

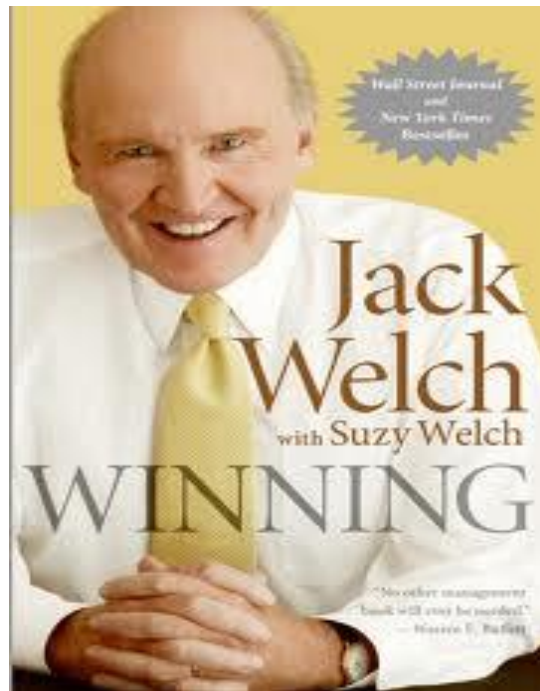
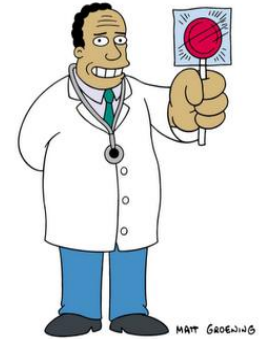
# Of Managers and Management: Evidence from Matched Employer-Employee Data

NBER Workshop, Stanford  
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Stefan Bender (Bundesbank), Nicholas Bloom (Stanford),  
David Card (UC Berkeley), John Van Reenen (LSE), Stefanie  
Wolter (FDZ)



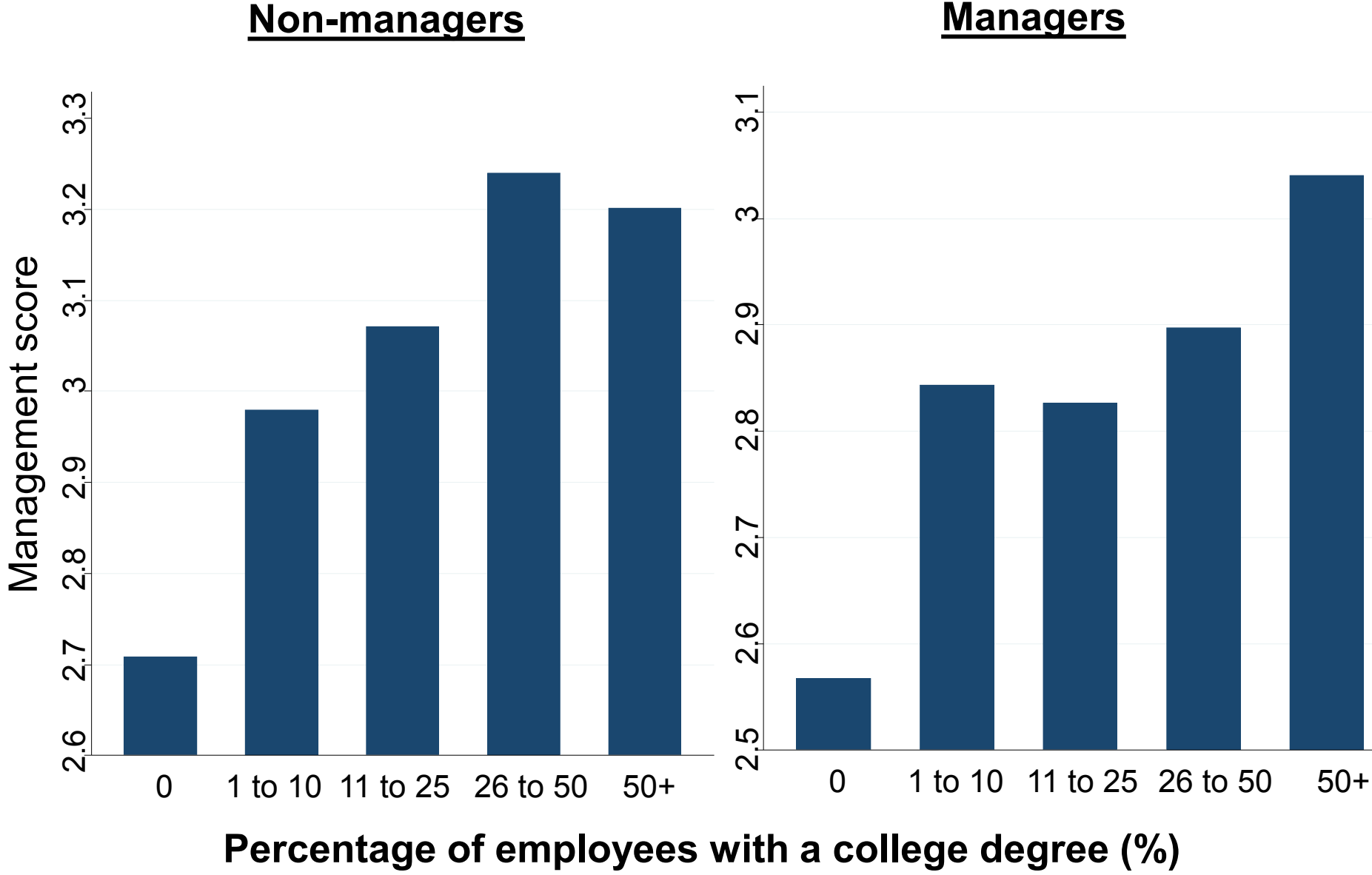
# Are Management practices just due to folks like these?



# MOTIVATION

- Big dispersion in firm productivity (e.g. Syverson, 2011)
- Management practices matter a lot for productivity
  - Personnel Economics (Ichniowski, Shaw & Prennushi, 1997; Lazear, 2000; HLE, 2011)
  - World Management Survey (WMS): linked to firm TFP (Bloom & Van Reenen, 2007; Bloom et al, 2013) & country TFP (e.g. Bloom et al, 2015 find ~30% of TFP gaps with US management related)
- Do “good management practices” simply reflect human capital: e.g. more talented CEOs (Lucas, 1978), senior managers, or employees in general?
- **Or are these firms more than just the sum of the “atoms” of human capital of managers– e.g. Toyota corporate culture persists when managers leave or founder dies?**

# EDUCATION FOR NON-MANAGERS AND MANAGERS POSITIVE CORRELATED WITH BETTER MANAGEMENT IN WMS DATA



Sample of 8,032 manufacturing and 647 retail firms.

