Restoring productivity: Does management matter?

John Van Reenen (LSE)

July 2nd 2015
CE² Conference, Warsaw
Draws heavily on joint work with Nick Bloom (Stanford) and Raffaella Sadun (HBS)
OR... BOSS-ONOMICS
MOTIVATION

• Evidence of extensive firms & plant productivity (TFP) differences (e.g. Syverson, 2011)
• Finding has influenced many fields: trade (e.g. Melitz, 2003), labor (e.g. Card, Heining & Kline, 2013), macro (Hsieh & Klenow, 2009), IO etc.
• This talk:
  – Productivity heterogeneity related to certain core management practices
  – Some management practices like a technology, not simply different contingent styles (cf. Woodward, 1958)
  – Management matters a lot in explaining TFP gap with US across countries (~30% on average)
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 managerial 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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"...wide range [of ability] among the employers give the phenomenon in every trade some employers realizing no profits; others, fair profits; others, large profits; others, still, colossal profits."

Alfred Marshall (QJE, July 1887, 1(4)) response
But there is still a wide debate – many people claim management is just “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)
Measuring Management

Management Models

Data Description

Empirics
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 |

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

http://worldmanagementsurvey.org/
Examples of performance metrics – Car Plant
Examples of a performance metrics – Hospital
**INCENTIVES - e.g. “HOW DOES THE PROMOTION SYSTEM WORK?”**

| Score | (1) People are promoted primarily upon the basis of tenure, irrespective of performance (ability & effort) | (3) People are promoted primarily upon the basis of performance | (5) We actively identify, develop and promote our top performers |

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

[http://worldmanagementsurvey.org/](http://worldmanagementsurvey.org/)

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

Now extended to Hospitals, Retail, Schools, etc.
Average Management Scores by Country

Note: Unweighted average management scores (raw data) with number of observations. All waves pooled (2004-2014)
Average management scores across countries are strongly correlated with GDP per capita.

Note: Unweighted average management scores (raw data) with number of observations. All waves pooled (2004-2014).
Large variation of firm management within countries

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)
Management varies heavily by ownership type

<table>
<thead>
<tr>
<th>Ownership Type</th>
<th>Number</th>
<th>Management Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispersed Shareholders</td>
<td>3,879</td>
<td>3.2</td>
</tr>
<tr>
<td>Private Equity</td>
<td>476</td>
<td>3.0</td>
</tr>
<tr>
<td>Family owned, external CEO</td>
<td>650</td>
<td>2.9</td>
</tr>
<tr>
<td>Managers</td>
<td>276</td>
<td>2.8</td>
</tr>
<tr>
<td>Private Individuals &amp; other</td>
<td>2,548</td>
<td>2.7</td>
</tr>
<tr>
<td>Government</td>
<td>301</td>
<td>2.6</td>
</tr>
<tr>
<td>Family owned, family CEO</td>
<td>2,467</td>
<td>2.5</td>
</tr>
<tr>
<td>Founder owned, founder CEO</td>
<td>3,200</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Management score varies heavily by ownership type.

Notes: Data from 14,686 firm interviews. Created May 2015. Source: [www.worldmanagementsurvey.com](http://www.worldmanagementsurvey.com)
Measuring Management

Management Models

Data Description

Empirics
ECONOMIC PERSPECTIVES ON MANAGEMENT

• Management as Design
  – Organizational Economics (Gibbons and Roberts HOE, 2013) e.g. Personnel Economics
  – Contingent management School (Woodward, 1958)
  – Optimal “styles” of management

• Management as a Technology (MAT)
  – Management a part of firm’s TFP (intangible capital)
  – Consider simple model: dynamic equilibrium model with firm heterogeneity in productivity & imperfect competition
We define a *stylized* Management As a Technology (MAT) model (Bloom, Sadun & Van Reenen, 2015)

Production Function: \( Y = AK^\alpha L^\beta M^\gamma \) where \( M = \text{management} \)

