Assessing European Competitiveness: the CompNet approach

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Disclaimer: the opinions expressed in this presentation are those of the authors and do not necessarily reflect the views of the ECB, the European system of Central Bank, and the ACI
Outline

1. Motivation
2. A short overview of CompNet **holistic** approach
3. CompNet **micro-aggregated database:**
   - methodology and few stylized facts;
   - examples of recent research works;
4. Concluding remarks
1. Motivation
Why is competitiveness analysis important, also for a Central Bank?

- Trade liberalisation and - globalisation in general - increase international competitive pressures
- Within the euro area, competitiveness asymmetries are at the bulk of the crisis
- Need to assess competitiveness issues in order to identify the appropriate structural reforms, i.e. those that “[...] lift the path of potential output, either by raising the inputs to production or by ensuring that those inputs are used more efficiently” and “make economies more resilient to economic shocks by facilitating price and wage flexibility and the swift reallocation of resources within and across sectors”

M. Draghi, Sintra - May 2015
“A competitive economy, in essence, is one in which institutional and macroeconomic conditions allow productive firms to thrive. In turn, the development of these firms supports the expansion of employment, investment and trade.”

M. Draghi, Paris - November 2012

“In the global economy the euro area cannot compete on costs alone with emerging countries. Our comparative advantage has to come from combining cost competitiveness with specialisation in high-value added activities.”

M. Draghi, Jackson Hole - August 2014
CompNet goals

• The EU system of Central Banks set up the Competitiveness Research Network (CompNet) in March 2012

1. Provide a robust theoretical and empirical link between the drivers of competitiveness and macroeconomic performance for research and policy analysis

2. Using cross-country benchmarking and adopting a multi-dimensional approach (i.e. a set of complementary macro, firm-level and cross-border indicators)
2. Overview of the holistic approach
CompNet approach: merging three dimensions

Macro level

Outcomes:
- Trade, Employment, Growth
- Welfare

More elaborate indicators
Adjustments needed to correct imbalances

Cross-border level

Impact of policies on the level of trade & operating costs
Distortions due to double-counting / Macroeconomic co-movement

Micro level

Firm-level determinants
Reverse causality

Market access through GVCs and impact on firm performance
Architecture of GVCs and information on firm boundaries

Impact of institutions & overall macroeconomic environment
Impact of firms heterogeneity
Assessing competitiveness: the macro perspective

- Traditional macroeconomic price/cost indicators alone are unable to provide a comprehensive explanation of trade developments.

**Price competitiveness and export market shares**

Average annual percentage changes, Pre-crisis (1999-2008Q3)

Pre-crisis export performance in **Germany** and **Italy** is positively correlated with changes in price competitiveness (gain for Germany, losses for Italy).

This is not the case for **France** (which lost export shares though it gained price competitiveness).

**Other factors** must have been at play

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Source: ECB calculations.

*Note:* Price competitiveness is proxied by relative export prices (competitors over domestic prices). A positive value corresponds to a gain in price competitiveness.
CompNet papers focused on a number of non-price factors such as:

i) **quality** and consumer **taste**
ii) the extent of the **globalisation** of production processes
iii) **domestic conditions** faced by exporters
iv) the role of the **geographical** and product structure of exports
Novel macro-indicators of competitiveness

- One of the main outcomes of CompNet since its creation has been the building of **innovative indicators** that are essential in going **beyond the traditional price-based measures** in understanding short and medium-term developments in competitiveness.

- The compendium to this new “**Diagnostic Toolkit for Competitiveness**”, a comprehensive database of innovative and traditional macro-indicators of competitiveness, is available [here](#).

- Important sources of information have been **trade data** (e.g. UN Comtrade data).

- Example of novel indicators available:
  - Sophistication indices
  - Relative export prices adjusted for quality and taste
  - Dynamic Trade Link Analysis
Production of most goods and services around the world is vertically fragmented along GVCs...

Exports incorporates a large foreign value added component.
The Global Value Chain (GVC) dimension

- ...which is **increasing** in all major economies, as share of total exports

Source: Amador et al. (2015).

*Note:* The euro area is taken as a whole (i.e. intra-euro area trade flows are disregarded).

