Innovation, Management & Competition

John Van Reenen (& Nick Bloom)
European Investment Bank, Berlin

September 26th 2014
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MOTIVATION

• World is still suffering hangover from global financial crisis. EU growth particularly weak
• How can our research shed light on what is to be done?
• Draghi/Abe “3 pillars”
  – Expansionary Monetary Policy
  – Expansionary Fiscal Policy
  – Structural Reforms (focus tonight)
The Economic Challenge

Measuring Management

Management & Performance

Drivers & Policy
LARGE PRODUCTIVITY DIFFERENCES BETWEEN COUNTRIES

Source: Jones and Romer (2010). US=1
Europe about 30% lower income (GDP per head) than US

Source: Conference Board (2014), TED Table 8 derived, EU-15
https://www.conference-board.org/retrievelfile.cfm?filename=SummaryTables_Jan20141.pdf&type=subsite
It isn’t just less jobs and more holidays. EU productivity 22% lower than US

Source: Conference Board (2014), TED Table 8 derived, EU-15
https://www.conference-board.org/retrievefile.cfm?filename=SummaryTables_Jan20141.pdf&type=subsite
EUROPEAN CATCH-UP WITH US REVERSED IN MID 1990S

Labor Productivity Levels

Output per hour worked, 2005 US$

Source: GGDC Dataset
Average Labour Productivity (GDP per worker) Growth before and after the Global Financial Crisis

Source: Conference Board (2014), TED Table 9 derived
https://www.conference-board.org/retrievfile.cfm?filename=SummaryTables_Jan20141.pdf&type=subsite
Average Labour Productivity (GDP per worker) Growth before and after the Global Financial Crisis

Pre-crisis 1997-2007
Post-crisis 2007-2014

Source: Conference Board (2014), TED Table 9 derived
Average Labour Productivity (GDP per worker)
Growth before and after the Global Financial Crisis

Pre-crisis 1997-2007

Post-crisis 2007-2014

Source: Conference Board (2014), TED Table 9 derived
https://www.conference-board.org/retrievelfile.cfm?filename=SummaryTables_Jan20141.pdf&type=subsite
PRODUCTIVITY GAPS AT FIRM LEVEL WITHIN COUNTRIES

- Big macro productivity gaps mirrored at the firm level
- In a typical narrow industry (e.g. cement) most efficient top 10% of US plants have 4x higher labor productivity than those in bottom 10%
  - Controlling for other inputs (e.g. capital), remaining productivity (TFP) difference still enormous (~2:1)
- In EU & developing countries these gaps even bigger
- Macro productivity trends disguise “creative destruction”
  - About ½ of aggregate productivity growth is “creative destruction”: more productive growing bigger & less productive shrinking/exiting
WHAT ARE REASONS FOR LARGE DIFFERENCES IN FIRM AND COUNTRY PERFORMANCE

• Technological Innovation?
  – R&D, patents, diffusion of ICT (Information and communication technologies), etc.
Total R&D to GDP ratio, 2010

Source: OECD (2013)
WHY SUBSIDISE INNOVATION?

- Market failure because innovation “spills over” to other firms.
- **Growth Theory:** *positive* knowledge spillovers ("my ideas benefit you") means **too little** R&D by private firms
- **Industrial economics:** *negative* spillovers ("my ideas hurt you") means **too much** R&D, an "arms race"
- Bloom, Schankerman & Van Reenen (2013)
  - Look at firm’s stock market value: both effects matter
  - R&D by product market rivals hurts me, but R&D by those I share technologies with helps me
- But positive spillovers dominate, so social benefits from innovation are about three times larger than private R&D
- Implies big role for state (& EIB) in supporting innovation
WHAT ARE REASONS FOR LARGE DIFFERENCES IN FIRM AND COUNTRY PERFORMANCE

• Technological innovation matter a lot, but:
  – After controlling for technology, still a big residual
  – Productivity effects of ICT depend on firm management/organization (e.g. Bloom, Sadun & Van Reenen, 2012, AER)

• So are management practices also important?
  – Business case studies
  – History of economic thought
FIRM HETEROGENEITY HAS LONG BEEN RECOGNIZED WITH POSSIBLE LINK TO MANAGEMENT

“It is on account of the wide range [of ability] among the employers of labor that we have the phenomenon in every community and in every trade 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)
It is on account of the wide range [of ability] among the employers of labor that we have the phenomenon in every trade some employers realizing no profits; others, fair profits; others, large profits; others, still, colossal profits."

