

# **MANAGEMENT AS A TECHNOLOGY?**

**Nick Bloom (Stanford), Raffaella Sadun (HBS) &  
John Van Reenen (LSE)**

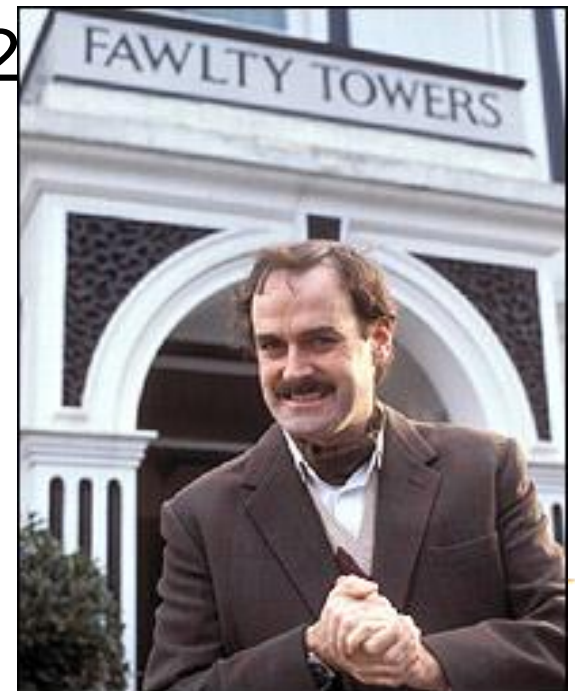
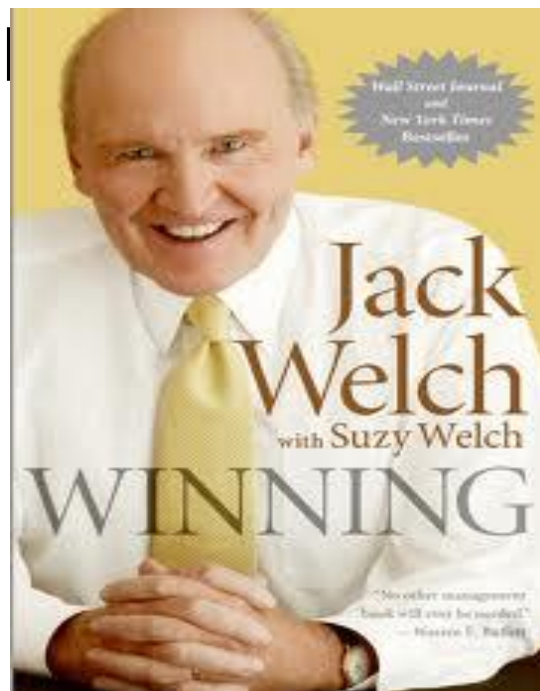
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# MANAGEMENT AS A TECHNOLOGY?

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# INTRODUCTION

- Explosion of econometric work on firms & plant performance in last 1-2 decades
  - Heterogeneity of productivity 1<sup>st</sup> order economic fact
  - Related to management practices (new data)
  - Management (partly) like a technology
- Empirical evidence
  - Positive effect of management on performance
  - Reallocation to better managed firms
    - Especially strong in US
    - Related to labor regs, trade costs & competition
    - Account for ~30% cross-country management gap
  - Management ~1/3 TFP differences (e.g. US-Greece)
  - Informational frictions impede management

# PRODUCTIVITY DISPERSION WITHIN COUNTRIES

- **Large cross sectional dispersion *within* countries**
  - Within US SIC4, plant labor productivity 90<sup>th</sup>-10<sup>th</sup>  $\approx 4x$  (TFP  $\approx 2x$ ). Syverson (2004, 2011).
  - Persistent Productivity Differences (PPDs)
  - Also find big variation in other countries, although degree of reallocation differs (e.g. Bartelsman, Haltiwanger & Scarpetta, 2012)
- **Is it all measurement problems? NO**
  - Robust to different methods of production function estimation (Olley-Pakes, 1996; Blundell-Bond, 2000; Akerberg et al, 2007, Solow residual)
  - Using plant-specific prices (Foster, Haltiwanger & Syverson, 2009)
  - Other measures of firm performance (e.g. profitability, size, management quality, etc.) show wide variation

# FIRM HETEROGENEITY HAS LONG BEEN RECOGNIZED

*“...we have the phenomenon in every community and in every trade, in whatever state of the market, of some employers realizing no profits at all, while others are making fair profits; others, again, large profits; others, still, colossal profits.”*

Francis Walker (*Quarterly Journal of Economics*, 87)

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# **Economic Theories**

Measuring Management

Data Description

Empirics

# REASONS FOR PERFORMANCE HETEROGENEITY

- **TFP Heterogeneity due to “hard technologies”**
  - R&D, patents, diffusion of ICT (information and communication technologies), etc.
- **These hard technologies matter a lot, but:**
  - After controlling for technology, still a big TFP residual
  - E.g. Productivity effects of ICT depend on firm management/organization (e.g. Bresnahan, Brynjolfsson and Hitt, 2002; Bloom, Sadun & Van Reenen, 2012)
- **Heterogeneity of management practices?**
  - Econometric tradition that fixed effects in production function = managerial ability (Mundlak, 1961)
  - Case studies & recent advances in measurement



# SOME ECONOMIC PERSPECTIVES ON MANAGEMENT

- **Fads and fashions?**
- **Management as Design (MAD)**
  - Organizational Economics e.g. Personnel Economics (Lazear & Oyer, 2009) application of economics to Human Resources
  - Contingent management School (Woodward, 1958)
- **“Management as a Technology” (MAT)**
  - Incorporates firm heterogeneity in productivity
  - *Non transferable* management capabilities (e.g. Lucas, 1978, & Melitz, 2003)
  - *Transferable* capabilities “diffusion” models
- **Management as Factor of production (MAF)**

# FORMALIZATION OF MANAGEMENT THEORIES IN PRODUCTION FUNCTION SETTING

- ***Management as Design (MAD)***

- Example:  $\ln Q = \alpha^L \ln L + \alpha^K \ln K - \sigma [M \ln(K/L)]$

- ***Management (M) as a Technology (MAT)***

- Example:  $Q = A(M)F(K,L)$

- $\ln Q = \beta M + \alpha^L \ln L + \alpha^K \ln K$

- ***Management as a Factor of Production (MAF)***

- Example:  $Q = AF(M,K,L)$

- $\ln Q = \ln A + \alpha^M \ln M + \alpha^L \ln L + \alpha^K \ln K$

- Hard to distinguish in practice from MAT (spillovers?)

# **SOME IMPLICATIONS OF “MANAGEMENT AS A TECHNOLOGY” VIEW**

- **Effect of Management on Performance**
  - Positive effect on productivity & profitability across industries
- **Management and Reallocation**
  - Better managed firms larger, more likely to survive and grow faster
  - These effects should be greater when environment favours reallocation (e.g. US vs. Greece; low trade barriers & labor regulations)
- **Management and competition**
  - Competition likely to have a positive effect on average management quality (selection and incentives)
- **Management and information**
  - Info a key reason for differences in management

Economic Theories

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# BLOOM - VAN REENEN (2007) SURVEY METHODOLOGY

## 1) Developing management questions

- 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
- Run from LSE, with same training and country rotation

## 3) Getting firms to participate in the interview

- Introduced as “Lean-manufacturing” interview, no financials
- Official Endorsement: Bundesbank, Bank of England, RBI, etc.
- Run by 100 MBA types (loud, assertive & business experience)

# MONITORING – e.g. “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**

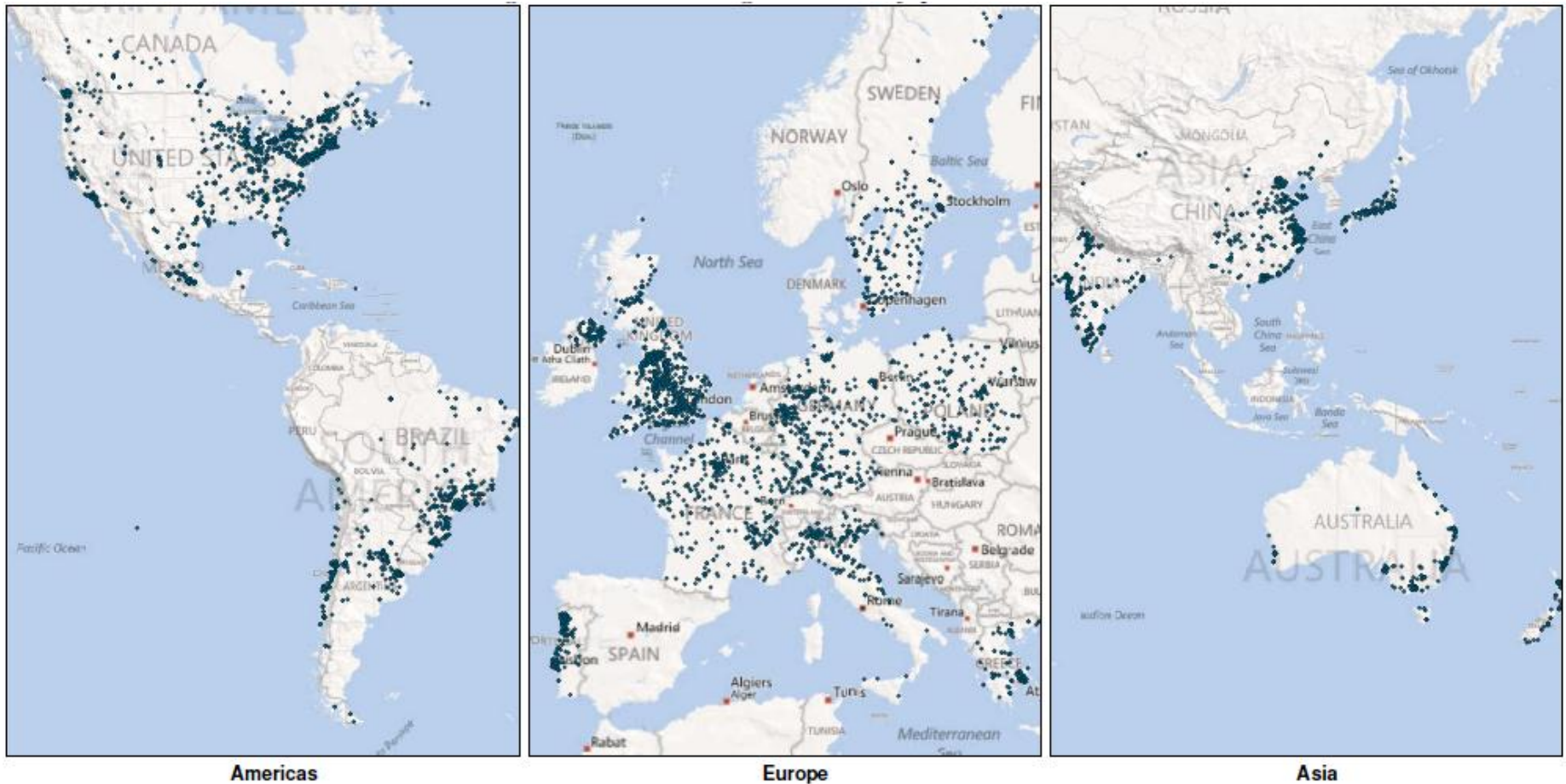
Note: All 18 dimensions and over 50 examples in Bloom & Van Reenen (2006)

# **INCENTIVES - e.g. “HOW DOES THE PROMOTION SYSTEM WORK?”**

<b>Score</b>	<b>(1) People are promoted primarily upon the basis of tenure</b>	<b>(3) People are promoted upon the basis of performance</b>	<b>(5) We actively identify, develop and promote our top performers</b>
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**Note:** All 18 dimensions and over 50 examples in Bloom & Van Reenen (2006)

# Plant locations from World Management Survey (~8,000 firms, 3 major waves: 2004, 2006, 2009; 20 countries)



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

Now extended to Hospitals, Retail, Schools, etc.