Firms invest in \( M \) (intangible capital) which depreciates like \( K \), but unlike \( K \), firms draw an endowment at entry (Hopenhayn, 1992; Melitz, 2003)

Other assumptions:

- \( A \) also drawn randomly at entry \( (K_0=0) \) from known distribution. Hit by ongoing \( A \) shocks
- Changing \( M \) & \( K \) involves adjustment costs (\( L \) flexible)
- Monopolistic competition (Iso-elastic demand, \( e \))
- Sunk entry cost \( (\kappa) \) & fixed per period operating cost \( (F) \)
Timing of firm decisions

1. Entrants pay a sunk cost $\kappa$ for a draw on $(A,M)$. Free entry condition determines number of firms

2. Each period firm gets TFP shock, $\varepsilon_{it}$; $\ln A_{it} = \rho \ln A_{t-1} + \varepsilon_{it}$

3. Pay fixed operating cost $F$ per period (or exit)

4. Invest in $M$ & $K$ (investment “price” + quadratic adjust cost)

5. Choose labor (fully flexible)
Model has 15 parameters – 9 taken from prior literature, 2 normalized, and 4 estimated by SMM

Predefined parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>value</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital – output elasticity</td>
<td>$\alpha$</td>
<td>0.3</td>
<td>NIPA factor share</td>
</tr>
<tr>
<td>Labor – output elasticity</td>
<td>$\beta$</td>
<td>0.6</td>
<td>NIPA factor share</td>
</tr>
<tr>
<td>Management – output</td>
<td>$\gamma$</td>
<td>0.1</td>
<td>Bloom et al (2013)</td>
</tr>
<tr>
<td>Demand elasticity</td>
<td>$e$</td>
<td>5</td>
<td>Bartelsman et al (2013)</td>
</tr>
<tr>
<td>Standard deviation of ln(TFP)</td>
<td>$\sigma_A$</td>
<td>0.31</td>
<td>Bloom (2009)</td>
</tr>
<tr>
<td>AR(1) parameter on ln(TFP)</td>
<td>$\rho$</td>
<td>0.885</td>
<td>Cooper and Haltiwanger (2006)</td>
</tr>
<tr>
<td>Discount Factor</td>
<td>$\phi$</td>
<td>0.9</td>
<td>Standard 10% interest rate</td>
</tr>
<tr>
<td>Capital depreciation rate</td>
<td>$\delta_K$</td>
<td>10%</td>
<td>Bond and Van Reenen (2007)</td>
</tr>
<tr>
<td>Capital resale loss</td>
<td>$\phi_K$</td>
<td>50%</td>
<td>Ramey and Shapiro (2001)</td>
</tr>
</tbody>
</table>

Notes: Fixed cost normalized at 100 and mean of TFP at 1
Estimate the four remaining parameters by SMM

Panel A: Structurally estimated parameter values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation rate of management</td>
<td>$\delta_M$</td>
<td>0.082</td>
</tr>
<tr>
<td>Adjustment cost parameter for management</td>
<td>$\gamma_M$</td>
<td>0.387</td>
</tr>
<tr>
<td>Adjustment cost parameter for capital</td>
<td>$\gamma_K$</td>
<td>0.150</td>
</tr>
<tr>
<td>Sunk cost of entry</td>
<td>$\kappa$</td>
<td>86.9</td>
</tr>
</tbody>
</table>

Panel B: Empirical Moments used

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data Value</th>
<th>Estimated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard deviation of 5 year management growth</td>
<td>0.564</td>
<td>0.560</td>
</tr>
<tr>
<td>Standard deviation of 5 year sales growth</td>
<td>0.980</td>
<td>0.980</td>
</tr>
<tr>
<td>Standard deviation of 5 year capital growth</td>
<td>0.887</td>
<td>0.888</td>
</tr>
<tr>
<td>Annual Exit rate</td>
<td>4.43%</td>
<td>4.44%</td>
</tr>
</tbody>
</table>

