Productivity decline and inter-firm diffusion:
Firm level analysis and policy implications

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Global AGGREGATE productivity has been declining in the last two decades

GDP per hour worked, constant prices
*(4 year moving average of annual growth)*

Legend: France, Germany, Italy, Japan, UK, US
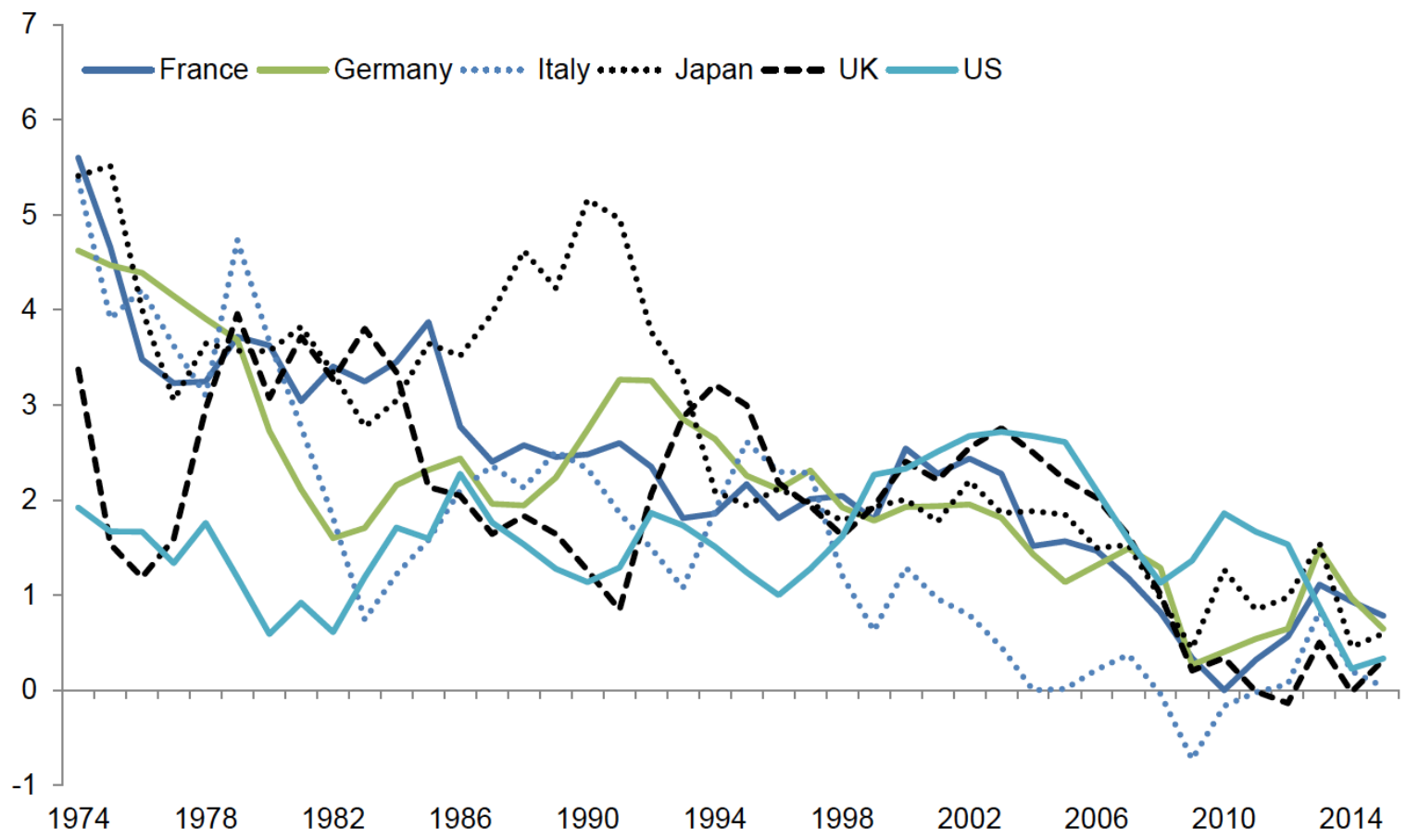
Source: OECD, productivity statistics. Data available: http://www.oecd.org/std/productivity-stats/
Last observation: 2015 (annual data)

1. Productivity growth has been declining over the years and prospects (..including with Trump) are lackluster

2. There is a growing literature – firm level based – which has attempted to disentangle the underlying factors

3. Bottom line: there is strong and increasing difference between the largest and most productive firms ("frontier firms") and the rest

4. CompNet data (European based firm level project) show that reasons are country specific

5. Evidence for Asia-Pacific is still limited, but will provide some firm level results for New Zealand

6. The main message is …keep working on collecting better data and engage in cross-country comparisons with no delay

- Firm performance distribution is **very disperse** and **asymmetric**

- Rather than most firms around an "average" performance, there are lots of firms which have low productivity and **only** a **few** which are **very productive** in the "**right-tail**" of the distribution (the so called "*happy few*"), where exports are concentrated