**Traditional trade indicators must be complemented with value-added based measures**
The rational of firm-level perspective

- 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**”)
Implications for research and policy

1. Aggregate indicators alone, when interpreted as if they had been generated by the behavior of a **representative firm**, risk to give **partial** (if not wrong) messages and consequently **incomplete policy recommendations**

2. Impacts of a macro **shock** or **policy** depend on the shape of the **underlying distribution**

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CompNet set up in the last years a **novel firm-level micro-aggregated database** in order to:

- set up a new research infrastructure to **overcome confidentiality** and **comparability** issues of balance-sheet information of European firms
- take into account the **link** between their **productivity** and trade/financial/labour/regulation conditions
3. **CompNet micro-aggregated database**
Data collection approach

✓ Common protocol to extract information from existing firm-level datasets available within each NCB or NSI

✓ Common codes to aggregate indicators at industry, macro-sector and country level in order to solve confidentiality 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.
Participants: 17 EU countries
13 of which in EA
+ 3 just joined (CZ, DK and LV)

Target population: non-financial corporations (S11)

Period: 1995-2012
with delayed entrance of some countries

Sector: 9 macro-sector
1-digit industry
≈ 60 sectors
2-digit industry (NACE rev.2)
Relevant indicators are now available across countries

**Productivity and allocative efficiency**
- Labor productivity
  - TFP
  - ULC
- LC per employee
- Firm size
- Capital intensity
- Static Allocative Efficiency
- Dynamic Allocative Efficiency

**Financial**
- Investment Ratio
- RoA
- Cash holdings
- Leverage
- Financing gap
- Collateral
- Equity to Debt
- Cash flow
- Implicit interest rate
- Trade Credit/Debt
- Debt burden
- Credit constraint index

**Trade**
- % permanent exp.
- % sporadic exp.
- Export value
- Export value added
- Productivity premium of exporters

**Competition**
- Weighted PCM
- Sector-specific mark-ups
- Sector-specific collective bargaining power
- Concentration measures

**Labour**
- % firms that increase/decrease employment
- Productivity or ULC between t and t+3
- Characteristics of growing and shrinking firms
- Share of High-growth firms

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Not only averages...

- For each indicator we get:
  - **Full distribution** considering all firms operating in a given industry, or level of aggregation (country, macro-sector, size class)
    
    i.e. information on **all the deciles of the distribution**
  - **Other statistics**: like mean, median, skewness, sd and IQR
  - **Full set of firms’ characteristics** within a given level of aggregation for:
    - Exporting/non-exporting firms
    - Financially constrained/unconstrained firms
    - Growing firms/downsizing firms

- But also **joint-distributions**, useful to investigate the dynamics and characteristics of firms located at the different tails of the performance distribution.
3a. Some stylized facts from CompNet
Trends in credit constraints across productivity deciles

Share of credit constrained firms by deciles of labor productivity
ICC index estimated within CompNet

- On average more productive firms are less likely to be credit constrained
- The effect of the crisis is different: in stressed countries share of credit constrained firms increased more, particularly among least productive
Only the most productive firms export

Export premia in labour productivity
Manufacturing sector

Source: Berthou et al. (2015)

- On average exporters are 20% more productive than non-exporters in the same sector, although there are wide country differences
Exports are highly concentrated

Share of top exporters on total country-level exports

Manufacturing sector in 2008

- Top 10 exporters
- Top 5 exporters

• **Top-10 exporters** account on avg. for 25% of aggregate country-exports.
• Relevant because idiosyncratic shocks affecting large (exporting) firms have important macro effects.

Source: Berthou et al. (2015)
Evolution of wages and productivity of the top 10% and bottom 10% productive French firms with at least 20 employees in the manufacturing sector
3b. Few examples of research works: “from micro to macro”
Response to exchange rate movements are heterogeneous across firms and therefore aggregate estimates of elasticities can be biased:

a) Berthou et al. (2015) find that export elasticity relative to ULC-REER is inversely correlated with size and productivity.

<table>
<thead>
<tr>
<th>Firm Size</th>
<th>Δln(REER)</th>
<th>TFP</th>
<th>Δln(REER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st quartile</td>
<td>-1.760***</td>
<td>1st quartile</td>
<td>-1.678***</td>
</tr>
<tr>
<td>2nd quartile</td>
<td>-1.165***</td>
<td>2nd quartile</td>
<td>-1.229***</td>
</tr>
<tr>
<td>3rd quartile</td>
<td>-0.766***</td>
<td>3rd quartile</td>
<td>-0.670***</td>
</tr>
<tr>
<td>4th quartile</td>
<td>-0.477*</td>
<td>4th quartile</td>
<td>-0.599**</td>
</tr>
</tbody>
</table>

Sources: Berthou et al. (2015).
Notes: *** p<0.01, ** p<0.05, *p<0.10. Includes controls for macro determinants and sector/firm characteristics.
b) Work co-authored with Demian (2015) shows that elasticity of exports to exchange rate fluctuations is lower in sectors with a higher dispersion of productivity.

That there is an asymmetry between responses to an appreciation and depreciation.

Finally, that size matters → only large exchange rate movements appear to have a significant impact on export.

Since there is still not consensus in the literature, we need further micro-based analysis on firm responses to exchange rates shocks.
4. Concluding Remarks
**Policy contributions**

- The **interaction** of the three CompNet **work-streams** (macro, firm-level and global value-chains) has delivered substantial **research results** and related policy implications which have been collected in the **report** “Assessing European competitiveness: the contribution of CompNet research” **published** in June 2015.

