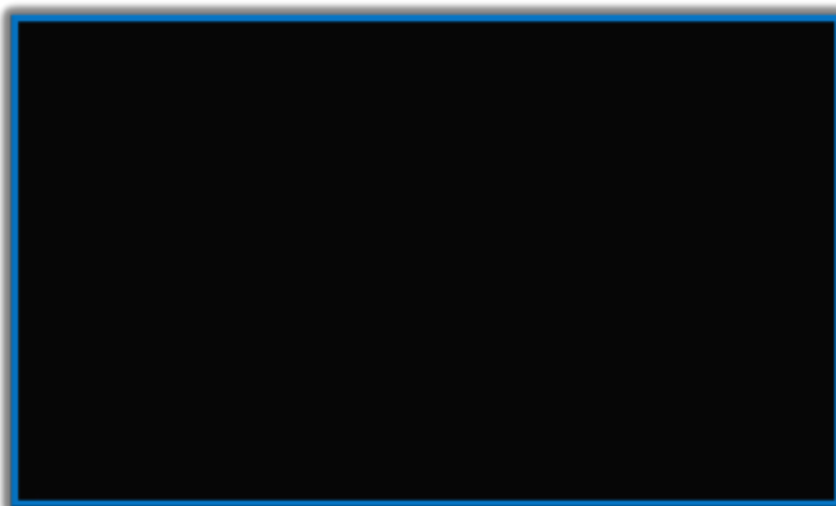# CompNet :
First-year results

Filippo di Mauro

European Central Bank

CompNet Workshop, Central Bank of Ireland,
Dublin, March 12, 2013

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The virtual choir….

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Outline

1. **Motivation, objectives and approach**

2. **A macro/sectoral view on competitiveness**

3. **Competitiveness diagnostics based on firm-level data**

4. **The relevance of global value chains in assessing competitiveness**
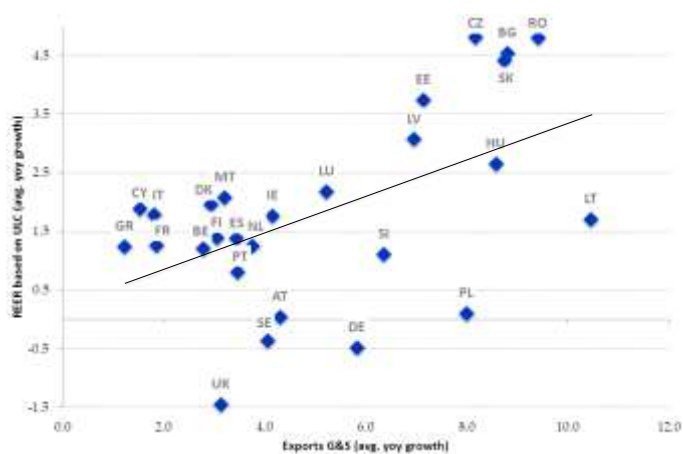
5. **The road ahead**

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One of the puzzles
Relative prices and exports are positively correlated

*Exports and relative prices in the EU*

(2000 - 2011)

Source: Eurostat, EC

9

1. Motivation, objectives and approach

- **CompNet's mission is to provide solid analytical foundations for formulating policies that address competitiveness issues.**

- **Start from three observations/findings:**
  - → Competitiveness assessment has three dimensions: Macroeconomic, firm-level and cross-border (global value chains).
  - → Price competitiveness is only a part of the story
  - → Non-price competitiveness also matters greatly for growth

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The CompNet Approach to Competitiveness Assessment