Evolution of labor productivity distribution in France
Manufacturing sector - firms with 20+ employees
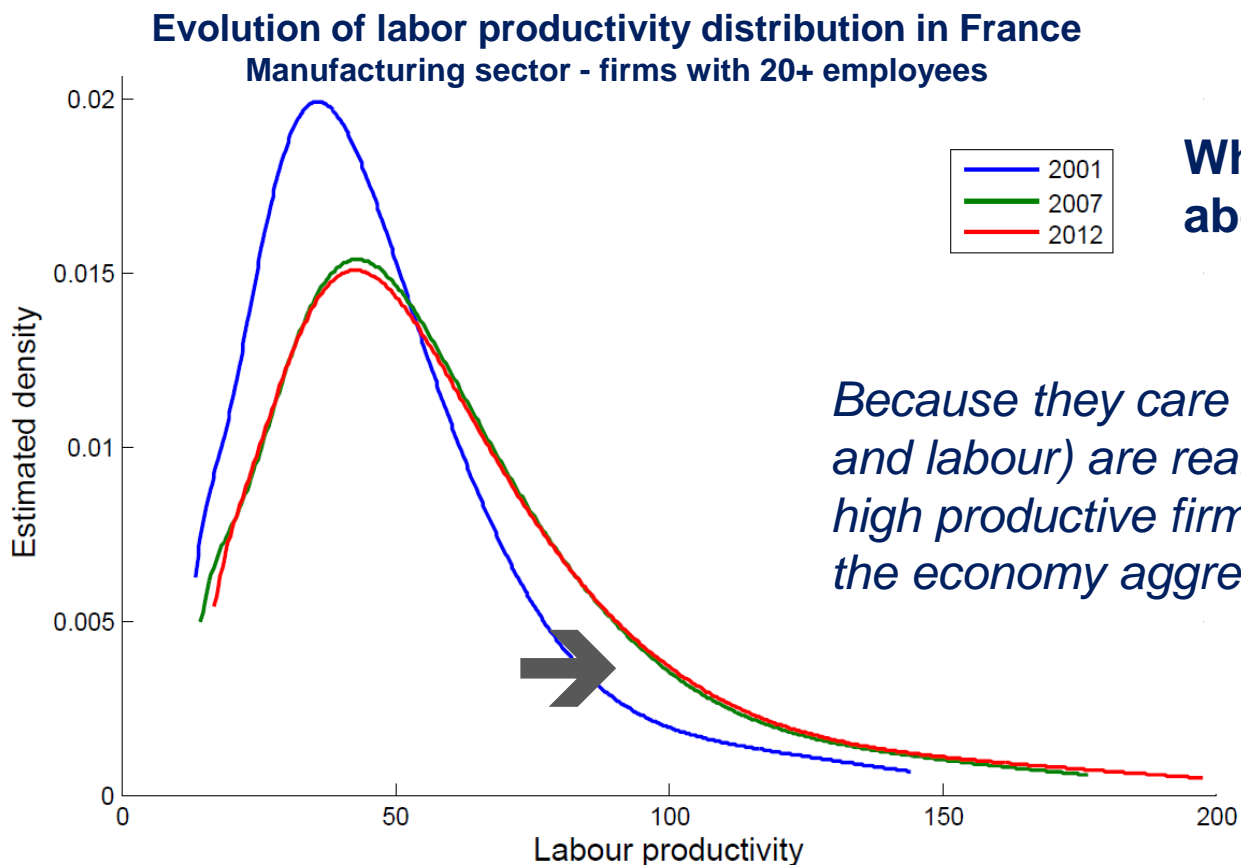
Why do economists care about firm heterogeneity?

Because they care that resources (capital and labour) are reallocated from low to high productive firms, in order to increase the economy aggregate performance
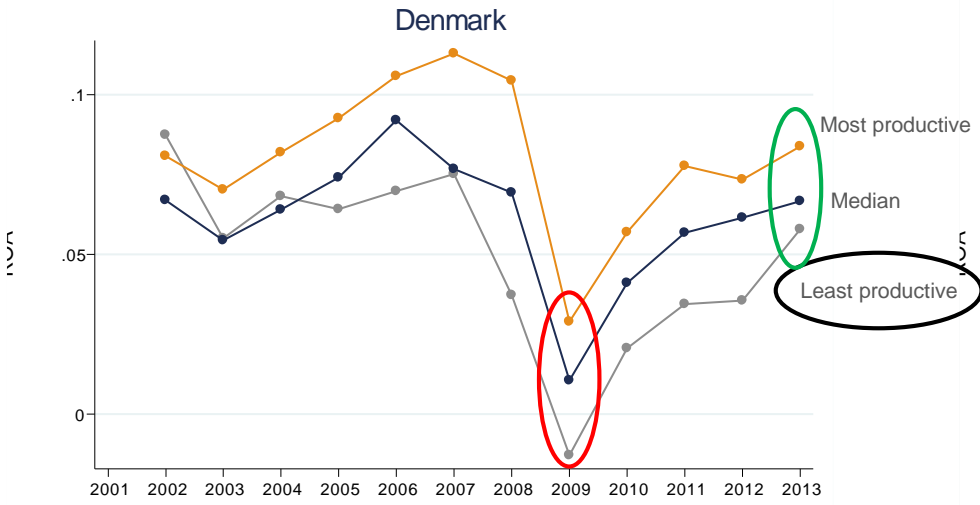
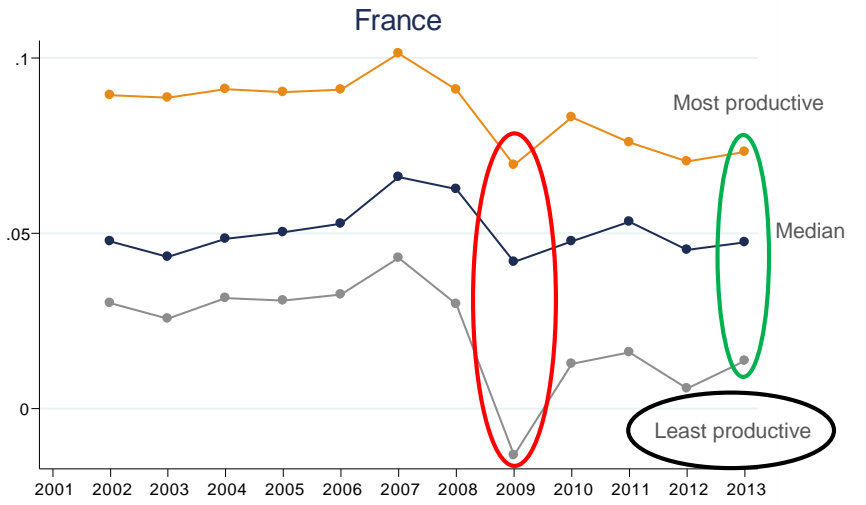**The use of firm-level data provides a more reliable picture of the performance of the economy because:**

1. **Aggregate** indicators alone (say Labour costs) when interpreted as if they had been generated by the behavior of a **representative firm**, risk to give **partial** (if not wrong) messages

2. In reality firms are very different to each other and it is the specific structure/configuration of such firms that matters for the overall performance of the economy

3. For instance, is the economy mostly characterised by small firms, by exporting firms, are these firms financially solid, are their labour costs under control and so on?

