Firm Concentration and Aggregate Productivity

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Motivation

Evidence of rising firm concentration in both the US and Europe
(Though more pronounced and sustained in the US)

What are the consequences?
- Negative view
  - Reflects increases in market power and markups
  - More lax antitrust enforcement
  - Increases in competition stifling business regulations
- Positive view
  - Changing nature of competition rewarding more efficient firms with increased market shares
  - "Winner take all/most" VanReenen (2018)
- Our contribution: Assess concentration trends in Europe and how they fit with those views

Overview of US Evidence

Along with increases in concentration over the past 20 years, the US has also experienced:

- Increases in aggregate markups driven by market share reallocations towards high markup firms (DeLoecker et al, 2020)

- Decreases in labor share also driven by market share reallocations (Autor et al, 2020)

- Increases in productivity dispersion (Decker et al, 2018)

- Decreases in *local* measures of concentration (Rossi-Hansberg et al, 2020)

Correlates of rising concentration across sectors:

- Increases in sector productivity (Autor et al, 2020)

- Increases in intangible capital investment (Crouzet and Eberly, 2019)

Revenue concentration in US
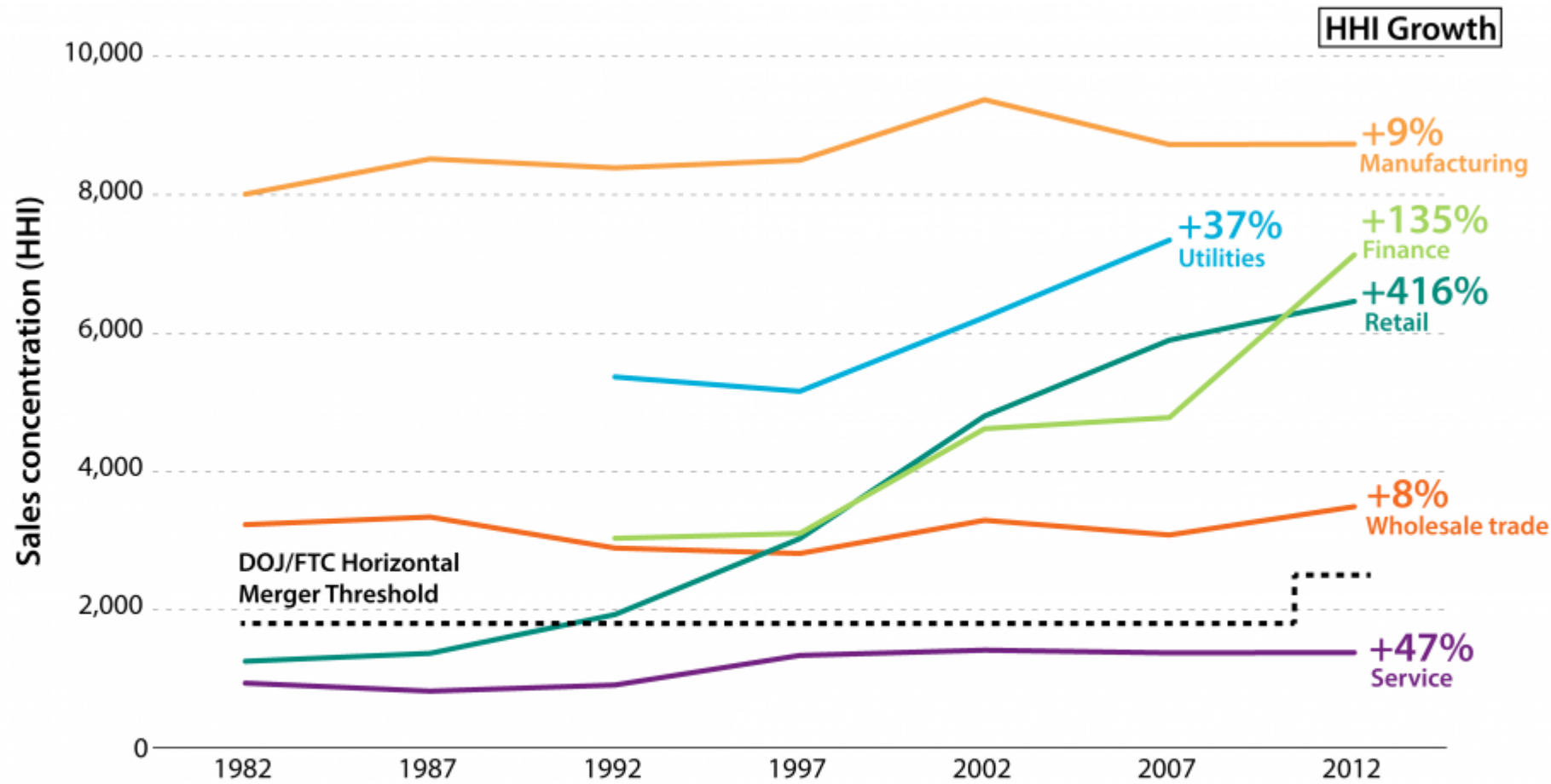
Revenue Concentration in Europe