Extension to nearer population surveys (e.g. US MOPs)



# **ADDITIONAL CONTROLS FOR BIAS & NOISE**

## **8 INTERVIEWEE CONTROLS**

- Gender, seniority, tenure in post, tenure in firm, countries worked in, foreign, worked in US, plant location, reliability score

## **3 INTERVIEWER CONTROLS**

- Set of analyst dummies, cumulative interviews run, prior firm contacts

## **5 TIME CONTROLS**

- Day of the week, time of day (interviewer), time of the day (interviewee), duration of interview, days from project start

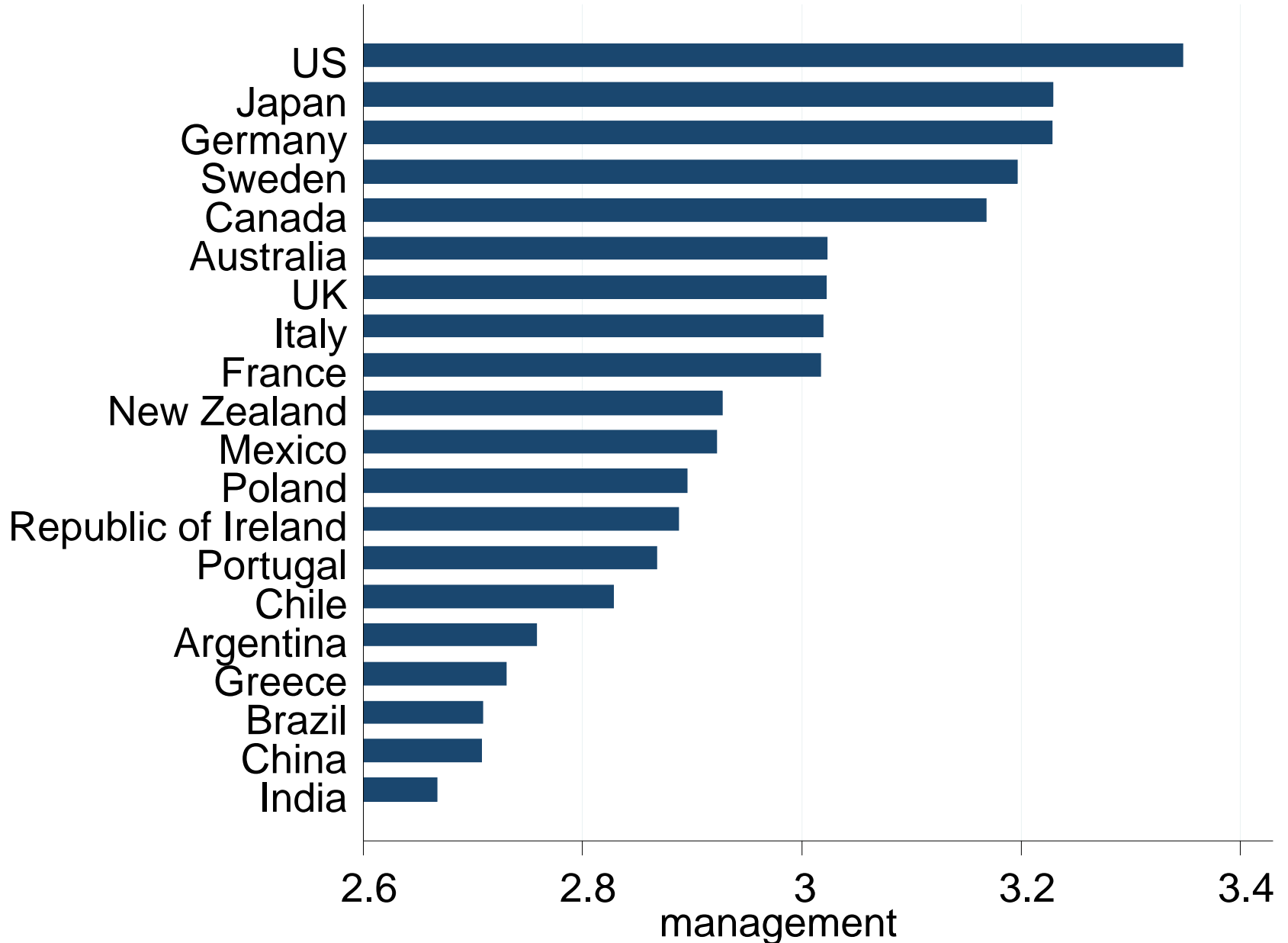
Economic Theories

Measuring Management

**Data Description**

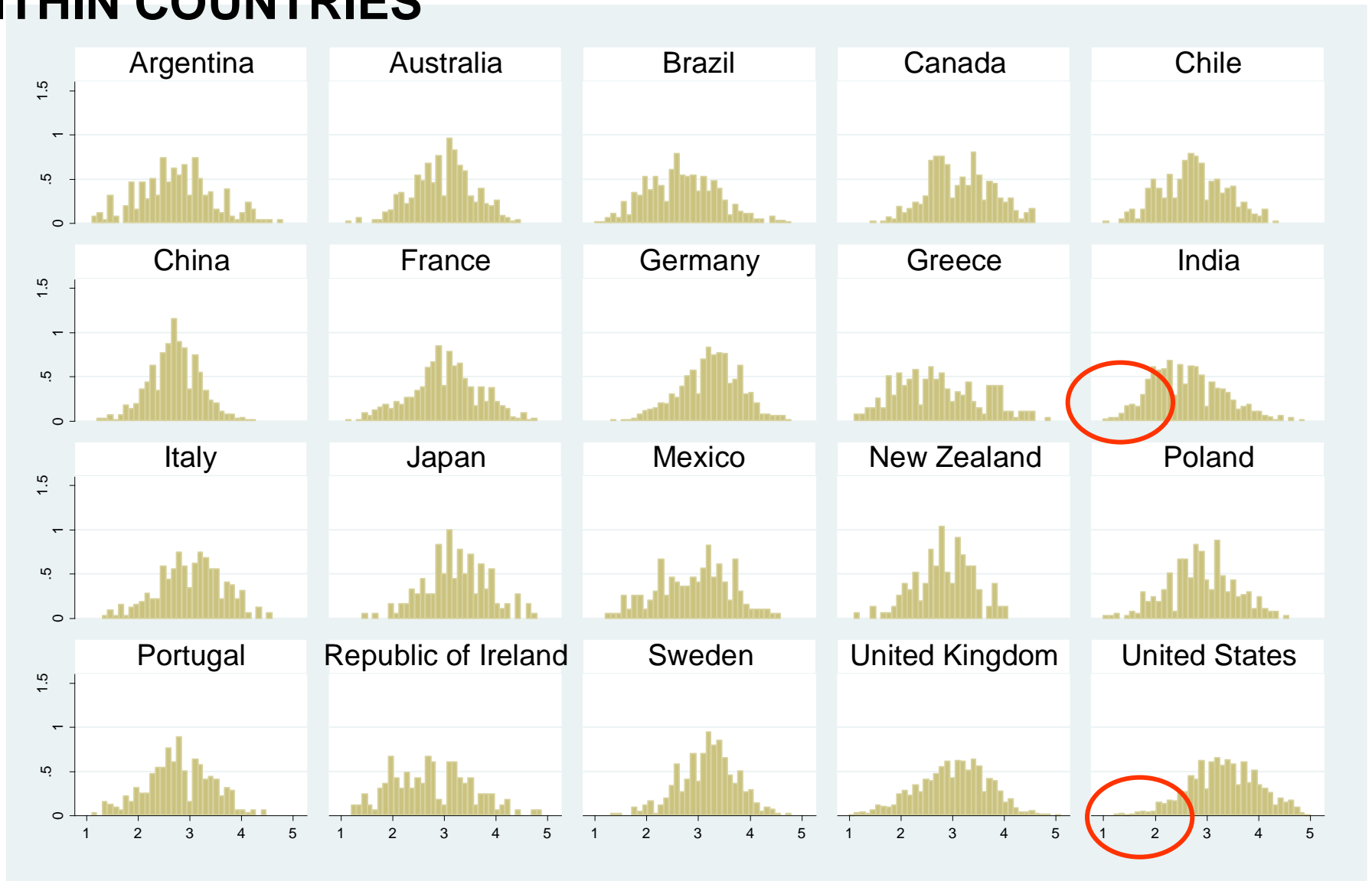
Empirics

# MANAGEMENT PRACTICE SCORES ACROSS COUNTRIES



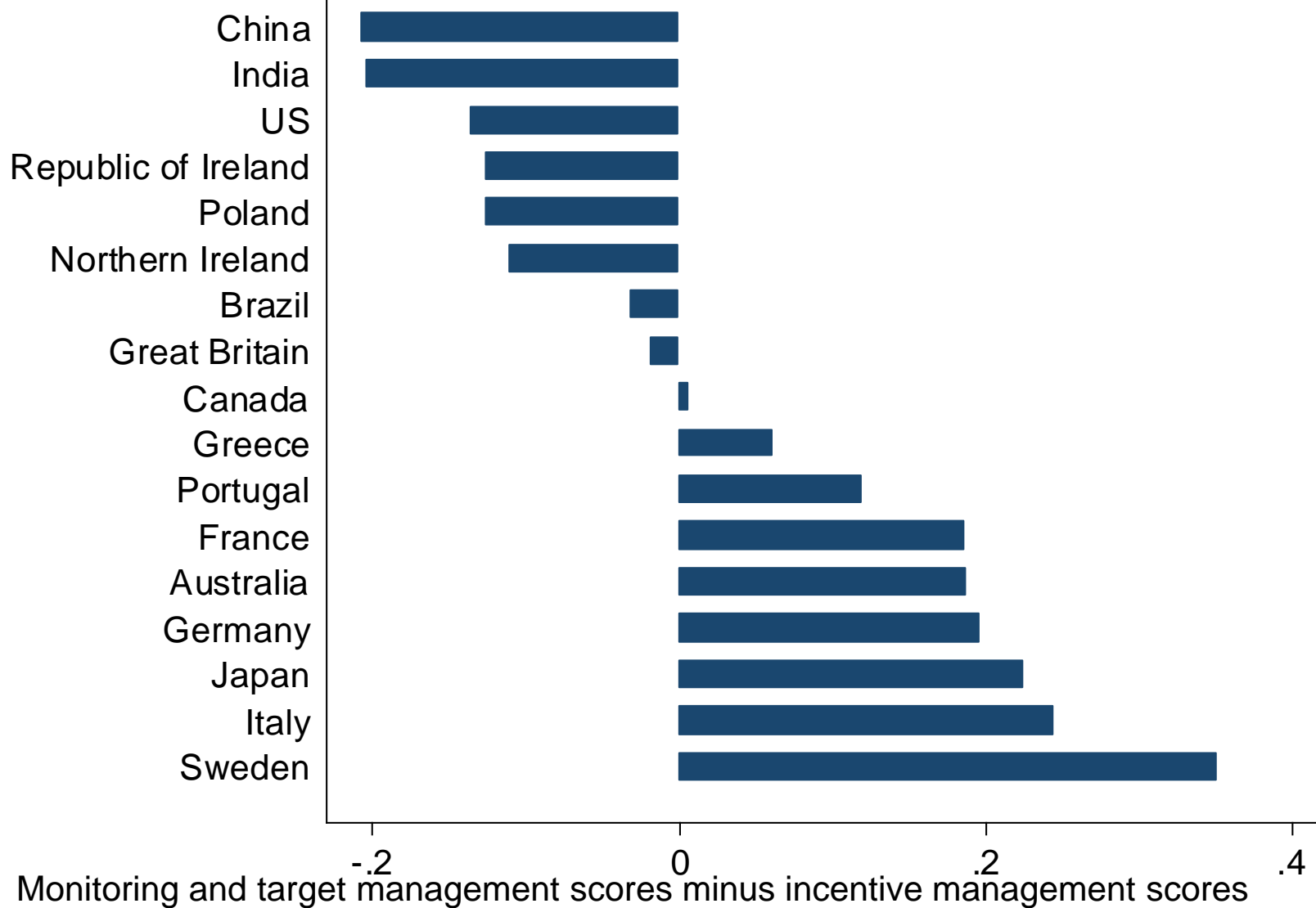
Note: Averages taken across all firms within each country.