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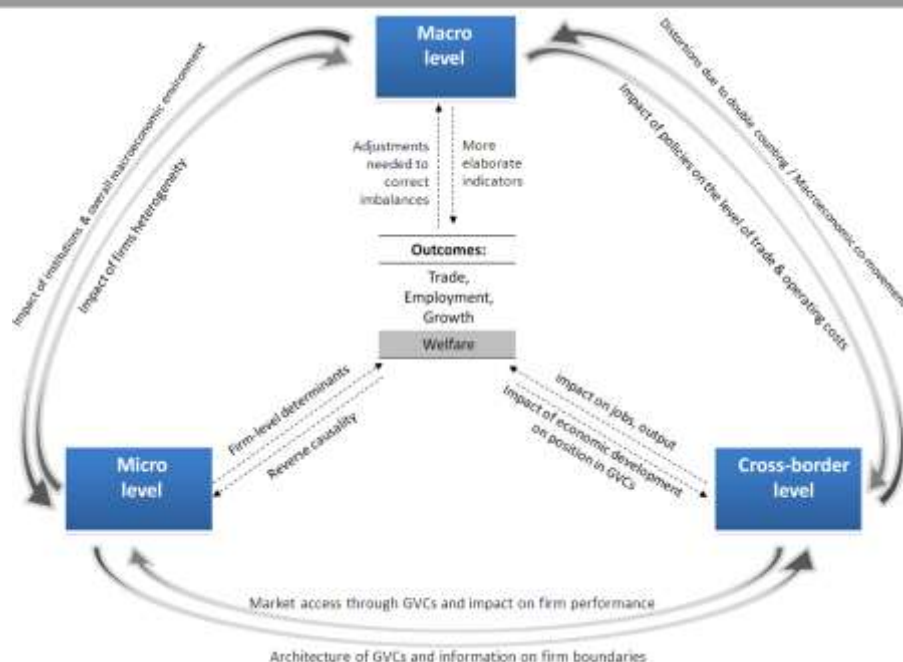
Designing a Competitiveness Diagnostic Toolkit

Step 1: **Capturing more complex dimensions over and above the traditional price/cost based indicators (at macro, micro, cross border)**

Step 2: **Establishing a solid theoretical and empirical connection between indicators and policy outcomes**

Step 3: **Developing a "therapeutic repertoire", i.e. a framework that links specific symptoms of imbalances to appropriate policy levers**

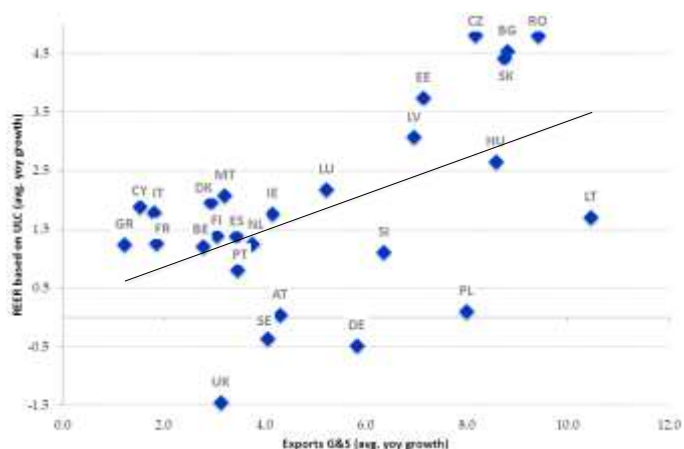➔ **Great progress on step 1 (and partly 2)**

➔ **Established effective organizational set up (Do.file)**

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2. A macro/sectoral view on competitiveness

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One of the puzzles
Relative prices and exports are positively correlated

Exports and relative prices in the EU
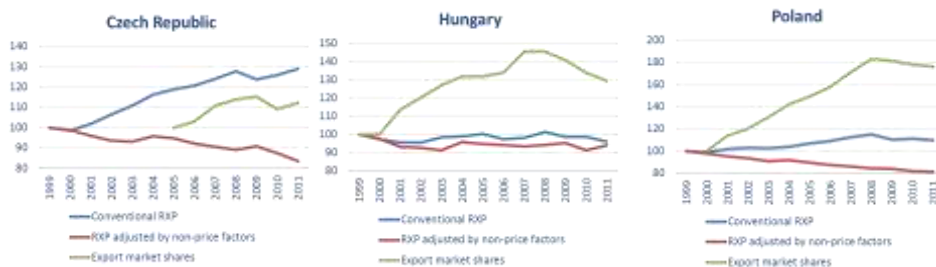
(2000 - 2011)

Source: Eurostat, EC

9

Quality upgrade helps understanding this pattern.