- Conflicting trends in last 20 years based on data source
  - OECD Multiprod: Increasing concentration
  - Orbis: Decreasing concentration

- Challenge: How to harmonize firm-level data across countries?

- Using CompNet data, we find a trend for increased concentration at the *aggregate* level after 2008

Data description: the CompNet dataset

- Unbalanced panel of 19 European countries for the period 2000-2017
- Micro-aggregated indicators on productivity, concentration and competitiveness
- The indicators are computed using mostly administrative data which have better coverage than other sources (e.g. Amadeus, ORBIS)
- A careful harmonization process allows full cross-country comparison

Countries	Macro – Sectors
Belgium, Czech Republic, Finland, France, Germany, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Switzerland	Manufacturing, Transportation and storage, ICT, Real Estate, Professional activities, Administrative and service

In order to allow full comparability the following Macro Sectors available in CompNet are excluded: Construction, Wholesale and retail trade, Accomodation and food service activities
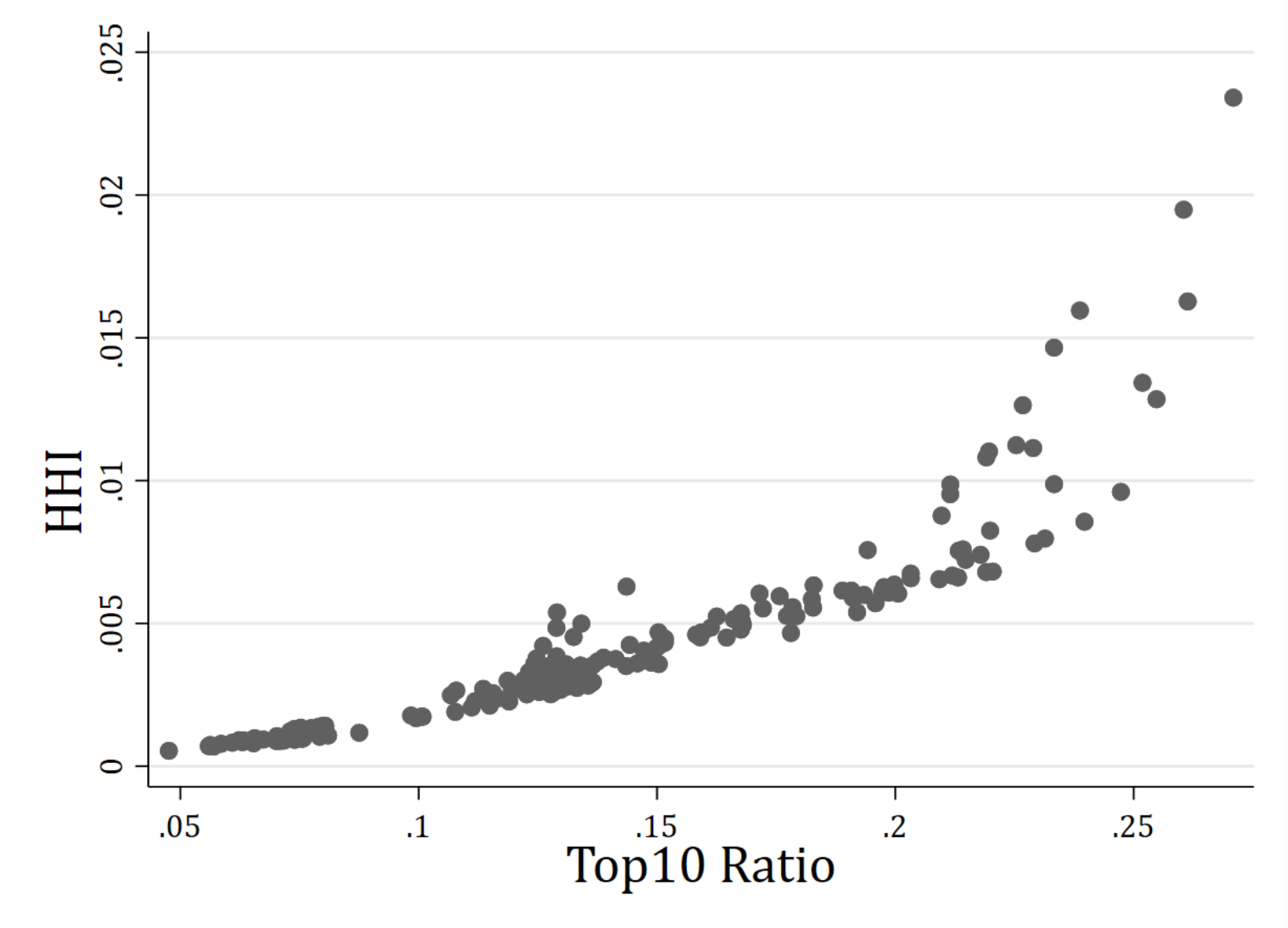
Measuring concentration