# HUGE VARIATION IN MANAGEMENT SCORES ACROSS FIRMS WITHIN COUNTRIES



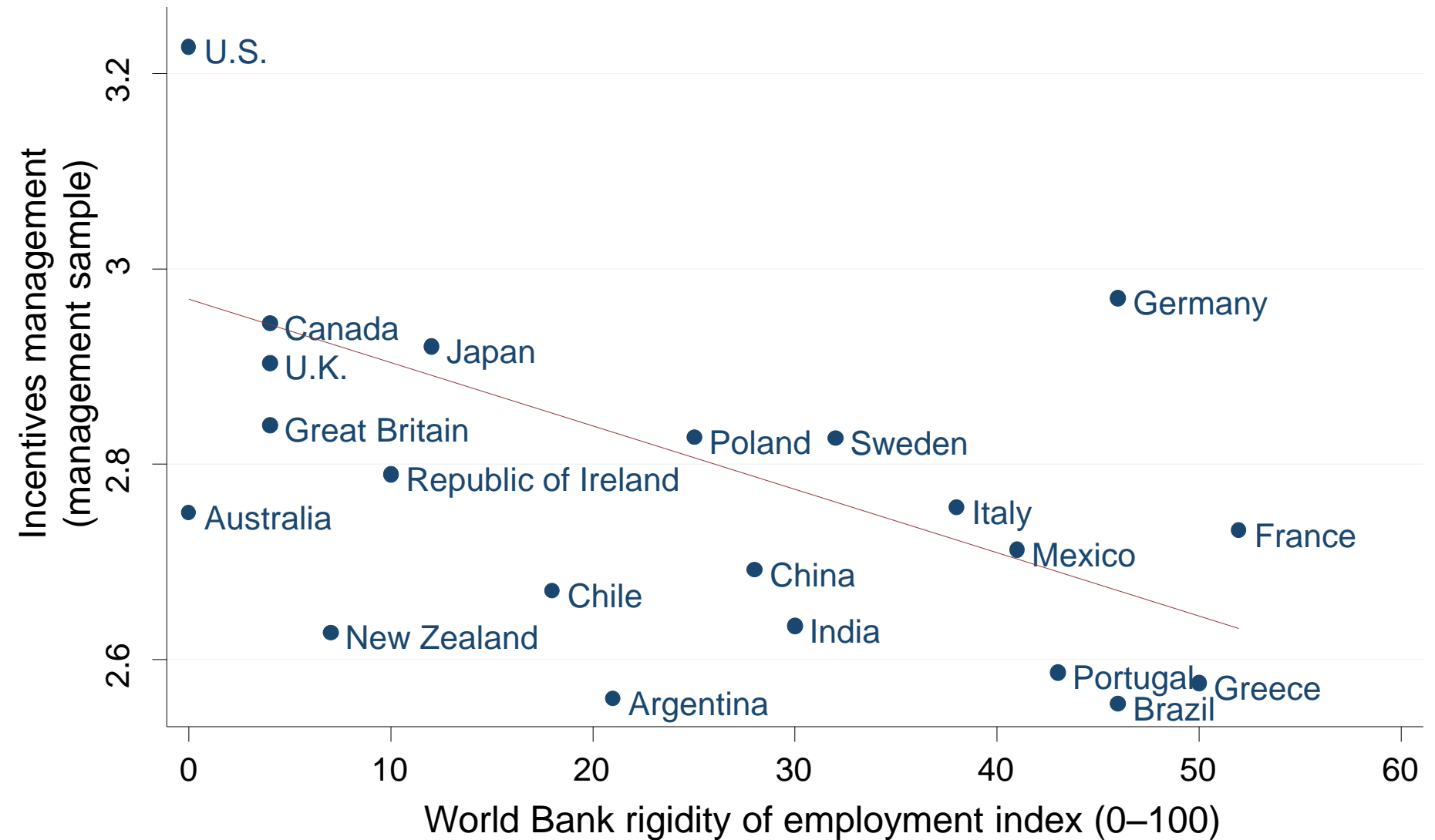
**Note:** Bars are the histogram of the actual density. Scores from 9,995 management interviews across 20 countries.

# Styles differ systematically across countries (Monitoring/Targets – People Management)



Note: Averages taken across all firms within each country. 5,747 observations in total. Negative figures indicate countries are relatively better at incentives management (hiring, firing, pay and promotions) while positive figures indicate countries are relatively better at operations management (monitoring and targets).

# Labor Market Regulation Negatively correlated with People Management



Note: Averaged across all manufacturing firms within each country (9,079 observations). We did not include other sectors as we do not have the same international coverage. Incentives management is defined as management practices around hiring, firing, pay, and promotions. The index is from the Doing Business database: <http://www.doingbusiness.org/ExploreTopics/EmployingWorkers/>.

Economic Theories

Measuring Management

Data Description

**Empirics**

## **Empirics**

- **Management effect on Performance**
- Management and Reallocation
- Management and Competition
- Management and Information



# PERFORMANCE REGRESSIONS

Performance  
measure

$$y_i^c = \beta M_i^c + \alpha_l l_i^c + \alpha_k k_i^c + \alpha_h h_i^c + \gamma' x_i^c + u_i^c$$

country c

management  
(average z-scores)

ln(labor)

ln(capital)

ln(materials)

other controls

- Note – not a causal estimation, only an association
- Check what happens when we allow industry specific coefficients

# TABLE 3: FIRM PERFORMANCE IS CORRELATED WITH BETTER MANAGEMENT

Dependent variable	Ln(sales)	Ln(sales)	Ln(employment)	Profitability ROCE	5yr Sales growth	Exit
Estimation	OLS	Fixed Effects	OLS	OLS	OLS	OLS
Firm sample	All	2+ surveys	All	All	Quoted	All
Management	0.158***	0.030**	0.287***	0.911**	0.049***	-0.008**
	(0.017)	(0.015)	(0.021)	(0.368)	(0.014)	(0.003)
Ln(employees)	0.658***	0.375***				
	(0.026)	(0.112)				
Ln(capital)	0.293***	0.243***				
	(0.021)	(0.090)				
Firms	2,925	1,340	2,925	2,925	2,925	477
Observations	7,035	5,450	7,035	7,035	7,035	1,186

**Notes:** Regressions includes controls for country, SIC3 & year, dummies. Firm-age, skills, noise controls etc. SE clustered by firm.

# TAB 1 MANAGEMENT COEFFICIENTS SIMILAR ACROSS INDUSTRIES (BUT COEFFICIENTS ON LABOR & CAPITAL VARY)

Dependent variable	Ln(Sales)	TFP	Ln(Sales)
<b>Management</b>	0.140*** (0.014)	0.133*** (0.014)	0.011** (0.042)
<b>ln(labor)</b>	0.642*** (0.025)		0.258*** (0.110)
<b>ln(capital)</b>	0.319*** (0.020)		0.442*** (0.077)
<b>Fixed Effects</b>	No	No	Yes
<b>Joint Significance of Industry interactions (<i>p-value</i>)</b>			
<b>Management*SIC2</b>	0.69	0.78	0.20
<b>Ln(labour)*SIC2</b>	0.00		0.00
<b>Ln(capital)*SIC2</b>	0.09		0.01
<b>Observations</b>	7,094	7,094	5,512

**Notes:** OLS Regressions includes controls for country, industry, year, skills. S.E.s are clustered by firm. Management is z-scored. Industry 20 is baseline.

# RANDOMIZED CONTROL TRIALS: BLOOM ET AL (2011)

- Experiment on plants in Indian textile firms outside Mumbai
- Randomized treatment plants get heavy management consulting, control plants get very light consulting (just enough to get data)
- Collect weekly performance data on all plants from 2008 to 2010
  - Improved management practices led to large and significant improvements in productivity and profitability (around \$325,000)
  - One sd increase in management, 10% higher TFP

# Productivity improvements in a randomized field experiment on the adoption of modern management practices



**Notes:** Weekly average total factor productivity for the 14 treatment plants which adopted modern management practices for quality, inventory and production efficiency and the 6 control plants. All plants make cotton fabric near Mumbai, India, with between 100 and 1000 employees. Values normalized so both series have an average of 100 prior to the start of the intervention. Confidence intervals bootstrapped over firms. **Source:** Bloom, Eifert Mahajan, McKenzie, Roberts (2011).

## **Empirics**

- Management effect on Performance
- **Management and Reallocation**
- Management and Competition
- Management and Information

# EXAMINING THE ROLE OF REALLOCATION

$$Y_{ijk} = \alpha M_{ijk} + \beta(M * REALLOCATION)_{ijk} + \gamma REALLOCATION_{ijk} + u_{ijk}$$

- $Y_{ijk}$  = *SIZE* (or *GROWTH*) for firm  $i$  in country  $j$  industry  $k$
- One measure of strength of reallocation is a set of country dummies, with US as base
- Alternative use country & industry\*country policy variables (like labor regulations & trade barriers)

**TABLE 4: EMPLOYMENT CORRELATED WITH MANAGEMENT MORE STRONGLY IN US (OMITTED BASE)**

Management	179.2***	194.1***	353.1***
MNG*Argentina			-273.1**
MNG*Australia			-259.8*
MNG*Brazil			-210.1*
MNG*Canada			-170.3
MNG*Chile			-167.9
MNG*China			95.7
MNG*France			-497.6**
MNG*Germany			-18.7
MNG*Greece			-352.1***
MNG*India			-148.6
MNG*Ireland			-257.9**
MNG*Italy			-288.7***
MNG*Mexico			-243.3*
MNG*NZ			-376.9*
MNG*Japan			-301.4**
MNG*Poland			-305.2***
MNG*Portugal			-306.1***
MNG*Sweden			-213.0
MNG*UK			-107.4
<b>General Controls</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>

**Notes:** Dependent var is firm employment; 5,662 observations; domestic firms only



# RELATIONSHIP BETWEEN MANAGEMENT & SIZE IS MUCH WEAKER IN COUNTRIES WITH LESS COMPETITION

- “Selection” effect – market reallocates jobs to more efficient firms
- An additional sd of management score associated with of employment increase:
  - US ~353 more workers
  - UK ~246 more workers
  - Italy ~65 more workers
  - Greece~0
- Competitive forces of reallocation much weaker in Southern EU and than US
- Same story with sales growth (dynamic reallocation)

**TABLE 5: REALLOCATION OF SALES GROWTH TOWARDS BETTER MANAGED FIRMS IS ALSO STRONGER IN US**

<b>Dependent Variable</b>	<b>Sales Growth</b>	<b>Sales Growth</b>	<b>Sales Growth</b>	<b>Sales Growth</b>
Management (MNG)	0.018***	0.035***	0.031**	0.098***
MNG*Argentina		-0.092***	-0.093**	-0.143***
MNG*Australia		-0.076	-0.082	-0.155**
MNG*Brazil		-0.022	-0.034	-0.108***
MNG*Canada		-0.033	-0.054	-0.138**
MNG*Chile		-0.030	-0.049	-0.166
MNG*China		-0.011	-0.011	-0.067
MNG*France		-0.055***	-0.059***	-0.099**
MNG*Germany		-0.004	-0.006	-0.081*
MNG*Greece		-0.039*	-0.040*	-0.103**
MNG*India		0.020	0.021	-0.070
MNG*Ireland		-0.006	-0.040	-0.094
MNG*Italy		-0.026	-0.055**	-0.100**
MNG*Mexico		-0.028	-0.033*	-0.082*
MNG*Japan		-0.032	-0.042*	-0.107**
MNG*Poland		-0.009	-0.015	-0.064
MNG*Portugal		-0.048	-0.062*	-0.117**
MNG*Sweden		-0.025	-0.009	-0.075
MNG*UK		-0.008	-0.044*	-0.071
Controls for noise and age	No	No	Yes	yes
Drop multinationals?	No	No	No	Yes
N	3734	3734	3734	2756

# TAB 6/7: REALLOCATION WORSE IN COUNTRIES WITH HIGH EMPLOYMENT PROTECTION LAWS (EPL) & HIGH TARIFFS


Dependent Variable:	Employment	Employment	Employment	Employment	Employment
Management (MNG)	223.18*** (37.48)	315.02*** (94.53)	344.70*** (55.99)	156.98*** (60.44)	97.93 (67.25)
MNG*Tariff (cty*ind specific Feenstra-Romalis)					-8.13** (3.34)
MNG*EPL (WB, 2008; 1=Low, 100=High; cty level)	-1.46** (0.70)				
MNG*EPL (OECD, 1985-08 1=Low,6=high; cty level)		-68.79* (38.62)			
MNG*Trade Cost (WB, 2008 1=low, 6=high; cty level)			-0.17*** (0.05)		
Tariff (US \$, Feenstra-Romalis, cty-ind specific)				-3.37 (4.10)	-5.26 (4.20)
Observations	5,580	5,504	4,916	1,559	1,559