Notes: Estimation by SMM using management panel data 2004-2014. Calibrate 11 parameters – see Table 1: 9 from literature and two normalizations (Fixed cost=100 and mean of lnA=1). Run 100 years until steady state. Keep last 10 years of data.
Predictions from numerical MAT model (Note not directly used in structural SMM estimation)

1) Performance ↑ in management

Notes: Simulate 5,000 firms per year in the steady state using estimated parameters from SMM and calibrated parameters.
1) Performance ↑ in management

2) Management ↑ in competition

Notes: Simulate 5,000 firms per year in the steady state using estimated parameters from SMM and calibrated parameters.
Predictions from numerical MAT model (Note not directly used in structural SMM estimation)

3) Firm Age & management

4) Management & skill price

Firm Age increasing
Management price increasing

Notes: Simulate 5,000 firms per year in the steady state using estimated parameters from SMM and calibrated parameters. Plots normalized log(management)
Very stylized model with many possible extensions

- Governance & principal-agent issues: initial draw of M a reduced form way of proxying these problems

- Multi-factor: currently 1-dimensional M, but under “Design” model sub-components of management styles

- Management technology could be (partially) non-rival so spillovers (Bloom, Schankerman & Van Reenen, 2013)

- More generally, Rivkin (2000) on why better management practices aren’t adopted:
  - Information (later)
  - Incentives (our focus)
  - Co-ordination (Gibbons & Henderson, 2012)
Examining the Model’s Predictions

- Performance
- Competition
- Skills
- Age

Management and cross-country TFP
Data: 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
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 in general is robustly \textit{correlated} with management pretty much any way you cut the data.

<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 ROCE</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>OLS</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>0.156*** (0.019)</td>
<td>0.134*** (0.020)</td>
<td>0.034** (0.012)</td>
<td>0.402*** (0.013)</td>
<td>1.034*** (0.296)</td>
<td>0.044*** (0.012)</td>
<td>-0.006*** (0.002)</td>
</tr>
<tr>
<td>Ln(emp)</td>
<td>0.621*** (0.028)</td>
<td>0.621*** (0.050)</td>
<td>0.427*** (0.061)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln(capital)</td>
<td>0.297*** (0.022)</td>
<td>0.333*** (0.034)</td>
<td>0.189*** (0.043)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs</td>
<td>8,877</td>
<td>8,877</td>
<td>8,877</td>
<td>24,501</td>
<td>12,578</td>
<td>11,291</td>
<td>7,507</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.
Performance: results from randomized control trials also supportive of MAT (Bloom et al, 2013)

- Experimented on plants in Indian textile firms outside Mumbai

- Randomized treatment plants got heavy management consulting (as in the practices discussed here), control plants got very light consulting

- Collected weekly data & found:
  - Management score improved by 2sd & TFP up by 20%
  - **Implies: 1 SD increase in management index caused 10% increase in TFP**
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.
Performance: causal results from randomized control trials also supportive of MAT

Weeks after the start of the management experiment

1 SD in management caused 10% increase in productivity
Measuring Data

Management Models

Examining the Model’s Predictions
- Performance
- **Competition**
- Skills
- Age

Management and cross-country TFP
Management increasing in Competition – raw Data

Notes: Management is an average of all 18 questions (set to sd=1) on the y-axis. Lerner is median firm profits over sales ratio in industry-country pair. Management & competition are expressed in relation in deviations from the country and global industry average. Competition measure (1-Lerner) is binned into quintiles. 5,982 observations.
## Competition associated with improved management (Dependent var. = MNG)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>MNG</th>
<th>MNG</th>
<th>MNG</th>
<th>MNG</th>
<th>MNG</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Lerner Index (country by industry)</td>
<td>0.067***</td>
<td></td>
<td>0.479***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td></td>
<td>(0.185)</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of reported competitors</td>
<td>0.039***</td>
<td></td>
<td>0.067***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td></td>
<td>(0.023)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Openness (country-industry)</td>
<td></td>
<td>0.095*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.050)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs</td>
<td>10,611</td>
<td>14,786</td>
<td>4,554</td>
<td>10,611</td>
<td>14,786</td>
</tr>
</tbody>
</table>