- Top *n* ratio: share of the *n* firms with the highest revenue

- Herfinahl-Hirschman Index:
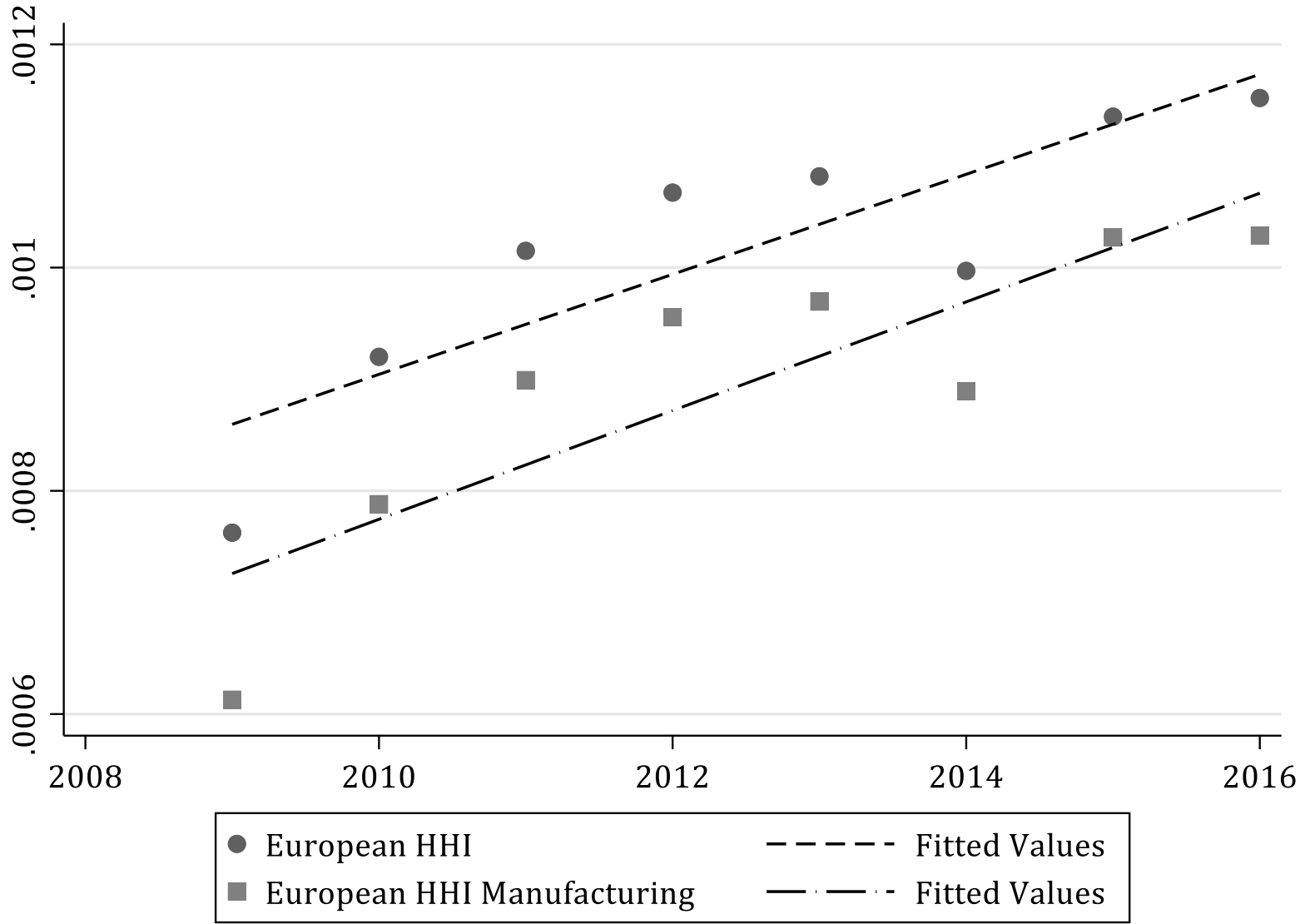
$$HHI = \sum_{i=1}^{T} s_i^2$$

