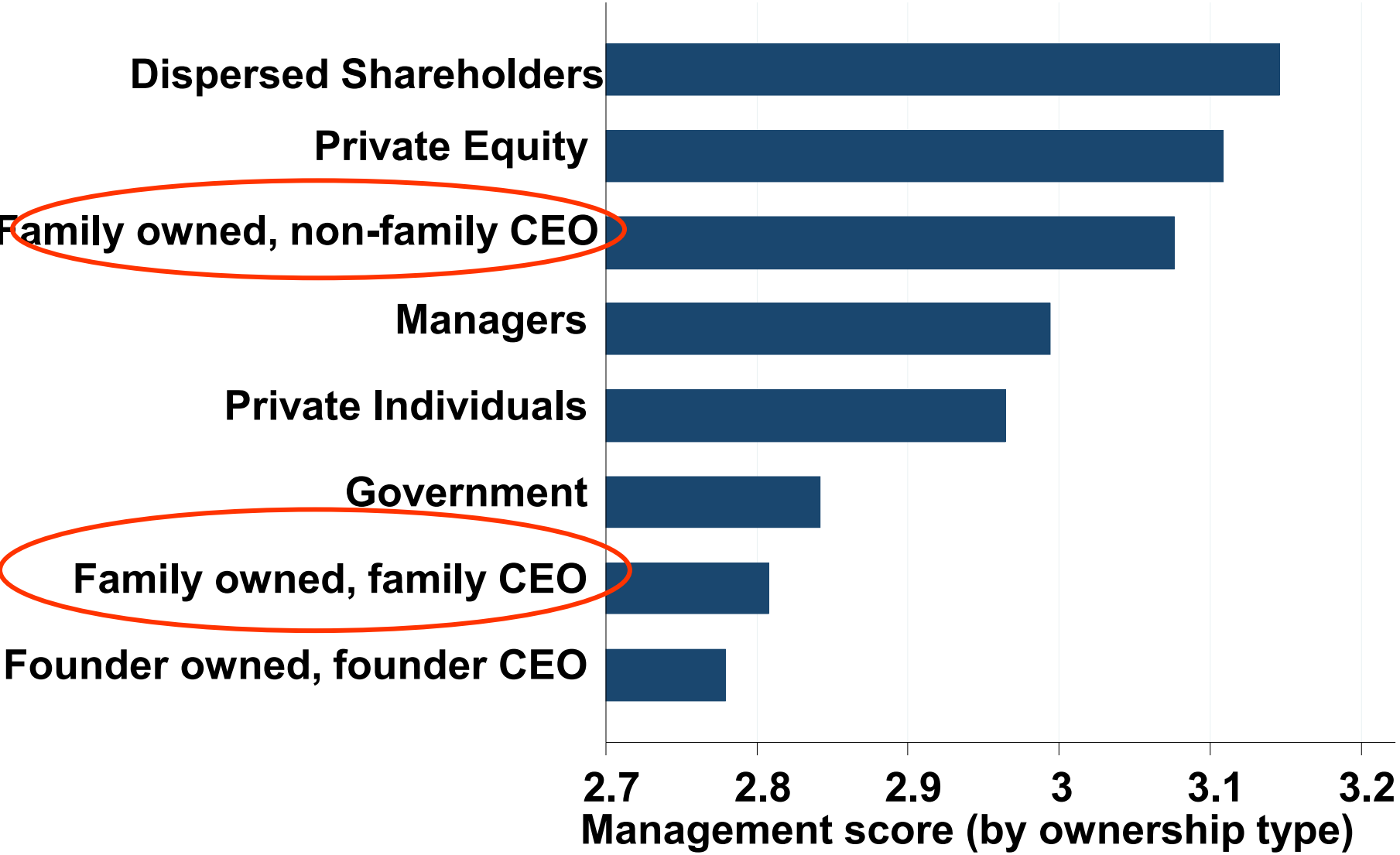
- **Political marginals**:
  - Hospital competition in UK NHS after 2000s reforms. Incentives to attract patients.
  - Under publicly run system hospitals rarely closed down in districts that are politically marginal.
  - Implies some exogenous variation in market structure
  - Bloom, Propper, Seiler & Van Reenen (2015, ReStud) find positive impact of competition (more hospitals) on management (& outcomes such as survival rates)
- Cooper et al. (2013, EJ); Gaynor et al (2016, AER) confirm result on patient outcomes using Diff in Diffs
  - Compare areas with high hospitals density pre-reform (where competition increased) vs. those with few hospitals

So why does management vary across countries and firms?

Factors that seem important

- Competition
- **Family firms**
- Multinationals
- Labor market regulations
- Education
- Information

Differences in management across ownership types (even controlling for country, industry and size)



Note: Management scores after controlling for country, industry and number of employees. Data from 9085 manufacturers. “Founder owned , founder CEO” firms are those still owned and managed by their founders. “Family firms” are those owned by descendants of the founder “Dispersed shareholder” firms are those with no shareholder with more than 25% of equity, such as widely held public firms.

Discussion of family firms

- Negative correlation of management with Primogeniture (first born son inherits) robust to many other controls
- Consistent with earlier lecture on negative impact of family firms on performance
- Lemos and Scur (2019) use the gender composition (# male children controlling for family size) of founders' children. WMS data on 13 countries. Find family firms significantly reduce WMS scores under IV.
- Could reflect deeper rooted problems of contract enforceability, trust, corruption