The strong export market share growth in some CEE countries in periods of strong appreciation can be explained by accounting for quality improvements.

Export prices relative to competitors' export prices

Source: Benkovskis and Wörz (2012), ECB (data for CZ and PL export shares only available after 2005 and 2000 respectively)

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The link between ULC and exports depends on innovation content

The relation between ULC and the probability to export varies significantly depending on whether firms engage in R&D activities or not.


Source: Altomonte et al. (2012) based on EFIGE data (firm-level data for AT, FR, DE, HU, IT, ES, UK)

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Extensive margin

The average contribution of the extensive margin to total EU trade growth was small over the last decade (i.e. mainly the result of a deepening of existing trade relationships rather than the exploration of new sectoral or geographical markets).

Average contribution of the extensive margin to total export growth
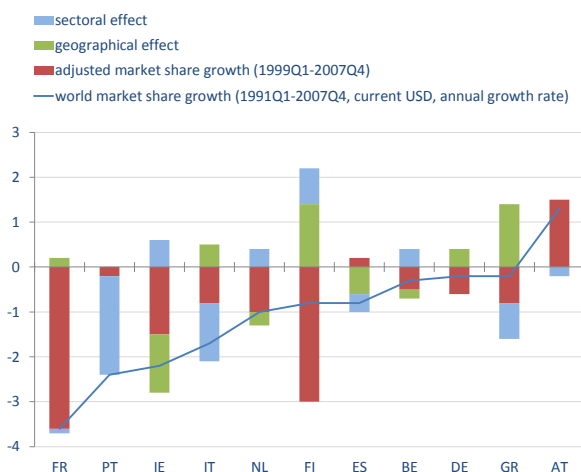
(average over 2000 – 2010)
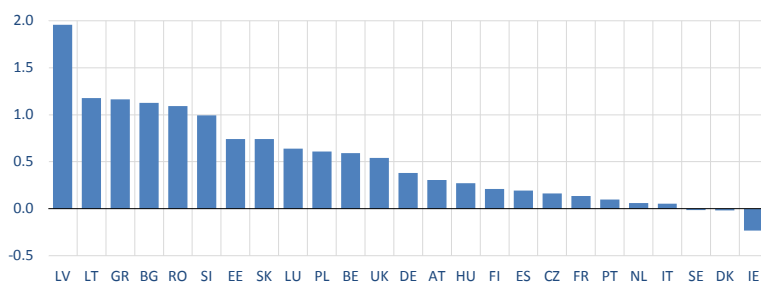
Source: BoL-OeNB calculations based on UN COMTRADE

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Decomposition of export market share growth, run-up to crisis

Decomposition of export market share growth

(Q1 1999 - Q4 2007)

sectoral effect
geographical effect
adjusted market share growth (1999Q1-2007Q4)
world market share growth (1991Q1-2007Q4, current USD, annual growth rate)

- Before the crisis the decline in export market shares was in most countries caused by a combination of a squeeze in export performance and the orientation towards shrinking geographical and product markets with no one factor primarily responsible (excepting France and Portugal).