# SUMMARY OF PAPER

- **We combine:**
  - WMS data on management & firm performance
  - IEB data on near population of German workers 1975-2011. Use Abowd et al (1999) approach to recover employee fixed effects (“ability”) & firm FE
- **We find:** Firms with high WMS management scores have more talented managers & workers (observable & unobservable human capital). Also higher firm wage FE
  - Partly via selection of employee inflows & outflows
- **Also find:**  $\sim 1/4$  to  $1/2$  of firm TFP-WMS management practices correlation is because of human capital (esp. managerial talent)
  - Consistent with important role for practices over and above human capital

## **WMS Data: World Management Survey**

IEB: Data: German Employer-Employee Panel

Management Practices & Human Capital

Productivity

Selection – Inflows & Outflows

Extensions & Robustness

# 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 200 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
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**Note:** All 18 questions and over 50 examples in Bloom & Van Reenen (2007) & Appendix



# World Management Survey (12,342 firms, 4 major waves: 2004, 2006, 2009, 2014; 34 countries)



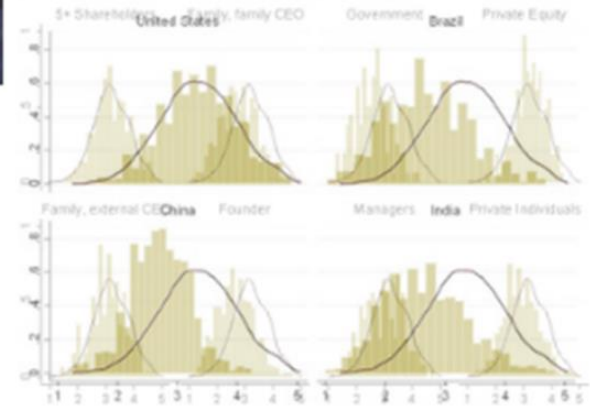
- Home
- Policy & Business Reports
- Academic Research
- Teaching Material
- Survey Data
- Media
- Network



Benchmark your manufacturing firm, hospital, school, or retail outlet against others in your country, industry or size class.

**Benchmark your organization**

Management scores across firms ownership type.  
WMS team analyses the distribution of management practices within countries by type.

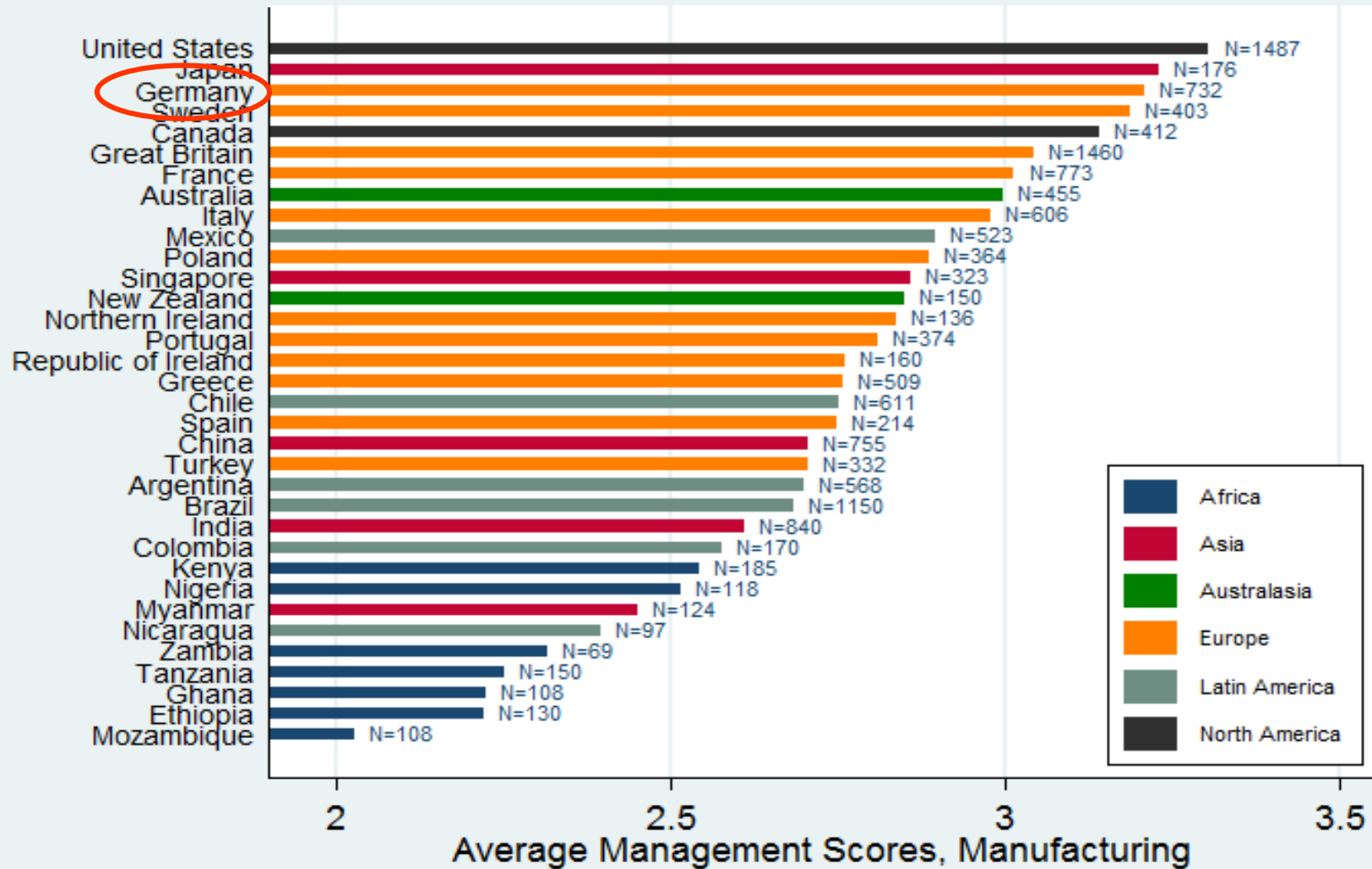


## Featured publications

- » [Why do management practices differ across firms and countries?](#)
- » [Management Practice and Productivity: Why They Matter](#)
- » [Management in Healthcare: Why good practice really matters](#)

Medium sized manufacturing firms(50-5,000 workers, median≈250)  
Now extended to Hospitals, Retail, Schools, etc.