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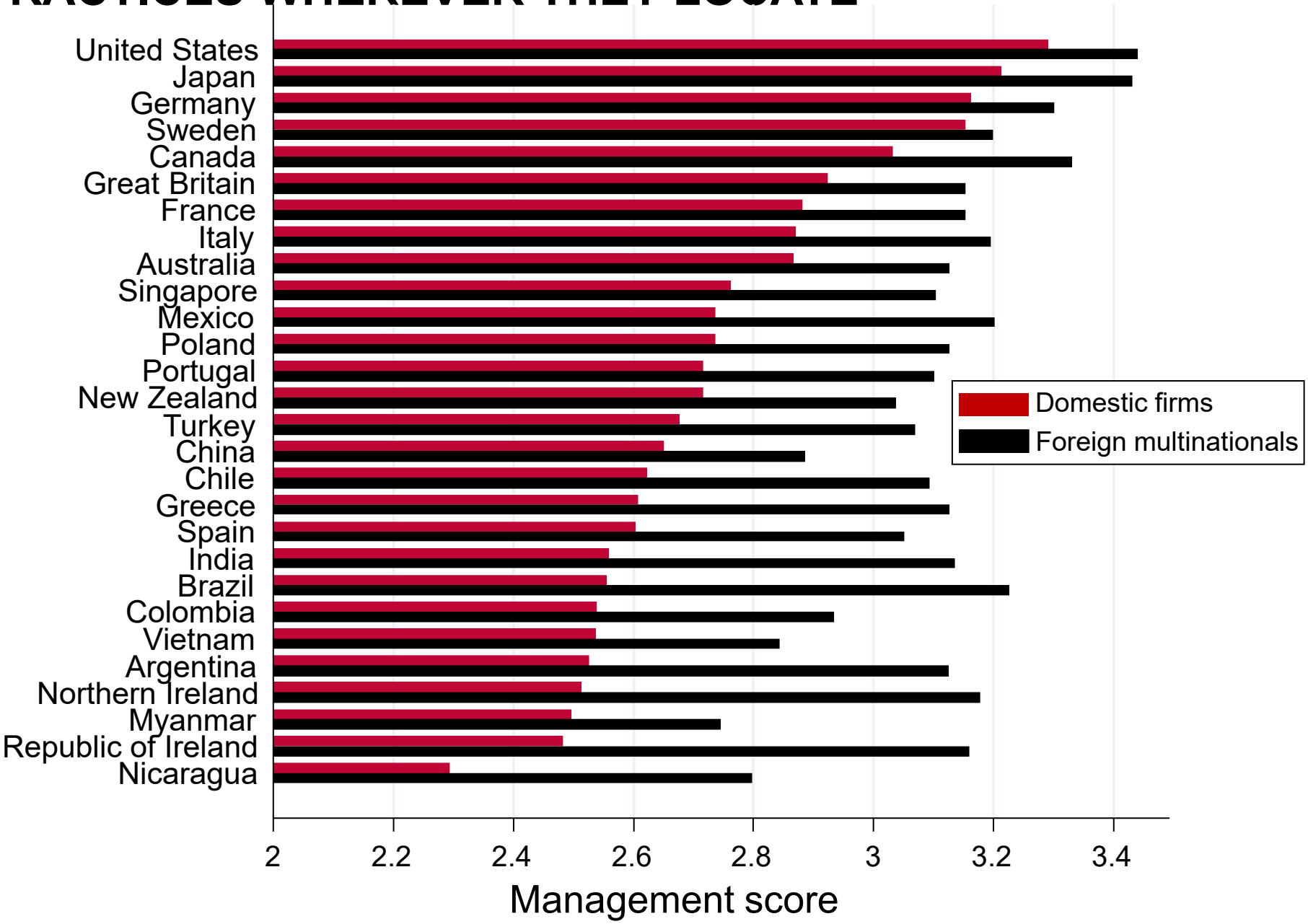
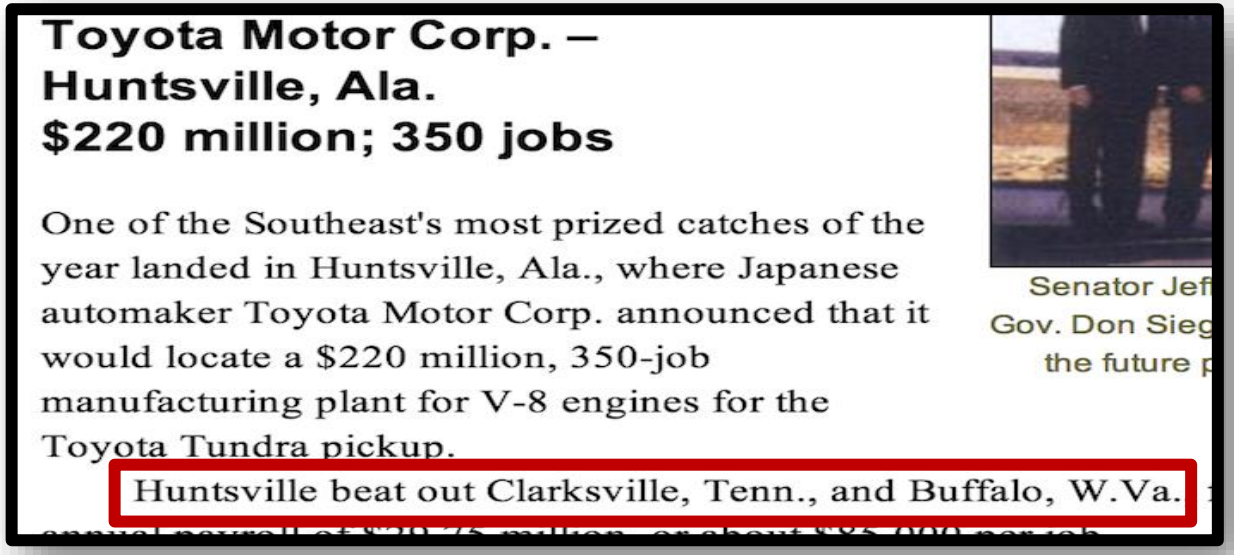
MULTINATIONALS ACHIEVE GOOD MANAGEMENT PRACTICES WHEREVER THEY LOCATE



<u>Spillovers</u> - Look at impact of winning a "Million Dollar Plant" (MDP) versus being the runner up

Following Greenstone, Hornbeck & Moretti (2010) **"Million Dollar Plants"** use Site Selection magazine (& other sources) to look at impact of winning an MDP

Magazine has monthly stories about winning county and runner up counties, which we supplement with news coverage