- Use of it for **policy-making** has **just started**
  - members of **ECB Executive Board** have frequently used CompNet analysis as background for their public speeches;
  - we received request of collaboration and data use by researchers in **EC DG-EC/FIN, OECD, EIB, IMF** and several academic institutions.
Future research plan

- We have identified for the future two directions:

1. Resources allocation and growth
   - secular stagnation
   - productivity puzzle
   - weak investments
   - role of intangibles and innovation

2. International trade and Global Value Chains
   - complementing the macro-analysis of GVCs with firm-level based information
   - the role of skill-matching
Thanks for your attention

All relevant information, documents on objectives and output of the network can be found on CompNet website:


For further information and research collaborations, please e-mail at compnet@ecb.europa.eu
CompNet output in 2015

Methodological paper published


4 Work-stream modules

**Trade**
Export status of the firm, export value

**Financial**
Firms position and indicator of credit constraints

**Labor**
Employment, productivity and transition matrices

**Mark-up**
Sector level mark-ups and bargaining power

ECB WP 1788  ECB WP 1836  ECB WP forthcoming

✓ Which add to 36 already published ECB Working Paper

5 recent Journal Publications

Final report published (available here)
Timeline for research and policy use of dataset

New Round of Do-file data collection
- Same data set
- Additional Countries: - Latin America (with World Bank?)
  - Singapore (with ACI?), Other ASEAN?

2013 CompNet data available for Cross-country analysis

Completion of CompNet on-going research projects

CompNet Conference in Prague

CompNet-World Bank Conference in Washington (DC)
Reserve Slides
Ex. 3 - Institutional factors and job reallocation

- Proportion of firms **expanding**, staying **equal** or **shrinking** in size over the period 2001-2012 (with base-year 2001)

1. **Pre-crisis**: stable firms' growth dynamics

2. **After crisis**: generalized increase of the proportion of firms **cutting employment**

3. **Different** impacts across countries in **timing** and **intensity**
Within ECB we have merged WDN and CompNet database to analyze if cross-country heterogeneity in labour market response to the crisis (see previous slide) can be explained by the relationship between

- Different levels at which bargaining negotiations take place across firms in the euro area
- Different firm-level cost cutting strategies (employment vs. wages) following the Great Recession

Important from a policy perspective:

Whether and to what extent wage setting institutions amplified the impact of the economic crisis on employment through the limitations they impose on wage adjustments.
The higher the share of firms **engaging in multi-level/employer (i.e. centralized system, sectorial) bargaining**

The greater the **employment reduction** at the firm-level over the Great Recession

<table>
<thead>
<tr>
<th>Share of shrinking firms</th>
<th></th>
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<tbody>
<tr>
<td>% of firms in <strong>multi-level</strong> bargaining</td>
<td>0.2025*** (0.0459)</td>
</tr>
<tr>
<td>% of firms in <strong>multi-employer</strong> bargaining</td>
<td>0.112*** (0.040)</td>
</tr>
<tr>
<td>% of firms in <strong>plant-level</strong> bargaining</td>
<td>0.0697 (0.0537)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.265*** (0.0219)</td>
</tr>
<tr>
<td>Country, sector dummy yes</td>
<td>yes</td>
</tr>
<tr>
<td>Size, time dummy yes</td>
<td>yes</td>
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<tr>
<td>N. Observations</td>
<td>362</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.78</td>
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</tbody>
</table>

**N.B.** Robust also when controlling for sectorial TFP
1- Stylized facts: Role of productivity distributions...

...over time...

..and across countries

Normalized labour productivity density

Kernel density for Italy over time

2001
2007
2012

Portugal
Spain
Italy
An example: investment ratio across productivity levels

We can connect the value of selected indicators:

<table>
<thead>
<tr>
<th>Real value added</th>
<th>Labour</th>
<th>Investment ratio</th>
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<tbody>
<tr>
<td>TFP</td>
<td>Labour Costs</td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>ULC</td>
<td></td>
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<tr>
<td>Capital intensity</td>
<td>Total Employment</td>
<td></td>
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<tr>
<td></td>
<td>Labour Productivity</td>
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<td>Leverage</td>
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<td>Collateral</td>
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<td></td>
<td>Debt burden</td>
<td></td>
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<td></td>
<td>Equity debt ratio</td>
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<tr>
<td></td>
<td>% of credit constrained</td>
<td></td>
</tr>
</tbody>
</table>

with the different deciles of

- Real value added
- ULC
- TFP
- Capital
- Capital intensity
- Labour
- Labour costs
- TFP
- Labour growth
- Labour productivity
- Labour productivity growth

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