# Average Management Scores by Country



Note: 14772 interviews with firms between 50 and 5000 employees,

**Note:** Unweighted average management scores (raw data) with number of observations. All waves pooled (2004-2014)

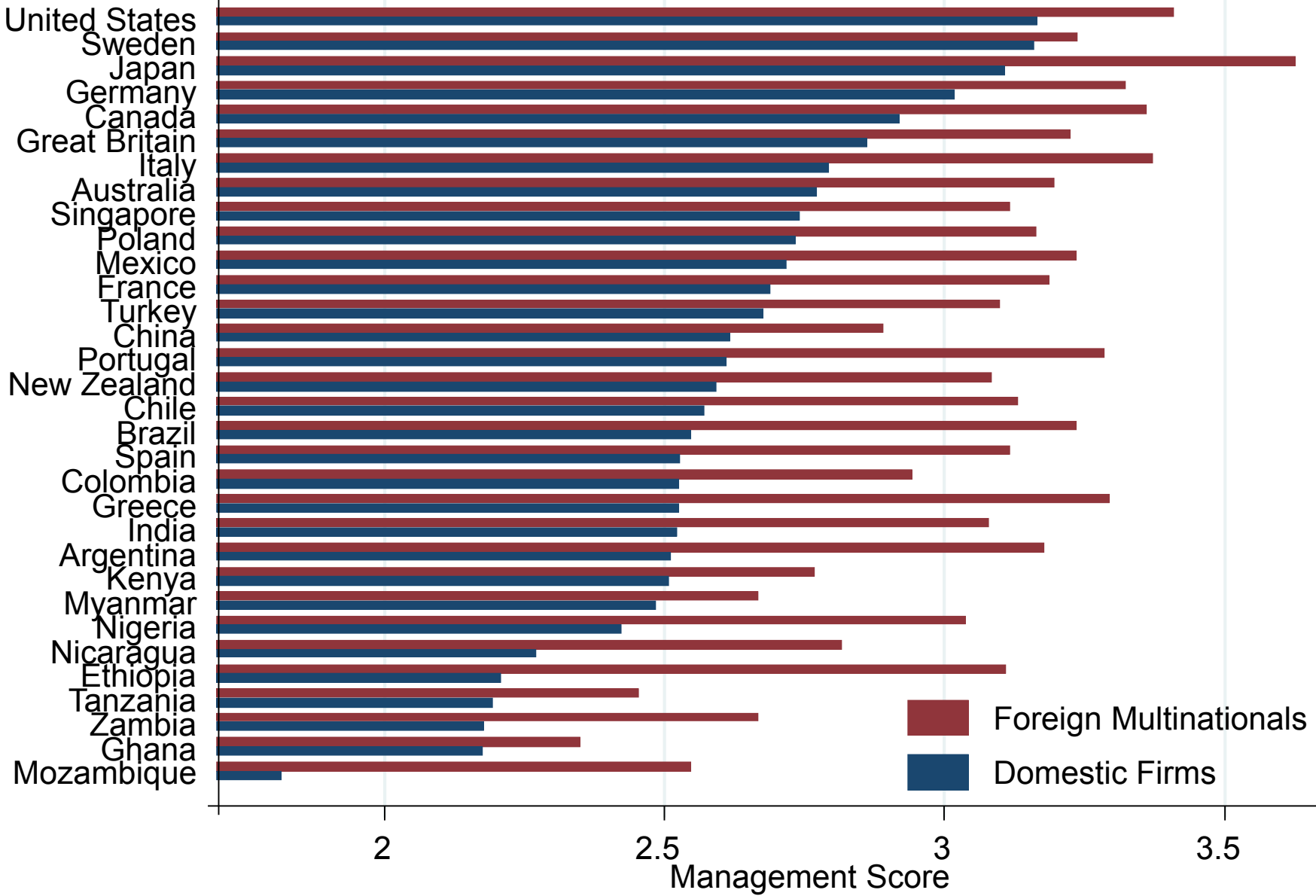
# Large variation of firm management within countries



Graphs by country\_rank

Firms with 50 to 5000 employees randomly surveyed from country population. Mar 2014.

# Foreign Multinationals appear to transplant management overseas



Source: Bloom, Sadun and Van Reenen (2015) "Management as a Technology"

WMS Data: World Management Survey

**IEB Data: German Employer-Employee Panel**

Management Practices & Human Capital

Productivity

Selection – Inflows & Outflows

Extensions & Robustness

# Proxying Employee Ability (German IEB Panel Data)

- Abowd, Kramarz & Margolis (1999) adopted by Card, Heining, Kline (2013)
- Focus on 1996-2002 period with  $\ln(\text{daily wage})$  as dependent variable with individual & firm fixed effects

$$y_{it} = \eta_i + \psi_{jJ(i,t)} + x'_{it}\beta + r_{it}$$

$J(i,t)$  = establishment  $j$  employs worker  $i$  in year  $t$

$\eta_i$  = employee component (**person effect**)

$\psi_{jJ(i,t)}$  = establishment component (**firm effect**)

$x'_{it}\beta$  = time varying observable characteristics

$r_{it}$  = random effect

# Recover employee (& firm) Fixed Effects using full IEB Data

- Individual controls ( $x$ ) – Cubic in age fully interacted with education; estimate separately for men & women
- IEB data: Labor market biographies of West Germans 1975-2011, East Germany 1992-2011
- Estimate CHK model to recover individual employee fixed effects (“ability”) & firm effects
- Focus on 1996-2002 period for CHK (86m person-years) as this is before our first 2004 WMS (but compare with other periods)
- Connected set = 97% of employees; 90% of establishments

# Matching IEB administrative data to WMS data

- Link WMS to IEB data via names, company ID, address
  - Found 361 of the 365 WMS firms
- Sample includes everybody who worked at least one day in these firms between 1992 to 2010
- Match 88% of employees in our 361 firms to their FE
  - 98% of relevant population in firms (full-time employed, age 20-60). ~200,000 employee FE
- “Employee ability”: Av. employee FE by firm-year
- Assume managers in upper part of firm wage hierarchy
  - “Managerial ability”: av. employee FE in the top quartile of wages (compare other cut-offs like decile)
  - Alternatively, use average employee fixed effects in “managerial” occupations



# Tab 1A: Firm level Descriptive Statistics on WMS-IEB matched data

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	<b>Mean</b>	<b>SD</b>
Firm age	64.34	62.79
Number of workers	440.02	642.87
Proportion Female	0.27	0.17
% Employees with college degree share	0.12	0.13
ln(capital)	9.89	1.69
ln(materials)	11.29	1.07
% with 5 or more competitors	0.586	
% family owned	0.229	

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**Notes:** 590 firm-year observations 2004, 2006 & 2009 across 355 firms

Data: World Management Survey

Data: German Employer-Employee Panel

## **Management Practices & Human Capital**

Productivity

Selection – Inflows & Outflows

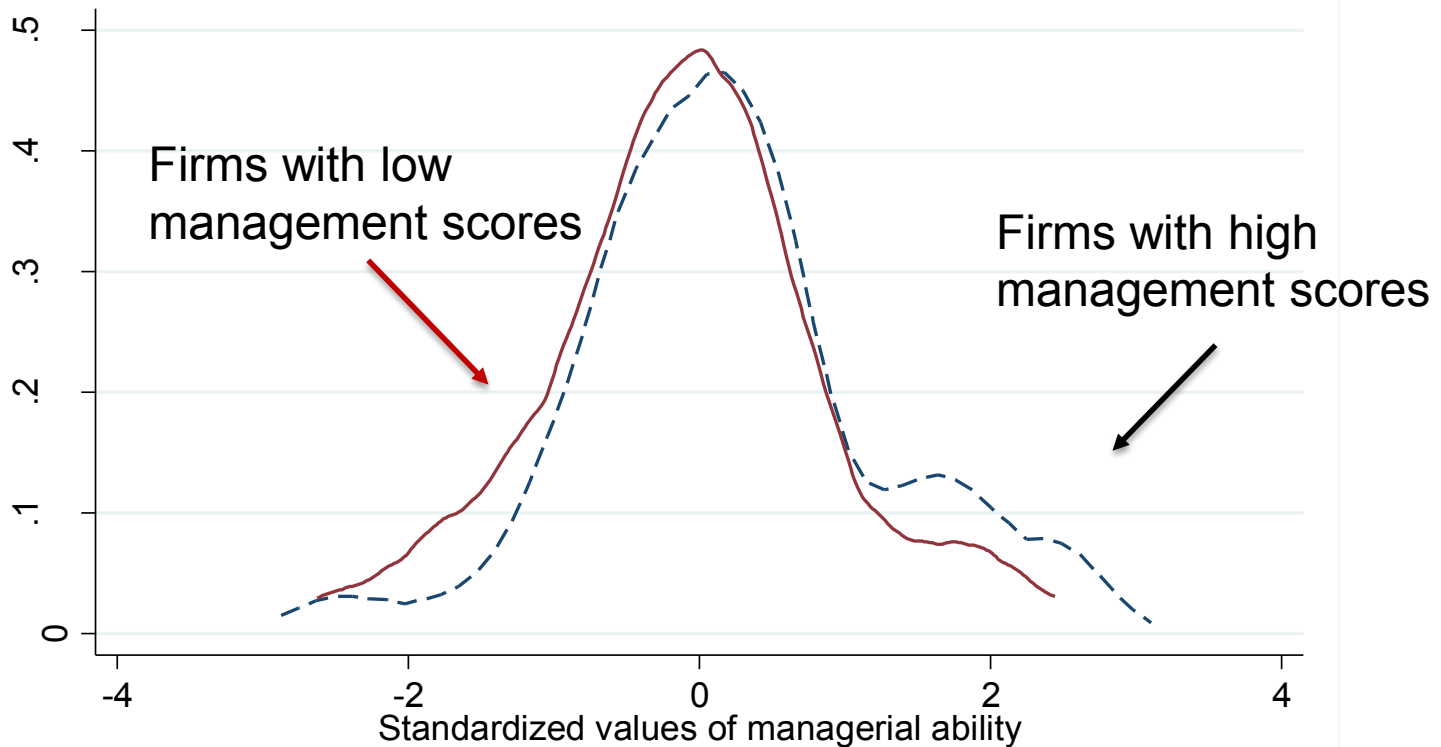
Extensions & Robustness

# Fig 1: Firms with high average employee ability have higher management scores



**Notes:** 590 firm-year observations across 355 firms; employee ability & management are z-scored. Ability is firm average of employee FE from CHK & in vingtile groups

