Overview

1. The Competitiveness Research Network (CompNet)

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3. Cross-Country Comparability

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1. The Competitiveness Research Network (CompNet)

The Competitiveness Research Network

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

- Expanded to become a network of academics and policy practitioners collaborating to:

  1. Provide a robust theoretical and empirical link between drivers of competitiveness and macroeconomic performance for **research**, **policy analysis** and **country surveillance**

  2. Use cross-country benchmarking and adopting a **multi-dimensional** approach (i.e. a set of complementary macro, firm-level and cross-border indicators)

Member Institutions: Partner Institutions

- **European Central Bank (ECB)**

- **European Commission (EC)**

- **Halle Institute for Economic Research (IWH)**

- **European Bank of Reconstruction and Development (EBRD)**

- **European Investment Bank (EIB)**

- **Tinbergen Institute**

Governance Structure

Steering Committe

Advisory Board

Executive Committe

CompNet Team

Research Team

Secretariat

What Does CompNet Offer?

Dataset

Workshops

Conferences

Exchange Forum

Trainings

2 Working Paper Series

Latest achievements

- **Enlargement of the Network:**
  - Statistical offices: INSEE (France), Swiss Statistical institute, possibly ONS (UK)
  - Other institutions: Ministry of Economy Portugal

- **Improvement of the codes**

- **Active in research …**
  - over 40 ongoing research projects based on CompNet data
  - 7 Working Papers since 2016
  - 22 refereed journal articles from members of the CompNet network

- **… and in policy**
  - European Commission: Country Report Spain 2018
  - EBRD: Transition Report 2017/18, chapter 2
  - Articles in the ECB Economic Bulletin and in VOXEU.org

2. The CompNet Dataset

Firm performance is heterogeneous and asymmetric

## *Dispersion of firm productivity within sectors (2001-13)*

(productivity ratio of top 10% relative to bottom 10% firms in same 2-digit industry)

■ old EU Member States
■ new EU Member States
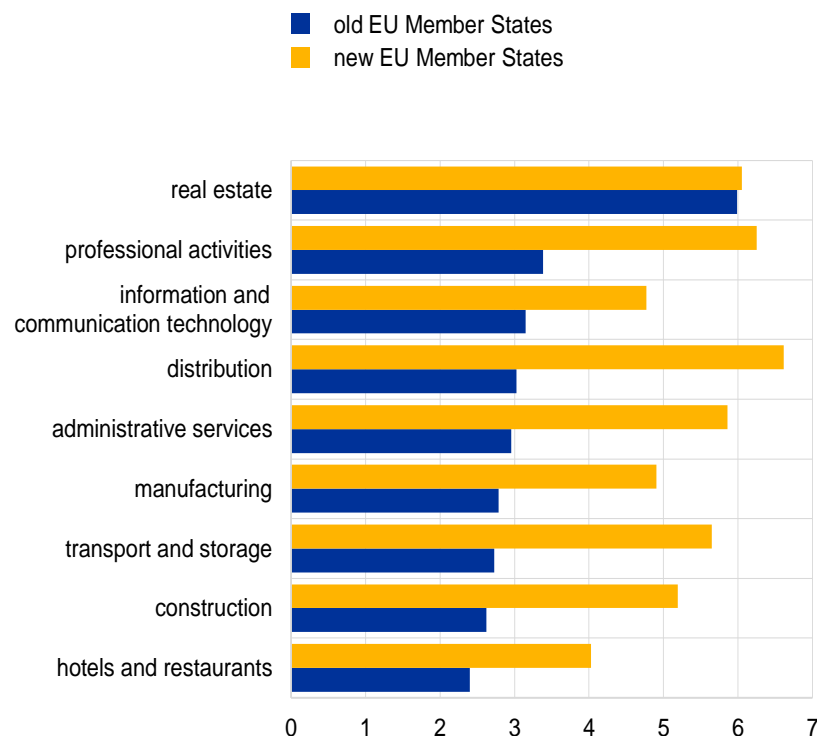
Source: ECB staff calculations based on CompNet data.
Notes: Computed at the 2-digit level, aggregated to the macro-sector with VA shares. Unweighted average across 19 countries. Data refers to the 20E sample.

