Managerial human capital & The Wealth of Nations

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Draws heavily on joint work with Nick Bloom (Stanford) and Raffaella Sadun (HBS)
Managerial human capital & The Wealth of Nations
MOTIVATION

• How much does human capital matter for the wealth of nations?
• Years of schooling only accounts for a fraction of cross country productivity differences in development accounting (e.g. Caselli, 2005)
  – But what about managerial/entrepreneurial human capital? (e.g. Gennaioli et al, 2013, QJE)
• This talk:
  – Productivity closely related to core management practices
  – Management matters a lot in explaining productivity differences (~50% of US-Southern EU gap)
  – What is relationship between human capital & management practices?
LARGE PRODUCTIVITY DIFFERENCES BETWEEN COUNTRIES

Source: Jones and Romer (2010). US=1
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)
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Alfred Marshall (QJE, July 1887, 1(4)) response
Because the scientific evidence on management is limited – mostly case-studies and ad-hoc surveys

Syverson (2011, JEL) “no potential driving factor of productivity has seen a higher ratio of speculation to empirical study”.

Management literature? San Francisco Airport bookstore
DATA DESCRIPTION

Management & Performance

Management & human capital

- Are management practices simply individual managerial (or employee) talent?
- Does the supply of human capital increase management scores?
- Is the management of schools important in the production of human capital?
Measuring Management

Data Description

Management & Performance

Management & human capital

- Are management practices simply individual managerial (or employee) talent? [NO]
- Does the supply of human capital increase management scores? [YES]
- Is the management of schools important in the production of human capital? [YES]
Measuring Management

Data Description

Management & Performance

Management & human capital
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)
Measuring Management

Data Description

Management & Performance

Management & human capital
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.
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?”
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”
Measuring Management

Data Description

Management & Performance

Management & human capital
Moments: TFP 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
PERFORMANCE REGRESSIONS

\[ \ln Y_{it} = \alpha_M M_{it} + \alpha_L \ln(n_{it}) + \alpha_K \ln(k_{it}) + \alpha_X x_{it} + u_{it} \]

- \( M \), Management Index is average of all 18 questions (sd=1)
- Other controls include: % employees with college degree, average hours worked, firm age, industry, country & time dummies & noise (e.g. interviewer dummies).
Firm Performance in general is robustly *correlated* with management practice score

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

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

Employment Share of firm \( i \)

Management score of firm \( i \)

\[
M = \sum_{i} s_i M_i
\]
“OLLEY PAKES” (\( OP \)) DECOMPOSITION OF WEIGHTED AVERAGE MANAGEMENT SCORE (\( M \)) IN GIVEN COUNTRY

\[
M \equiv \sum_i s_i M_i
\]

\[
= \sum_i \left[ (s_i - \bar{s}) (M_i - \bar{M}) \right] + \bar{M}
\]

= \( OP \) + \( \bar{M} \)

Employment Share of firm \( i \)

Management score of firm \( i \)

Covariance (Olley-Pakes, 1996, reallocation term)

Unweighted mean of management score
First calculate the employment weighted difference in management (from the US as baseline)

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.
Management gap with the US

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 $\uparrow 1$ SD management $\approx \uparrow 10\%$ 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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ARE MANAGEMENT PRACTICES MORE THAN MANAGEMENT TALENT?

• Lucas (1978) TFP is simply CEO talent.
• Management practices could just be unobserved ability of bosses & employees
  – Or is this “reductionist” approach to management too simple? India RCT evidence suggests so as managers largely stayed the same
• Bender, Bloom, Card, Van Reenen & Wolter (2014)
  – Match management data into German IEB (98% match). Near population of West German workers from 1975 onwards
  – Calculate worker & firm fixed effects via Card, Hening & Kline (2013) AKM method on whole IEB
  – Look at mean & distribution of employee fixed effects in firms of different management scores
Better managed firms employ more able workers & managers

Management score and Ability of 10th percentile

Management score and Ability of 90th percentile

Note: 353 firms and 179,401 individuals underlying these Figures.
Only about half of TFP-management relationship due to managerial/employee talent

<table>
<thead>
<tr>
<th>Dep variable:</th>
<th>Ln(sales)</th>
<th>Ln(sales)</th>
<th>Ln(sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management z-score</td>
<td>0.564***</td>
<td>0.360***</td>
<td>0.164**</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td>(0.101)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Av. Employee quality</td>
<td>0.798***</td>
<td></td>
<td>0.364***</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td></td>
<td>(0.089)</td>
</tr>
<tr>
<td>Ln(Capital)</td>
<td></td>
<td></td>
<td>0.182***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.065)</td>
</tr>
<tr>
<td>Ln(Materials)</td>
<td></td>
<td>0.533***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.058)</td>
<td></td>
</tr>
<tr>
<td>Ln(Employment)</td>
<td>0.226**</td>
<td>0.382***</td>
<td>0.224***</td>
</tr>
<tr>
<td></td>
<td>(0.091)</td>
<td>(0.089)</td>
<td>(0.055)</td>
</tr>
<tr>
<td>Ind dummies</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>493</td>
<td>493</td>
<td>491</td>
</tr>
</tbody>
</table>

Notes: *, **, *** Significant at 10%, 5%, 1% respectively. SE Clustered on 293 establishment in parentheses; controls for year dummies in columns; OLS regressions weighted by coverage rate (% of workers for which we have FE); controls for industry & year (column I and II only year)
Measuring Management

Data Description

Management & Performance

Management & human capital

• Are management practices simply individual managerial (or employee) talent?
• **Does the supply of human capital increase management scores?**
• Is the management of schools important in the production of human capital?
EDUCATION FOR NON-MANAGERS AND MANAGERS APPEAR LINKED TO BETTER MANAGEMENT

Sample of 8,032 manufacturing and 647 retail firms.

