THE FUTURE OF PRODUCTIVITY

… productivity isn't everything, but in the long run it is almost everything.

Paul Krugman, 1994

Chiara Criscuolo
Directorate for Science, Technology and Innovation OECD

Understanding the Great recession: from micro to macro
Bank of England
London | 24 September 2015
Outline

1. Productivity: now more than ever
2. Thinking about productivity: frontier firms and diffusion
3. How to revive productivity growth
4. Policy messages and issues for future research
PRODUCTIVITY: NOW MORE THAN EVER
Cross-country gaps in GDP per capita mainly reflects productivity shortfalls


A. Percentage GDP per capita difference compared with the upper half of OECD countries

Note: GDP/Population = (GDP/Employment) * (Employment/Population)

B. Percentage difference in labour resource utilisation and labour productivity

Productivity growth slowed across the OECD, even before the crisis

Labour productivity growth since 1990
GDP per hour worked (China and India refer to GDP per worker)

Source: OECD calculations based on the Conference Board Total Economy Database.
Growth without MFP?

Contribution of production factors to GDP growth
1990-2013 (%pts)

Labour composition  MFP  Capital intensity  Labour quantity

Source: Conference Board Total Economy Database
Why the slow-down? Taking a granular approach:
A) Is it because the **productivity frontier is slowing**?
B) Is it because of **misallocation** and **declining business dynamism**?
C) …or **something else**?
   • Role of **policies**?

Techno-pessimists vs techno-optimists …
The debate is not settled

Productivity will be the key driver of future growth but uncertain outlook
THINKING ABOUT PRODUCTIVITY: FRONTIER FIRMS AND DIFFUSION

Source: Harvard Business Review
1. Widespread heterogeneity: very high MFP and very low MFP firms coincide within narrowly-defined industries.

2. Adoption lags for new technologies across countries have fallen, but long-run penetration rates once technologies are adopted have diverged (Comin & Mestieri, 2013).

3. MFP growth of laggard firms is more closely related to productivity developments at the national frontier (NF), as opposed to the global frontier (GF) (Bartelsman, Haskel & Martin, 2008)
Analytical framework

Country A

Country B

Country C

Global frontier

Adoption convergence

National Frontier

Penetration divergence

Laggards
The Increasing gap between firms at the frontier and the others

Solid growth at the global productivity frontier but growth of the rest disappointed

Labour productivity; index 2001=0

Possible explanations and robustness

1. Technological diffusion slowed down
2. “Winner takes it all”
3. Replication and diffusion of the magic “bundle” is becoming more difficult

Robustness to methodology
   - Productivity measure (MFP, LP)
   - Frontier definition (Top 5%, top 100)

• Not driven only by stronger selection at the top
  - Long-time frontier firms also pull away
• No difference by ICT usage
• National frontier are also pulling away
The globally most productive firms – who are they?

Mean firm characteristics: frontier firms and non-frontier firms
Selected OECD Countries, 2005 (unless otherwise noted)

<table>
<thead>
<tr>
<th>Global Frontier Firms</th>
<th>Non-Frontier Firms</th>
<th>Difference in means</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td>Mean: 4.06, Std Dev: 1.04, Number: 3657</td>
<td>Mean: 2.51, Std Dev: 0.91, Number: 294031</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td>Mean: 309, Std Dev: 3770, Number: 3657</td>
<td>Mean: 229, Std Dev: 4119, Number: 294031</td>
</tr>
<tr>
<td><strong>Capital stock (€m)</strong></td>
<td>Mean: 31, Std Dev: 355, Number: 3657</td>
<td>Mean: 19, Std Dev: 343, Number: 294031</td>
</tr>
<tr>
<td><strong>Turnover (€m)</strong></td>
<td>Mean: 250, Std Dev: 1731, Number: 3657</td>
<td>Mean: 59, Std Dev: 754, Number: 294031</td>
</tr>
<tr>
<td><strong>Profit rate</strong></td>
<td>Mean: 0.57, Std Dev: 0.33, Number: 3657</td>
<td>Mean: 0.13, Std Dev: 6.33, Number: 294031</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Mean: 21.5, Std Dev: 20.3, Number: 3657</td>
<td>Mean: 23.2, Std Dev: 18.6, Number: 294031</td>
</tr>
<tr>
<td><strong>MNE status</strong></td>
<td>Probability: Mean: 0.47, Std Dev: 0.50, Number: 3450</td>
<td>Probability: Mean: 0.28, Std Dev: 0.45, Number: 310765</td>
</tr>
<tr>
<td><strong>Depreciated patent stock</strong></td>
<td>Mean: 3.71, Std Dev: 45.15, Number: 3657</td>
<td>Mean: 0.90, Std Dev: 56.17, Number: 294031</td>
</tr>
</tbody>
</table>