Firm productivity distribution in manufacturing (2006-12)

■ Germany
■ Spain
■ France
■ Italy
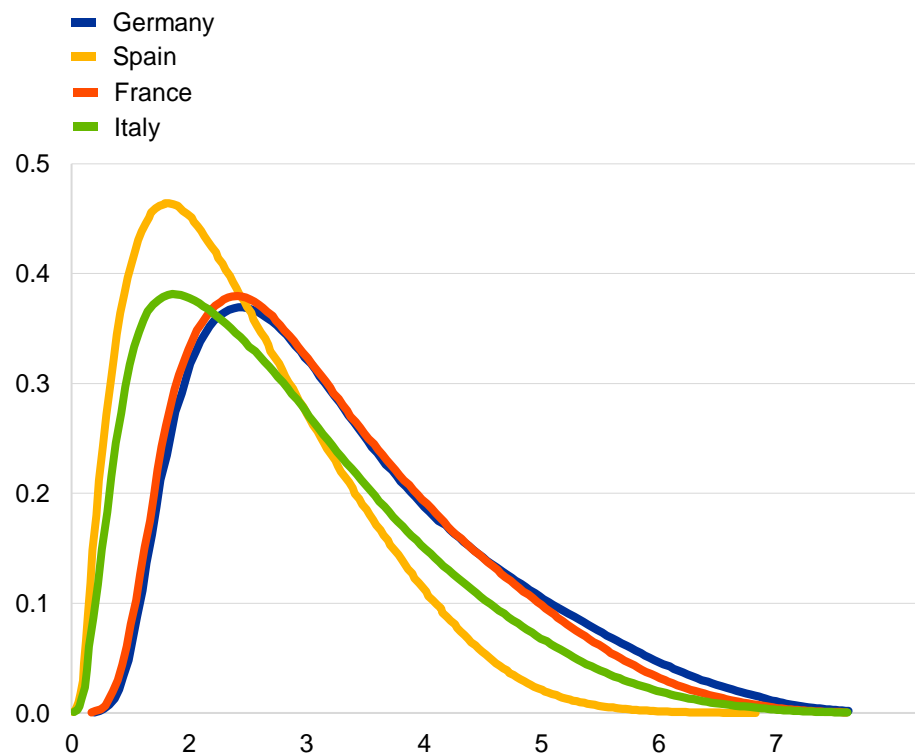
Sources: ECB staff calculations based on CompNet data, Eurostat data and Statistical office of Germany – AFiD-Panel data for Germany.
Note: Re-scaled so the mean of the distribution equals GDP per capita. Data refers to the 20E sample.

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Implications for research and policy

1. Aggregate indicators alone risk to give **partial** messages

2. Aggregate performance (e.g. exports) **driven by dynamics of few** very large and productive players

3. Aggregate productivity can be boosted by **better allocating existing production resources**

4. Impact of a macro shocks depend on the shape of the **underlying distribution of firm performance**

Micro-founded Analysis in a Cross-Country Set-Up

- Country coverage and cross-country comparability is hindered

- We can focus on one-country analysis; or rely on commercial databases like Bureau van Dijk

    - Important [limitations](#) concerning the analysis of competitiveness

- A third way is the **micro-aggregated methodology**: collects moments of the distribution of indicators in a harmonized way across countries

    - No firm-level data but sufficient richness for many analyses

    - Apply statistical methods to improve comparability within our possibilities

Micro-aggregated Methodology

Write a code to compute different indicators of interest at the firm-level

Harmonise definitions, target samples and cleaning & treatment of the raw data

Collect results, aggregated at a country/sector/size/year level or country/region /year level to preserve confidentiality...