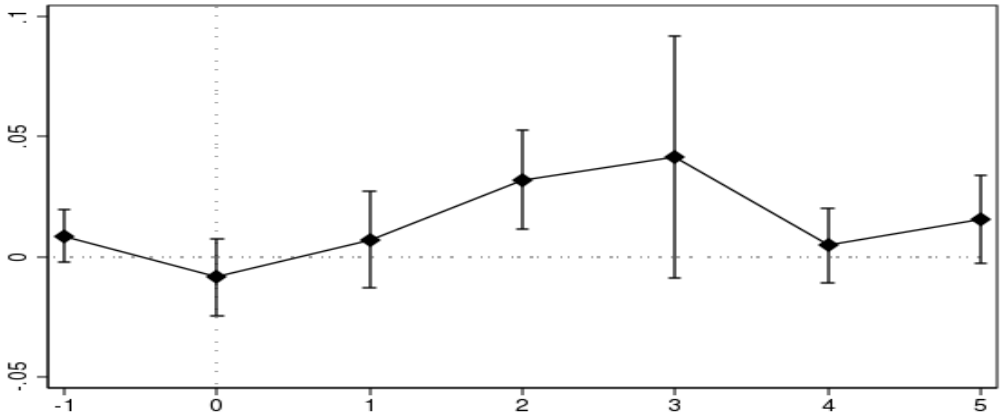
Toyota Motor Corp. –
Huntsville, Ala.
$220 million; 350 jobs

One of the Southeast's most prized catches of the year landed in Huntsville, Ala., where Japanese automaker Toyota Motor Corp. announced that it would locate a $220 million, 350-job manufacturing plant for V-8 engines for the Toyota Tundra pickup.

Huntsville beat out Clarksville, Tenn., and Buffalo, W.Va.

Senator Jef
Gov. Don Sieg
the future p

Event Studies of impact of Million Dollar Plants on incumbent plants



Panel A:
Overall Treatment Effect

Source: Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten & Van Reenen (2019, AER) “What Drives management?”

MDP lead to local (county-specific) spillovers in management, TFP and employment for incumbent plants (& stronger in industries with high managerial inflows from MDP's industry

Dependent variable:	Change in Management	Change in Log(TFP)	Employment Growth
Panel A: All industries pooled			
MDP Opens	0.018**	0.024	0.014**
	(0.007)	(0.017)	(0.005)
Panel B: Split high/low manager flow			
MDP Opens×High	0.031***	0.069***	0.017**
	(0.008)	(0.019)	(0.006)
MDP Opens×Low	-0.005	-0.050	0.009
	(0.011)	(0.034)	(0.01)
P-value for equality	0.007	0.004	0.495
Observations	~2,500	~2,500	~2,500

Source: Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten & Van Reenen (2019, AER) "What Drives management?"

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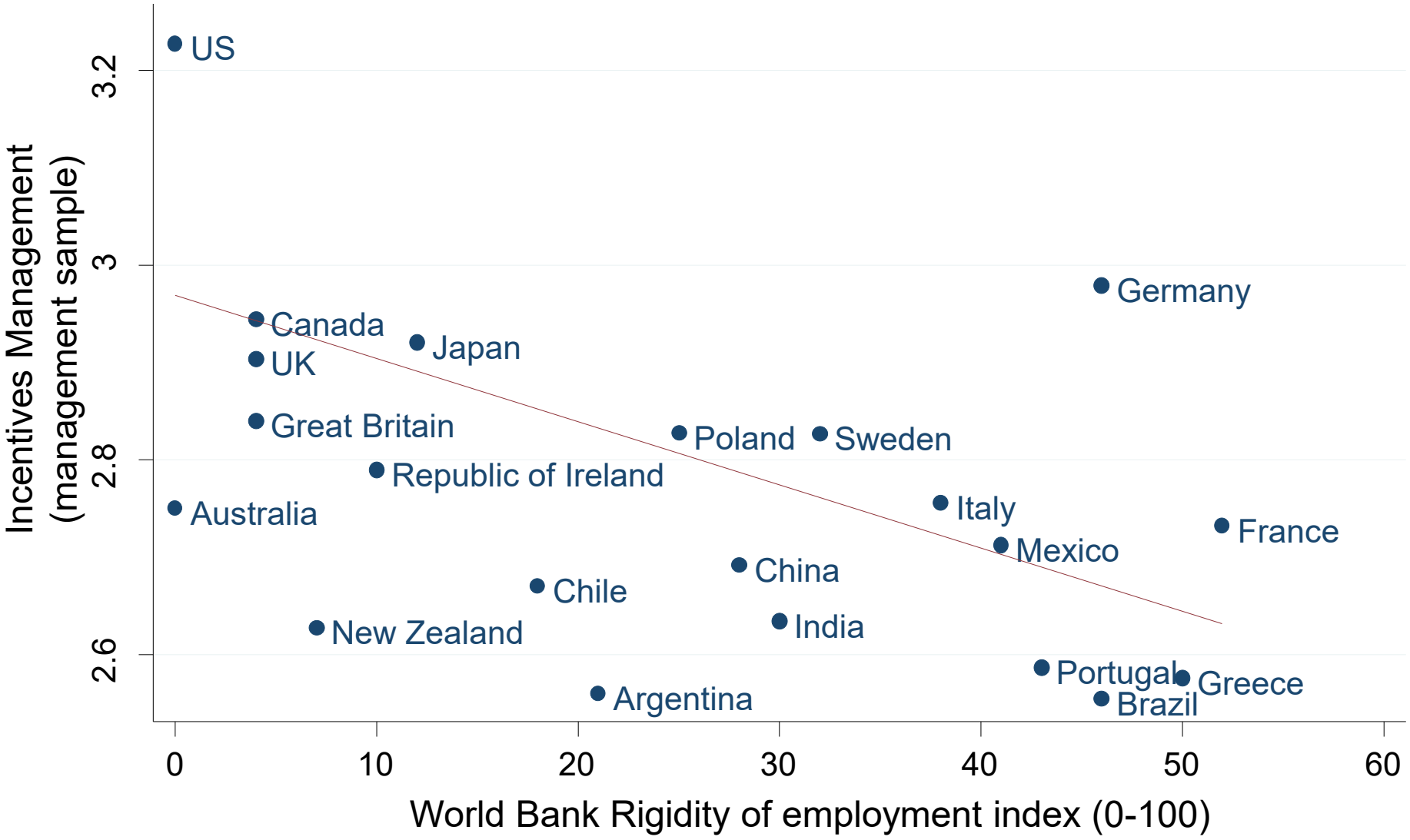
Labor Market Regulation & Incentives Management



Note: Averaged across all manufacturing firms within each country (9079 observations). We did not include other sectors as we do not have the same international coverage. Incentives management defined as management practices around hiring, firing, pay and promotions. The index is from the Doing Business database http://www.doingbusiness.org/ExploreTopics/EmployingWorkers/

Regulation – Bloom et al (2019) on causal Effect of "Right to work" (RTW: no automatic deduction of union dues)?