**Notes:** Includes SIC-3 industry, country, firm-size, public and interview noise (interviewer, time, date & manager characteristic) controls. Col 1, 3, & 4 clustered by industry*country, cols 2 & 5 by firm.
IS COMPETITION EFFECT CAUSAL?

• Also use natural experiments to generate exogenous increases in competition

• Trade liberalization following China accession to WTO & subsequent phase out of MFA quotas in textiles & apparel industries in 2005. Bloom, Draca & Van Reenen (2015, ReStud)
  — Strong first stage on Chinese imports into EU
  — Big improvement in management & productivity in more affected sectors

• Hospital competition in UK under Blair reforms (Bloom, Propper, Seiler & Van Reenen, ReStud, 2015)
Do more competitive (less distorted) markets have more reallocation towards better managed firms?

\[ Y_{ijk} = \alpha M_{ijk} + \beta (M \times \text{FRICTION})_{ijk} + \gamma \text{FRICTION}_{ijk} + u_{ijk} \]

- \( Y_{ijk} = \text{SIZE} \) (or \( \text{GROWTH} \)) for firm \( i \) in industry \( j \) country \( k \), and \( M \) is management

- \text{Frictions} = \text{Proxies for frictions to competition}

- Key test is \( \beta < 0 \) (more competition = more reallocation)
Find the US – where markets generally most competitive – has the most reallocation

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Employees</th>
<th>Employees</th>
<th>Sales growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management (US=base)</td>
<td>201.7***</td>
<td>371.9***</td>
<td>0.069**</td>
</tr>
<tr>
<td>(US=base)</td>
<td>(19.9)</td>
<td>(64.3)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>MNG*Africa</td>
<td>-237.0***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(75.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNG*Americas</td>
<td>-192.1***</td>
<td>-0.068**</td>
<td></td>
</tr>
<tr>
<td>(66.7)</td>
<td>(0.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNG*(“Northern” EU)</td>
<td>-164.2*</td>
<td>-0.024</td>
<td></td>
</tr>
<tr>
<td>(93.7)</td>
<td>(0.037)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNG*(“Southern” EU)</td>
<td>-292.0***</td>
<td>-0.047</td>
<td></td>
</tr>
<tr>
<td>(66.9)</td>
<td>(0.035)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNG*Asia</td>
<td>-131.2*</td>
<td>-0.064*</td>
<td></td>
</tr>
<tr>
<td>(77.1)</td>
<td>(0.037)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reallocation towards better managed firms significantly worse in other countries than in US

Observations: 8,895 8,895 2,627

Notes: US is the omitted country in columns 2 and 3. Includes year, country, 3-digit SIC dummies, firm and noise controls.
<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Employment</th>
<th>Employment</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management (M)</td>
<td>329.81***</td>
<td>514.31***</td>
<td>208.111***</td>
</tr>
<tr>
<td></td>
<td>(58.39)</td>
<td>(112.59)</td>
<td>(34.335)</td>
</tr>
<tr>
<td>Management*Trade Costs (World Bank Country Cost)</td>
<td>-0.12***</td>
<td>-0.20***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.05)</td>
<td></td>
</tr>
<tr>
<td>Management*Job Regulation</td>
<td></td>
<td>-57.38*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(30.13)</td>
<td></td>
</tr>
<tr>
<td>Management*Tariff (country x industry)</td>
<td></td>
<td></td>
<td>-4.309**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.164)</td>
</tr>
<tr>
<td>Fixed Effects</td>
<td>Industry,</td>
<td>Industry,</td>
<td>Industry*</td>
</tr>
<tr>
<td></td>
<td>country</td>
<td>country</td>
<td>country</td>
</tr>
<tr>
<td>Observations</td>
<td>8,873</td>
<td>7,341</td>
<td>6,064</td>
</tr>
</tbody>
</table>