...but keeping much of the richness of the firm-level data

The CompNet Dataset

- We construct a firm-level based dataset from business registers

- Country teams run common codes to create indicators at industry, macro-sector and country level

  - Confidentiality is preserved
  - Data comparability is ensured

- In addition to sector averages, we collect the <u>full distribution</u> for more than **70** critical business related variables

  → <u>Information is much richer</u> in comparison to the usual available sector aggregation (e.g. Eurostat)

- The CompNet dataset includes <u>two different samples</u>:

  - Full Sample
  - 20e Sample

Recent Development: Data Improvements

- Wide country coverage and cross-country comparability have become a "must" of the network – this vintage: 18 countries

- Reorganization has brought a pause to the data compilation process; this has been important to:

  - Rethink and improve existing indicators

  - Improve coding: efficiency, comparability, confidentiality checks

  - Incorporate new indicators relevant for stakeholders (distressed firms, job flows, human capital…)

  - Incorporate new countries to the database (SE, NE) and improve some existing ones (DE)

The 6ᵗʰ Vintage of the CompNet Dataset

- Time period:
  - **1999 – 2016**

- Data coverage:
  - (up to) **90% in firms**
  - (up to) **86% in employees**

- Geographical coverage:
  - **18 EU countries**

- Data collection:
  - Richer set of **variables**
  - More efficient **codes**

- Data are available:
  - **online** for CompNet members
  - **upon request** for all researchers

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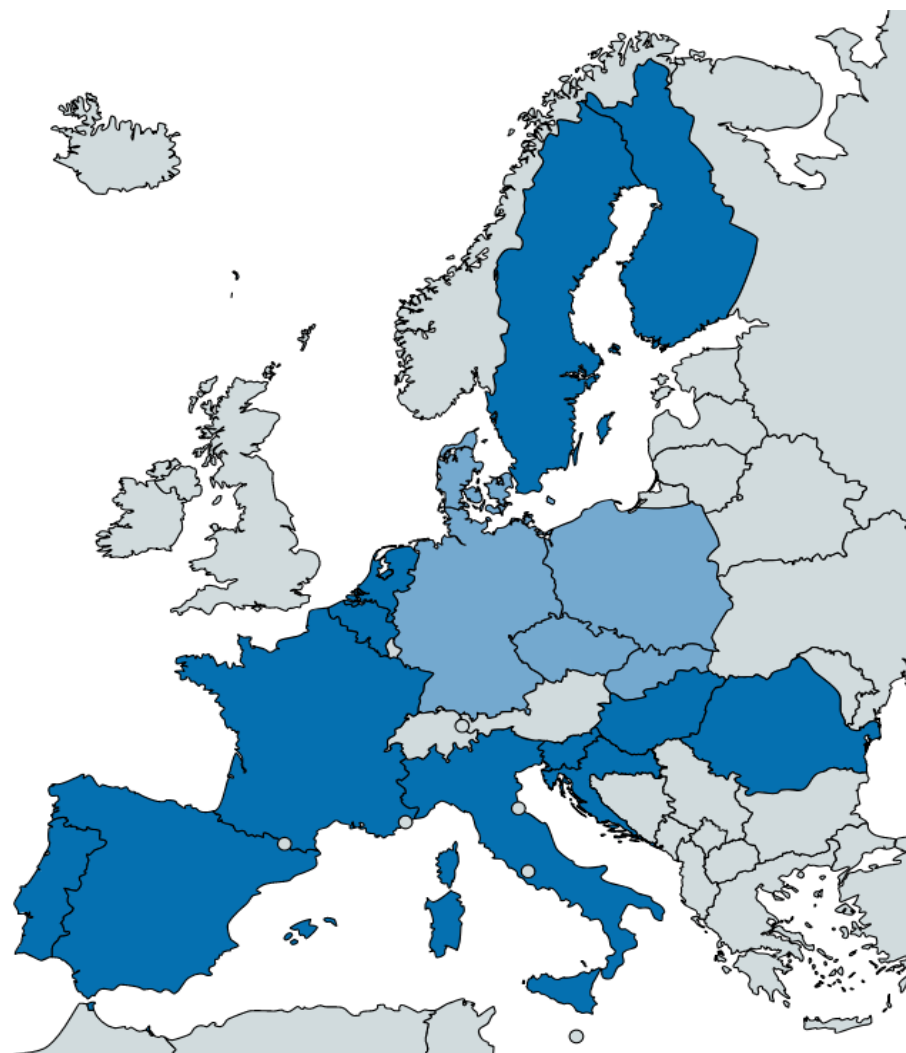
Five Categories of Variables