4. ……Are you being provided with this kind of information?

Results for European countries
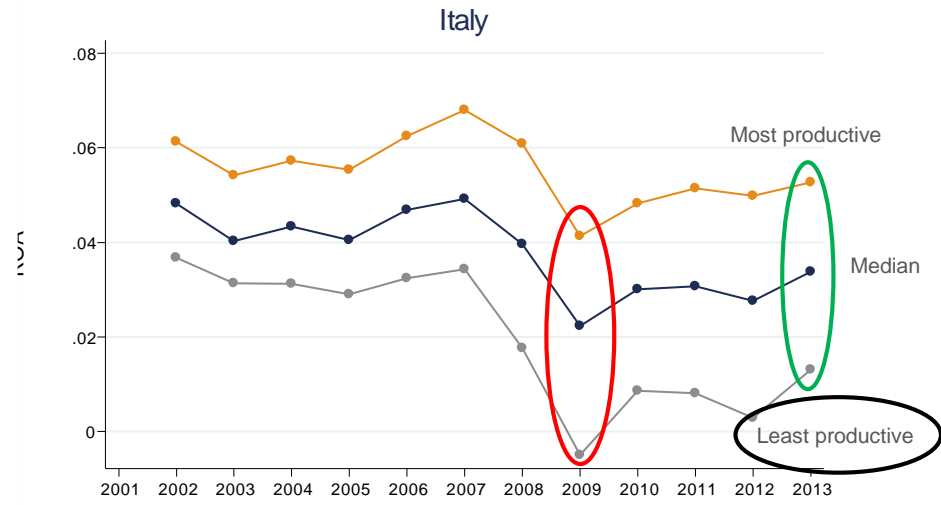
Profitability (ROA) correlates with productivity

Denmark

Source: CompNet 20e sample - Manufacturing Macro-sector

France

Most productive

Median

Least productive

Source: CompNet 20e sample - Manufacturing Macro-sector

Italy

Most productive

Median

Least productive

Source: CompNet 20e sample - Manufacturing Macro-sector

- In 2009, there has been a sharp decline in Returns on Assets (ROA)

- Low productive firms were the most affected by the crisis

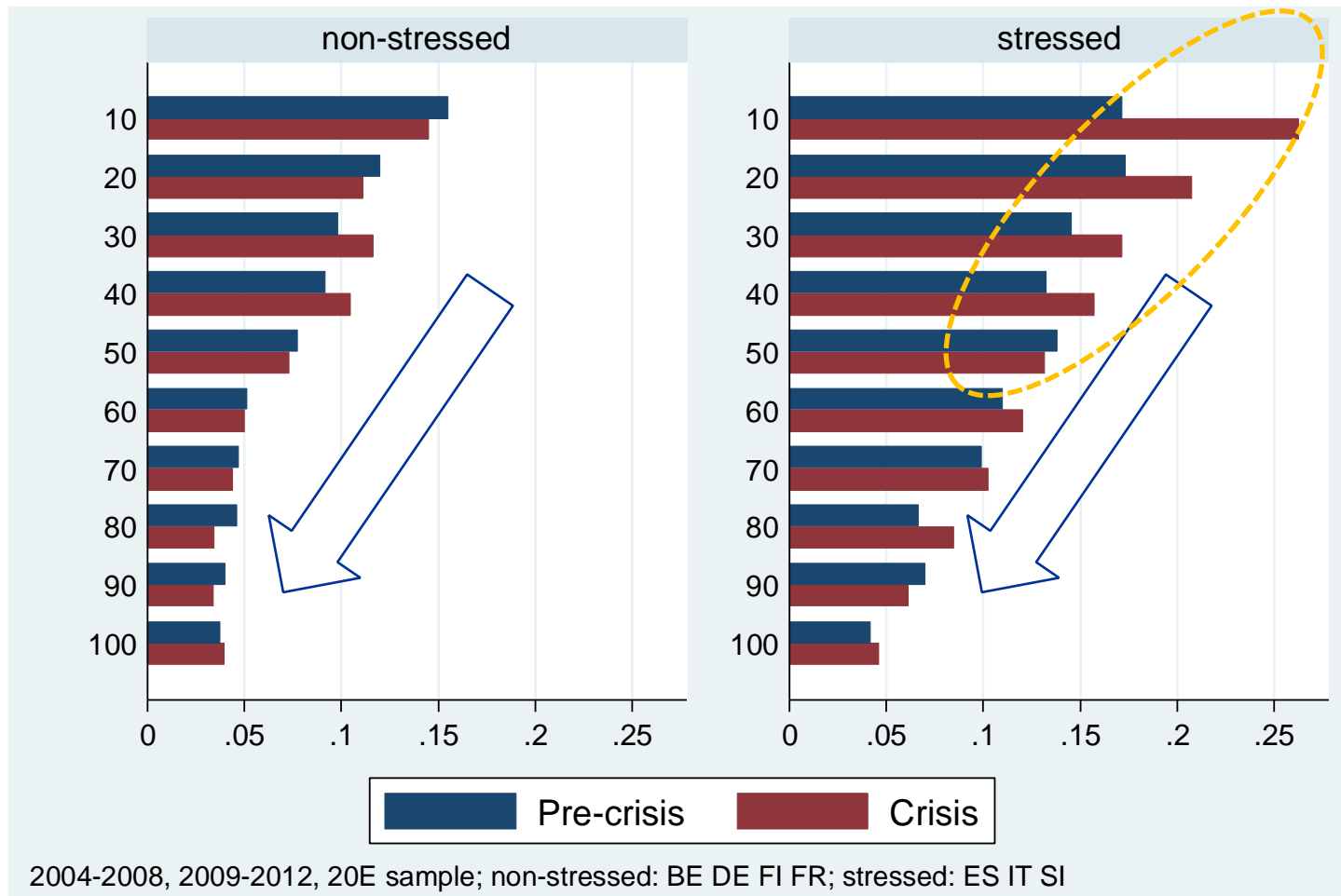- In 2013, all firms recover in their profitability