First approach:

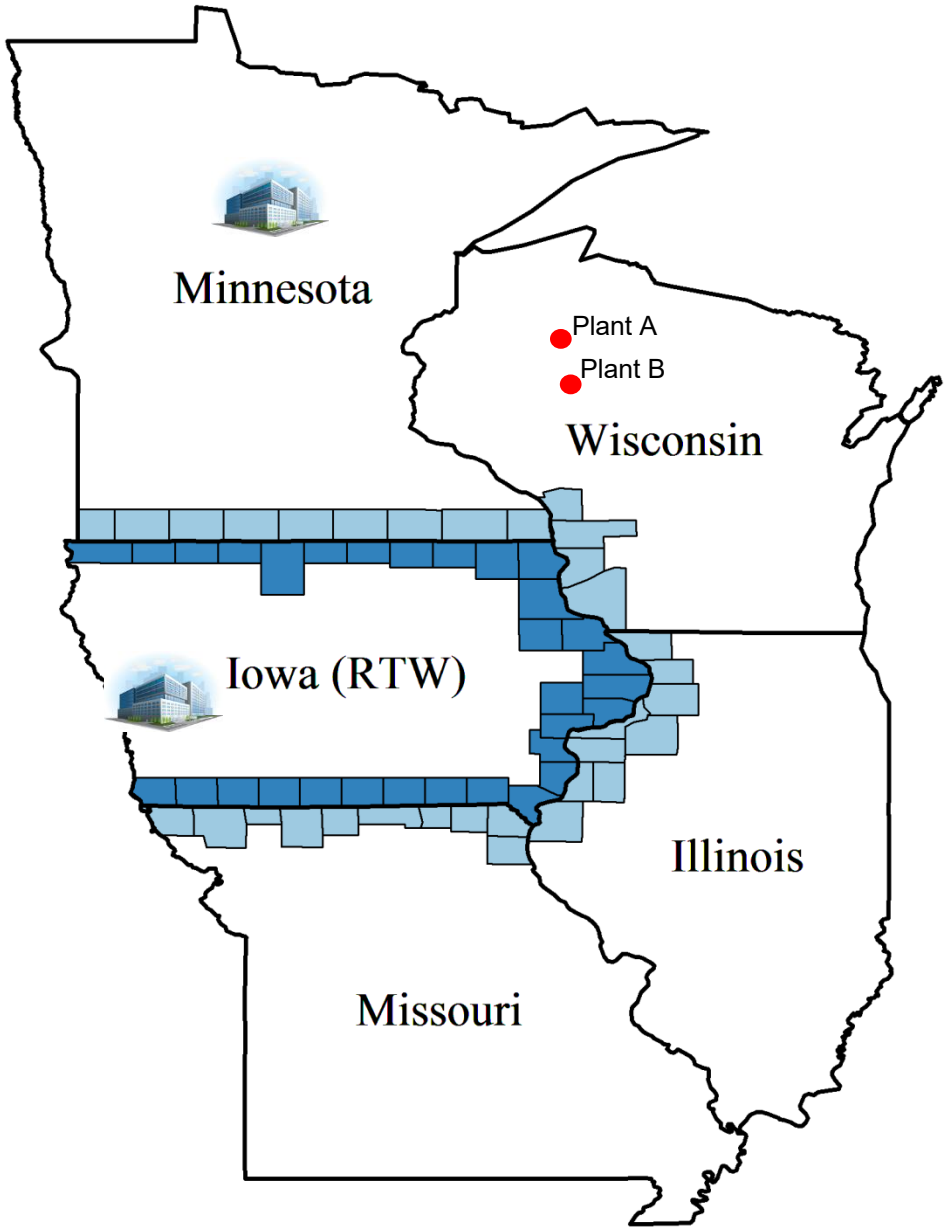
Focus on counties 30 miles of the RTW state border (Holmes 1998). Use spatial RD Design

Second approach:

Use MOPS 2015 for Diff-in-Diffs over states that changed since 2010 (IN, MI, WI)

Results:

Both approaches suggest RTW improves people management, but not other aspects



So why does management vary across countries and firms?