Productivity and allocative efficiency	Financial	Trade	Competition	Labour
Labour productivity	Investment ratio	% permanent exp.	Price-cost margins	% firms that change employment between t and t+3 (t+1)
VA and revenue TFP; various estimation techniques	RoA	% sporadic exp.	Mark Ups	Share of high-growth firms
	Cash holdings	Export intensity	Herfindahl index	Job creation and job destruction rates
ULC	Leverage	Characteristics of top exporters	Concentration of sales in top 10 firms of a sector	Wage premium (proxy for human capital)
Firm size	Financing gap			
Capital Intensity	Collateral	Productivity premium of exporters		
	Equity to Debt			
Marginal revenue productivity of inputs	Cash flow			
	Interest coverage ratio	Characteristics of firms that export AND import		
Static and dynamic allocative efficiency	Trade Credit/Debt			
	Debt burden			
	Credit constraint index			
	Share of "distressed" firms			

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Joint Distributions: One Example

Productivity and allocative efficiency	Financial	Trade	Competition	Labour
Labour and capital productivity	Investment ratio	% permanent exp.	Estimated and non-parametric price-cost margins	% firms that change employment between t and t+3 (t+1)
VA and revenue TFP, various estimation techniques	RoA	% sporadic exp.		Share of high-growth firms
ULC	Cash holdings	Export intensity	Concentration of sales in top 10 firms of a sector	
Firm size	Leverage	Characteristics of top exporters		Job creation and job destruction rates
Capital Intensity	Financing gap		Herfindahl index	Wage premium paid by firms
Marginal revenue productivity of inputs	Collateral	Productivity premium of exporters		
Static and dynamic allocative efficiency	Equity to Debt			
	Cash flow	Characteristics of firms that export AND import		
	Implicit interest rate			
	Trade Credit/Debt			
	Debt burden			
	Credit constraint index			
	Share and characteristics of "zombie" firms			

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

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Sample Representativeness: Employment by Macro-Sector

Country	Manufacturing	Construction	Services
Belgium	29.7% (27.5%)	12.3% (17.7%)	57.9% (54.7%)
Croatia	34.3% (43.4%)	12.3% (25.4%)	53.3% (31.1%)
Denmark	23.3% (31.3%)	12.8% (15.3%)	63.7% (53.3%)
Finland	30.6% (31.0%)	13.7% (16.9%)	55.6% (51.9%)
France	22.4% (24.9%)	14.3% (16.3%)	63.2% (58.6%)
Hungary	32.9% (34.9%)	8.90% (11.6%)	58.1% (53.3%)
Italy	37.8% (33.1%)	10.3% (15.5%)	51.8% (51.3%)
Lithuania	27.2% (30.2%)	12.7% (18.1%)	59.9% (51.5%)
Netherlands	19.5% (17.1%)	10.7% (13.7%)	69.6% (69.1%)
Portugal	28.4% (24.1%)	13.7% (15.6%)	57.8% (60.2%)
Romania	35.7% (40.1%)	12.4% (15.2%)	51.8% (44.6%)
Slovenia	45.9% (43.6%)	9.23% (18.5%)	44.7% (37.8%)
Spain	24.3% (21.8%)	12.9% (16.3%)	62.6% (61.7%)
Sweden	21.2% (28.0%)	13.9% (17.1%)	64.8% (54.8%)
Czech Republic*	52.3% (56.2%)	6.88% (9.34%)	40.8% (34.3%)
Germany**	-	-	-
Poland*	44.9% (54.7%)	8.21% (11.5%)	46.8% (33.6%)
Slovakia*	50.2% (64.3%)	5.95% (9.43%)	43.7% (26.1%)