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.....Most productive firms are <u>not</u> credit constrained

Share of credit contrained firms by deciles of labor productivity
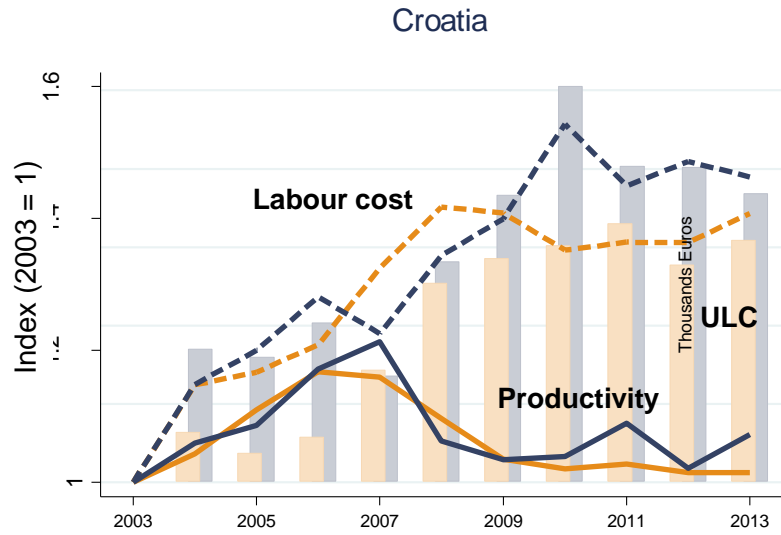**ICC index** estimated within CompNet
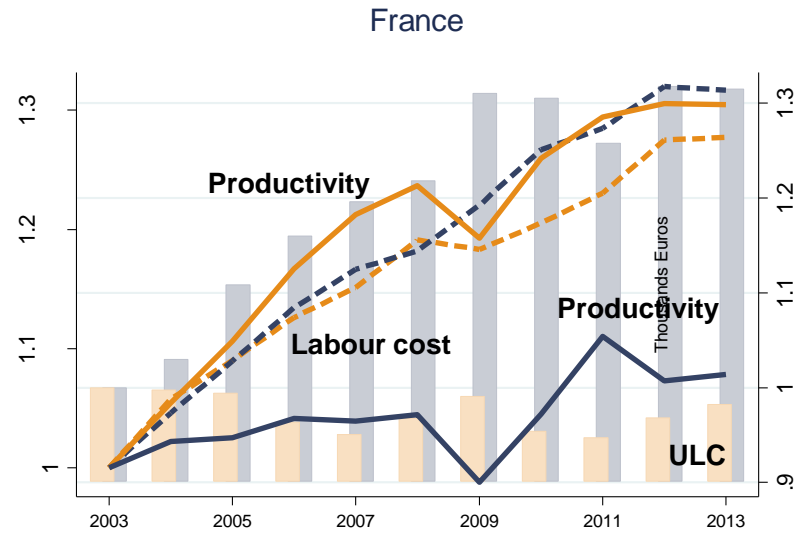
Least productive

Most productive

2004-2008, 2009-2012, 20E sample; non-stressed: BE DE FI FR; stressed: ES IT SI

Labour cost and productivity divergence is not always generalised

Croatia

France

Source: CompNet 20e sample - Manufacturing sector

Source: CompNet 20e sample - Manufacturing sector

High productive firms:
— L productivity (2003=1)
--- L cost (2003=1)
▮ ULC (2003=1)

Low productive firms:
— L productivity (2003=1)
--- L cost (2003=1)
▮ ULC (2003=1)

- In the last decade, there has been a growing gap between labour productivity and lab our cost … but for different reasons:

  - *In Croatia, overall labour productivity stagnated or declined after the crisis*

    → *see ULC of all firms increasing*

  - *In France, costs were diverging, **but only for the least productive firms** (see hystograms)*

   → *see ULC of most productive firms remaining subdue* 9

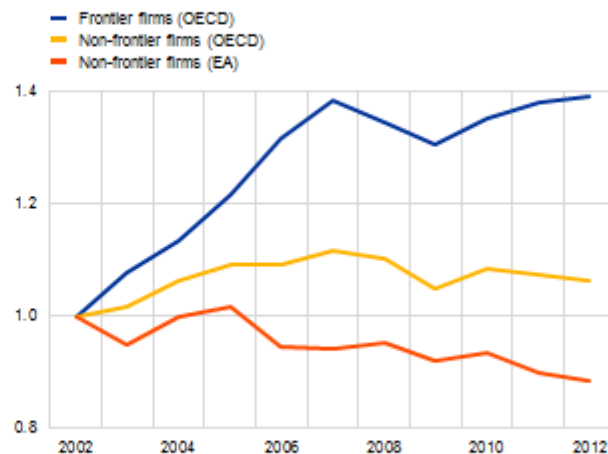# The external dimension and interfirm productivity diffusion
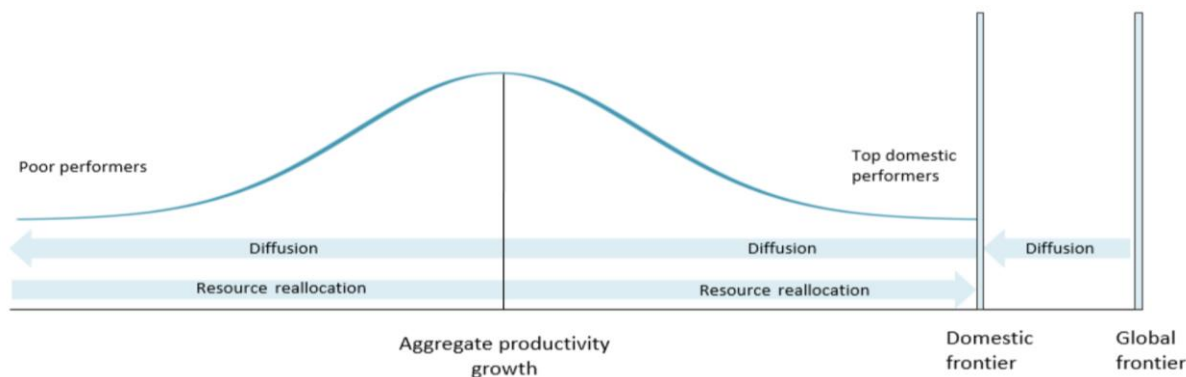
- Domestic diffusion via resource reallocation may be not enough, if not accompanied by productivity diffusion induced by international competition
- How far are individual countries from the Global frontier?