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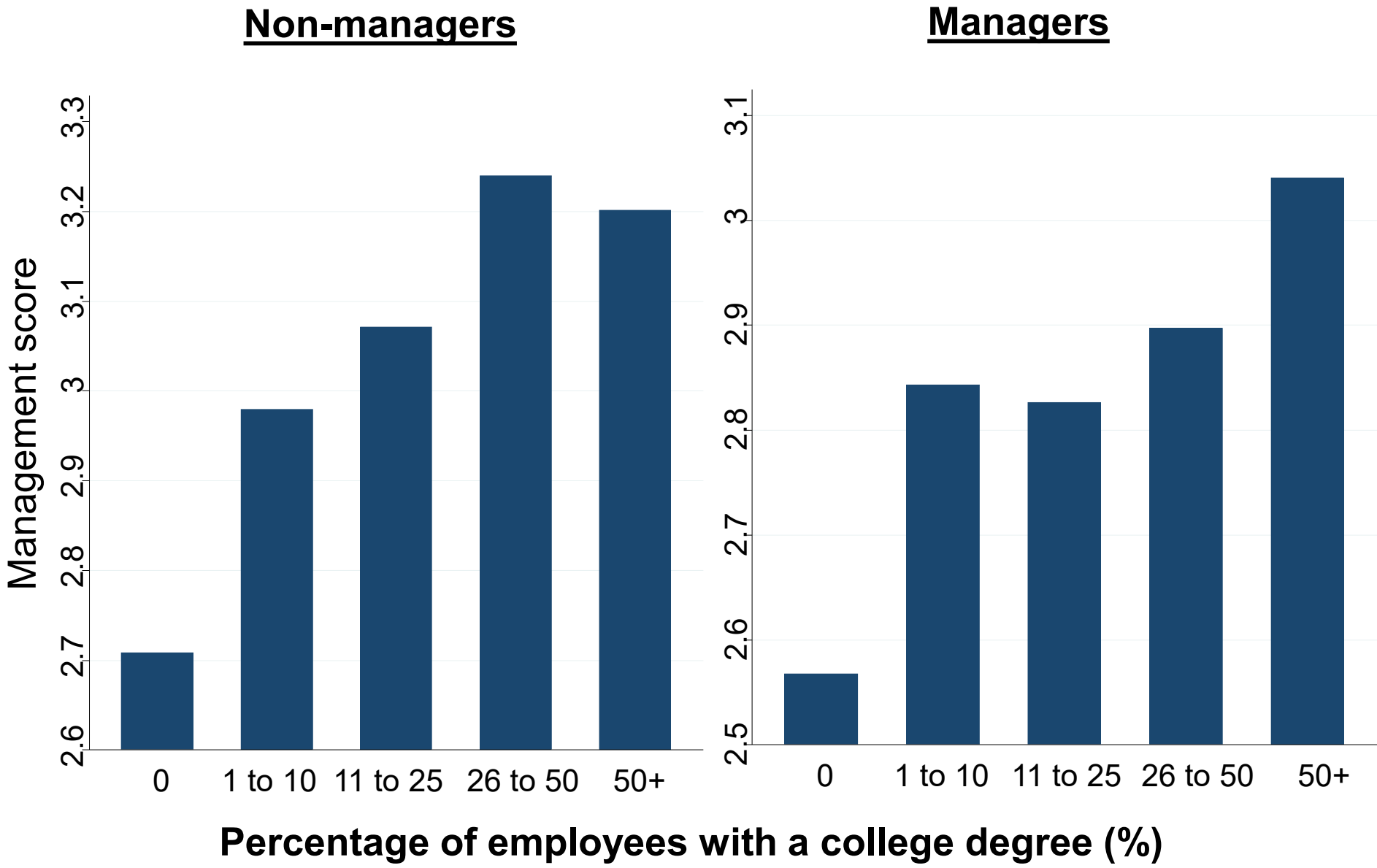
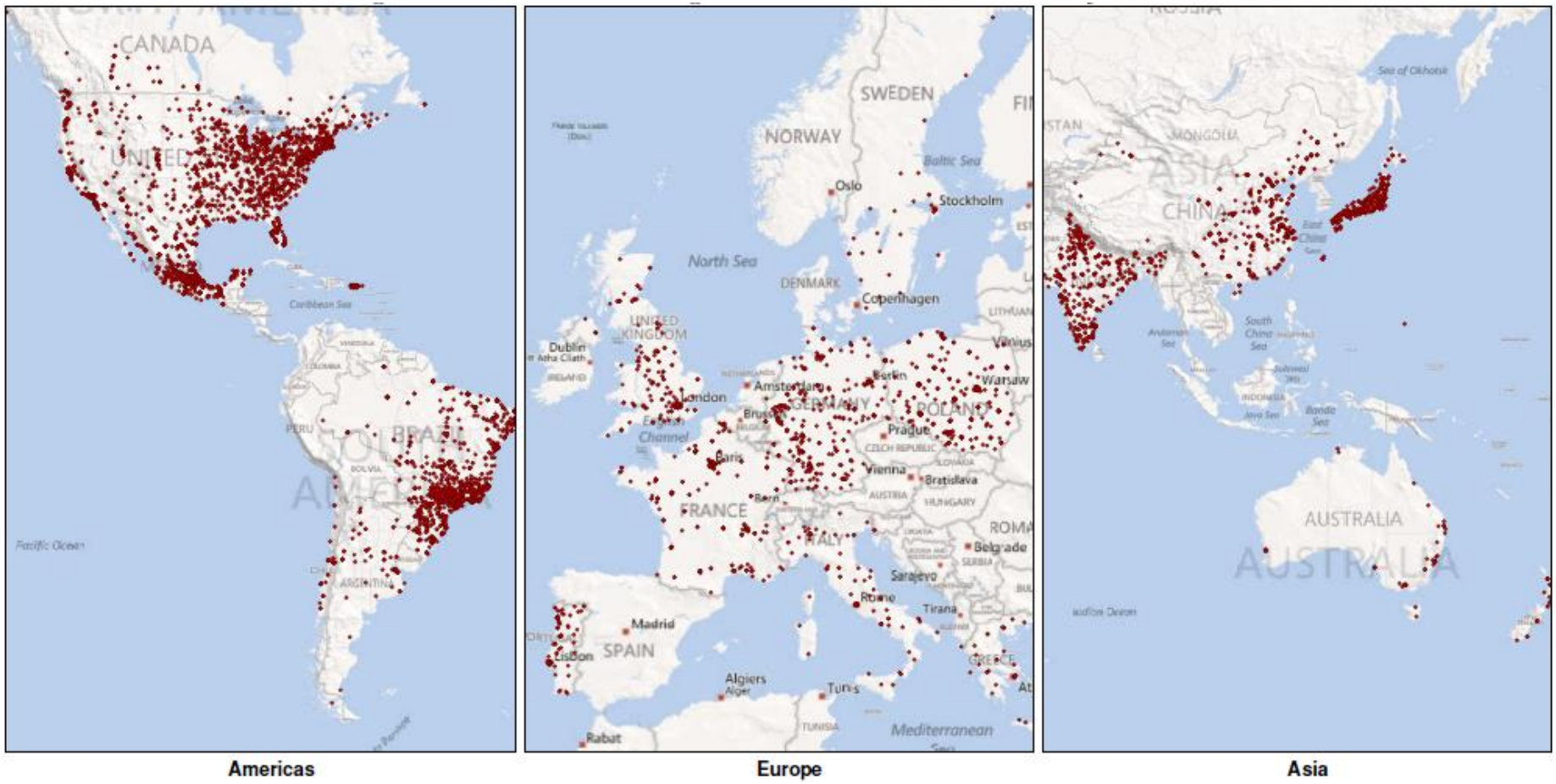
- **Education**
- Information

Education for Non-Managers and Managers Appear Linked to Better Management (in manufacturing and retail)



Sample of 8,032 manufacturing and 647 retail firms. We did not collect comparable education data in hospitals and schools.