Firms at the global productivity frontier have become larger

Average of log employment for global frontier firms and the rest
Based on top 5% of MFP; index, 2001=0

Firms at the global productivity frontier have become older

Average age (years) of firms in the frontier and non-frontier groups

Manufacturing

Services

Notes: Frontier is measured by the top 100 firms in each 2-digit industry and each year, based on Solow residual-based MFP.

... consistent the broader decline in business dynamism

HOW TO REVIVE PRODUCTIVITY GROWTH
Three areas for policy:

1. **Pushing out the global frontier**
   - More and more efficient public investment in **basic research**.
     - Role for international co-operation?
   - Enabling **experimentation** of firms with new technologies and business models.

2. **More efficient resource allocation**
   - Reduce barriers to firm **entry and exit** to enable high productivity firms to grow and low productivity firms to exit.
   - “Resolving” **Skill mismatch** and **upscaling** a double whammy for both growth and equity

3. **Reviving the diffusion machine**
   - From global to national frontier and from national frontier to laggards
     - through exposure to best practice (trade and GVC participation, FDI, mobility of skilled workers) resource (e.g. skill) allocation and absorptive capacity (e.g. R&D; University collaboration)
Aggregate gains from the frontier magnified by efficient reallocation

How much higher would be the overall manufacturing sector labor productivity if NF firms were as productive and large as GF firms?

NF firms in Italy have productivity levels close to the GF but they are relatively small.
... but up-scaling can be difficult

Post-entry growth - average size of young and old firms

Manufacturing

Services

The crisis: cleansing or scaring? *The jury is still out…*

Average employment growth across the firm MFP distribution
Deviation from 2002-10 average; selected European countries – business sector

But comparison with past recessions is difficult

Notes: Authors calculations based on production survey data from ESSLait. Unweighted average of 11 countries: AT, DE, DK, FI, FR, IT, NO, NL, PO, SE, UK. A common (European) industrial structure is employed to aggregate industries.
The crisis: cleansing or scaring? *The jury is still out*…

Net growth rate in differences from the 2001-11 average

Note: Average across all available countries. Net growth rates are calculated as net job creation over total average employment in the biennium. Source: OECD, Dynemp Express database
The crisis: most jobs were destroyed by the downsizing of old incumbents

Contributions to aggregate net job creation by entrants, young/old exitors, and young/old incumbents.

POLICY MESSAGES & ISSUES FOR FUTURE RESEARCH
Policies to revive productivity growth

Framework policies

1. Pro-competition product market reforms, esp. in services
2. Exit matters: bankruptcy legislation that does not excessively penalise failure
3. Policies that do not inhibit labour mobility

Innovation policies

1. Public investment in basic research
2. Collaboration between firms and universities
3. R&D fiscal incentives and IPRs but design is crucial
Research agenda

• Analysis on new harmonized and representative data to study the micro drivers of aggregate productivity.
  – creative destruction process across countries and its contribution to productivity growth;
  – Within-sector productivity dispersion and efficient allocation of resources.
  – Frontier growth; winner-takes-all and diffusion
• New questions: role of finance; link between productivity and wage inequality and their trends
• Develop better policy indicators:
  – Bankruptcy legislation;
  – IP systems.
• Political economy of productivity policy: e.g. productivity commissions in New Zealand; Norway; Denmark etc.
References and More information...


http://www.oecd.org/eco/the-future-of-productivity.htm
http://www.oecd.org/sti/dynemp.htm

Chiara.Criscuolo@oecd.org