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Sample Representativeness: Employment by Size Class

Country \ Size Classes	1 - 9 Employees	10 - 19 Employees	20 - 49 Employees	50 - 249 Employees	> 250 Employees
Belgium	21.5% (26.3%)	12.8% (7.78%)	20.3% (12.4%)	24.4% (16.8%)	20.8% (36.5%)
Croatia	27.2% (9.29%)	13.9% (13.0%)	17.4% (15.1%)	26.4% (27.8%)	14.9% (34.6%)
Denmark	41.1% (23.0%)	14.0% (9.55%)	17.8% (12.6%)	19.3% (21.6%)	7.57% (33.1%)
Finland	28.7% (28.2%)	14.0% (8.73%)	18.5% (11.2%)	24.9% (18.4%)	13.7% (33.3%)
France	30.4% (25.7%)	14.5% (8.05%)	19.2% (11.3%)	24.9% (15.9%)	10.8% (38.9%)
Hungary	37.2% (37.1%)	15.1% (8.58%)	15.4% (9.34%)	20.5% (16.7%)	11.6% (28.1%)
Italy	23.0% (41.0%)	18.3% (11.8%)	21.2% (10.8%)	25.7% (14.2%)	11.6% (21.8%)
Lithuania	23.4% (28.8%)	13.9% (11.1%)	20.2% (15.7%)	29.4% (23.0%)	12.8% (21.1%)
Netherlands	16.9% (26.2%)	13.4% (8.50%)	20.1% (11.5%)	30.1% (20.9%)	19.2% (32.8%)
Portugal	36.5% (32.1%)	16.4% (11.8%)	19.4% (13.7%)	19.8% (18.4%)	7.66% (23.8%)
Romania	29.3% (21.7%)	13.3% (8.17%)	18.4% (12.4%)	28.2% (23.3%)	10.5% (34.2%)
Slovenia	24.3% (36.9%)	11.7% (9.96%)	16.3% (8.53%)	28.6% (22.6%)	18.8% (21.8%)
Spain	33.3% (37.7%)	17.2% (9.54%)	20.2% (11.4%)	17.2% (14.6%)	11.8% (26.6%)
Sweden	39.8% (21.9%)	17.7% (9.72%)	22.3% (13.4%)	17.9% (20.0%)	2.01% (34.8%)
Czech Republic*	-	-	16.2% (16.5%)	38.3% (32.8%)	45.3% (50.5%)
Germany*	-	-	5.06% (7.33%)	27.5% (24.7%)	67.2% (53.4%)
Poland*	-	-	13.4% (13.6%)	40.2% (34.4%)	46.2% (51.9%)
Slovakia*	-	-	13.9% (14.6%)	34.3% (32.9%)	51.7% (52.4%)

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6th Vintage: Complementary Reports

- A **cross-country report** providing an overview of the main novelties of the dataset

- A **cross-country comparability report** providing metadata and documenting existing differences across countries

- A **comparability tool** for the user to track cross-country differences in each indicator

- A **user's guide** with detailed information on definitions of and methodology used to compute some of the core indicators

- A "**road-map**" mapping indicators to data files and vice versa

3.Cross-Country Comparability

Cross-Country Comparability Report

Data sources will never be fully comparable →
important to know where differences lie and how they impact the result

- CompNet has set up a Working Group to analyze cross-country comparability

  - Carlo Altomonte(Bocconi), Paloma Lopez-Garcia(ECB), Marc Melitz (Harvard), Sebastian Roux (INSEE), Michael Polder (Netherlands Statistics), Jan Paul van der Kerke (ECB)

- Cross-country differences stem from country, source and/or variable specific factors.

The Road Towards Full Comparability

- The **unit of observation**: Some sources use the legal unit while others measure economic activity at the enterprise level.