Percentage of employees with a college degree (%)
SUPPLY OF EDUCATION AND MANAGEMENT: USE UNESCO World Higher Education Database university locations (N=9,081)

Valero & Van Reenen (2014) Exogenous university openings followed by future increases in productivity growth
### BEING CLOSER TO A UNIVERSITY POSITIVELY ASSOCIATED WITH HIGHER MANAGEMENT (＆ SKILLS)

<table>
<thead>
<tr>
<th>Dependent Variable: % employees with degree in firm</th>
<th>OLS</th>
<th>OLS</th>
<th>OLS</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance (drive time to nearest university)</td>
<td>-0.049***</td>
<td>-2.267***</td>
<td>(0.019)</td>
<td>(0.403)</td>
</tr>
<tr>
<td>% employees with Degree in firm</td>
<td>0.789***</td>
<td>3.190***</td>
<td>(0.082)</td>
<td>(1.113)</td>
</tr>
<tr>
<td>Observations</td>
<td>6,406</td>
<td>6,406</td>
<td>6,406</td>
<td>6,406</td>
</tr>
</tbody>
</table>

**Source:** Feng (2013)

**Notes:** Controls for country, industry, population density, lat/log, size, ownership. SE Clustered by 313 regions. In final column proportion skilled is instrumented with distance to university.
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• Is the management of schools important in the production of human capital?
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)
Schools: Pupil outcomes correlated with higher management scores

Notes: Graph based on 354 observations with available school performance information (Canada=77; UK=85; US=120; Sweden=72). Performance data are zscored within country (US 2009 math exam pass rate from High School Exit Exams/End-of-Course exams, UK 2009 average uncapped GCSE score, CA 2009 Fraser Institute calculated ratings from school reports, and SW 2009 9th grade GPA). Source: Bloom, Genakos, Sadun & Van Reenen (2012)
Notes: Brazil: average math score in High School National Exam; US: Math exam pass rate from HSEEs (only available for public schools), UK: average GCSE score, Canada: school-level rating (Fraser Institute), Sweden: 9th grade GPA, India: Standards Average Math Score. “School controls”: #pupils, pupil/teacher ratio, governance (public regular, public autonomous, private); whether curriculum academic or vocational; noise controls interviewer dummies, tenure & seniority of manager, day of the week; time of day the interview; interview duration, reliability indicator).

Source: Bloom, Lemos, Sadun, & Van Reenen (2014)
School results consistent with Dobbie & Fryer RCTs

- RCTs of “high performance” US Charter Schools find better pupil outcomes (Angrist et al. 2010 Boston & KIPP charters; Dobbie & Fryer, 2011, on Harlem Promise Academies)

  - Use of data to guide instruction
  - Frequent teacher feedback
  - High dosage tutoring
  - Increased instructional time
  - Culture of high expectations

- Increased math score by 0.28 SD & reading by 0.08 SD

- Fryer running new Houston intervention using our management survey to see if management scores and pupil outcomes improve

- McCormack et al (2013) on universities (using WMS methods)
CONCLUSIONS

- Heterogeneity in firm productivity linked to management
  - Management improves firm performance
  - ~25% of cross-country TFP gap

- Management & human capital
  - Supply of general human capital associated with better management (& productivity)
  - Improving management of schools raises outcomes
  - Management is more than just atoms of human capital. How they are organized together matters
Interviewing school principals is always interesting…..

*Interviewer* “How standardized are your instructional planning processes?”

*Principal: “Very standardized! For example, I tell all my World History teachers that they must kill Napoleon before Christmas!”*
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…”
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…]
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
LINK BETWEEN PRODUCTIVITY & MANAGEMENT HOLDS TRUE ACROSS DIFFERENT COUNTRIES

**Labour productivity**

- U.S.
- U.K.
- CN
- JP
- FR
- DE
- SE
- PL
- IT
- PT
- GR

**Log scale**

- Sales per worker

**Firms are grouped in 0.5 increments of assessed management score**
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
Moments: Sales are increasing in management

Management is the average of all 18 questions (set to sd=1). Sales is log(sales) in US$. N=10197
DECOMPOSING THE RELATIVE MANAGERIAL DEFICIT BETWEEN COUNTRY \( j \) AND THE US ECONOMY

\[ M^k - M^{US} = (OP^k - OP^{US}) + (\bar{M}^k - \bar{M}^{US}) \]

- Difference in aggregate share-weighted Management scores
- Difference in reallocation (between firm)
- Difference in unweighted Means (within firm)
UNESCO World Higher Education Database
business school locations (N=5,724)