Source: WB – BdF ; data from Trademap data set, International Trade Center
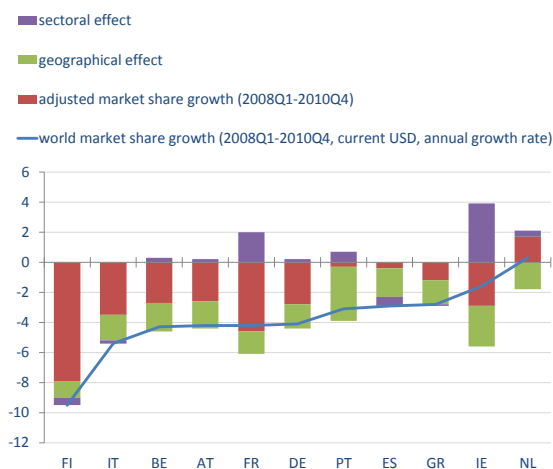
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…..(continued)
2008-2010

Decomposition of export market share growth

(Q1 2008 - Q4 2010)

sectoral effect

geographical effect

adjusted market share growth (2008Q1-2010Q4)

world market share growth (2008Q1-2010Q4, current USD, annual growth rate)

- Most of the decline in euro area export market shares is attributable to the squeeze in export performance free of other compositional effects.

- However, the geographical orientation of exports towards shrinking markets also played a hindering role.
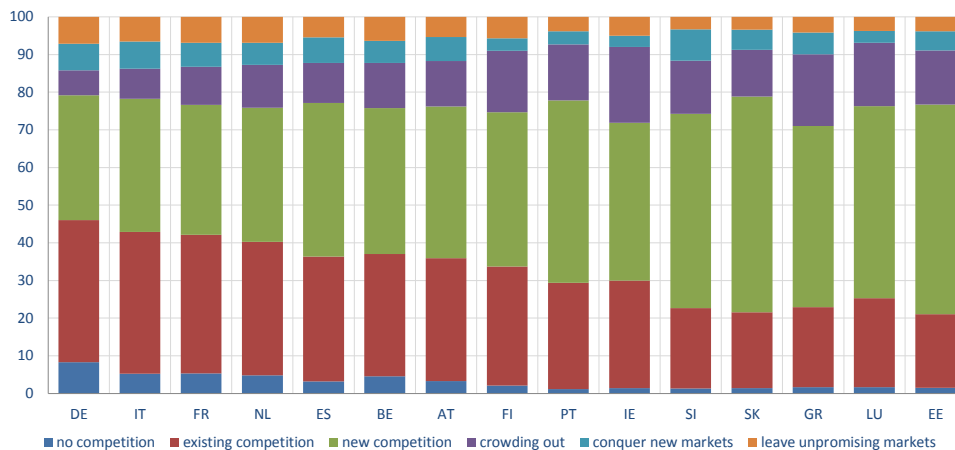
Source: WB – BdF ; data from Trademap data set, International Trade Center

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Decomposing competitive pressures
BRICS

Dynamic trade link analysis: types of competition, EA Members vs. BRIC
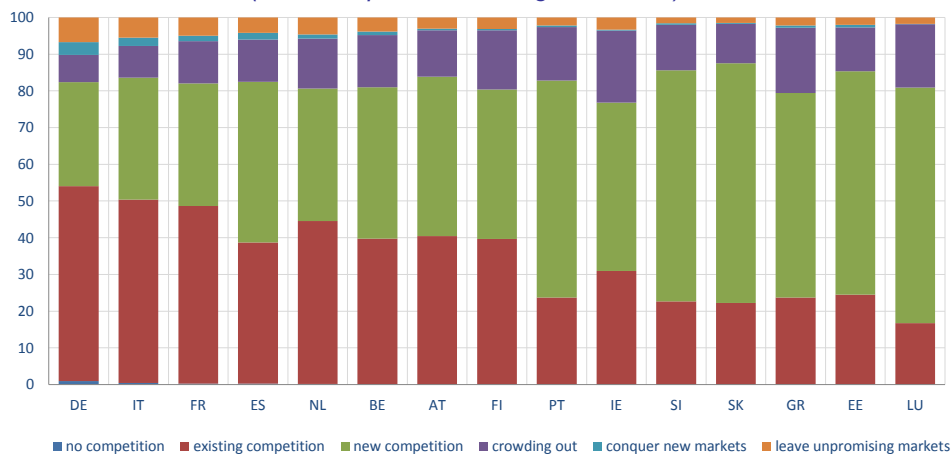
(in % of reporter's existing trade links)