**Notes:** OLS, clustered by firm; dependent variable is firm employment; Domestic firms only

# “OLLEY PAKES” (OP) DECOMPOSITION OF WEIGHTED AVERAGE MANAGEMENT SCORE ( $M$ ) IN GIVEN COUNTRY

Management score of firm  $i$

Size of firm  $i$

$$M = \sum_i M_i Y_i$$


# “OLLEY PAKES” (OP) DECOMPOSITION OF WEIGHTED AVERAGE MANAGEMENT SCORE ( $M$ ) IN GIVEN COUNTRY

Management score of firm  $i$

Size of firm  $i$

$$M = \sum_i M_i Y_i$$

$$= \sum_i [(M_i - \bar{M}_i)(Y_i - \bar{Y}_i)] + \bar{M}$$

$$= OP + \bar{M}$$

Olley-Pakes  
reallocation term

Unweighted mean  
of management score

# DECOMPOSING THE RELATIVE MANAGERIAL DEFICIT BETWEEN COUNTRY $j$ AND THE US ECONOMY

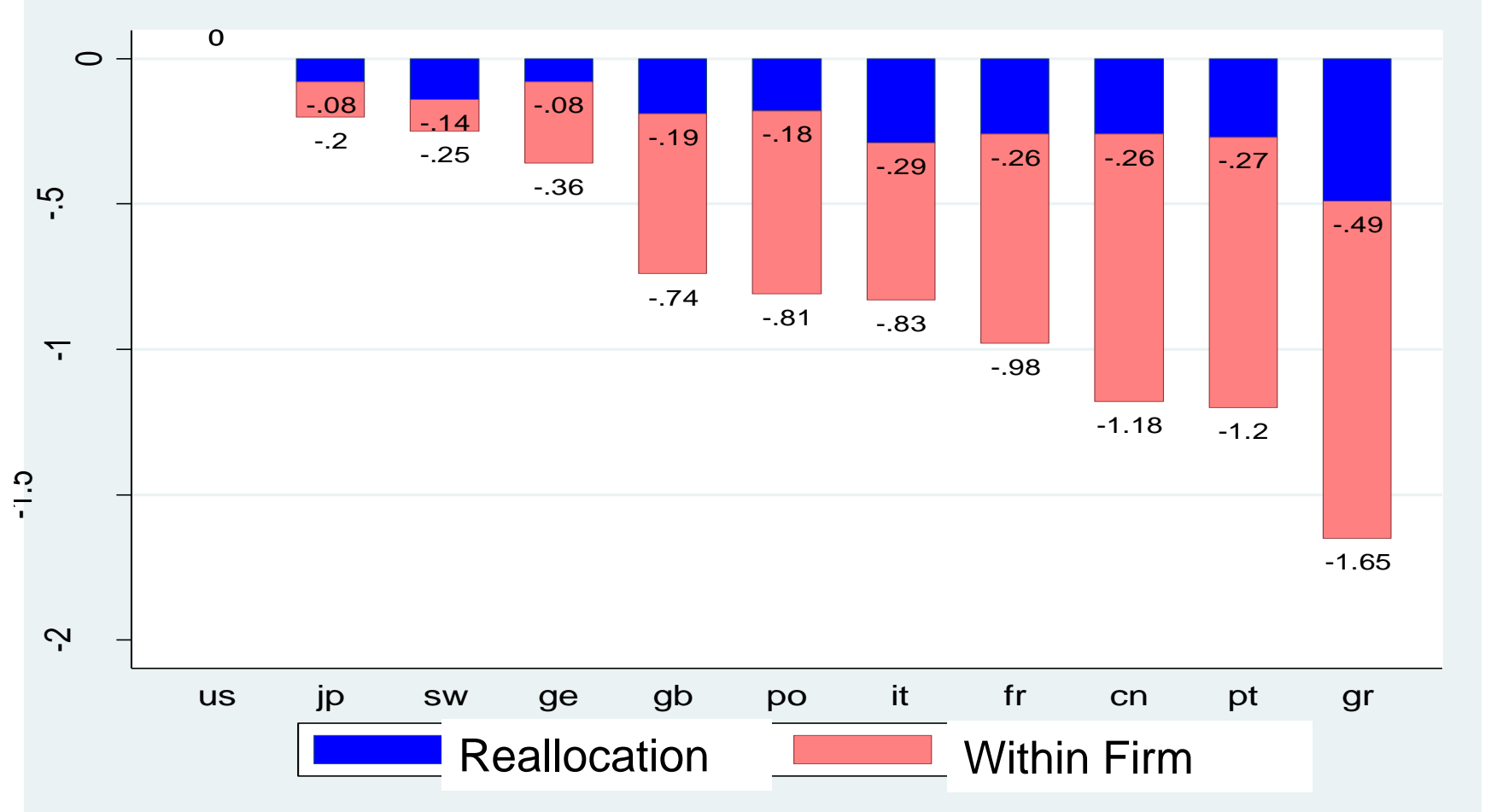
$$M^j - M^{US} = (OP^j - OP^{US}) + (\bar{M}^j - \bar{M}^{US})$$

Difference in aggregate  
Weighted management  
Scores

Difference in reallocation  
(between firm)

Difference in unweighted  
Means (within firm)

# FIG7: COUNTRY MANAGEMENT SCORES & REALLOCATION ACROSS COUNTRIES RELATIVE TO THE US LEVEL

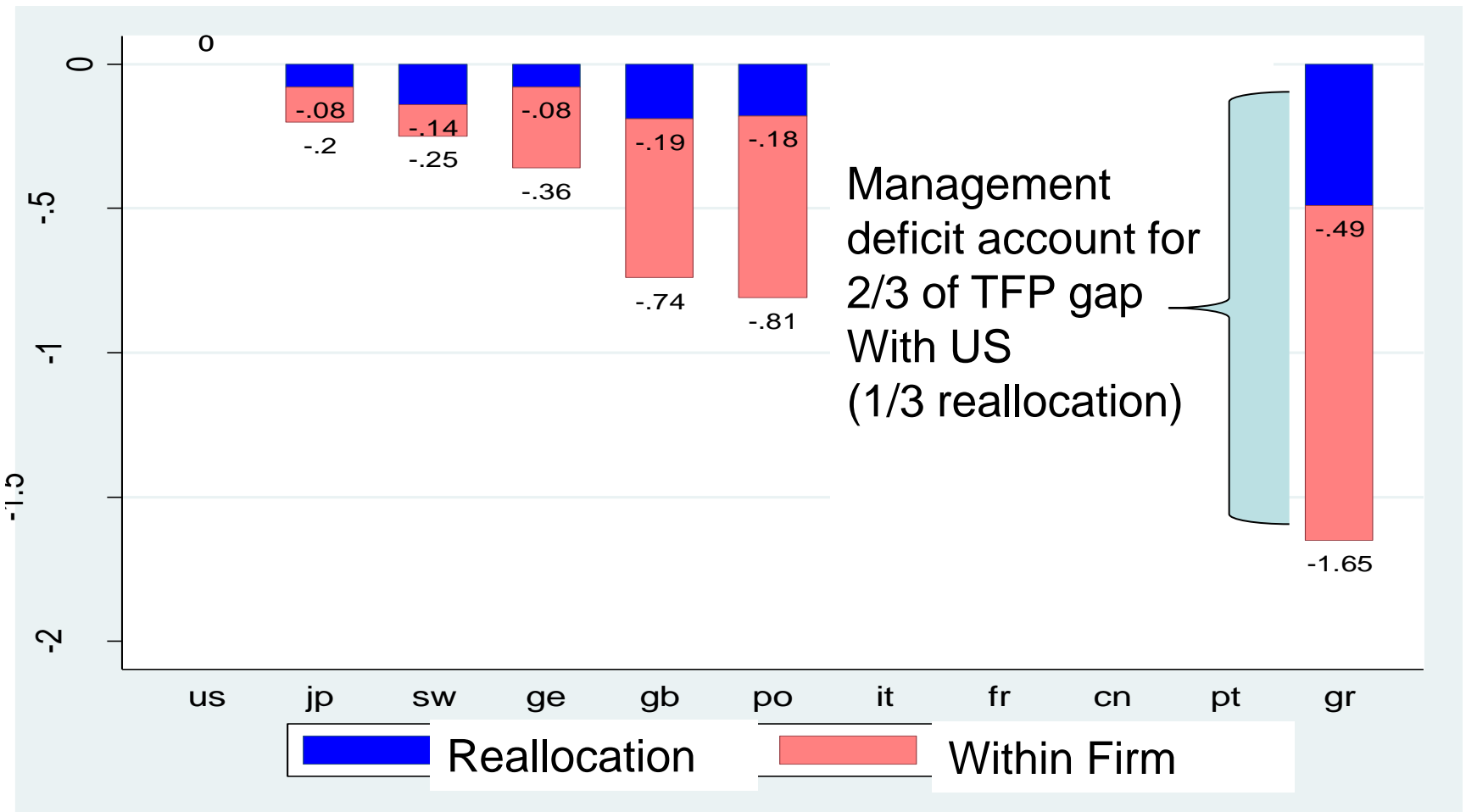


Source: Bloom, Sadun & Van Reenen (2012)

Notes: Total weighted mean management deficit with the US is the number on top of bar. This is decomposed into (i) reallocation effect (OP, blue bar) and (ii) unweighted average management scores (sd=1, red bar). Domestic firms, scores corrected for sampling bias

Similar ranking to Bartelsman, Haltiwanger & Scarpetta (2012)

# COUNTRY MANAGEMENT SCORES & REALLOCATION ACROSS COUNTRIES RELATIVE TO THE US LEVEL



Source: Bloom, Sadun & Van Reenen (2012)

Notes: Total weighted mean management deficit with the US is the number on top of bar. This is decomposed into (i) reallocation effect (OP, blue bar) and (ii) unweighted average management scores (sd=1, red bar). Domestic firms, scores corrected for sampling bias

Similar ranking to Bartelsman, Haltiwanger & Scarpetta (2012)



**TAB 8: DECOMPOSING AGGREGATE MANAGEMENT GAP INTO REALLOCATION & UNWEIGHTED MEAN DIFFERENCE**

<b>Country</b>	<b>Share-Weighted Average Management Score, M (1)=(2)+(3)</b>	<b>Reallocation effect (Olley-Pakes, OP)</b>	<b>Unweighted Average Management Score</b>	<b>“Deficit” in Share-weighted Management Score relative to US</b>	<b>“Deficit” in Reallocation relative to US</b>	<b>% of deficit in management score due to worse reallocation (6)=(5)/(4)</b>
US	0.67	0.36	0.31	0	0	
Japan	0.47	0.28	0.19	-0.2	-0.08	40%
Sweden	0.43	0.22	0.20	-0.24	-0.14	58%
Germany	0.31	0.28	0.03	-0.36	-0.08	22%
GB	-0.07	0.17	-0.24	-0.74	-0.19	26%
Poland	-0.14	0.18	-0.32	-0.81	-0.18	22%
Italy	-0.15	0.07	-0.23	-0.82	-0.29	35%
France	-0.31	0.10	-0.41	-0.98	-0.26	27%
China	-0.51	0.10	-0.61	-1.18	-0.26	22%
Portugal	-0.53	0.09	-0.62	-1.20	-0.27	22%
Greece	-0.98	-0.13	-0.85	-1.65	-0.49	30%

# DECOMPOSITIONS – HOW MUCH OF TFP GAP ACCOUNTED FOR BY MANAGEMENT GAP?

Country	“Deficit” in Share-weighted Management Score relative to US	“Deficit” in Reallocation relative to US	% of deficit in management score due to worse reallocation (6)=(5)/(4)	TFP Gap with the US (Jones and Romer, 20120)	% of TFP gap with US accounted for by management
US	0	0			
Japan	-0.20	-0.08	40%	33.6	5.95
Sweden	-0.24	-0.14	58%	32.2	7.45
Germany	-0.36	-0.08	22%		
GB	-0.74	-0.19	26%	20.3	36.45
Poland	-0.81	-0.18	22%		
Italy	-0.82	-0.29	35%	17.2	47.67
France	-0.98	-0.26	27%	25.3	38.74
China	-1.18	-0.26	22%	78.3	15.07
Portugal	-1.20	-0.27	22%	24.9	48.19
Greece	-1.65	-0.49	30%	51	32.35

**Note:** Assume a treatment effect of management on TFP of 10%

# TAB 9: EFFECT OF RECESSION ON REALLOCATION

(DEPENDENT VARIABLE IS SALES GROWTH 2009/8 – 2007/6)

<b>SHOCK</b>	-0.051***	-0.052***		
<b>(COMTRADE)</b>	(0.014)	(0.014)		
<b>Management*SHOCK</b>		0.018*		
<b>(COMTRADE)</b>		(0.010)		
<b>SHOCK</b>			-0.033**	-0.035**
<b>(ORBIS)</b>			(0.014)	(0.014)
<b>Management*SHOCK</b>				0.027**
<b>(ORBIS)</b>				(0.011)
<b>Management</b>	0.001	-0.008	0.002	-0.014
	(0.006)	(0.009)	(0.006)	(0.010)
<b>Firms</b>	1,599	1,599	1,567	1,567
<b>Observations</b>	1,685	1,685	1,653	1,653

**Notes:** SHOCK is defined as the fall in exports (COMTRADE) or sales (ORBIS) in the SIC3 by CTY cell. All columns include controls for CTY and SIC3

## **Empirics**

- Management effect on Performance
- Management and Reallocation
- **Management and Competition**
- Management and Information

# COMPETITION & MODELS OF MANAGEMENT

- Various ways that competition may influence management
  - Selection – badly run firms more likely to exit
  - Effort – forces badly run firms to try harder to survive (although Schumpeterian effects may counterbalance)
- No obvious relationship in Design and Factor of Production perspectives
- Using panel we can find a role for both mechanisms

# COMPETITION AND MANAGEMENT PRACTICES

3 competition proxies from Nickell (1996) & Aghion et al. (2005)

Competition proxies	Dependent variable: Management			
<b>Import penetration</b> (lagged industry-country level)	<b>0.081**</b> <b>(0.044)</b>			
<b>1- Lerner Index<sup>1</sup></b> (lagged industry-country level)		<b>5.035**</b> <b>(2.146)</b>		
<b># of competitors</b> (Firm level)			<b>0.115***</b> <b>(0.023)</b>	<b>0.120**</b> <b>(0.052)</b>
<b>Observations</b>	<b>2,657</b>	<b>2,819</b>	<b>2,789</b>	<b>864</b>
<b>Firm fixed effects?</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>
<b>Full controls<sup>2</sup></b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**Notes:** “Full controls” includes 108 SIC-3 industry, country, firm-size, public and interview noise (interviewer, time, date & manager characteristic) controls, 2004-2006, UK, US, France and Germany only. Col (1) and (2) clustered SE by ind\*cty, col (3) clustered by firm

## **Empirics**

- Management effect on Performance
- Management and Reallocation
- Management and Competition
- **Management and Information**