# Fig A1B: Distribution of managerial ability shifted to right in top quartile of management scores compared bottom quartile



kernel = epanechnikov, bandwidth = 0.2621

**Notes:** Kernel distribution of average managerial ability (mean employee FE in top quartile within firm) in firms in (i) highest and (ii) lowest quartile of WMS management score

# Table 2: Correlations of WMS Management Scores with average employee & managerial ability

Dependent Variable:	WMS Management average firm z-score			
Mean employee quality	0.215*** (0.077)		0.0135 (0.090)	-0.098 (0.112)
Mean managerial quality		0.298*** (0.068)	0.290*** (0.086)	0.268*** (0.089)
% Employees with college				0.971** (0.452)
Ln(Employees)	0.237*** (0.049)	0.273*** (0.048)	0.274*** (0.049)	0.274*** (0.050)
Observations	588	588	588	588

**Notes:** SEs clustered by 354 firms; Dependent variable & ability measures are z-scored. All columns include East Germany dummy, %female, ownership dummies, #competitors, firm age, 2 digit industry & time dummies. Employee quality mean level of individual FE over 1996-2002. Managerial quality is employee quality in the top quartile of the within firm distribution.

Data: World Management Survey

Data: German Employer-Employee Panel

Management Practices & Human Capital

**Productivity**

Selection – Inflows & Outflows

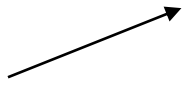
Extensions & Robustness

# PRODUCTION FUNCTIONS

Firm sales



$$\ln Y_{jt} = \alpha_M M_{jt} + \alpha_L \ln(L_{jt}) + \alpha_K \ln(K_{jt}) + \alpha_z z_{jt} + u_{jt}$$



WMS Management

(z-score each question,  
average & z-score again)



Labor services



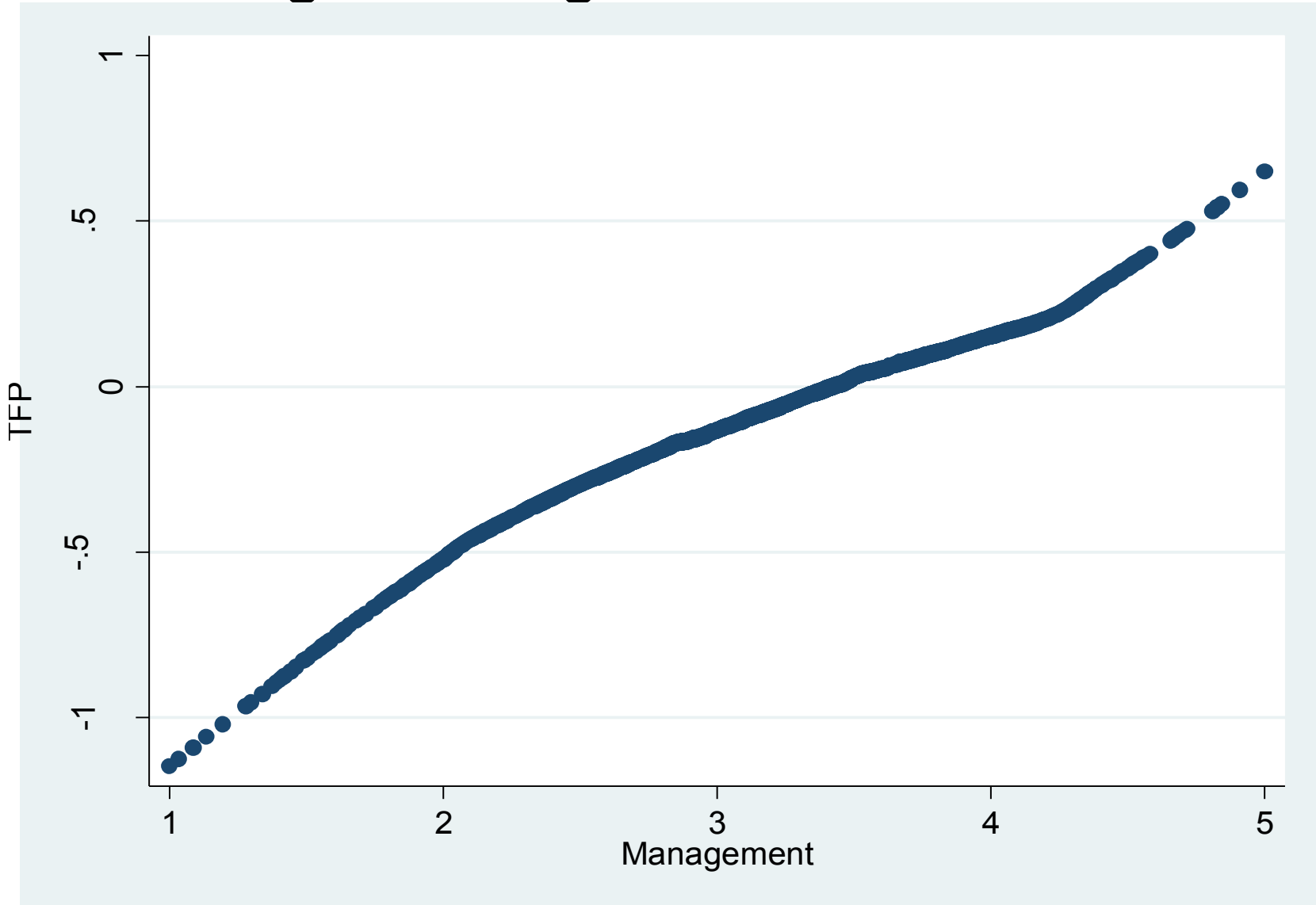
Capital services



Other controls

- $M$ , Management Index is average of all 18 questions (sd=1)
- $z$  : firm age, industry & time dummies, ownership, competition, “noise”
- What are labor services,  $L$ ?
  - Total #employee hours & observable characteristics (e.g. college %)
  - Average employee unobserved ability  $\bar{\eta}_{jt}$
  - Average Managerial unobserved ability  $\bar{\eta}_{jt}^M$