■ no competition ■ existing competition ■ new competition ■ crowding out ■ conquer new markets ■ leave unpromising markets

Source: BoL-OeNB calculations based on UN COMTRADE

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……(continued):
Intra-EA

Dynamic trade link analysis: types of competition, intra-EA

(in % of reporter's existing trade links)

■ no competition ■ existing competition ■ new competition ■ crowding out ■ conquer new markets ■ leave unpromising markets

Source: BoL-OeNB calculations based on UN COMTRADE

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3. Competitiveness diagnostics based on firm-level data

Adding the firm dimension to competitiveness assessment

The drivers of competitiveness cannot be understood without considering firm characteristics.

- Large heterogeneity in firm performance and high concentration of trade in few, large, highly productive firms:

- firm-level characteristics matter for competitiveness in international markets (e.g. size, ownership, quality of products, technological capacity)

- firm heterogeneity matters for the impact of policy changes via three channels:

    1. allocation of resources across plants
    2. firm selection (entry/exit)
    3. choice of firm strategy (investment, innovation, export).

The CompNet set-up for analysing competitiveness of EU firms

Three broad directions of research:

1. **Creation and study of a cross-country dataset of sector-level productivity dynamics,** focusing first on **cross-sector allocation** of resources

2. **Price / non-price competitiveness**

   ▪ Interaction selling price/market share depending on whether the firm is competing on price or on quality (Di Comite, Thisse and Vandenbussche, 2012)

3. **Relation between firm-level dynamics and aggregate exports growth**

   ▪ Role of export destination (joint project between the NBB, the Hungarian Research Institute and BdF)

   ▪ Role of exporters' size (Berthou and Vicard, 2012)

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CompNet novelty: cross-country harmonised firm-level indicators

Two critical features:

   i. Harmonization in the indicators constructed (quality, time horizon, cut-off etc.)

   ii. Circumvention of the problem of data confidentiality, as all computations have been completed by the NCBs according to a centralised algorithm without disclosure of raw data.

Two innovations:

   i. Pre-/post-crisis state

   ii. Larger data set than previously available (12 EU countries and 60 sectors)

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4. The relevance of global value chains (GVCs) in assessing competitiveness

Firm behavior characterized by increasing international fragmentation of production

- Integration into GVCs, fragmentation of production, increasing trade in intermediates and specialization in low- or higher-value-added tasks have had an effect on productivity, employment and overall competitiveness.

- Main research questions that CompNet is addressing are the following:

  1. which firms take part in GVCs,

  2. which countries are net gainers and which countries are net losers from participating in GVCs,

  3. what are the effects of production fragmentation on the interdependencies between economies, on labour markets and on the accumulation of external imbalances.

Employment creation correlated with higher participation in downstream side of GVCs

Long-term changes in employment (9 year growth rates) vs. the share of output/employment used as input by other countries
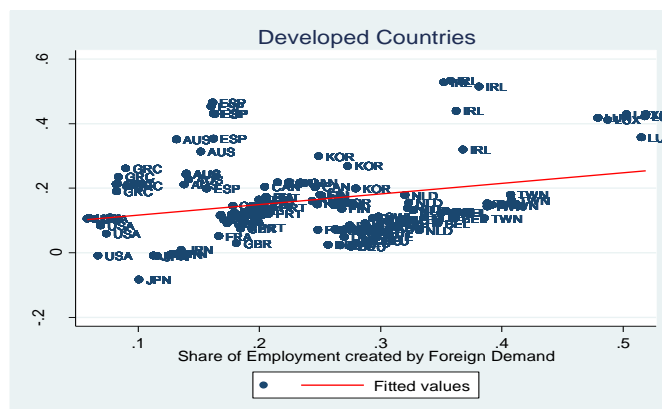
Source: Authors' elaboration, WIOD and firm-level employment data

- The positive slope shows that employment creation is correlated with higher participation in downstream side of the Global Value Chain.