Annual labour productivity growth of frontier and non-frontier firms (2002=1)
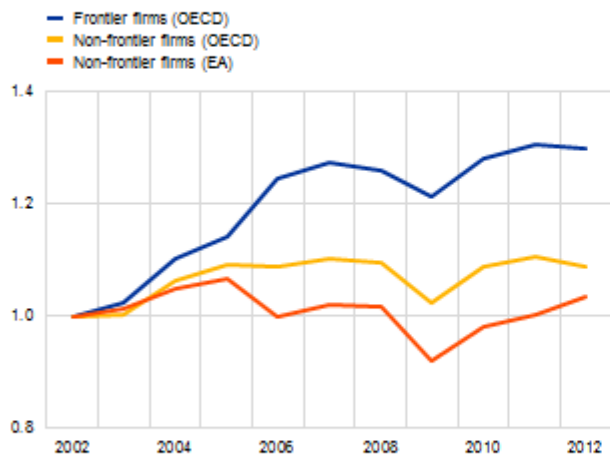
- *Has technology transfer slowed down?*
- *What is the role of Global Value Chains for technology absorption?*

Note: Services aggregated with value added weights. Sample is based on firms with more than 20 employees.
Source: "Firm productivity growth: the role of technology creation, absorption and diffusion" (ECB policy note by E. Gamberoni and P. Lopez-Garcia, forthcoming in march 2017), based on OECD and CompNet data.

How much is important the external dimension?

Labor productivity
Average across countries

Exporters Productivity Premium

Non Exporters — Exporters
Labour productivity premium
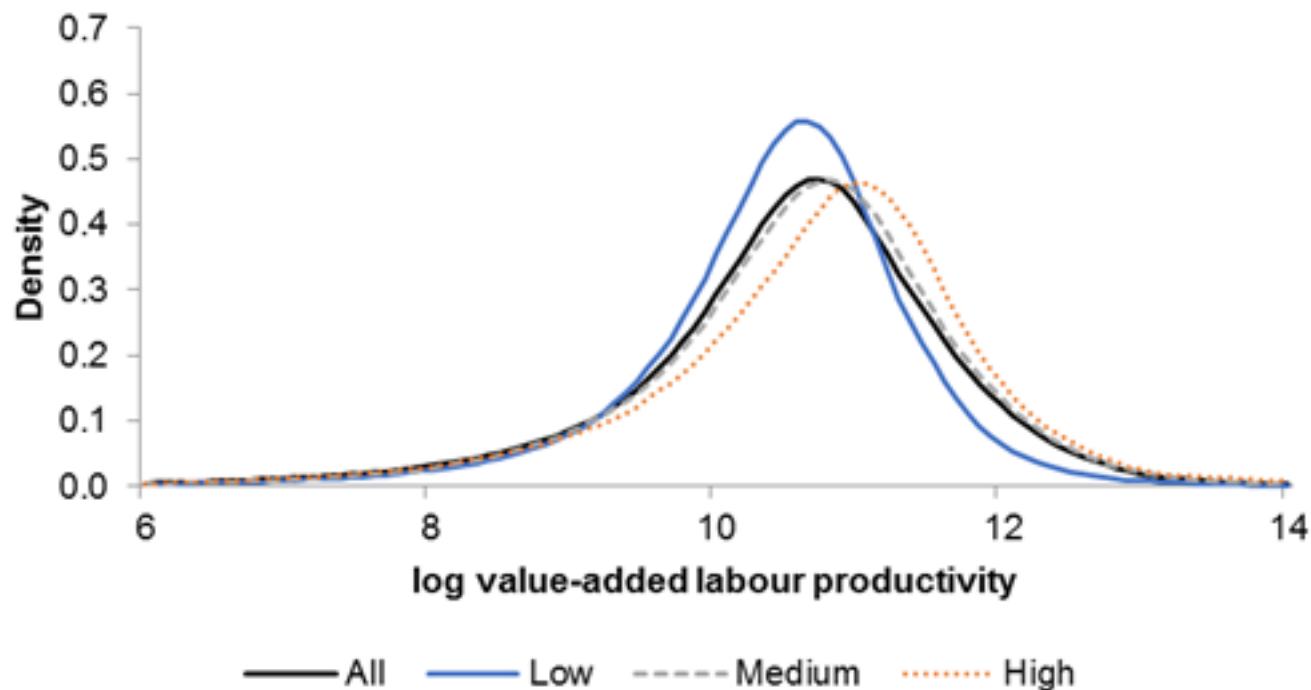