Range from 1/N (no concentration) to 1 (maximum concentration)

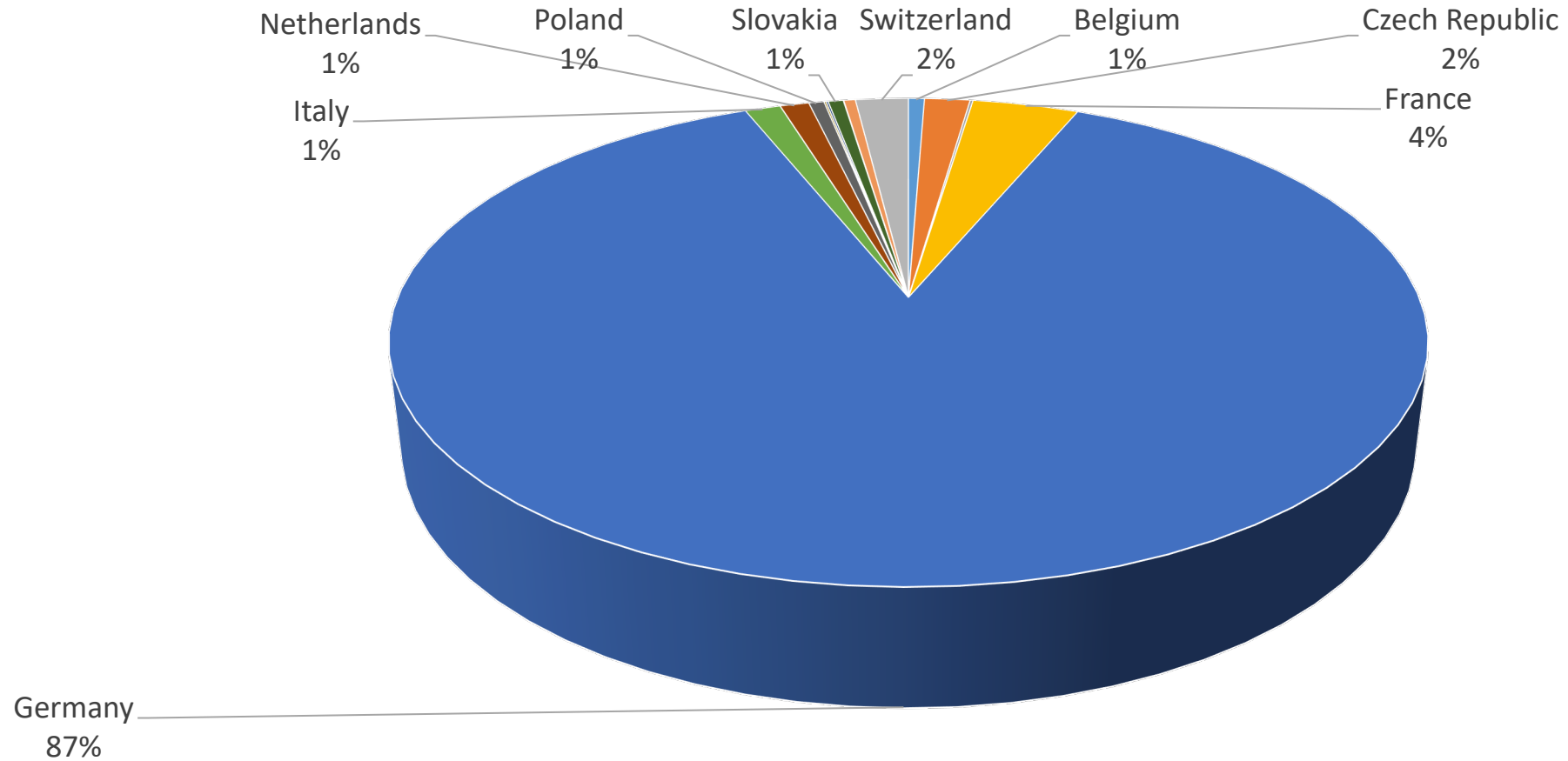- Advantage of *HHI*: Can be decomposed/aggregated across groups