Management and Education: UNESCO World Higher Education Database university locations (N=9,081)



Americas Europe Asia

Source: Valero & Van Reenen (2019)

Human capital and management

- Feng & Valero (2019) show plants located closer to universities have more educated employees & higher WMS management scores

- Bloom et al. (2020): hospitals located closer to colleges offering clinical and business education (Med Schools + B-Schools) had higher WMS management scores & better clinical outcomes

So why does management vary across countries and firms?

Factors that seem important

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- Family firms
- Multinationals
- Labor market regulations
- Education
- **Information**

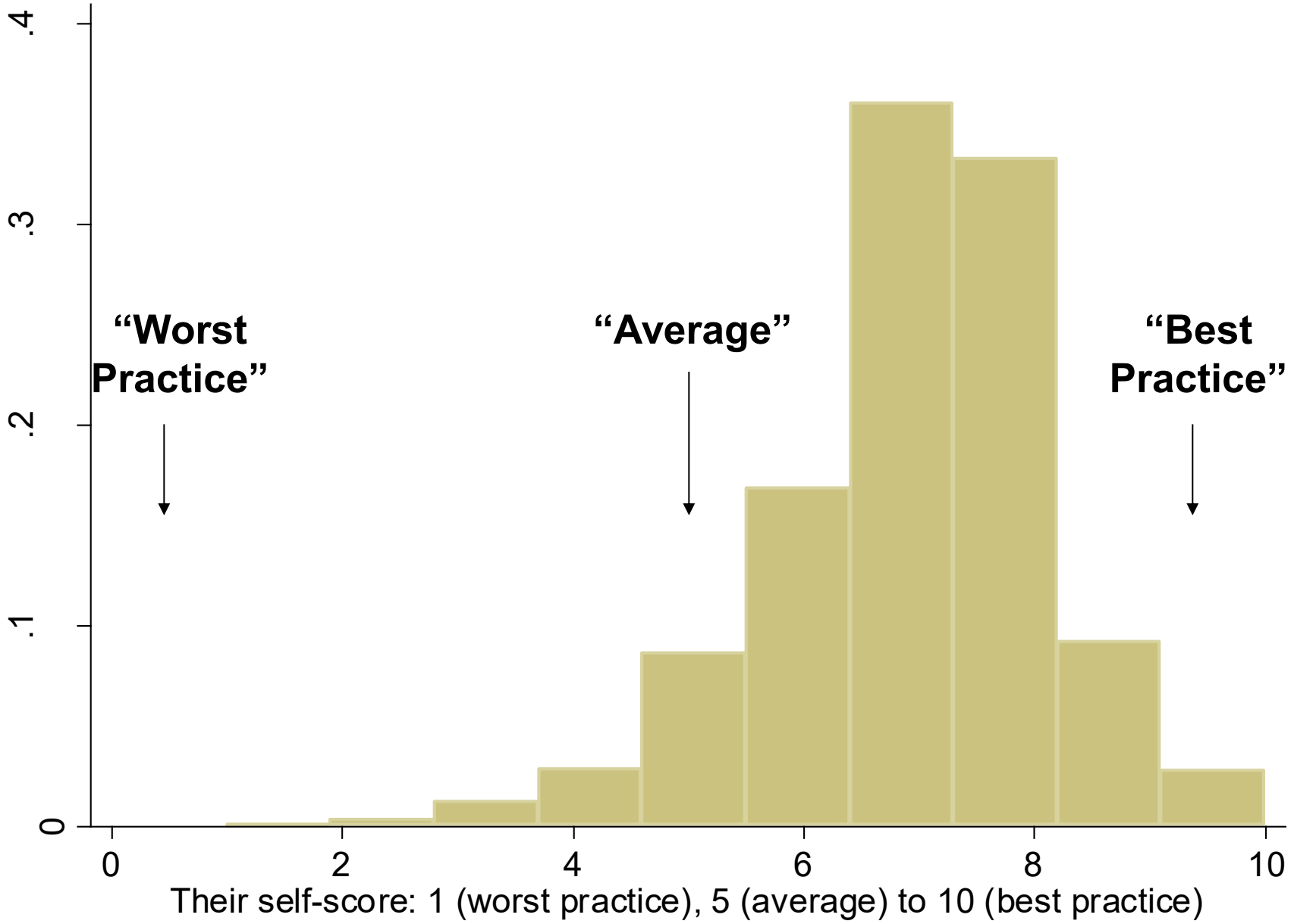
INFORMATION: ARE FIRMS AWARE OF THEIR MANAGEMENT PRACTICES BEING GOOD/BAD?