Firm heterogeneity has long been recognized with possible link to management.
But there is still a wide debate – many people claim management is all “hot air”

“No potential driving factor of productivity has seen a higher ratio of speculation to empirical study”

- Chad Syversson (2011, Journal of Economic Literature)
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Drivers & Policy
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 150 MBA types (loud, assertive & business experience)
| 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 questions and over 50 examples in Bloom & Van Reenen (2007) & Appendix D

http://worldmanagementsurvey.org/

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)
MANAGEMENT PRACTICE SCORES ACROSS 32 COUNTRIES

Note: Data as of April 2014; 13,264 observations over 10,668 firms; 32 countries
Average management scores across countries are strongly correlated with GDP per capita.

Data includes 2013 survey wave as of 9/20/2013. Africa data not yet included in the paper.
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.
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….”
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”
Higher management scores correlated with higher productivity

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
LINK BETWEEN PRODUCTIVITY & MANAGEMENT HOLDS TRUE ACROSS DIFFERENT COUNTRIES

**Firms are grouped in 0.5 increments of assessed management score**
RANDOMIZED CONTROL TRIALS: BLOOM ET AL (2013)

- 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)

- Collected weekly performance data on all plants from 2008 to 2011

- Improved management practices led to large & significant improvements in:
  - **Productivity**: 2sd increase in management index & 20% higher TFP
  - **Profitability**: around $325k p.a. compared to ~$200k market cost of consultancy
MANY PARTS OF THE FACTORIES ARE DIRTY AND UNSAFE
THE FACTORIES ARE ALSO DISORGANIZED

Instrument not removed after use, blocking hallway.

Oil leaking from the machine

Cotton lying on the floor

Instrument blocking the hallway
THE TREATED FIRMS INTRODUCED BASIC INITIATIVES

Worker involved in “5S” initiative on the shop floor, marking out the area around the model machine

Snag tagging to identify the abnormalities on & around the machines, such as redundant materials, broken equipment, or accident areas. The operator and the maintenance team is responsible for removing these abnormalities.
PRODUCTIVITY IMPROVEMENTS IN RCT ON ADOPTION OF 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 (2013).
We can estimate contribution of management to cross-country TFP differences

1. Estimate country differences in *size weighted* management

2. Impute impact of this on differences in TFP

Requires many assumptions, so only rough magnitude calculation
First calculate the employment weighted difference in management (from the US as baseline)

![Bar chart showing the employment weighted difference in management with the US as baseline. The chart is decomposed into reallocation effect (blue bar) and unweighted average management scores (red bar).](chart.png)

**Notes:** Total weighted mean management deficit with the US is the number on top of the bar. This is decomposed into (i) reallocation effect (blue bar) and (ii) unweighted average management scores (red bar). Domestic firms, scores corrected for sampling bias.
First calculate the employment weighted difference in management (from the US as baseline)

Greece management score 1.6 sd worse than US & 30% of gap due to better US reallocation

Notes: Total weighted mean management deficit with the US is the number on top of bar. This is decomposed into (i) reallocation effect (blue bar) and (ii) unweighted average management scores (red bar). Domestic firms, scores corrected for sampling bias.
Second, estimate impact of management on TFP using result from field experiments (and micro regressions) that ↑1 SD management ≈ ↑ 10% TFP