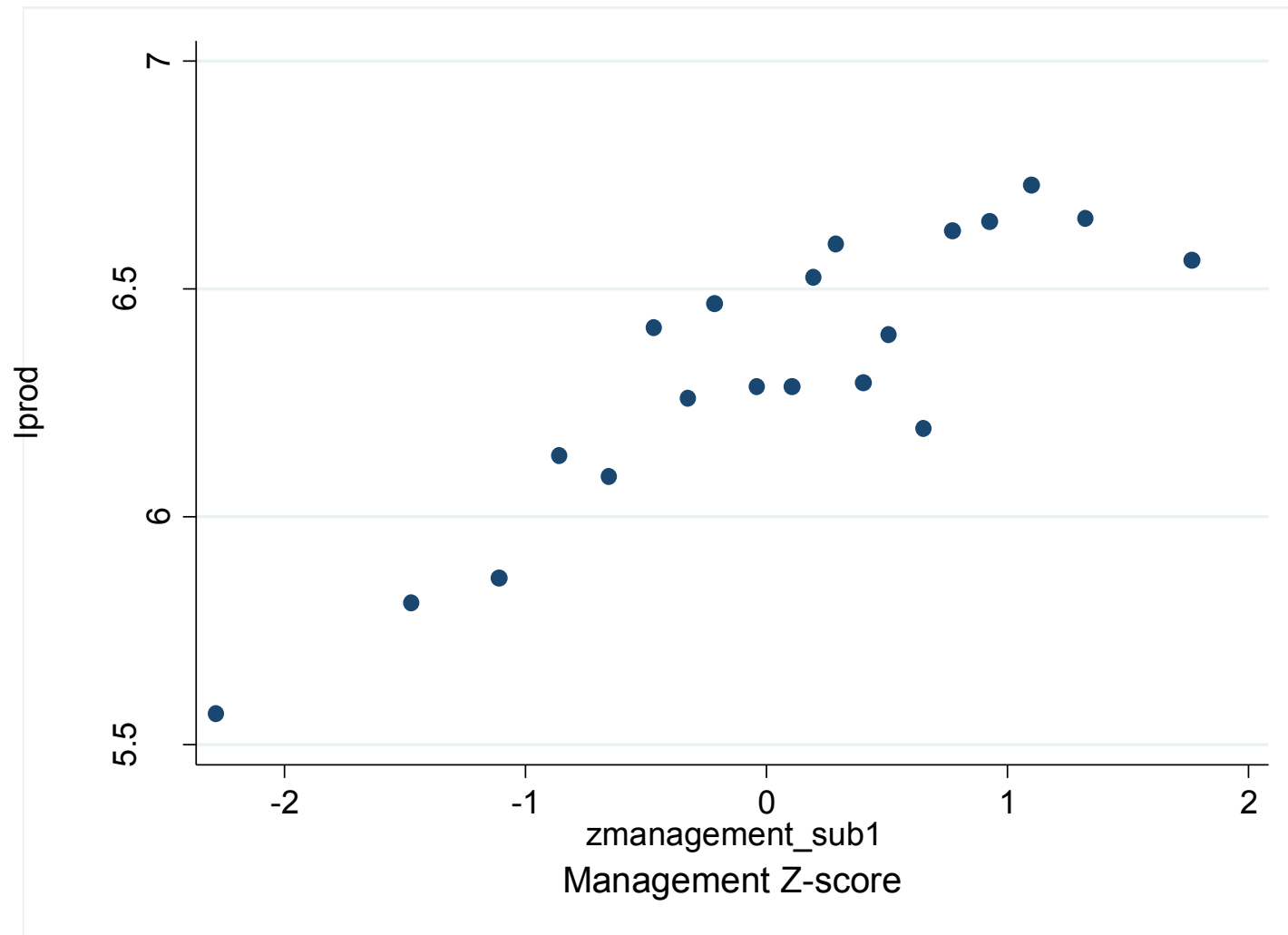
# WMS data from all countries: productivity is increasing in management



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

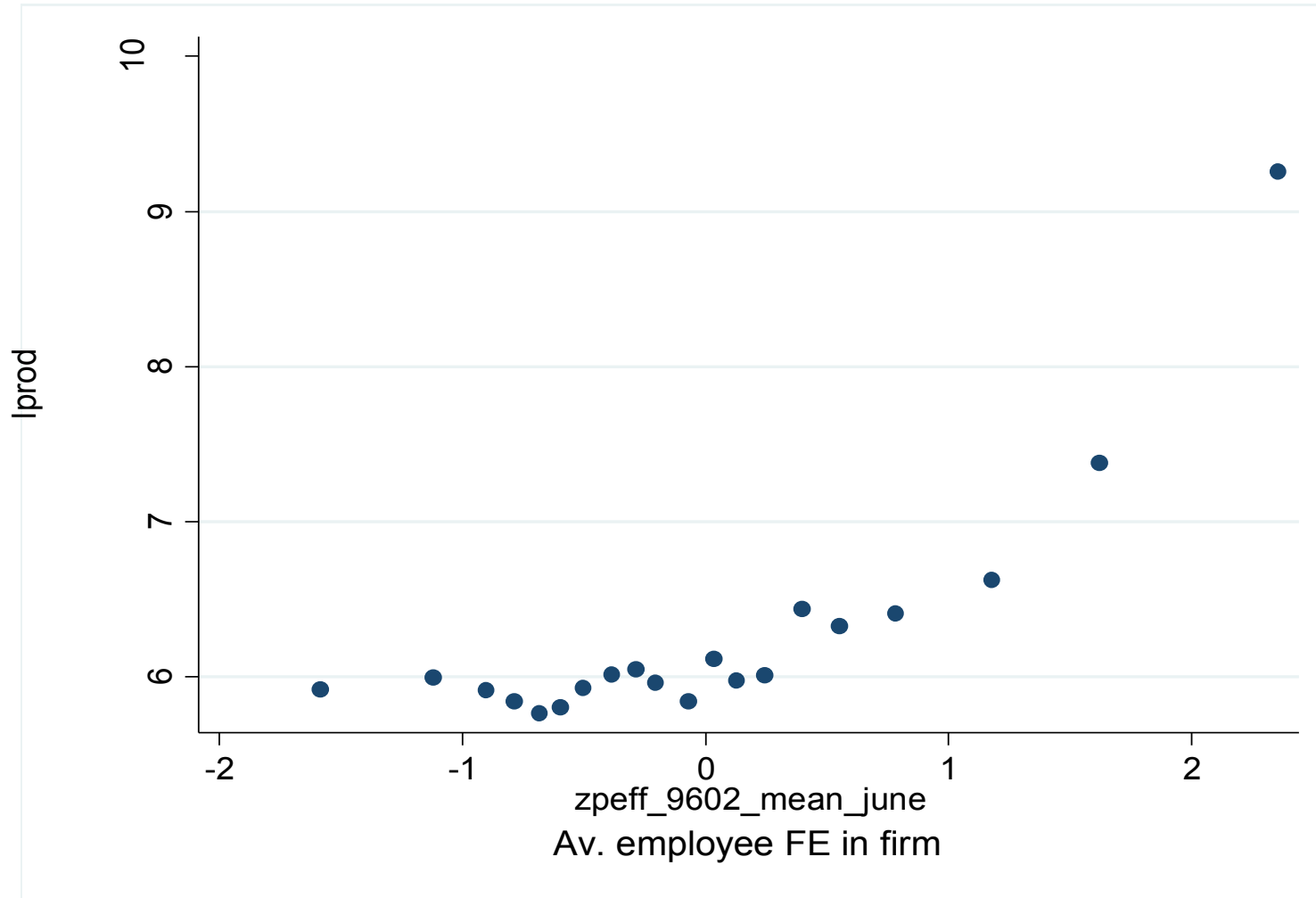


# Fig 3: Productivity is increasing in WMS management scores in our German sample as well



Management is an average of all 18 questions (set to sd=1). Productivity is  $\ln(\text{sales}/\text{worker})$  N=588

# Fig 4: Productivity is increasing in employee ability (especially for top talent)



Productivity is  $\ln(\text{sales}/\text{worker})$   $N=588$ ; Employee FE computed from CHK 1996-2002 & standardized