Disentangling the value added in trade flows

Traditional trade statistics that record the gross value of goods and services exchanged have become less meaningful given the architecture of the modern economy.

- Trade in value added offers a clearer picture of the integration into world markets, gives an adequate perspective on the bilateral distribution of external deficits/surpluses and sheds new light on the pattern of international shock transmission

Country	Main export partner in gross terms	Main export partner in value added terms
Germany	France	US
Italy	Germany	US
France	Germany	US

Source: IFS, OECD

- As the research on constructing appropriate databases is fairly advanced in a number of institutions (WTO, OECD, USITC) CompNet has functioned as a hub across databases and methodologies

5. The road ahead

3. The Road Ahead

➔ **We can be proud of the achievements so far.**

➔ **Three major inter-related strands of action going forward:**

   (1) fully exploit and possibly integrate further the rich set of firm-level based indicators newly obtained via the "DO.file" exercise

   (2) improve the conceptual and empirical framework linking external imbalances and competitiveness, also considering fully the firm-level dimension and

   (3) develop a series of concrete competitiveness-enhancing measures underpinned by theoretical and empirical evidence
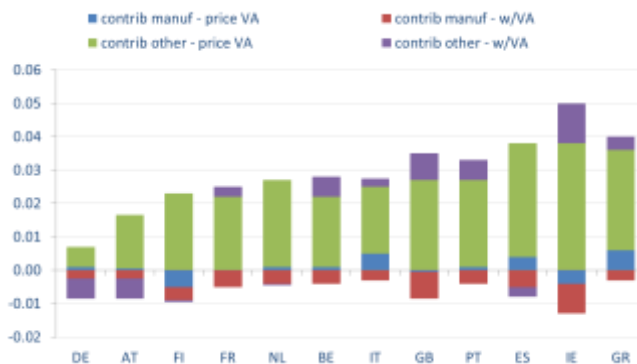
Reserve slides

Much ULC increase pre-crisis occurred in the non-traded sector

ULC decomposition (manufacturing vs. other sectors)
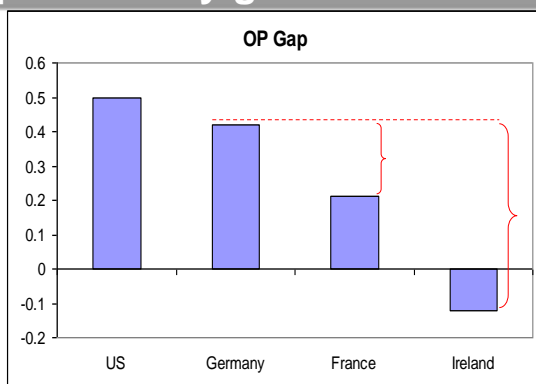
(average y-o-y growth, 1999 - 2007)

Source: Gaulier, Taglioni and Vicard (2012)

Cross-sectoral reallocation would yield aggregate productivity gains of the order of 20%...

OP Gap

OP Decomposition

$$\Omega_t = \sum_i \theta_{it}\omega_{it} = \bar{\omega}_t + \sum_i (\theta_{it} - \bar{\theta}_t)(\omega_{it} - \bar{\omega}_t)$$

OP Gap

Where:

Ω_t is industry index
ω_{it} is firm-level productivity
θ_{it} is the share of activity for the firm i
$\bar{\theta}_t$ and $\bar{\omega}_t$ are the un-weighted industry average of firm measures

Note: US data as in Bertelsman et al. (2013), 1991/2002 average. EU data as in Bartelsman (2012), 2003/2009 averages. Manufacturing industries

- Labor productivity in the average US industry is 50% higher than it would be if employment were allocated randomly across firms. The same figure is 42% for Germany.