We asked:

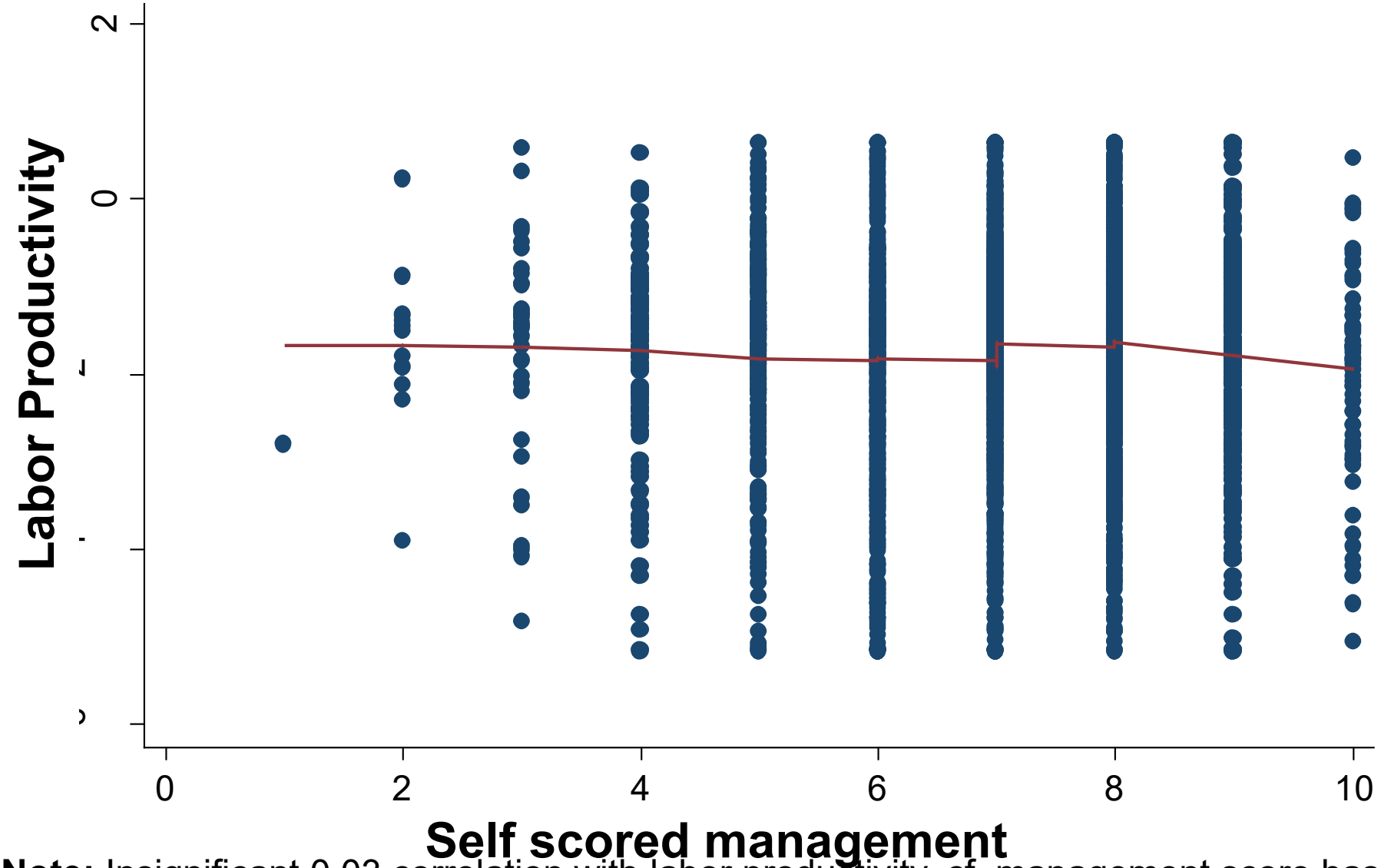
"*Excluding yourself, how well managed would you say your firm is on a scale of 1 to 10, where 1 is worst practice, 5 is average and 10 is best practice*"

We also asked them to give themselves scores on operations and people management separately

MOST MANAGERS THINK THEY ARE WELL ABOVE AVERAGE



SELF-SCORES UNCORRELATED WITH PRODUCTIVITY



Note: Insignificant 0.03 correlation with labor productivity, cf. management score has a correlation of 0.30

Managerial Informational RCTs

- **Cai and Szeidl (2018, QJE)**
  - 2,820 Chinese firms randomized into small groups whose managers met monthly for a year vs. no-meetings
  - MOPs style management scores rise significantly (~0.2 sd)
  - Revenue rises by 8.1%; profits ↑, inputs ↑
  - Mechanism appears to be via **information** - finding more business partners (supplier-client matching; trust). Better peers (i.e. if randomly matched to larger firms) increases benefits
- See also Brooks et al (2018); Bianchi and Giorcelli (2021, JPE)

Toolkit of Management policies

Policy type	Strength of evidence	Policy Net benefit (out of 5)	Ease of implementation	Time frame
Structural				
Competition	H		M	medium
Trade and FDI	H		L	medium
Education	M		M	long
Deregulation	M		L	medium
Governance	M		M/L	long
Direct				
Training - consulting	H		H	short
Training - formal classroom	M		H	medium
Information/benchmarking	L/M		H	medium