# Table 3: Productivity, Management Practices & ability

<b>Dependent Variable:</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>
<b>Management Score</b>	0.264*** (0.052)	0.199*** (0.046)	0.145*** (0.042)	0.125*** (0.0426)	0.071* (0.038)
<b>Mean Employee quality</b>		0.815*** (0.143)	0.601*** (0.107)	0.384*** (0.108)	0.249*** (0.094)
<b>Mean Managerial quality</b>			0.337*** (0.107)	0.296*** (0.098)	0.168* (0.093)
<b>% Employees with College degree</b>				1.894*** (0.642)	1.305*** (0.465)
<b>Ln(Labor)</b>	0.315*** (0.070)	0.446*** (0.067)	0.588*** (0.070)	0.591*** (0.070)	0.388*** (0.061)
<b>Ln(Capital)</b>					0.435*** (0.047)
<b>Observations</b>	560	560	560	560	560

**Notes:** All SEs clustered by 333 firms. Management score & employee ability are standardized. All columns include dummy for East German, %female, 5 ownership dummies, #competitors, firm age, a cubic in the coverage rate, industry & time dummies. Employee quality is mean of individual fixed effect measured over 1996-2002 period. Managerial quality is employee quality in the top quartile of the within firm distribution.

# **Table 3: Production Functions – with materials**

<b>Dependent Variable:</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>
<b>Management Score</b>	0.0421** (0.0191)	0.0332** (0.0168)	0.0316* (0.0169)
<b>Mean Employee Quality</b>		0.103* (0.0590)	0.0839 (0.0724)
<b>Mean Managerial quality</b>		0.0809* (0.0488)	0.0797 (0.0487)
<b>% Employees with College degree</b>			0.141 (0.223)
<b>Ln(Labor)</b>	0.0538*** (0.0175)	0.128*** (0.0257)	0.129*** (0.0267)
<b>Ln(Capital)</b>	0.200*** (0.0222)	0.177*** (0.0214)	0.178*** (0.0219)
<b>Ln(Materials)</b>	0.691*** (0.0341)	0.663*** (0.0310)	0.660*** (0.0330)
<b>Observations</b>	378	378	378

**Notes:** All SEs clustered by 229 firms. Management score & employee ability are standardized. All columns include dummy for East German, %female, 5 ownership dummies, #competitors, firm age, a cubic in the coverage rate, industry & time dummies. Employee quality is mean of individual fixed effect measured over 1996-2002 period. Managerial quality is employee quality in the top quartile of the within firm distribution.

Data: World Management Survey

Data: German Employer-Employee Panel

Management Practices & Human Capital

Productivity

**Selection – Inflows & Outflows**

Extensions & Robustness

# Why do “better managed” firms have higher ability employees?

- Several Possible mechanisms:
  1. Higher ability employees are selected into better managed firms
    - Look at the ability of inflows (again, ability estimated from wage data using CHK 1996-2002)
  2. Exit of lower ability employees from better managed firms
  3. Changing/training the quality of employees while they are in the firm

# Tab 1B: Inflows and outflows into the WMS-IEB matched data, 2004-2010

<b>Variables</b>	<b>Inflows to our firms from the specified labor market state</b>	<b>Outflows from our firms to the specified labor market state</b>
Unemployment	19,026	40,098
Jobs	70,682	75,028
Non-participation	32,763	17,600
Total	122,471	132,726

- Focus on inflows from **unemployment** as generally do not know WMS scores in firms where employees came from (or outflowed towards)

**Table 4: Inflows. Firms with high management scores select more able employees**

	(1)	(2)	(3)	(4)	(5)
<b>Dependent Variable:</b>	<b>Proportion of workers <u>above</u> different ability percentiles from total inflow from unemployment distribution (19,026 workers)</b>				
<b>Percentile</b>	<b>10%</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>	<b>90%</b>
<b>Panel A. No Size Control</b>					
Management Score	0.0016 (0.0025)	0.0020 (0.0046)	0.0008 (0.0080)	0.0201** (0.0089)	0.0227** (0.0091)
<b>Panel B. Including Size Control</b>					
Management Score	0.0023 (0.0024)	0.0027 (0.0047)	0.0023 (0.0083)	0.0188** (0.0091)	0.0157* (0.0090)
Observations	352	352	352	352	352

**Notes:** 19,026 workers. SEs clustered by firm. Management score is standardized. Controls for east dummy, competition, ownership, ln(firm age), %female & industry. Panel B has additional controls for age & college % of inflow



# Table 5: Outflows. Firms with high management scores exit least able employees more aggressively

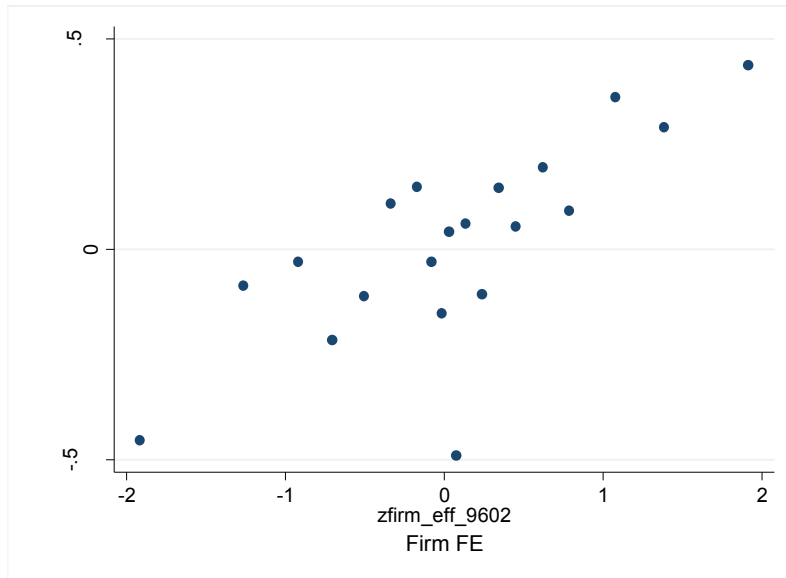
Dependent variable:	Average ability of outflow/Average ability of incumbents				Average ability of outflow	
<b>Management Score</b>	-0.0912*	-0.116**	-0.107*	-0.135**		
	(0.0527)	(0.0580)	(0.0592)	(0.0571)		
<b>Stringent firing/fixing Practices</b>					-0.0993*	-0.0469*
					(0.0508)	(0.0290)
<b>Average incumbent ability</b>						0.518***
						(0.0992)
<b>Average age of outflows</b>			0.0468***	0.0411***	0.0434***	0.0177
			(0.0160)	(0.0150)	(0.0149)	(0.0148)
<b>% college of outflows</b>				4.915***	4.877***	4.202***
				(0.873)	(0.881)	(0.561)
<b>General Controls</b>	No	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	347	347	347	347	347	347

**Notes:** 40,098 employees. SEs clustered by firm. Management score is standardized. "General controls" are East Germany dummy, competition, ownership, ln(firm age), %female & industry. Panel B has additional controls for age & college share of outflows.