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

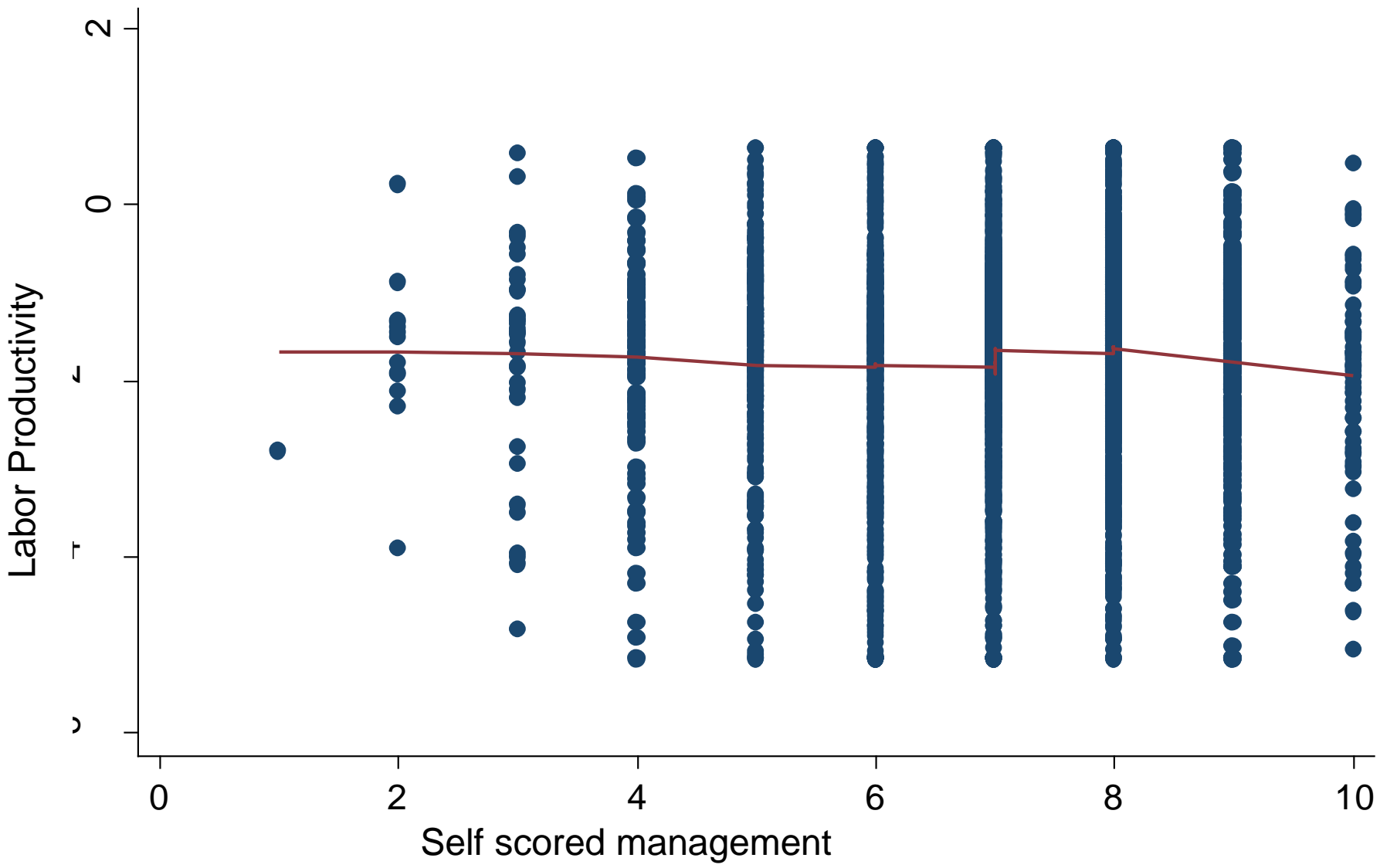
We asked:

*“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



# SELF-SCORES UNCORRELATED WITH PRODUCTIVITY



\* Insignificant 0.03 correlation with labor productivity, cf. management score has a 0.295

# COMPETITION AFFECTS FIRM'S SELF-PERCEPTIONS OF MANAGEMENT QUALITY

Dep. Var.	Management			Self-score Management		
	FEs	SIC3	Firm	SIC3	SIC3	Firm
Sample	All	2+ obs	2+ obs	All	2+ obs	2+ obs
Competition	0.064*** (0.018)	0.082*** (0.031)	0.119** (0.051)	-0.038* (0.023)	-0.041 (0.039)	-0.046 (0.073)
%college	0.115*** (0.008)	0.109*** (0.014)		0.040*** (0.011)	0.069*** (0.020)	
Ln(emp)	0.175*** (0.009)	0.157*** (0.017)		0.069*** (0.012)	0.060*** (0.022)	
Obs	8,776	3,276	3,349	7,960	2,934	3,007

**Notes:** Controls include country & year dummies, public & interview noise (interviewer, time, date & manager characteristic). SEs clustered by firm.

# CONCLUSIONS

- Heterogeneity in firm productivity linked to management
  - About 1/3 of cross-country TFP gap?
- Management as a “technology”
  - Management improves performance
  - Reallocation stronger in US
    - Linked to trade, labor regulations
    - Explains ~30% of US management advantage
  - Competition drives better management through selection, incentives & information
- **Next Steps:**
  - Supply of management (universities, B-Schools)
  - Management vs. managers
  - Management during Great Recession

# MY FAVOURITE QUOTES:

## The traditional British Chat-Up

[Male manager speaking to an Australian female interviewer]

*Production Manager:* “Your accent is really cute and I love the way you talk. Do you fancy meeting up near the factory?”

*Interviewer* “Sorry, but I’m washing my hair every night for the next month....”

# MY FAVOURITE QUOTES:

## The traditional Indian Chat-Up

*Production Manager:* “Are you a Brahmin?”

*Interviewer* “Yes, why do you ask?”

*Production manager* “And are you married?”

*Interviewer* “No?”

*Production manager* “Excellent, excellent, my son is looking for a bride and I think you could be perfect. I must contact your parents to discuss this”

# **NEXT STEPS: OTHER IMPLICATIONS OF THE TECHNOLOGICAL VIEW OF MANAGEMENT**

- **Management Practices or just managers?**
  - Better management practices just better human capital (observed and unobserved)
  - Well managed firms get more out of ex ante identical people
- **Management as resilience**
  - Better managed firms more resilient to shocks (e.g. Great Recession)
  - Similar to organizational capital view
- **Management and labour markets**
  - Supply of highly skilled workers
  - Supply of business skills (e.g. B-Schools)

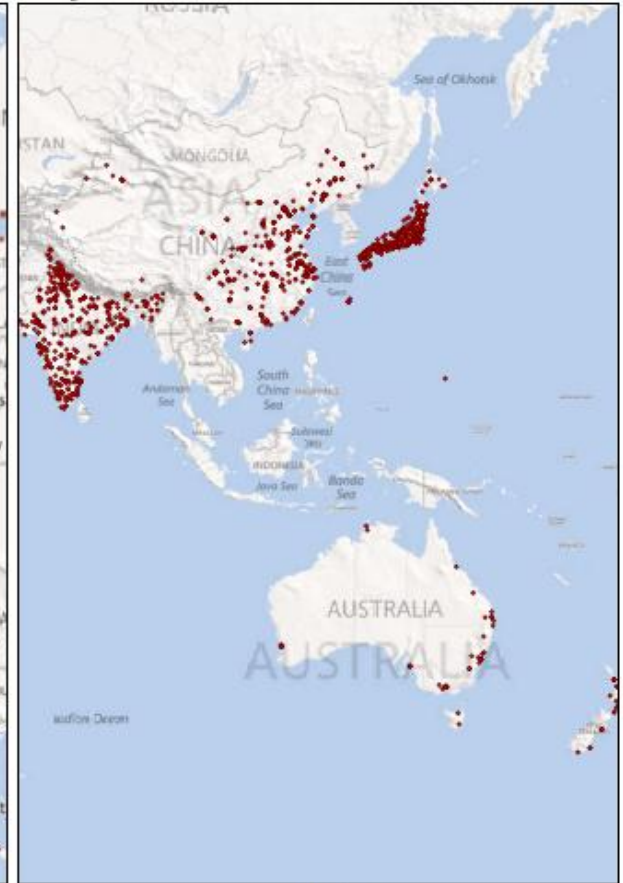
# UNESCO World Higher Education Database university locations (N=9,081)



Americas



Europe



Asia

# UNESCO World Higher Education Database business school locations (N=5,724)



Americas



Europe

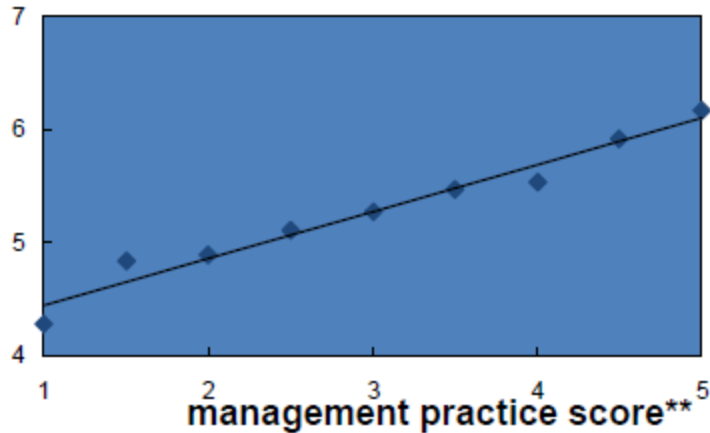


Asia

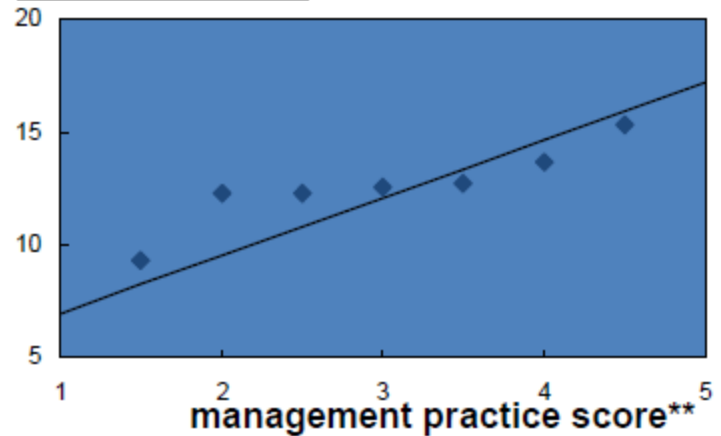


# EXTERNAL VALIDATION: MANAGEMENT SCORE CORRELATES WELL WITH PERFORMANCE INDICATORS

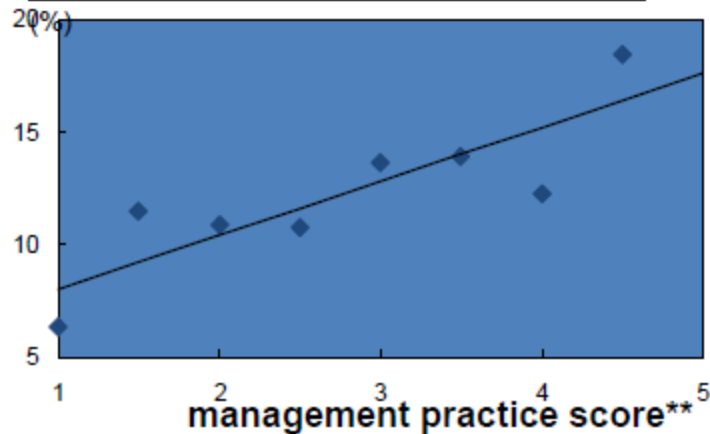
## Labour productivity\*



## Sales growth (%)



## Return On Capital Employed, ROCE



\* Log scale

\*\* Firms are grouped in 0.5 increments of assessed management score

# FACTORS INCREASING RISK OF FIRM BEING IN THE “LOWER TAIL” OF BAD MANAGEMENT

- Low Competition (later
- Family-run firm
- Low skills
- State ownership
- Heavy labor regulation

**TABLE 1 PANEL C: 2006-2009, All countries (1600 firms)**

<u>Quintile in 2009</u>	Bottom	Second	Third	Fourth	Top
Quintile in 2006					
Bottom	52 (61)	22 (15)	15 (7)	9 (6)	3 (9)
Second	23 (30)	25 (32)	25 (16)	8 (6)	10 (5)
Third	16 (12)	24 (22)	26 (20)	19 (22)	15 (15)
Fourth	7 (15)	16 (19)	26 (19)	26 (17)	24 (19)
Top	6 (14)	8 (16)	13 (9)	28 (16)	46 (32)