Labor productivity
By country
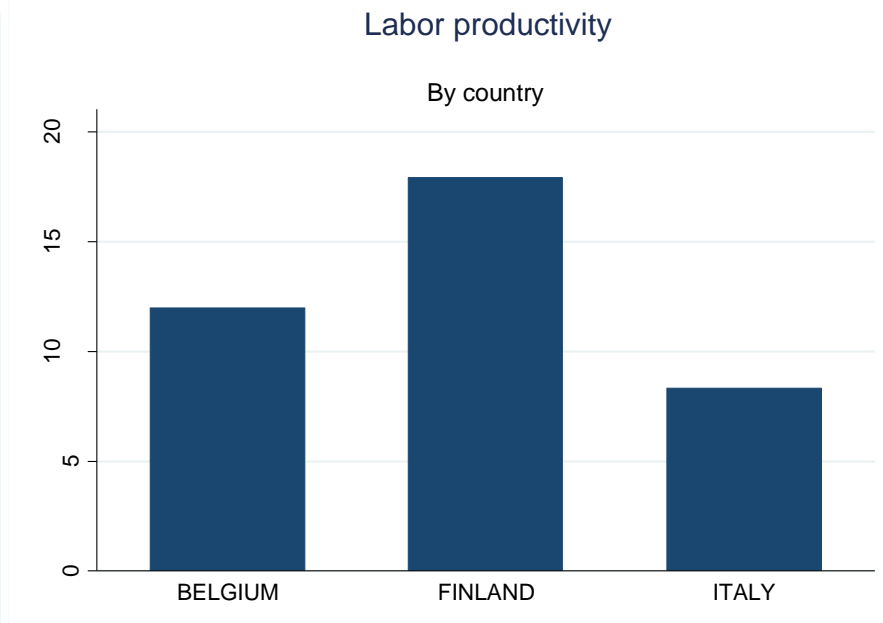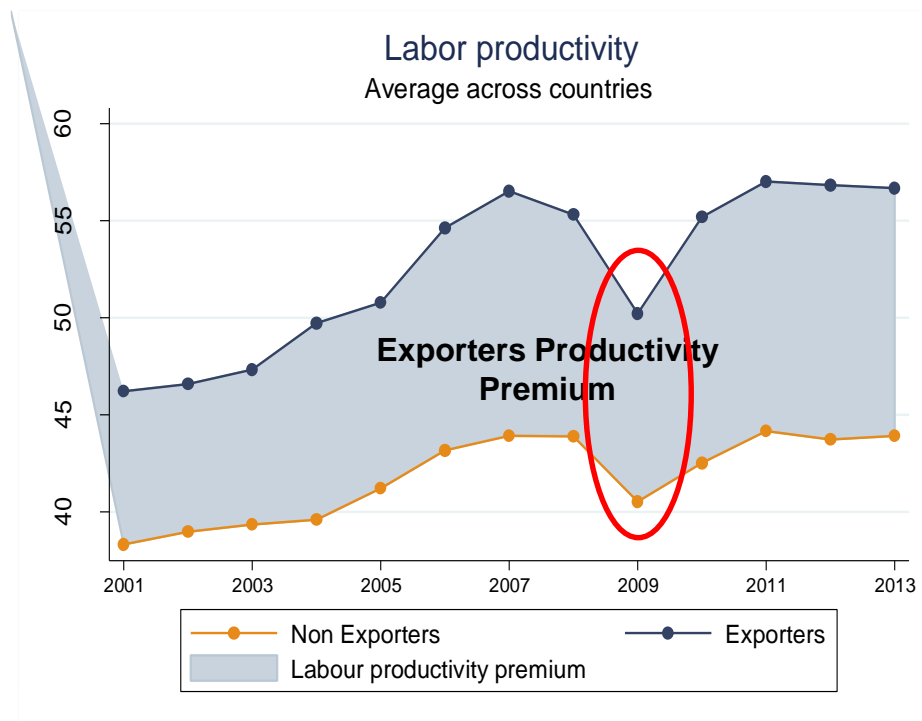
- Being an exporter is associated with higher levels of productivity (about 20%)

- Export productivity premium is highly heterogeneous, it varies sharply across countries

- During the crisis, the drop in productivity has been more pronounced for exporters
  They seem to be more vulnerable to macro-economic shocks

Some evidence from New Zealand

- Consistent with EU evidence, productivity distributions in NZ are heavily tailed, slightly skewed on the left.
- High differentiation across firms, low-medium-high productive

Access to the data presented was managed by Statistics New Zealand under strict micro-data access protocols and in accordance with the security and confidentiality provisions of the Statistic Act 1975. There/Our findings are not Official Statistics. The opinions, findings, recommendations, and conclusions expressed are those of the author(s)/researchers, not Statistics NZ.

- Firms which can trade over distance in NZ or have substantial foreign activity or are foreign owned
- tend to have higher average labor productivity and less productivity dispersion compared to other firms.
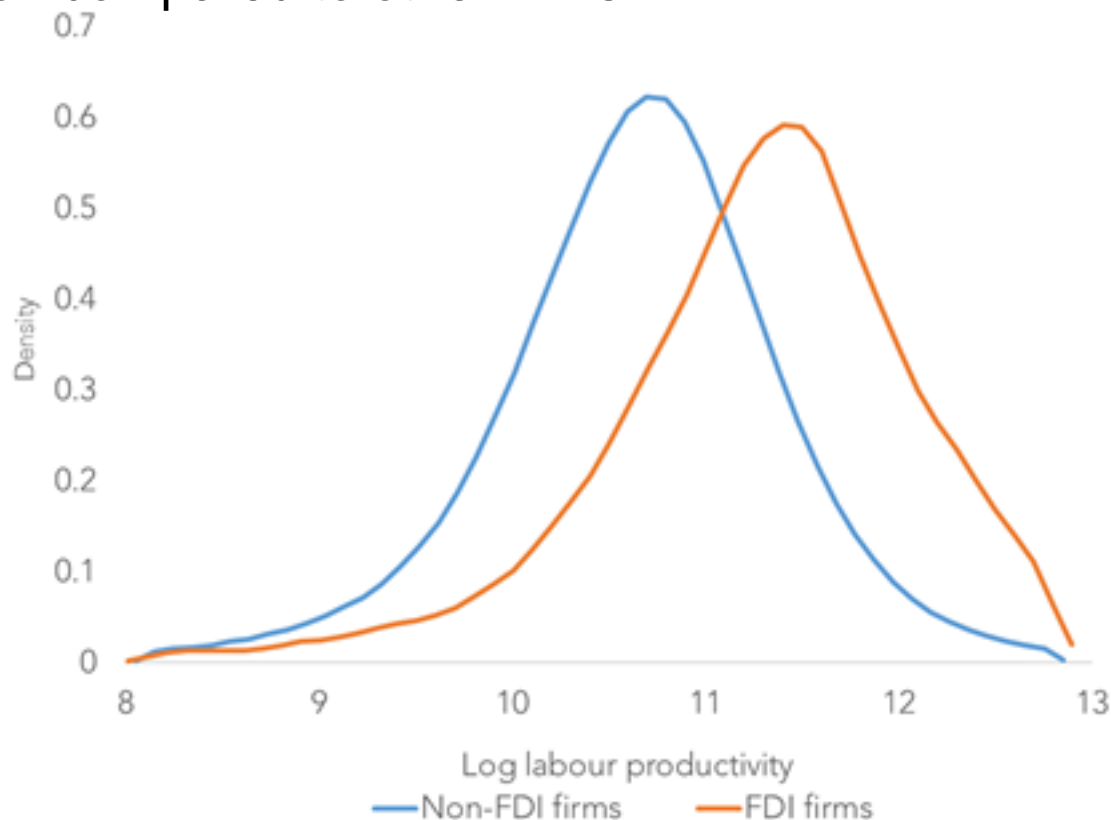
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- There are well established determinants for higher firm productivity