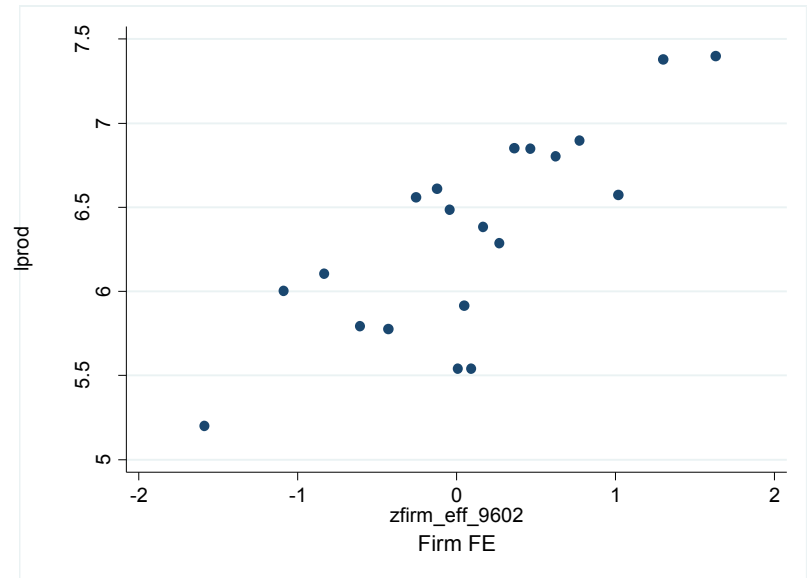
# Extensions & Robustness

- **Firm Fixed effects (Table A8)**
- Wage growth (Table A6) – do better managed firms promote high ability workers more quickly?
- Alternative definitions of managers (e.g. occupation)
- Alternative estimation period for FE
- Flows from other states (job to job; non-participation: Tables A2-A5)
- Drop East German firms
- Other ways of aggregating management practice index (e.g. principal components)

# Fig 3: Firm Fixed Effect (in wages) correlated with (a) WMS management scores (b) productivity



(a) WMS Management Score & Firm FE



(b) Productivity & Firm FE

# Table A8: Firm fixed effect is positively associated with management practices

Dependent Variable:	Firm effect					
<b>Management Score</b>	0.215*** (0.0482)	0.150*** (0.0396)	0.134*** (0.0424)	0.110*** (0.0414)	0.108*** (0.0414)	0.0853* (0.0438)
<b>Ln(Labor)</b>			0.0646 (0.0470)	0.0922* (0.0503)	0.102 (0.0632)	0.101* (0.0577)
<b>% Employees with College</b>				1.077*** (0.370)	0.678 (0.632)	0.510 (0.511)
<b>Mean Employee Quality</b>					0.134 (0.238)	-0.0418 (0.252)
<b>Mean Managerial quality</b>						0.293** (0.136)
<b>General Controls</b>	No	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	588	588	588	588	588	588

**Notes:** SEs clustered by firm. Management score & employee quality are standardized. "General controls": East Germany dummy, competition, ownership, ln(firm age), %female & industry.

# Table A9: Firm fixed effect is positively associated with Productivity

<b>Dependent Variable:</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>
<b>Firm fixed effect (in wages)</b>	0.556*** (0.069)	0.319*** (0.068)	0.101** (0.048)
<b>Management Score</b>			0.064* (0.038)
<b>Average incumbent quality</b>			0.258** (0.104)
<b>Mean Managerial quality</b>			0.139 (0.095)
<b>% Employees with College</b>			1.276*** (0.468)
<b>Ln(Employees)</b>		0.343*** (0.073)	0.383*** (0.062)
<b>Ln(Capital)</b>			0.427*** (0.048)
<b>General controls</b>	Yes	Yes	Yes
<b>Observations</b>	560	560	560

**Notes:** SEs clustered by firm. Management score & employee quality are standardized. “General controls” are East Germany dummy, competition, ownership, ln(firm age), %female & industry.

# Extensions & Robustness

- **Firm Fixed effects (Table A8)**
- Wage growth (Table A6) – do better managed firms promote high ability workers more quickly?
- Alternative definitions of managers (e.g. occupation)
- Alternative estimation period for FE
- Flows from other states (job to job; non-participation: Tables A2-A5)
- Drop East German firms
- Other ways of aggregating management practice index (e.g. principal components)

# CONCLUSIONS

- Merge WMS management scores in Germany with IEB-based estimates of manager & worker FE a la CHK
- WMS Management Scores correlated with human capital – particularly managerial ability
- About  $\frac{1}{4}$  to  $\frac{1}{2}$  of the relationship between productivity & management can be accounted for by human capital
- **Next Steps**
  - CEO characteristics
  - Other countries
  - Causal impact of human capital (e.g. universities)
  - Are management practices just complement with skills, or is it a “Moneyball” story of spotting undervalued individuals?

# MY FAVOURITE QUOTES:

## The bizarre (a firm in Kiel, Germany)

*Interviewer:* “[long silence].....hello, hello....are you still there....hello”

*Production Manager:* “.....I’m sorry, I just got distracted by a submarine surfacing in front of my window”



# MY FAVOURITE QUOTES:

## German Sex Toy Manufacturer

*Interviewer* : “Do you export any of your products?”

*Factory Manager*: “No, our products only cater for tastes in our local market”

## MY FAVOURITE QUOTES:

### The difficulties of defining ownership in Europe

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

*Interviewer:* “I think that’s the “*Other*” category.....although I guess I could put you down as an “*Italian multinational*” ?”

### Americans on geography

*Interviewer:* “How many production sites do you have abroad?”

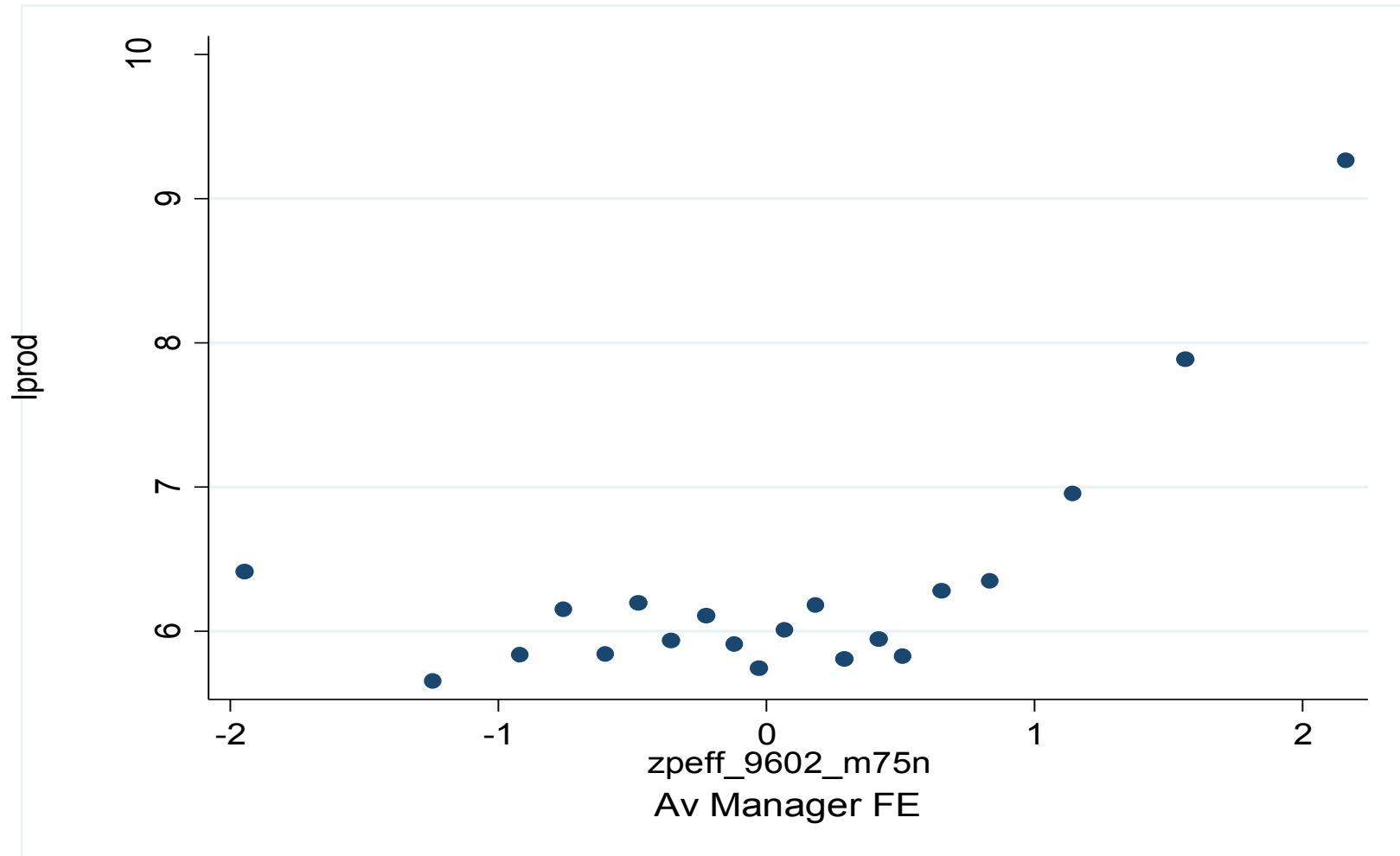
*Manager in Indiana, US:* “Well...we have one in Texas...”