# PANEL D – COMPARISON WITH US PLANT DATA FROM BAILEY, HULTEN AND CAMPBELL (1993)

Quintiles in 1977

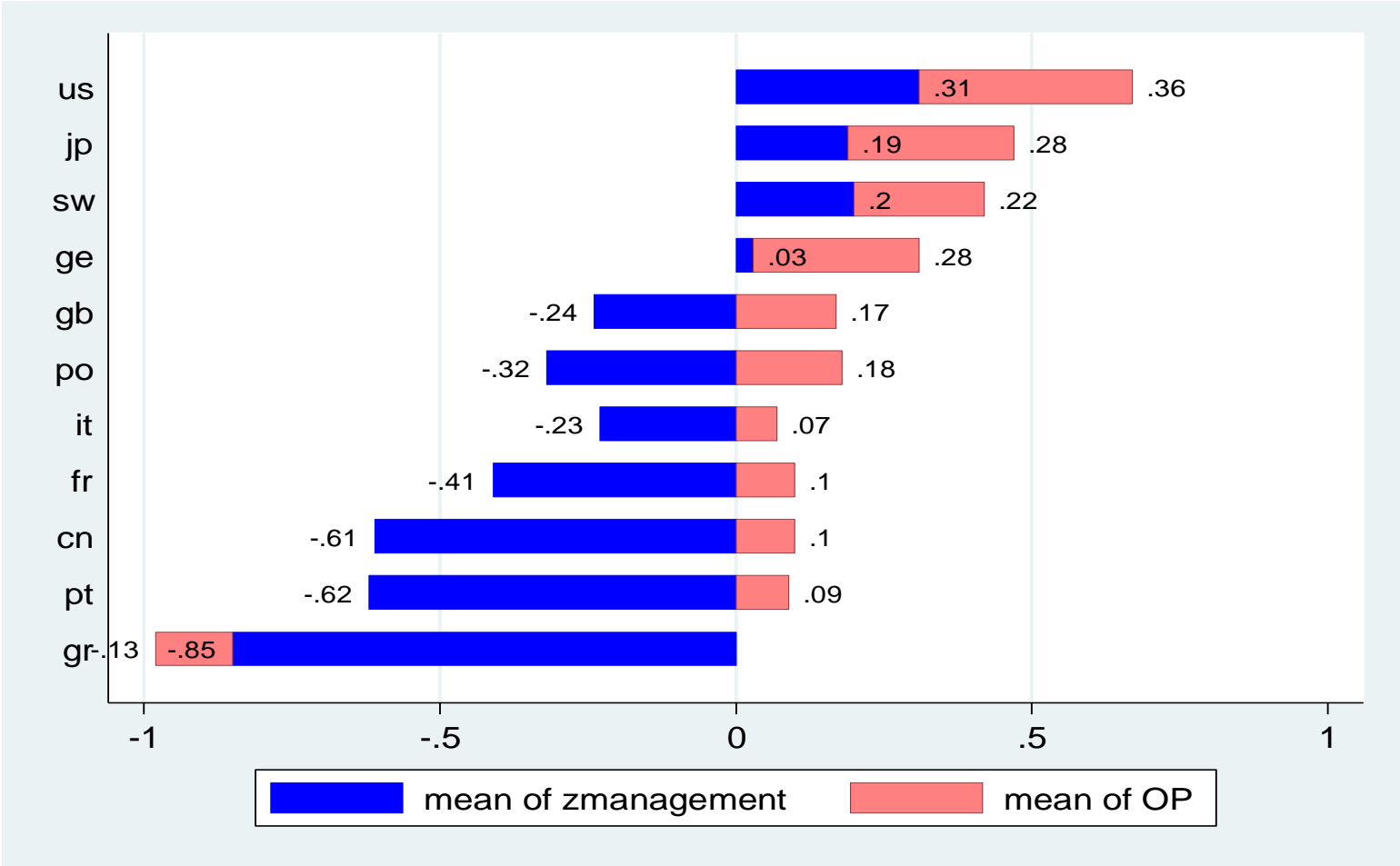
<i>Plant group</i>	Quintiles in 1977					<i>Switch out</i>	<i>Death</i>	<i>Row total</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>			
<i>1</i>	60.75	14.86	7.08	5.57	5.49	4.01	2.24	25.77
	52.89	18.81	13.69	11.34	8.90	22.04	16.67	
<i>2</i>	30.28	31.85	15.60	6.46	7.61	5.44	2.76	17.75
	18.16	27.77	20.77	9.06	8.49	20.56	14.12	
<i>3</i>	12.30	21.94	19.64	22.12	15.26	4.46	4.27	14.70
	6.11	15.83	21.65	25.68	14.11	13.97	18.12	
<i>4</i>	14.51	18.76	18.53	17.08	18.84	7.32	4.95	12.67
	6.21	11.68	17.61	17.09	15.02	19.78	18.08	
<i>5</i>	14.13	16.47	9.92	15.81	32.44	5.53	5.70	20.06
	9.58	16.23	14.93	25.05	40.94	23.65	33.01	
<i>Switch in</i>	24.97	24.40	19.16	15.65	15.82	...	...	4.90
	4.13	5.87	7.04	6.06	4.87	...	...	
<i>Birth</i>	20.79	18.66	13.82	17.44	29.30	...	...	4.16
	2.92	3.81	4.31	5.73	7.66	...	...	
<i>Column total</i>	29.60	20.36	13.33	12.66	15.90	4.69	3.46	100.00

Quintiles in 1972

Source: Authors' calculations.

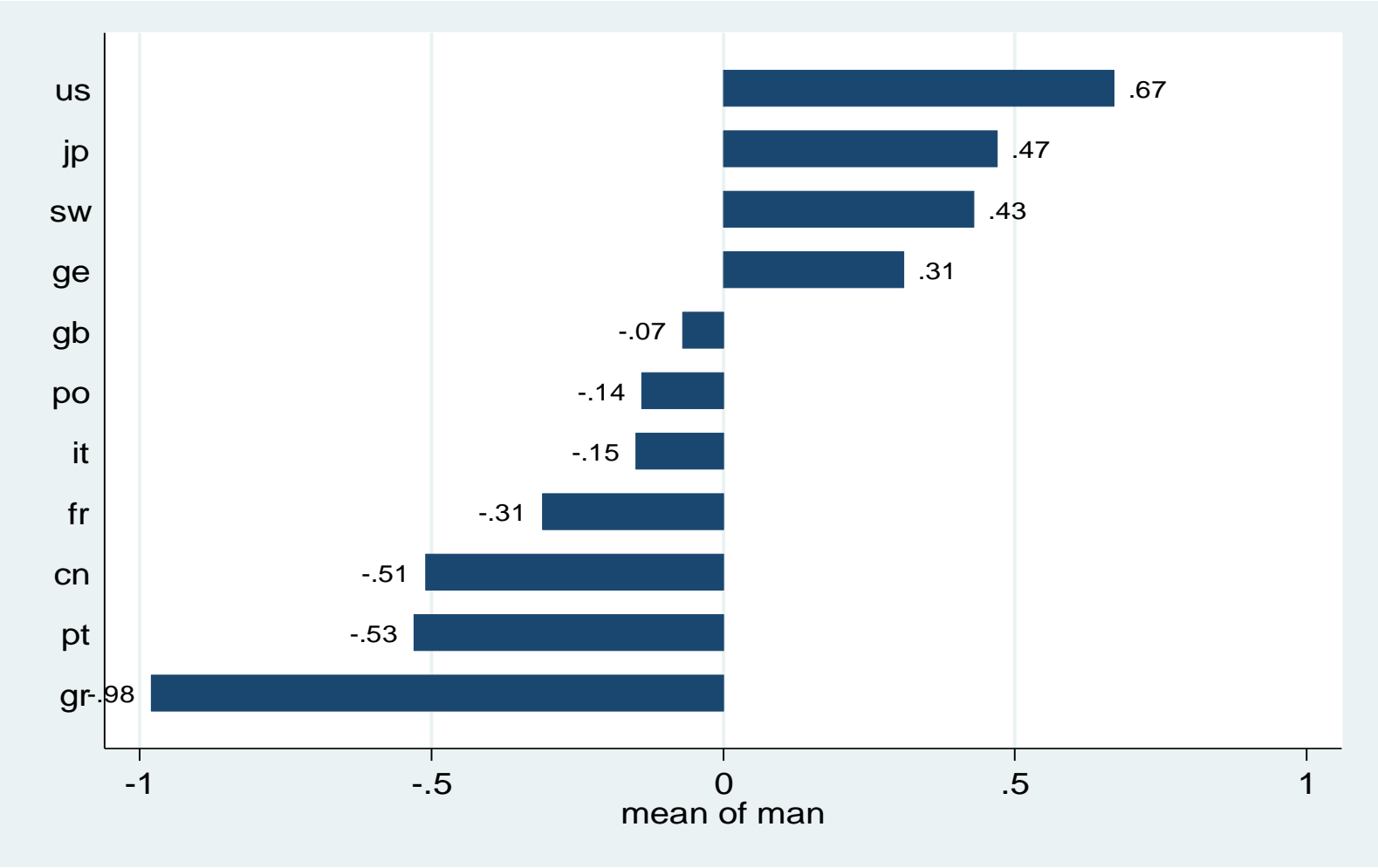
a. The top number in each cell shows where the plants that were in a given quintile in 1972 ended up in 1977. The bottom number in each cell shows where the plants that were in a given quintile in 1977 came from. Top numbers are row percentages; bottom numbers are column percentages.

# Figure 6: Decomposing the Weighted Average of Management Scores



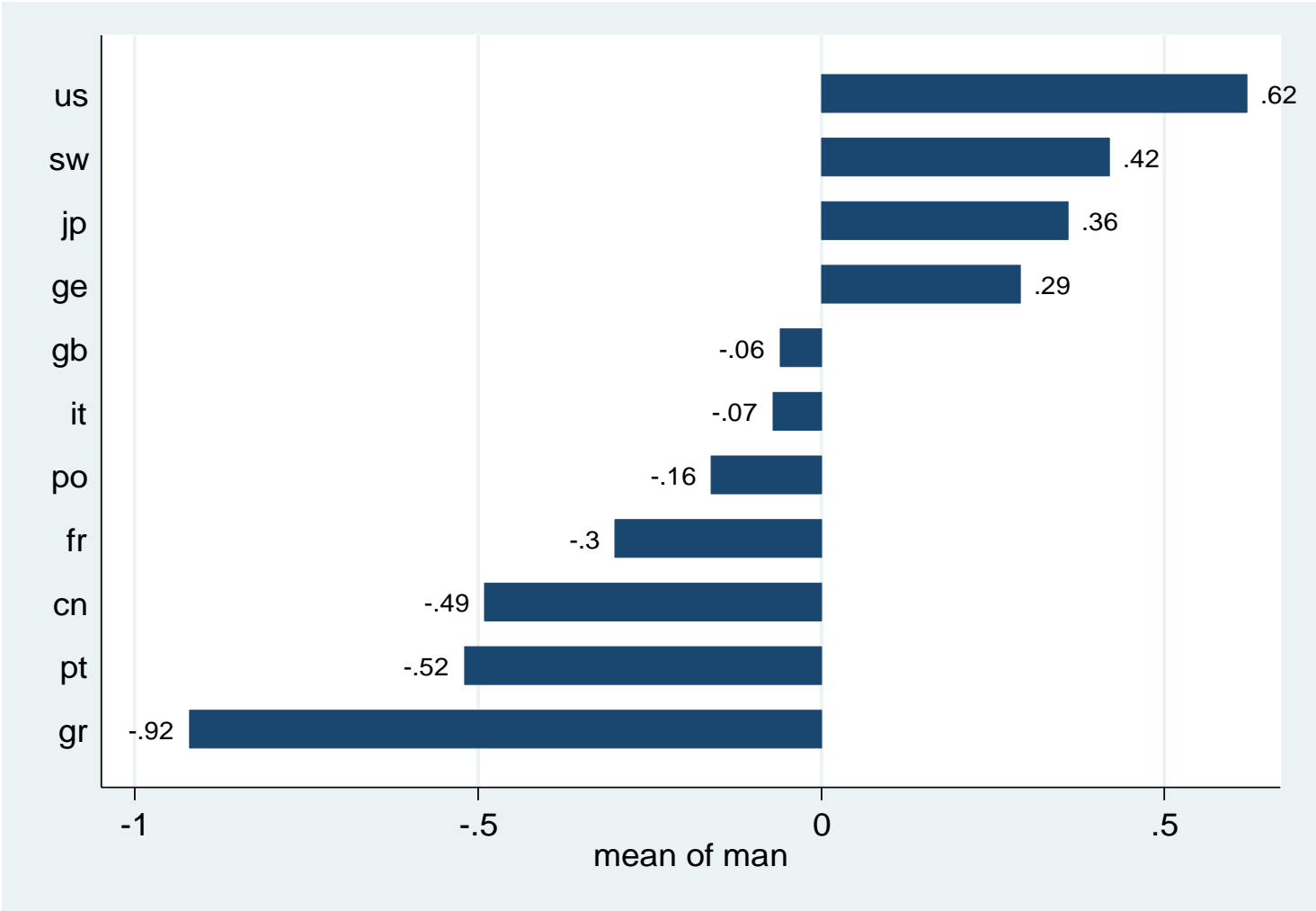
Notes: Weighted average management scores (sd=1) decomposed into a reallocation effect (OP, light red bar) and an unweighted firm average (blue bar). Domestic firms, scores corrected for sampling bias using propensity score by country. See text for full description.