<table>
<thead>
<tr>
<th>Country</th>
<th>Share-Weighted Average Management Deficit with US</th>
<th>TFP GAP with US</th>
<th>Proportion of TFP gap due to Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sweden</td>
<td>-0.25</td>
<td>32.2</td>
<td>7.8%</td>
</tr>
<tr>
<td>Japan</td>
<td>-0.35</td>
<td>33.6</td>
<td>10.4%</td>
</tr>
<tr>
<td>Canada</td>
<td>-0.50</td>
<td>22.3</td>
<td>22.4%</td>
</tr>
<tr>
<td>Great Britain</td>
<td>-0.74</td>
<td>20.3</td>
<td>36.5%</td>
</tr>
<tr>
<td>Italy</td>
<td>-0.81</td>
<td>17.2</td>
<td>47.7%</td>
</tr>
<tr>
<td>France</td>
<td>-0.82</td>
<td>25.3</td>
<td>38.7%</td>
</tr>
<tr>
<td>Brazil</td>
<td>-0.98</td>
<td>59.6</td>
<td>16.9%</td>
</tr>
<tr>
<td>China</td>
<td>-1.01</td>
<td>78.3</td>
<td>14.9%</td>
</tr>
<tr>
<td>Argentina</td>
<td>-1.17</td>
<td>57.3</td>
<td>20.6%</td>
</tr>
<tr>
<td>Portugal</td>
<td>-1.18</td>
<td>24.9</td>
<td>48.2%</td>
</tr>
<tr>
<td>Greece</td>
<td>-1.65</td>
<td>51.0</td>
<td>32.4%</td>
</tr>
<tr>
<td>Unweighted av.</td>
<td></td>
<td></td>
<td>25%</td>
</tr>
</tbody>
</table>

Assume one sd increase in management increases TFP by 10%. Regressions suggest about 5% to 15% depending on specification. TFP data from Jones and Romer (2010).
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MULTINATIONALS APPEAR TO ACHIEVE GOOD MANAGEMENT PRACTICES WHEREVER THEY LOCATE

Sample of 7,303 manufacturing firms, of which 4,926 are purely domestic and 2,377 are foreign multinationals. Domestic multinationals are excluded – that is the domestic subsidiaries of multinational firms (like a Toyota subsidiary in Japan).
FAMILY-RUN FIRMS TYPICALLY HAVE THE WORST MANAGEMENT

Management scores after controlling for country, industry and number of employees. Data from 9085 manufacturers and 658 retailers. “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.
Sample of 9469 manufacturing and 661 retail firms (private sector panel) Reported competitors defined from the response to the question “How many competitors does your [organization] face?”
EDUCATION FOR NON-MANAGERS AND MANAGERS APPEAR LINKED TO BETTER MANAGEMENT

Sample of 8,032 manufacturing and 647 retail firms.

<table>
<thead>
<tr>
<th>Percentage of employees with a college degree (%)</th>
<th>Non-managers</th>
<th>Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2.6</td>
<td>2.5</td>
</tr>
<tr>
<td>1 to 10</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>11 to 25</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>26 to 50</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>50+</td>
<td>3.0</td>
<td>2.9</td>
</tr>
<tr>
<td>100+</td>
<td>3.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Labor Market Regulation Seems to Inhibit Good Management Practices, Particularly 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/](http://www.doingbusiness.org/ExploreTopics/EmployingWorkers/)
In fact we formally investigated if firms can self-assess their management practices....

We asked at the end of the survey:

“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”
...and found firms are too optimistic on management
...and self-scores show no link to performance
POLICIES

• Allow reallocation – easier entry & growth; faster exit of inefficient (less protection for incumbent firms both small & large)

• Increase competitive intensity
  – Deepening internal market (especially services)
  – Trade (TTIP, EU-US trade deal)

• Foreign Investment

• Labour market reform

• Education (e.g. university funding & competition)
CONCLUSIONS

• Europe at a crossroads
  – Major successes in integration over last 50 years creating largest single market in world
  – But facing slow growth

• Growth through productivity & innovation
  – Major improvements possible & desirable if opportunities are seized through structural reform

• These structural reforms must be accompanied by accommodating monetary & fiscal policy
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...”
More results and data available on:

www.worldmanagementsurvey.org

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

The WMS generates data and reports that help managers and policy makers understand the drivers of better management practice.

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
MY FAVOURITE QUOTES:

The bizarre

*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”

The unbelievable

[Male manager speaking to a female interviewer]

*Production Manager*: “I would like you to call me “Daddy” when we talk”
[End of interview…]
Management across 3 sectors in US: Main reason for difference is people management (e.g. hiring/firing; promotion, etc.)

Source: Bloom, Lemos, Sadun, Scur & Van Reenen (2014)