- This includes financial health, labor costs, **size** of the firm, as well as its **export** status

- Firm-level data show that the relative importance of such determinants varies tremendously across countries and sectors

- Correctly formulated policies must incorporate such information

➔ more efforts are needed to improve the cross country comparability of the data

➔ **but data are available for use…Asian economists must work harder to get the data and use them...**

Thanks for your attention

http://www.comp-net.org

The Micro-founded Competitiveness Research Network (CompNet) dataset

✓ We use **existing** (no new surveys) firm-level data, mostly from business registers, to construct a wide set of relevant business indicators (productivity, costs, employment..)

✓ **Common codes** to **aggregate indicators** at industry, macro-sector and country level in order to solve <u>confidentiality</u> issues

✓ **Common methodology** to **harmonize** the resulting set of indicators across countries in terms of measures **definition**, treatment of **outliers**, **deflators** (based on Eurostat sectorial value added) and **PPPs**.
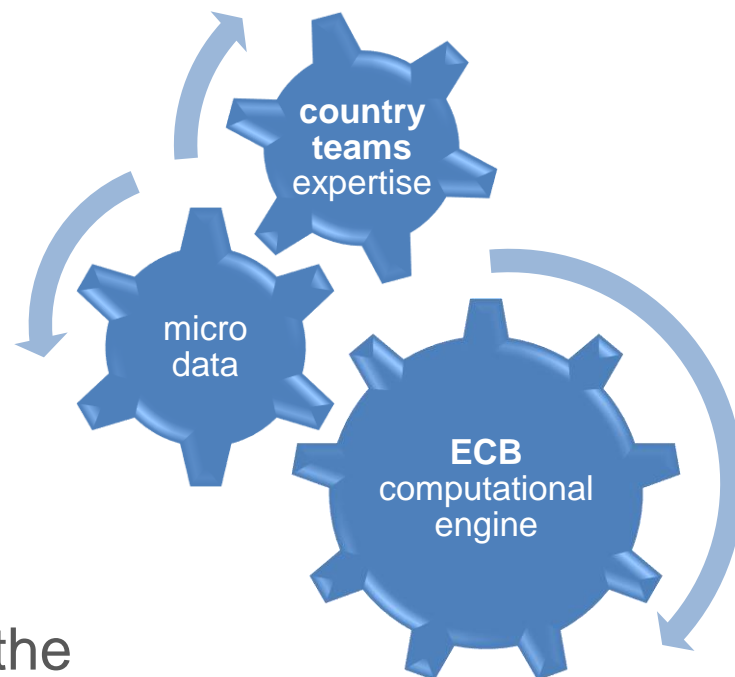
1. We have about 20 Country teams, from National Central Banks and Statistical Institutes

2. **Our aim is to ensure cross-country data comparability**

3. In addition to sector averages, we collect the **full distribution** for more than **70** critical business related variables

   → the information is much richer in comparison to the usual available sector aggregation

   → Most notably, the database includes more than **300** joint distributions linking different firms' characteristics

Five broad categories of variables are available…

Productivity and allocative efficiency	Financial	Trade	Competition	Labour
Labor productivity	Investment Ratio	% permanet exp.	Weighted PCM	% firms that increase/decrease employment productivity or ULC between t and t+3
TFP	RoA	% sporadic exp.	Sector-specific mark-ups	
ULC	Cash holdings	Export value		
LC per employee	Leverage	Export value added	Sector-specific collective bargaining power	Characteristics of growing and shrinking firms
Firm size	Financing gap	Productivity premium of exporters		
Capital intensity	Collateral		Concentration measures	Share of High-growth firms
Static Allocative Efficiency	Equity to Debt			
	Cash flow			
Dynamic Allocative Efficiency	Implicit interest rate			
	Trade Credit/Debt			
	Debt burden			
	Credit constraint index			