- **Employment** can be measured in Headcounts or FTE. Moreover only "persons employed" or "employees only" can be included. Across countries we observed differences.

- **Longitudinal linking**: the ability to adequately follow firms through changes in business structure differs across sources.

- **Outlier cleaning**: Some sources apply alterations to the data, while the code does so as well. Double and idiosyncratic outlier procedures introduce heterogeneity

- The **valuation** of output, intermediate inputs and labour costs differs across countries.

> CompNet is working on harmonizing these and other sources of cross-country differences.

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4. CompNet Data at Work

6th Vintage CompNet Cross-Country Report

- Report coordinated and drafted by Paloma Lopez-Garcia and the CompNet Team
  - Documents the 6th vintage of CompNet dataset in terms of coverage, representativeness, and indicators
  - Highlights selected stylized facts of potential high value for research and policy

Productivity	Unit Labor Costs	Distressed Firms	Trade

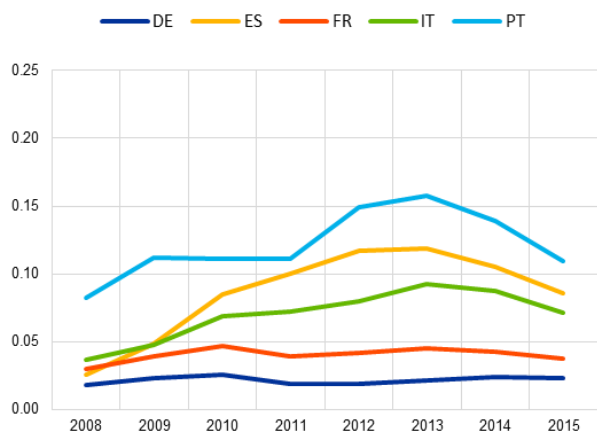| Mark-Ups	Wages	Job Flows

Distressed firms: Checking the data

Non-viable firms still in the market; we use different definitions (interest coverage ratio, negative profits excluding HGF)

Validation: CompNet, ORBIS and SAFE
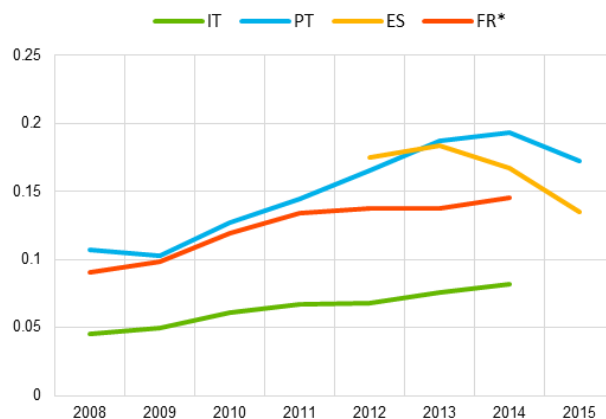
(share of distressed firms)

ORBIS: Storz et al. (2017)

Source: ORBIS.
Note: Distressed firms are defined according to Storz et al. (ECB WP, No. 2104/2017): Non-financial firms with negative investment, negative return on assets and EBITDA to financial debt of less than 5% for two consecutive years.
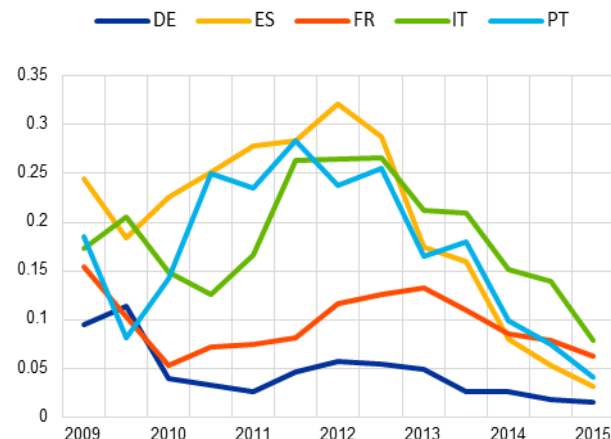
CompNet: Persistent negative profits

Sources: 6th vintage of CompNet
Notes: Firms with negative operating profits for 3 consecutive years, excluding high-growth firms.
Countries marked with * rely on the sample with at least 20 employees.