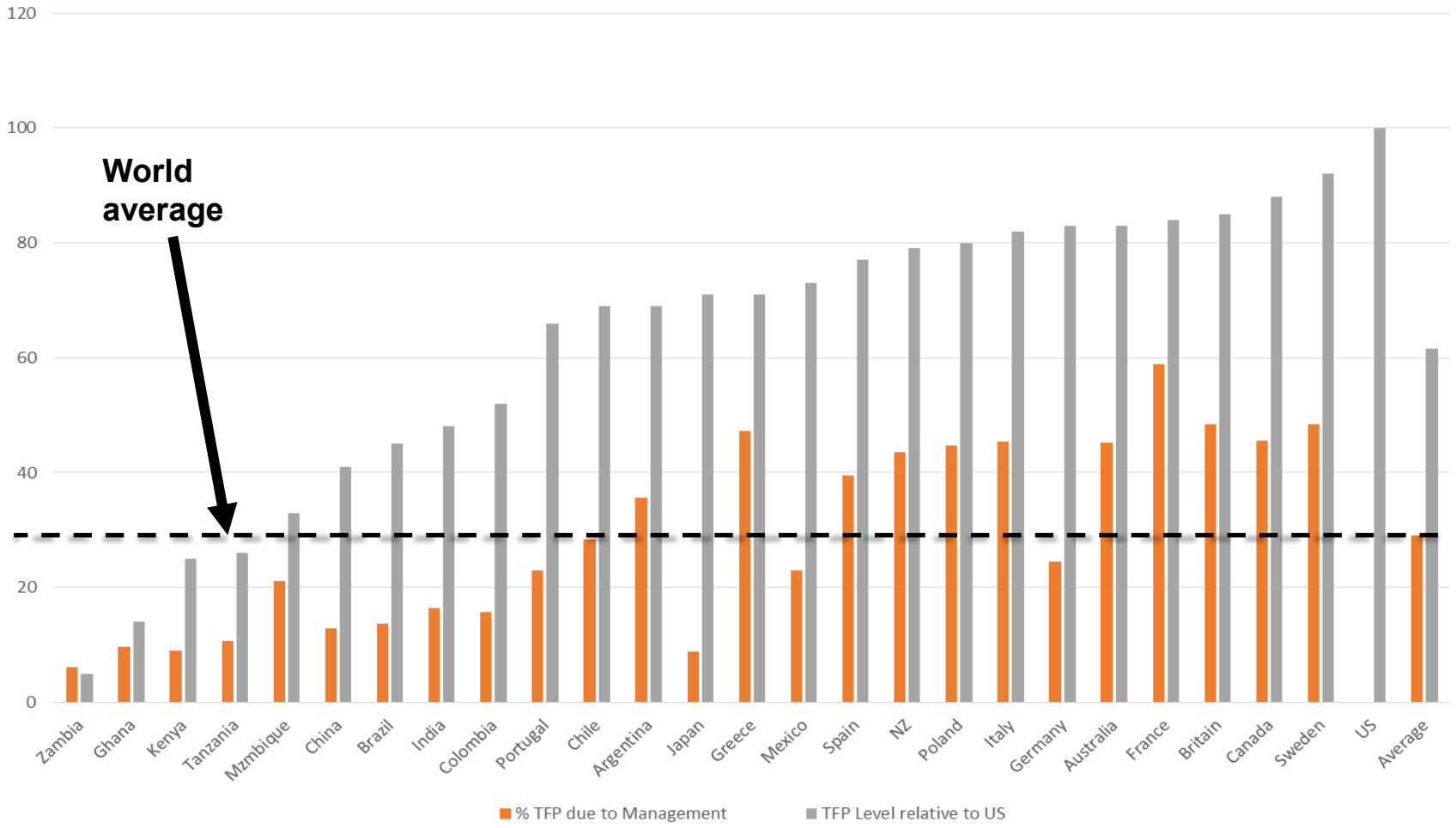
Source: Scur, Sadun, Van Reenen, Lemos & Bloom (2021)

L = Low; Not politically easy
M = Medium
H = Highly possible

Does management matter from a macro-economic perspective?

- In Schuh et al. (2026) We detail a structural model of management and use it to look at TFP differences between countries

Across countries, management accounts for about a quarter of international TFP gaps



Source: Schuh, Bloom, Hartley, Sadun, & Van Reenen (2026)

Conclusions

- New generation of (scalable) survey tools generate robust management measures
- Huge variation in management within & between nations
- Higher management firms more productive & larger (but frictions reduce ability of such firms to grow)
- Management is partially contingent ('Design' perspective), but some core practices they do seem to raise performance in a variety of contexts ('Productivity' perspective)
- Robust correlations with structural features of environment (e.g. product market competition)
- Management matters a lot for the wealth of nations & and is amenable to policy influence
- But there is far too much we do not know in this area. A rich seam of potential research projects

Thank you!

Some Further Reading (and viewing)

"Innovation Policies to Boost Productivity" (2020) Hamilton Policy Proposal 2020-13 https://www.hamiltonproject.org/assets/files/JVR_PP_LO_6.15_FINAL.pdf webinar

"A Toolkit of Policies to promote Innovation" (Nick Bloom, Heidi Williams and John Van Reenen), *Journal of Economic Perspectives (2019)* 33(3) 163–184 http://cep.lse.ac.uk/pubs/download/dp1634.pdf

"Why Do We Undervalue Competent Management" (Raffaella Sadun, Nick Bloom and John Van Reenen) *Harvard Business Review* (2017), September-October

"The new empirical economics of management" (Nick Bloom, Renata Lemos, Raffaella Sadun, Daniella Scur and John Van Reenen), *Journal of the European Economic Association* (2014) 12: 835–76,

"Measuring and Explaining Management practices across firms and nations" (Nick Bloom and John Van Reenen) *Quarterly Journal of Economics* (2007) 122(4), 1351–1408.

"The Costs and Benefits of Brexit" (Swati Dhingra, Hanwei Huang, Gianmarco Ottaviani, Joao Pessoa, Tom Sampson and John Van Reenen) *Economic Policy* (2017), 32(92) 651–705 Vox

"Who Becomes an Inventor in America? The Importance of Exposure to Innovation" (Alex Bell, Raj Chetty, Xavier Jaravel, Neviana Petkova and John Van Reenen), http://cep.lse.ac.uk/pubs/download/dp1519.pdf Data *Quarterly Journal of Economics* (2019)134(2) 647–713, New York Times Vox Atlantic Fortune Conversation VoxUS Economist VC Centrepiece INET

COVID-19: "A major wave of UK business closures by April 2021? The scale of the problem and what can be done." (Peter Lambert and John Van Reenen) 2021 CEP COVID analysis https://cep.lse.ac.uk/_NEW/PUBLICATIONS/abstract.asp?index=7711 IGA Radio Carona MIT Technology Review

Further reading

- "The World Management Survey at 18" (Bloom, Lemos, Sadun, Scur & Van Reenen, 2021), *Oxford Review of Economic Policy* https://poid.lse.ac.uk/textonly/publications/downloads/poidwp002.pdf
- World Management Survey http://worldmanagementsurvey.org/
- "Increasing Difference Between Firms" *Changing Market Structures and Implications for Monetary Policy*, Jackson Hole Symposium (Van Reenen, 2018) 19-65 http://cep.lse.ac.uk/pubs/download/dp1576.pdf NYT NPR
- LSE Growth Commission Final Report (Aghion et al, 2013)

http://www.lse.ac.uk/researchAndExpertise/units/growthCommission/documents/pdf/GCReportSummary.pdf

- "Management as a Technology" (Bloom, Sadun and Van Reenen, 2020): http://mitsloan.mit.edu/shared/ods/documents/?DocumentID=2685