Example of joint distributions

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Credit constraint index

Example type of question:
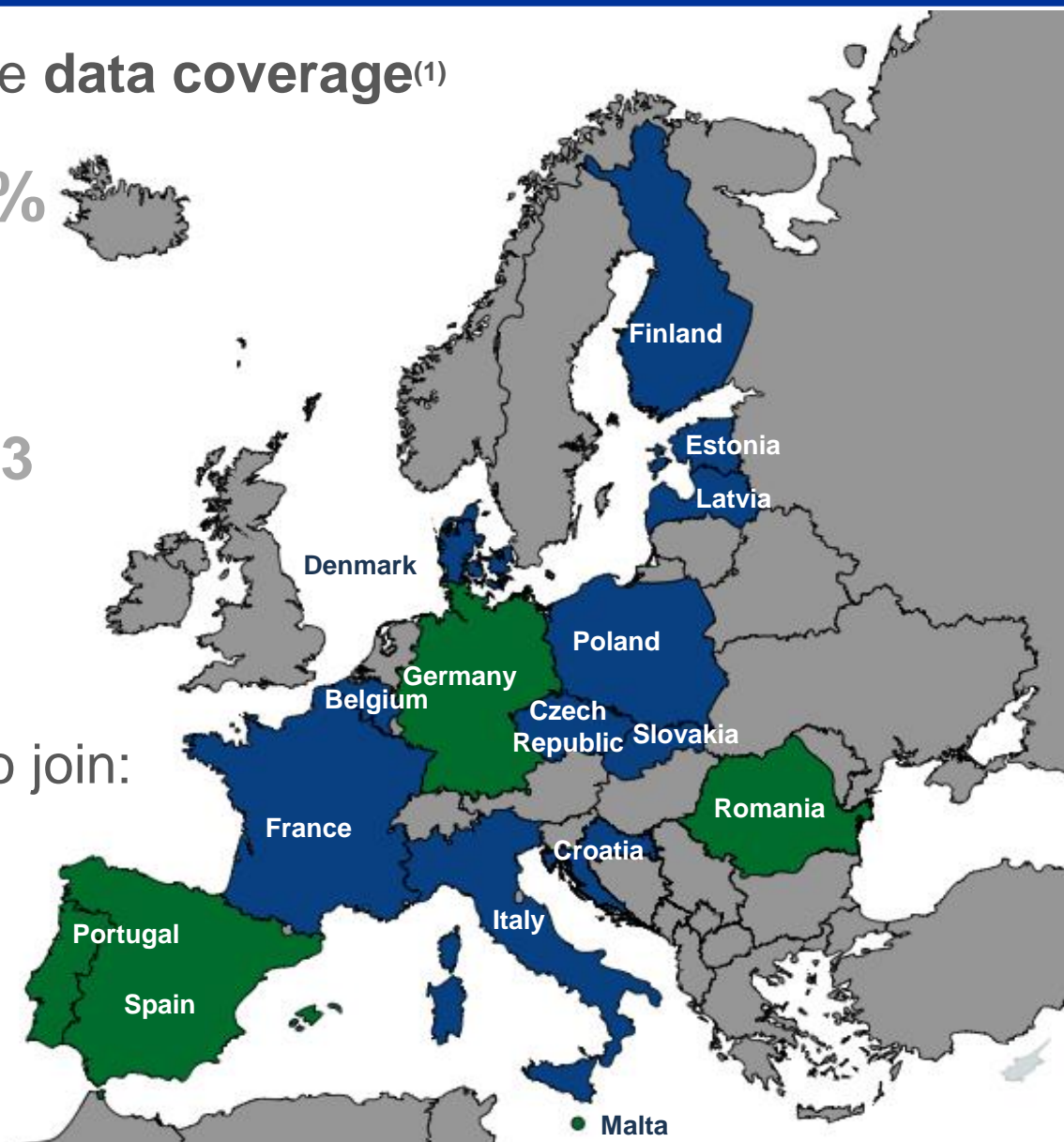**Are low productive firms in a country-sector characterized by higher credit constraints?**

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www.ecb.europa.eu ©

The 5th wave of the CompNet database

- Major improvements in the **data coverage**[1]

  # of firms: ▲ **83%**

  # employees: ▲ **85%**

- Time period: **1995 – 2013**

- Geographical coverage:

  16 EU countries

- Many more are working to join:

  New Zealand, UK,

  Switzerland …

Finland
Estonia
Latvia
Denmark
Poland
Germany
Belgium
Czech Republic
Slovakia
Romania
France
Croatia
Portugal
Italy
Spain
Malta

(1): years and countries available in the last round in comparison with Eurostat

Do exchange rate devaluations work?

→ The impact might change with respect to
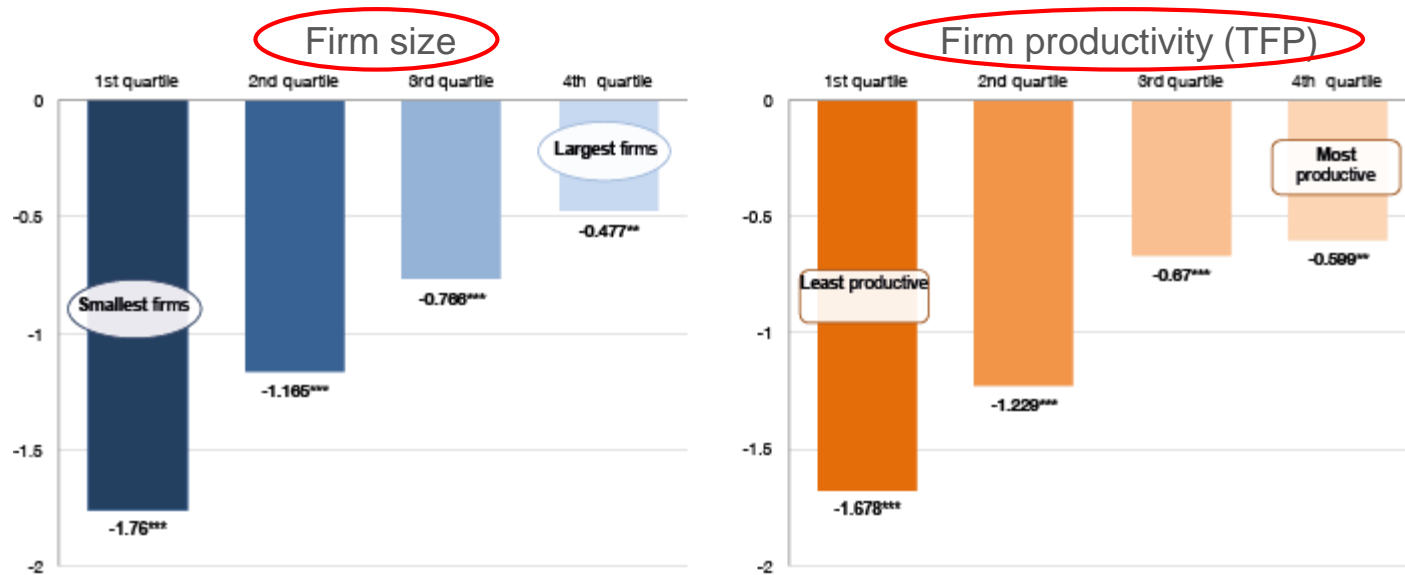
Important implications on aggregate export performance:

- The impact seems to be limited in the short run, as largely determined by the (low) reaction of the largest and most productive firms

- Exchange rate devaluation can be very effective in helping more vulnerable exporters to succeed in international markets

Source: Berthou, A. and di Mauro, F. (2015): "Exchange rate devaluations: When they can work and why", VOX.EU, 24 December.