Notes: OLS, clustered by firm; Domestic firms only. Controls for firm age, skills, noise, SIC3, country dummies, Employment Protection is “difficulty of hiring” from World Bank (1=low, 100=high). Trade cost is the cost in $ to export to the country (World Bank). Tariffs are MFN country-by-industry rates (in deviations from country & industry mean) from Feenstra and Romalis (2012).
Measuring Data

Management Models

Examining the Model’s Predictions
  • Performance
  • Competition
  • **Skills**
  • Age

Management and cross-country TFP
Education (for managers and non-managers) in the raw data is correlated with better management.

Source: www.worldmanagementsurvey.com
Management and Education: UNESCO World Higher Education Database university locations (N=9,081)
## Having a university near by is correlated with higher levels of firm skills and management scores

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>Management</th>
<th>% firm employees with degree</th>
<th>Management</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>OLS</td>
<td>OLS</td>
<td>IV</td>
</tr>
<tr>
<td>Drive time to nearest university</td>
<td>-0.049***</td>
<td>-1.534***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.423)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% employees with degree in the firm</td>
<td></td>
<td>0.789***</td>
<td>3.190***</td>
<td>3.190***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.082)</td>
<td>(1.113)</td>
<td></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>

**Notes:** Clustered by 313 regions. In final column proportion skilled is instrumented with distance to university. Controls include industry, regional (e.g. US state), local population density, distance to coast, weather and full set of firm and noise controls. Based on Feng (2013)
Examining the Model’s Predictions

- Performance
- Competition
- Skills
- Age

Management and cross-country TFP
Not good age information in our firm-level data. So use a Census Management Dataset (MOPS)

It was delivered to 47,534 manufacturing plants in 2011

This was quick and easy to fill out - and mandatory - so 78% of plants responded, covering 5.6m employees (>50% of US manufacturing employment)

Samples all ages & sizes
The impact of competition also shows up in US Census data – badly managed firms improve or exit.

When young, US plants show lots of variation (in red) and low average scores (in black).

When older, US plants show much less variation and higher scores – the bottom tail has gone.

Notes: Data from 31,793 plants from the Management and Organizational Practices survey.
Measuring Data

Management Models

Examining the Model’s Predictions
  • Performance
  • Competition
  • Skills
  • Age

Management and cross-country TFP
Following MAT we can estimate contribution of management to cross-country TFP differences

1. Estimate country differences in *size weighted* management

2. Impute impact of *size weighted* management on TFP

Requires many assumptions so rough magnitude calculation (in spirit of Development Accounting, Caselli, 2005)
Decomposition of the size weighted management ($M$) in each country we surveyed

$$M \equiv \sum_i S_i M_i$$

Employment Share of firm $i$  
Management score of firm $i$
Decomposition of the size weighted management (M) in each country we surveyed

\[ M \equiv \sum_{i} s_i M_i \]

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

\[ = \text{OP} + \bar{M} \]

“Between Firm” Covariance
(Olley-Pakes, 1996, reallocation term)

“Within Firm” Unweighted mean of management score
Calculate the size weighted management gap with the US in terms of these “between” (reallocation) and “within” terms.