# Figure 5: Management Scores, M, across Countries (weighted by employment shares)



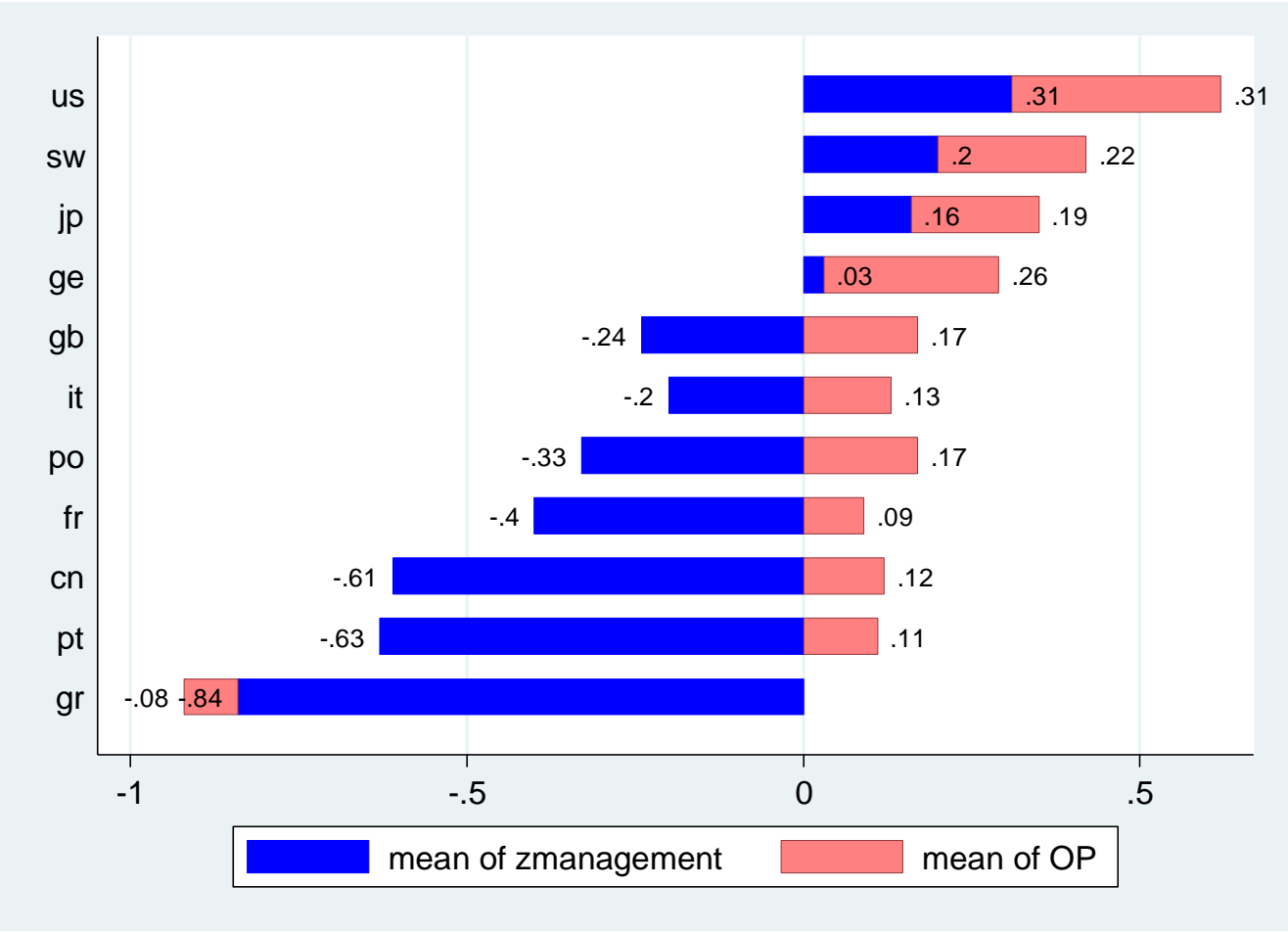
**Notes:** Firm scores are weighted by share of employment in the country. 2006 wave. Scores are corrected for response biases.

# Figure B1A Management Scores (weighted by employment shares; only emp in selection equation)



**Notes:** Firm scores are weighted by share of employment in the country. 2006 wave. Response bias corrections use country-specific employment only

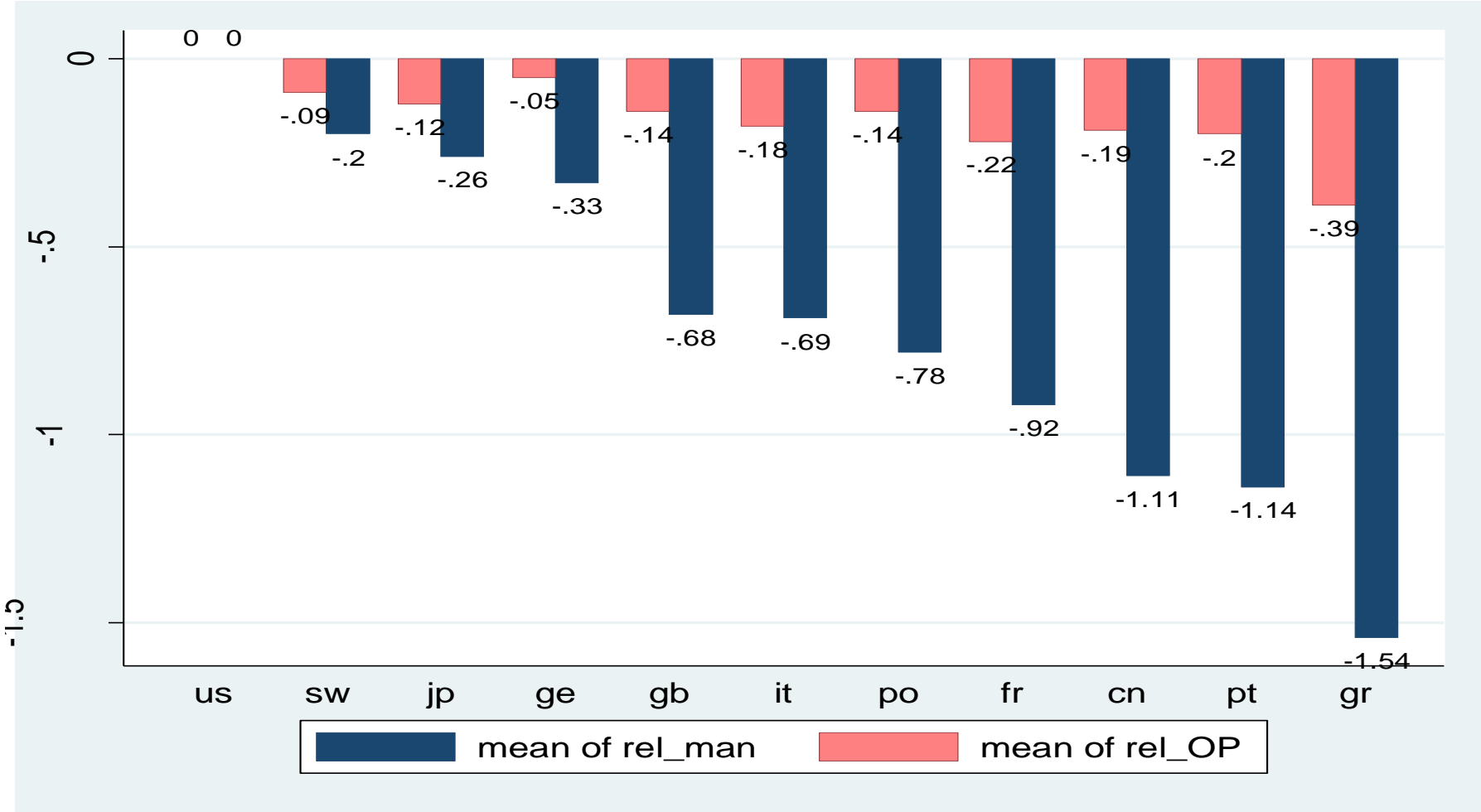
# Figure B1B: Decomposing Management (weighted by employment shares; only emp in selection equation)



Notes: Weighted average management scores (sd=1) decomposed into a reallocation effect (OP, light red bar) and an unweighted firm average (blue bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only . See text for full description.

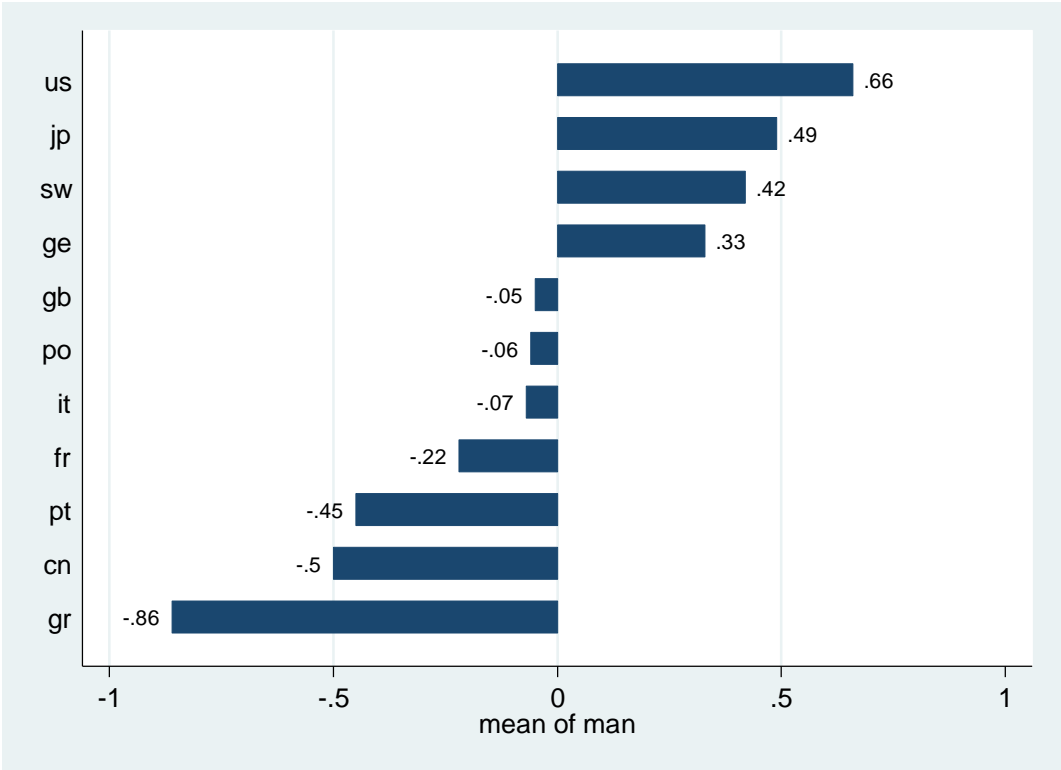


# Figure B1C: Relative Management (weighted by employment shares; only emp in selection equation)



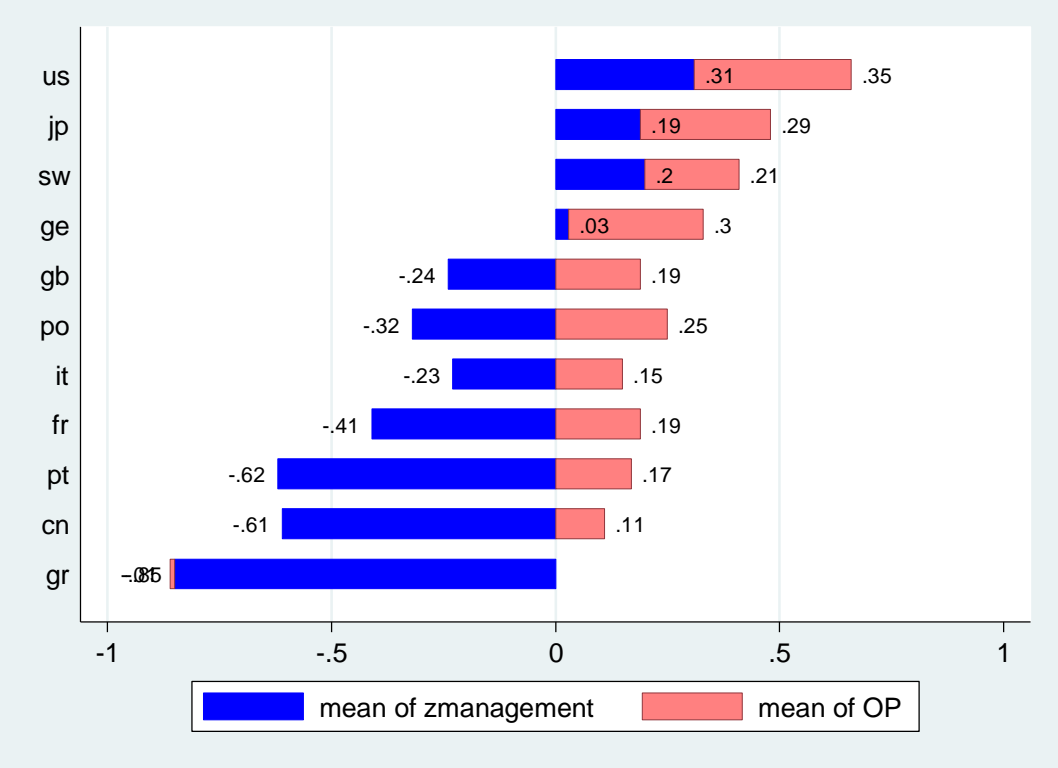
Notes: These are the differences relative to the US of (i) the weighted average management scores (sd=1, blue bar) and (ii) reallocation effect (OP, light red bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only