- Taking the German labor market as a benchmark for reallocation flexibility in Europe, <u>many European countries could achieve higher aggregate productivity by reallocating labour to more productive firms</u>

…but institutional settings may have prevented efficient reallocation
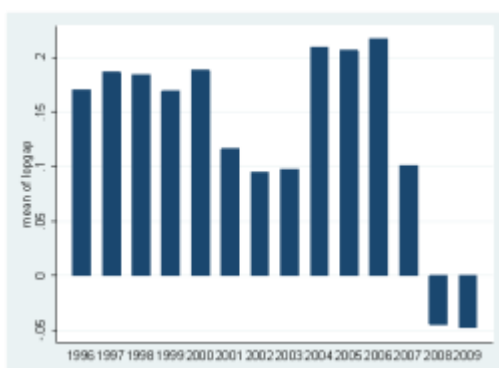
Note: French data on Labour Productivity OP Decomposition, 1996/2009 average per year.
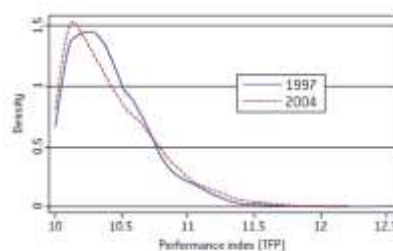
Source: Bruegel based on AMADEUS data.

Note: Machinery Industry in Italy

http://www.youtube.com/watch?v=zyLX2cke-Lw

The price elasticity of substitution varies significantly across products

Non-price factors affect elasticity of trade with respect to prices.

Distribution of import elasticities of substitution across products.

The case of Germany

Source: Corbo and Osbat (2012) - Gaussian kernel function approximation of the distribution
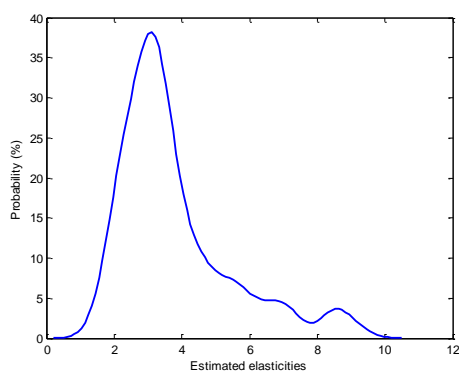
• Cross-sector heterogeneity exceeds cross-country heterogeneity: Compositional effects may be the main driver behind the differences in the aggregate country level estimates.

• Sectors with high elasticity:
  • Aircraft
  • Instruments for measuring, testing, navigating

Example 1: non-price competitiveness

Decomposition of the trade balance into price and non-price competitiveness

(2008-2010)

■ net fuels ■ non price ■ price ■ services ■ other
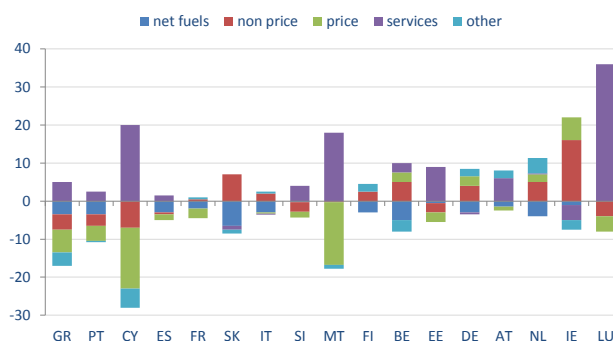
Source: Osbat, Özyurt and Karlsson (2012)

- Countries where structural policies aimed at boosting non-price competitiveness would be needed: Estonia, Slovenia

- An adjustment of relative prices appears to be necessary in: Cyprus, Greece, Malta

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The distribution of firm characteristics matters more than the average

One *statistical* and one *economic* reason why firm-level data are needed to complement the aggregated analysis:

- *statistical* argument of aggregation bias: due to high firm heterogeneity there is no 'representative' firm

  → indicators based on the average should be complemented with ones that account for the dispersion across firms (see the 'Spanish paradox')

- *economic* argument of firm heterogeneity complicating the design of macroeconomic policies:

  → policies and corresponding indicators should not aim at the average firm, but rather tackle each region of the distribution differently

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