# Firm Performance in general is robustly *correlated* with management practice score

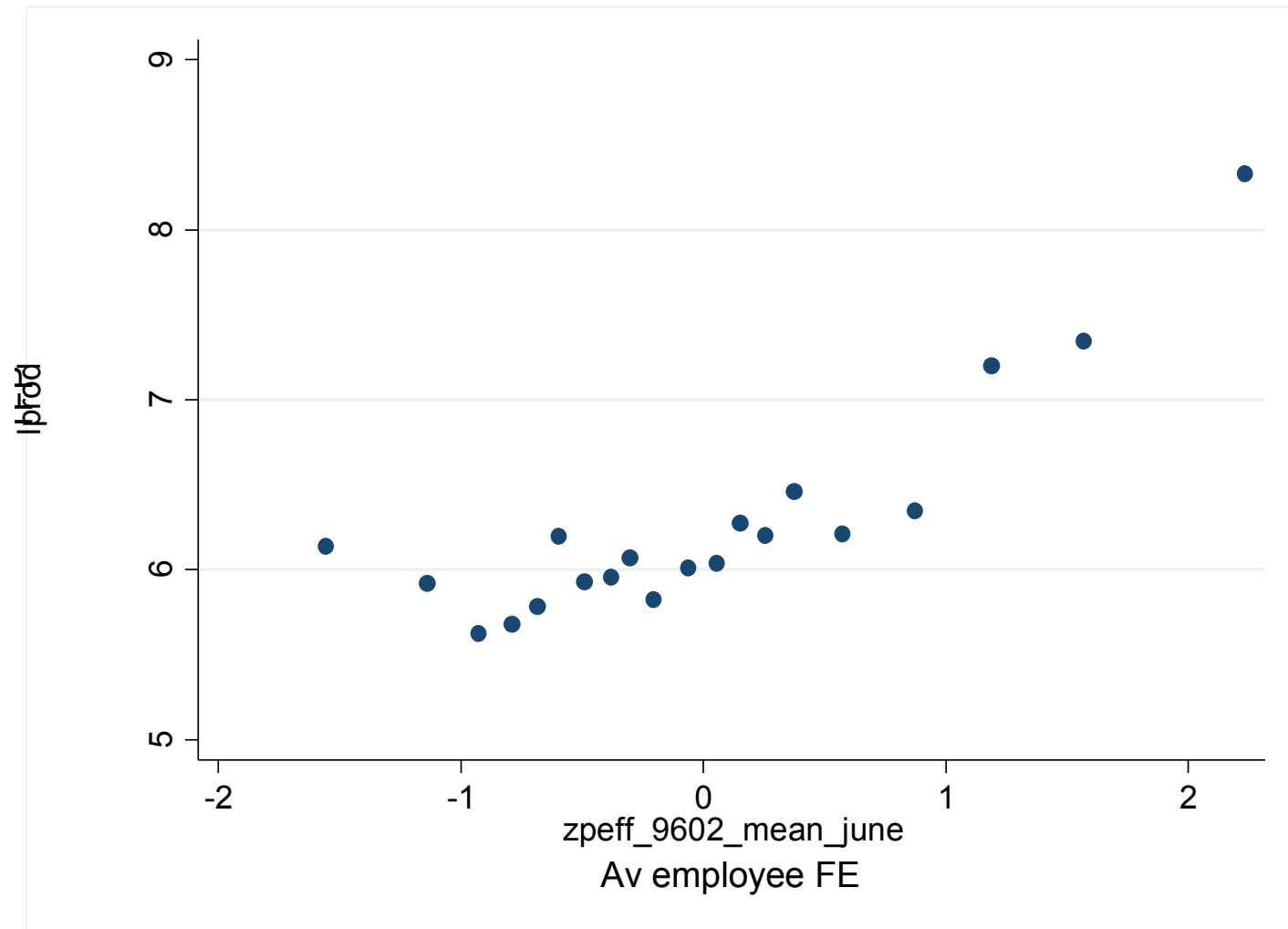
Dependent variable	Ln(sales)	TFP	Ln(sales)	Ln(employment)	Profit rate ROCE	5yr Sales growth	Exit
	OLS	(Olley-Pakes)	Fixed Effects	OLS	OLS	OLS	OLS
Firm sample	All	2+ surveys	2+ surveys	All	All	All	All
Management(SD=1)	0.150*** (0.016)	0.134*** (0.020)	0.033** (0.013)	0.338*** (0.015)	1.202*** (0.264)	0.039*** (0.013)	-0.006*** (0.002)
Ln(emp)	0.645*** (0.024)	0.621*** (0.050)	0.374*** (0.096)				
Ln(capital)	0.307*** (0.019)	0.333*** (0.034)	0.237*** (0.096)				
Obs	8,314	6,364	6,364	15,608	9,163	8,365	7,532

M, Management Index is z-score of average 18 questions z-scored (sd=1). Other controls include % employees with college, av hours, firm age, 3-digit industry, country & time dummies & noise controls (e.g. interviewer dummies). Standard errors clustered by firm. In OP coefficients on L and K are from first & second stage estimation procedure

# Labor Productivity is strongly increasing in “managerial” ability



# TFP increasing in WMS management scores in our German sample as well



# Table A8: Firm fixed effect is positively associated with Productivity

<b>Dependent Variable:</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>	<b>Ln(sales)</b>
<b>Firm fixed effect (in wages)</b>	0.556*** (0.069)	0.319*** (0.068)	0.101** (0.048)	0.033 (0.021)
<b>Management Score</b>			0.064* (0.038)	0.0289* (0.017)
<b>Average incumbent quality</b>			0.258** (0.104)	0.0736 (0.073)
<b>Mean Managerial quality</b>			0.139 (0.095)	0.0765 (0.048)
<b>% Employees with College</b>			1.276*** (0.468)	0.165 (0.227)
<b>Ln(Employees)</b>		0.343*** (0.073)	0.383*** (0.062)	0.126*** (0.027)
<b>Ln(Capital)</b>			0.427*** (0.048)	0.175*** (0.022)
<b>Ln(Materials)</b>				0.660*** (0.033)
<b>Observations</b>	560	560	560	378