Notes: These are the share-weighted management score differences relative to the US (sd=1). Length of bar shows total deficit which is composed of (i) the unweighted average management scores (“rel_zman”, light red bar) and reallocation effect (“rel_OP” blue bar). Domestic firms only with management scores corrected for sampling selection bias.
Calculate the size weighted management gap with the US in terms of these "between" (reallocation) and "within" terms

Notes: These are the share-weighted management score differences relative to the US (sd=1). Length of bar shows total deficit which is composed of (i) the unweighted average management scores ("rel_zman", light red bar) and reallocation effect ("rel_OP" blue bar). Domestic firms only with management scores corrected for sampling selection bias.
Step 2: What fraction of country k’s TFP gap (with the US) can this management gap (with the US) explain?

\[ \% \text{ TFP gap accounted for by management} = \gamma \times \left( \frac{\bar{M}^k}{\bar{M}^{US}} \right) \frac{\ln(TFP^k)}{\ln(TFP^{US})} \]

where \( \gamma = \text{impact of M on TFP} \)
Management accounts for ~30% of TFP Gap with US

<table>
<thead>
<tr>
<th></th>
<th>Weighted Mng. Gap with US</th>
<th>TFP Gap With US</th>
<th>% TFP due to Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>0</td>
<td>1</td>
<td>8.82</td>
</tr>
<tr>
<td>Japan</td>
<td>-.3</td>
<td>.71</td>
<td>48.46</td>
</tr>
<tr>
<td>Sweden</td>
<td>-.39</td>
<td>.92</td>
<td>24.46</td>
</tr>
<tr>
<td>Germany</td>
<td>-.46</td>
<td>.83</td>
<td>45.55</td>
</tr>
<tr>
<td>Canada</td>
<td>-.59</td>
<td>.88</td>
<td>23.04</td>
</tr>
<tr>
<td>Britain</td>
<td>-.71</td>
<td>.94</td>
<td>97.81</td>
</tr>
<tr>
<td>Mexico</td>
<td>-.74</td>
<td>.73</td>
<td>45.24</td>
</tr>
<tr>
<td>Australia</td>
<td>-.86</td>
<td>.83</td>
<td>45.4</td>
</tr>
<tr>
<td>Italy</td>
<td>-.92</td>
<td>.82</td>
<td>23.04</td>
</tr>
<tr>
<td>Portugal</td>
<td>-.95</td>
<td>.66</td>
<td>44.74</td>
</tr>
<tr>
<td>Poland</td>
<td>-.98</td>
<td>.8</td>
<td>58.87</td>
</tr>
<tr>
<td>France</td>
<td>-1.02</td>
<td>.84</td>
<td>15.69</td>
</tr>
<tr>
<td>Colombia</td>
<td>-1.03</td>
<td>.52</td>
<td>43.54</td>
</tr>
<tr>
<td>NZ</td>
<td>-1.05</td>
<td>.79</td>
<td>28.4</td>
</tr>
<tr>
<td>Chile</td>
<td>-1.05</td>
<td>.69</td>
<td>39.41</td>
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<tr>
<td>Spain</td>
<td>-1.05</td>
<td>.77</td>
<td>13.75</td>
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<tr>
<td>Brazil</td>
<td>-1.09</td>
<td>.45</td>
<td>12.89</td>
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<tr>
<td>China</td>
<td>-1.16</td>
<td>.41</td>
<td>16.38</td>
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<tr>
<td>India</td>
<td>-1.19</td>
<td>.48</td>
<td>35.64</td>
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<tr>
<td>Kenya</td>
<td>-1.26</td>
<td>.25</td>
<td>10.69</td>
</tr>
<tr>
<td>Argentina</td>
<td>-1.34</td>
<td>.69</td>
<td>47.28</td>
</tr>
<tr>
<td>Tanzania</td>
<td>-1.43</td>
<td>.26</td>
<td>6.06</td>
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<tr>
<td>Greece</td>
<td>-1.64</td>
<td>.71</td>
<td>9.64</td>
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<tr>
<td>Zambia</td>
<td>-1.84</td>
<td>.05</td>
<td>21.13</td>
</tr>
<tr>
<td>Ghana</td>
<td>-1.93</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Mzambique</td>
<td>-2.33</td>
<td>.33</td>
<td></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>-2.33</strong></td>
<td><strong>.33</strong></td>
<td><strong>31.4</strong></td>
</tr>
</tbody>
</table>
Preliminary estimates of contribution of management to within-country TFP spread ~1/3