# Figure B2A Management Scores (weighted by labor and capital inputs)



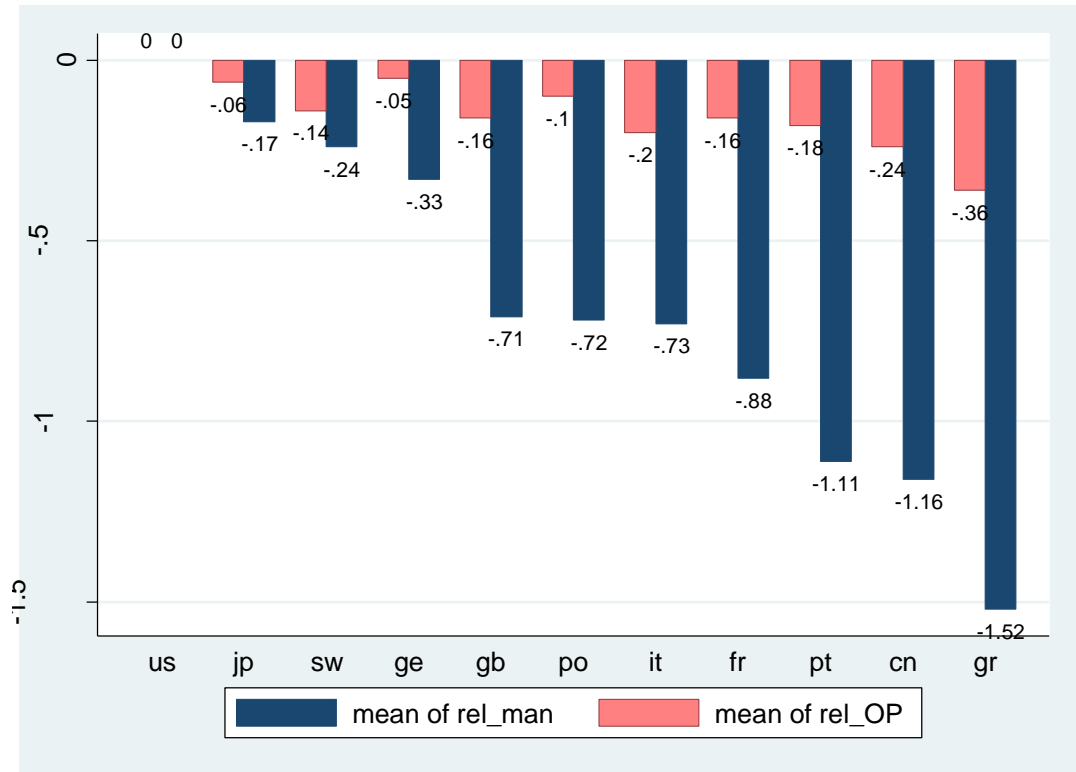
**Notes:** Firm scores are weighted by share of employment in the country. 2006 wave. Response bias corrections use country-specific employment only

# Figure B2B: Decomposing Management (weighted by labor and capital inputs)



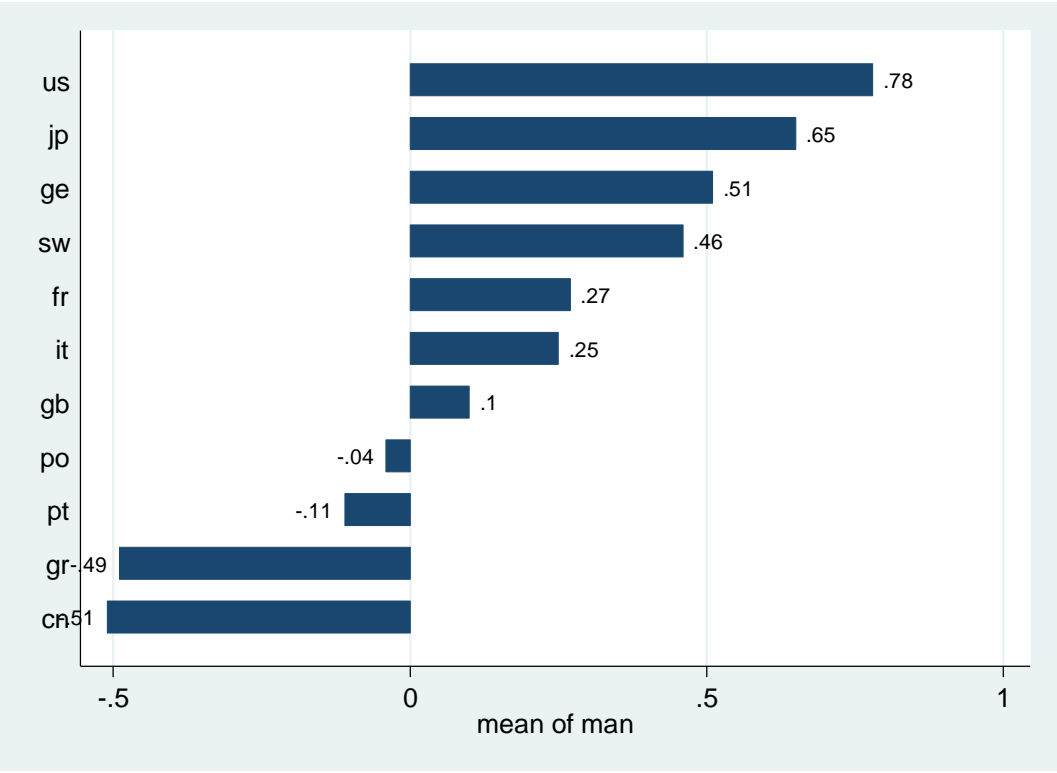
Notes: Weighted average management scores (sd=1) decomposed into a reallocation effect (OP, light red bar) and an unweighted firm average (blue bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only . See text for full description.

# Figure B2C: Relative Management (weighted by labor and capital inputs)



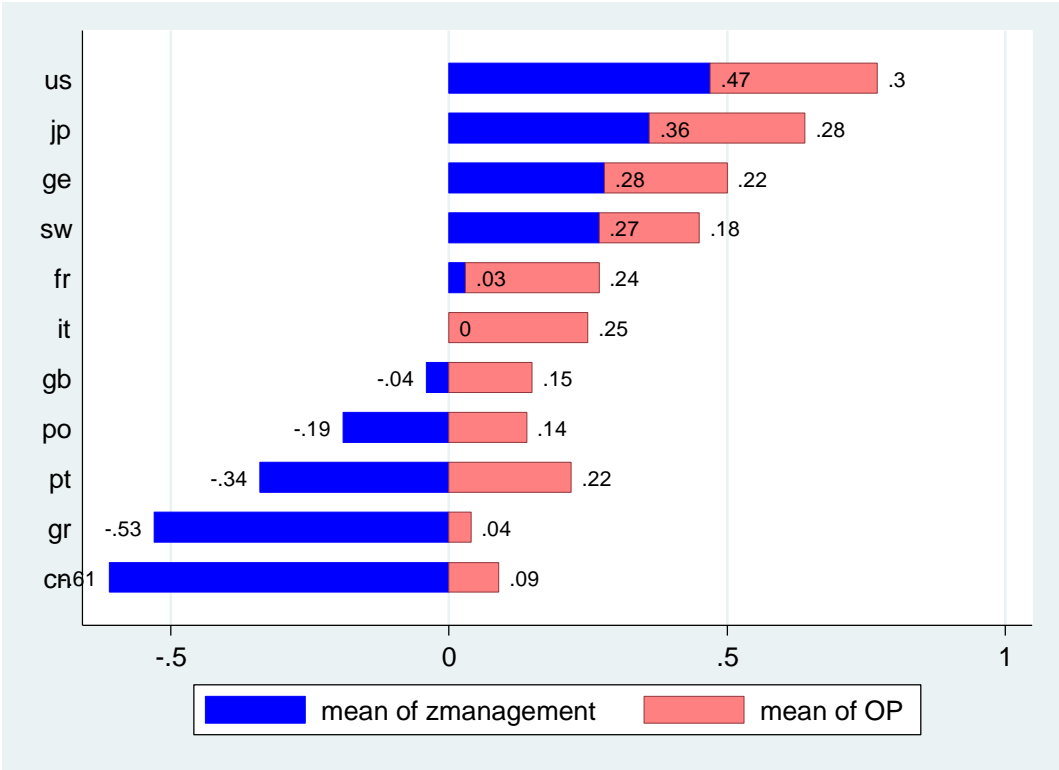
Notes: These are the differences relative to the US of (i) the weighted average management scores (sd=1, blue bar) and (ii) reallocation effect (OP, light red bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only

# Figure B3A Management Scores (weighted by employment shares; multinationals included)



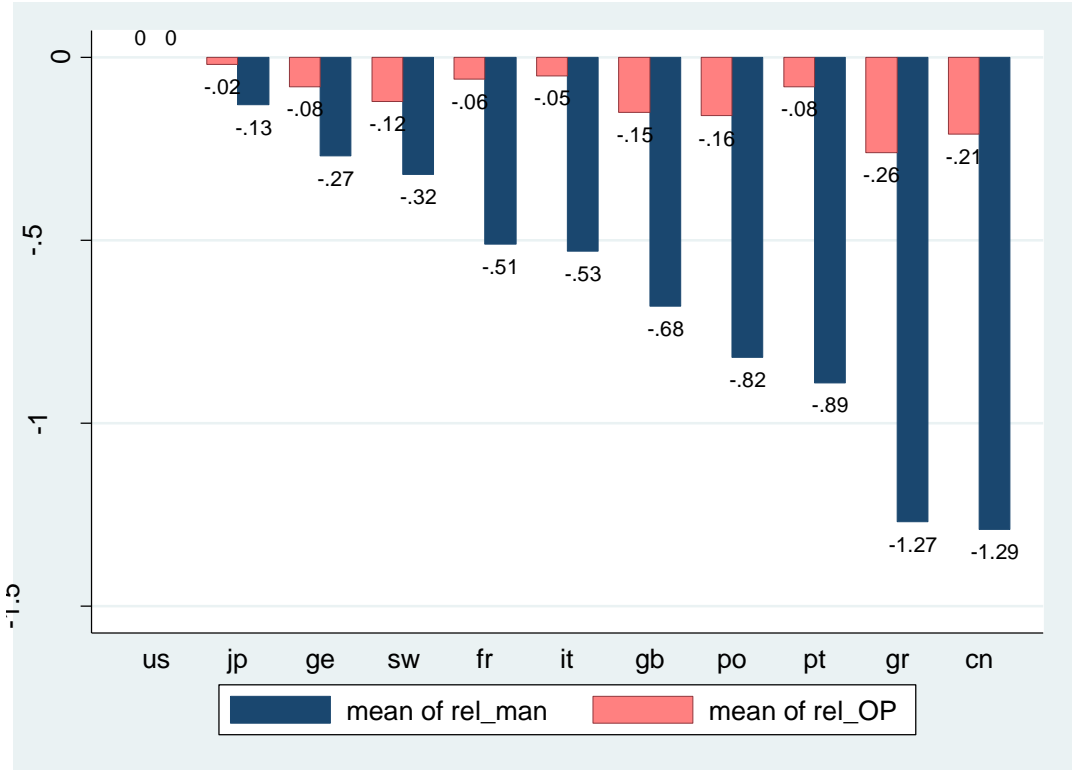
**Notes:** Firm scores are weighted by share of employment in the country. 2006 wave. Response bias corrections use country-specific employment only

# Figure B3B: Decomposing Management (weighted by employment shares; multinationals included)



Notes: Weighted average management scores (sd=1) decomposed into a reallocation effect (OP, light red bar) and an unweighted firm average (blue bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only . See text for full description.

# Figure B3C: Relative Management (weighted by employment shares; multinationals included)



Notes: These are the differences relative to the US of (i) the weighted average management scores (sd=1, blue bar) and (ii) reallocation effect (OP, light red bar). Domestic firms, . 2006 wave. Response bias corrections use country-specific employment only

# MY FAVOURITE QUOTES:

## Don't get sick in Britian

*Interviewer* : “Do staff sometimes end up doing the wrong sort of work for their skills?”

*NHS Manager*: “You mean like doctors doing nurses jobs, and nurses doing porter jobs? Yeah, all the time. Last week, we had to get the healthier patients to push around the beds for the sicker patients”

## Don't do Business in Indian hospitals

*Interviewer*: “Is this hospital for profit or not for profit”

*Hospital Manager*: “Oh no, this hospital is only for loss making”



## NOTIONS OF MANAGERIAL “BEST PRACTICE”

- Management styles that have always been better
  - e.g. promotion on ability/effort (rather than family)
- **Complementarity:** Practices that have become desirable because the environment has changed
  - Technological advances makes monitoring output better (e.g. SAP) and enables more performance related pay (Lemieux et al, 2009)
- **Innovation:** Discoveries of how to manage better
  - E.g. Toyota system of Lean Manufacturing
  - **Transferable:** dynamic diffusion