SAFE: Deterioration relative to previous 6 months


Sources: SAFE survey
Notes: Firms experiencing lower turnover, lower profits and higher interest expenses compared to the previous six months

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taken from the 6th Vintage CompNet Cross Country Report

Distressed firms: Zombie congestion?

Sector investment and share of distressed firms
(median investment of the 2-digit industry and share of distressed firms)
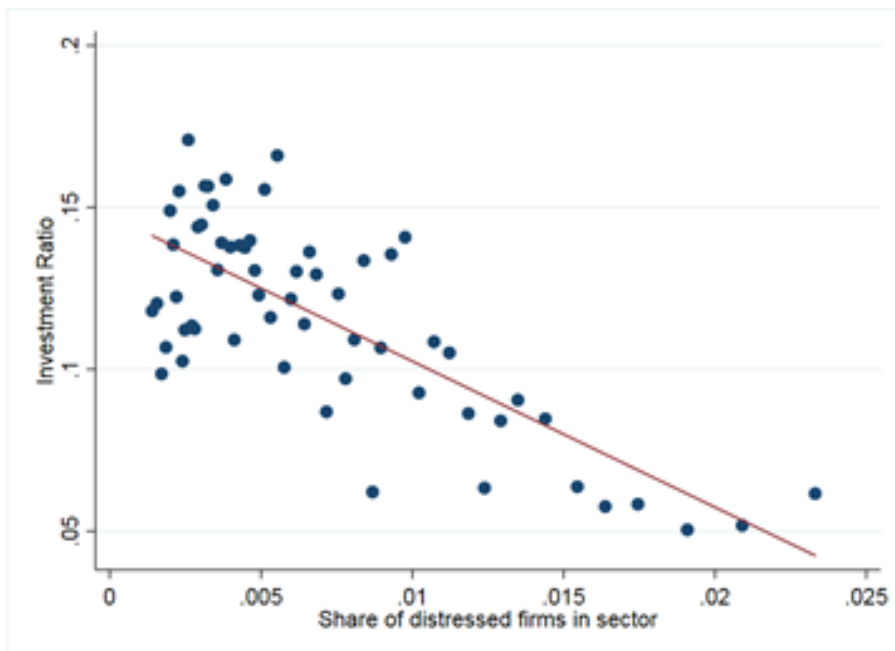
Source: 6th vintage of CompNet, full sample.
Notes: Firms with interest payments higher than operating profits for 3 consecutive years, conditional on positive profits. Countries included: BE, CZ, FI,HU, IT, LT, PT,RO, SP, SE. Binscatter controlling for country FE.

Do distressed firms have a sizeable economic impact?

- The chart shows median investment in each country-sector-year and share of distressed firms

- Sector with a higher share of distressed firms show significantly lower investment ration and job creation rates

taken from the 6th Vintage CompNet Cross Country Report

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5. Concluding Remarks

Concluding Remarks

CompNet

The CompNet Dataset

Cross-Country Comparability

Frontier Policy and Research Work

Thank You!