<table>
<thead>
<tr>
<th>Country</th>
<th>90-10 gap in:</th>
<th>% accounted for by management</th>
<th>TFP spread source:</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>TFP</td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>2.7 SDs</td>
<td>Syverson (2004)</td>
</tr>
<tr>
<td>UK</td>
<td>110%</td>
<td>3.0 SDs</td>
<td>Criscuolo, Haskel and Martin (2003)</td>
</tr>
</tbody>
</table>

Note: Management share imputed assuming that ↑1 SD management ≈ ↑ 10% TFP Using US MOPs on entire firm size distribution US figure is 21%
CONCLUSIONS

~30% cross-country & plant TFP spread due to management (more speculatively ~ 1/3 of cross-firm TFP spread)

Data fits management as a “technology”, $Y = AK^\alpha L^\beta M^\gamma$

- Management improves firm performance
- Competition improves average management
- Skill supply positively correlated with M
- Management increasing with firm age

Some Next Steps:

- Management & managers (German IAB)
- Determinants (e.g. Gibbons and Henderson, 2012)
- Spillover & diffusion
- Plant vs. firm differences (US MOPs)
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…”
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”
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”

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

Hospital Manager: “Oh no, this hospital is only for loss making”
Interviewer: “Do you offer acute care?”

Switchboard: “Yes ma’am we do”

Interviewer: “Do you have an orthopaedic department?”

Switchboard: “Yes ma’am we do”

Interviewer: “What about a cardiology department?”

Switchboard: “Yes ma’am”

Interviewer: “Great – can you connect me to the ortho department”

Switchboard?: “Sorry ma’am – I’m a patient here”
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…]*
Some quotes illustrate the African management approach

*Interviewer*: “What kind of Key Performance Indicators do you use for performance tracking?”

*Manager*: “Performance tracking? That is the first I hear of this. Why should we spend money to track our performance? It is a waste of money!”

*Interviewer*: “How do you identify production problems?”

*Production Manager*: “With my own eyes. It is very easy”
Further reading for business

Harvard Business Review

SPOTLIGHT ON HBR AT 90

Does Management Really Work?

How three essential practices can address even the most complex global problems

by Nicholas Bloom, Raffaella S последние, and John Van Reenen
Further reading for researchers

THE NEW EMPIRICAL ECONOMICS OF MANAGEMENT

Nicholas Bloom
Renata Lemos
Raffaella Sadun
Daniela Scur
John Van Reenen

Working Paper 20102
http://www.nber.org/papers/w20102

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2014

IT and Management in America

Nicholas Bloom¹, Erik Brynjolfsson², Lucia Foster³, Ron Jarmin⁴,
Megha Patnalk⁵, Itay Saporta-Eksten⁶ and John Van Reenen⁷

February 2014

The Census Bureau recently conducted a survey of management practices in over
400,000 firms across the US, the first large-scale survey of management in America. Analyzing
the data reveals several striking results. First, more structured management practices are tightly
associated with higher levels of IT intensity in terms of a higher expenditure on IT and more on-line
options. Second, more structured management is strongly linked with superior performance:
managers adopting more structured practices for performance monitoring, target setting and
control enjoy greater productivity and profitability, higher rates of innovation and faster
growth. Third, there is a substantial dispersion of management practices across the
firms. We find that 18% of establishments have adopted at least 75% of these more
structured practices, while 27% of establishments adopted less than 50% of these.

Management, Product Quality and Trade: Evidence from China

Nick Bloom, Stanford University and NBER
Kalina Manova, Stanford University and NBER
John Van Reenen, London School of Economics and CEP
Zhihong Yu, Nottingham University
International data on ownership: family firms

Notes: Data from 14,686 interviews. Created May 2015. Source: www.worldmanagementsurvey.com