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Background Slides

Raw Variables and Definitions

Variables	Common definition
Capital (Tangible fixed assets)	Tangible fixed assets
Raw materials	Consumption of materials + energy+ external services
Labour cost	Gross employee compensation
Value added	Turnover - material
Number of employees	Average number of employees calculated in full-time equivalents
Turnover	Total sales
Total assets	Total assets
Cash and cash equivalents	Cash and balances at banks
Cash flow (from profit/loss statement)	Net income - depreciation+ extraodinary income
Profit/loss	EBIT
Interest paid (or financial charges)	Interest on financial debts + other financial expenses
Long term debt	Loans due in more than 1 year
Short-term debt	Loans due within 1 year
Total inventories	Inventories and consumable biological assets
Depreciation	Depreciation on intangible assets and tangible assets
Trade credit (accounts payable)	Trade credit or Accounts payable (Liabilities related to purchased goods and services)
Trade debt (accounts receivable)	Trade debt or Accounts receivable
Current liabilities	Current liabilities
Non-current liabilities	Non-current liabilities
Shareholder funds (equity)	Equity
Profits and losses before taxes	Earnings before taxes (EBT)
Other current assets	Current assets – Trade debtors – Total inventories
Other non-current liabilities	Provisions
Other fixed assets	Total fixed assets - tangible fixed assets - intangible fixed assets
Intangible fixed assets	Total intangible fixed assets
Current assets	Current assets
Other current liabilities	Other current liabilities
Total fixed assets	Tangible, intangible and other fixed assets
Dividends	Dividends
Firm's birth year	Year of establishment of the firm

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Sample coverage: AMADEUS

> Although AMADEUS includes many firms, only a small share of them have employment information

Table 1: share of firms in Amadeus with data to construct productivity and TFP

	BELGIUM			GERMANY			SPAIN			ITALY		
	Number of firm ids	% with employment and turnover	% with employment, material costs, fixed assets and turnover	Number of firm ids	% with employment and turnover	% with employment, material costs, fixed assets and turnover	Number of firm ids	% with employment and turnover	% with employment, material costs, fixed assets and turnover	Number of firm ids	% with employment and turnover	% with employment, material costs, fixed assets and turnover
Manufacturing	26093	18%	11%	99855	9%	6%	101477	78%	77%	137170	42%	42%
Construction	42725	10%	2%	89946	5%	2%	137877	54%	51%	105775	26%	26%
Wholesale and retail trade	73194	13%	6%	146514	6%	3%	172781	71%	69%	163278	31%	30%
Transport and storage	10087	19%	8%	29964	7%	3%	28288	71%	61%	27487	33%	29%
Hotels and restaurants	17910	11%	1%	18719	4%	1%	47637	67%	66%	44300	25%	24%
ICT	14319	9%	4%	35928	5%	2%	19169	61%	52%	33778	30%	26%
Professional services	55437	5%	1%	203817	2%	1%	70847	59%	39%	52290	24%	20%
Administrative services	15033	11%	3%	50874	5%	1%	27553	63%	51%	34137	26%	24%
Business economy (excluding real state and financial sector)	*254798*	*11%*	*4%*	*675617*	*5%*	*2%*	*605629*	*66%*	*61%*	*598215*	*31%*	*30%*

- Amadeus data available at the DG-Statistics of the ECB
- Numbers refer to 2010

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Sample coverage: AMADEUS

Selection into the sample is not random in AMADEUS: better in manufacturing and large firms

Table 2: Coverage of micro-firms with employment data in AMADEUS

	BELGIUM		GERMANY		SPAIN		ITALY	
	Coverage of micro-firms	Coverage of firms with employees	Coverage of micro-firms	Coverage of firms with employees	Coverage of micro-firms	Coverage of firms with employees	Coverage of micro-firms	Coverage of firms with employees
Manufacturing	14%	25%	1%	5%	49%	61%	14%	23%
Construction	11%	15%	1.2%	2.3%	28%	36%	8%	12%
Trade	11%	16%	1.2%	2.7%	25%	33%	10%	14%
Transport and storage	15%	24%	1.0%	2.9%	15%	22%	11%	18%
Hotels & restaurants	8%	9%	0.2%	0.6%	13%	18%	4%	6%
ICT	14%	24%	1.9%	4.2%	43%	59%	23%	32%
Professional services	11%	16%	1.3%	2.7%	30%	39%	9%	13%
Administrative services	11%	16%	1.2%	2.8%	18%	27%	12%	19%
Business economy (excluding real state and financial sector)	*11%*	*17%*	*1.1%*	*2.9%*	*25%*	*34%*	*10%*	*15%*

- Amadeus data available at the DG-Statistics of the ECB
- Numbers refer to 2010

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