Top10 ratio vs HHI: levels

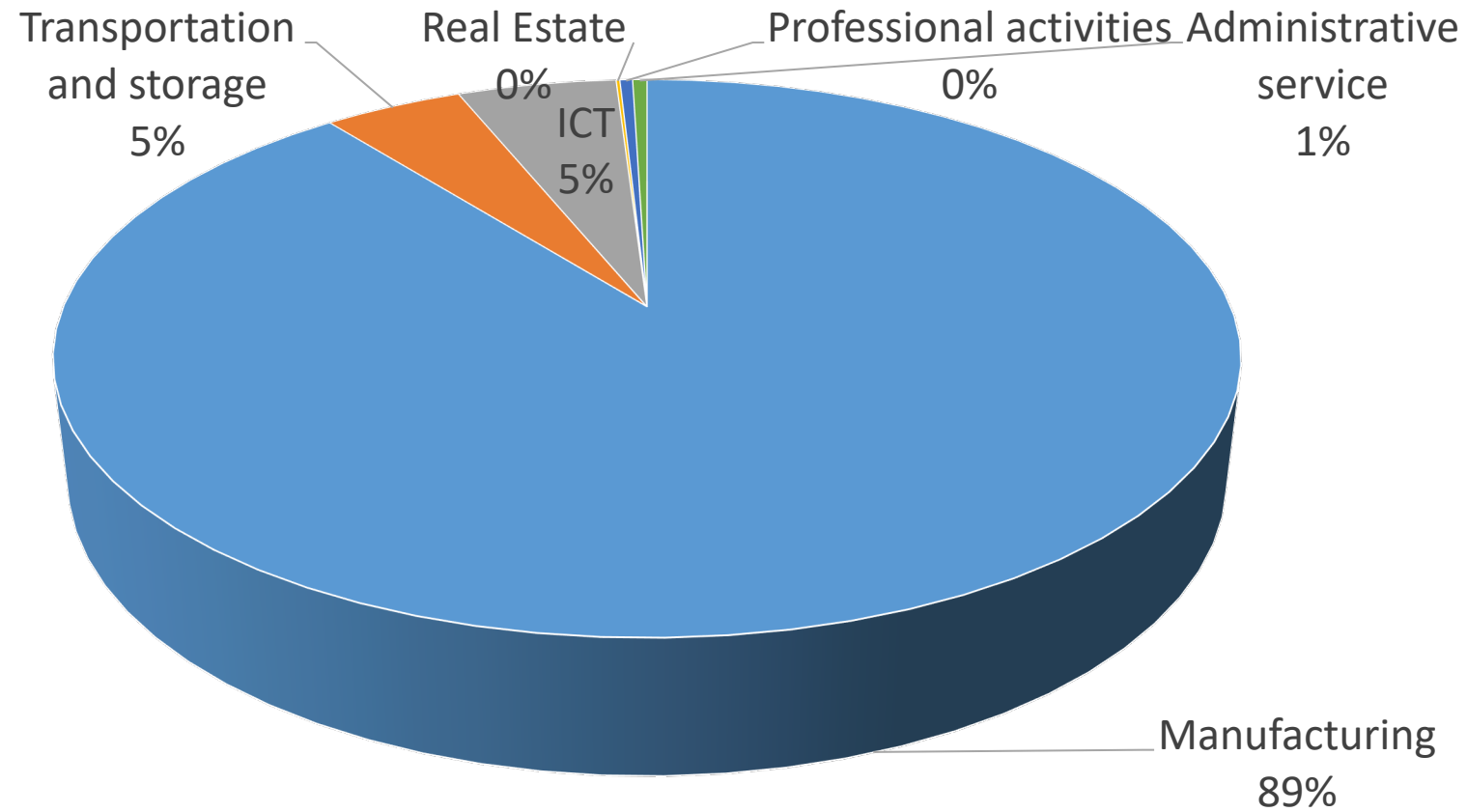# Top10 ratio vs HHI: first differences

Aggregated *HHI* revenue concentration in Europe

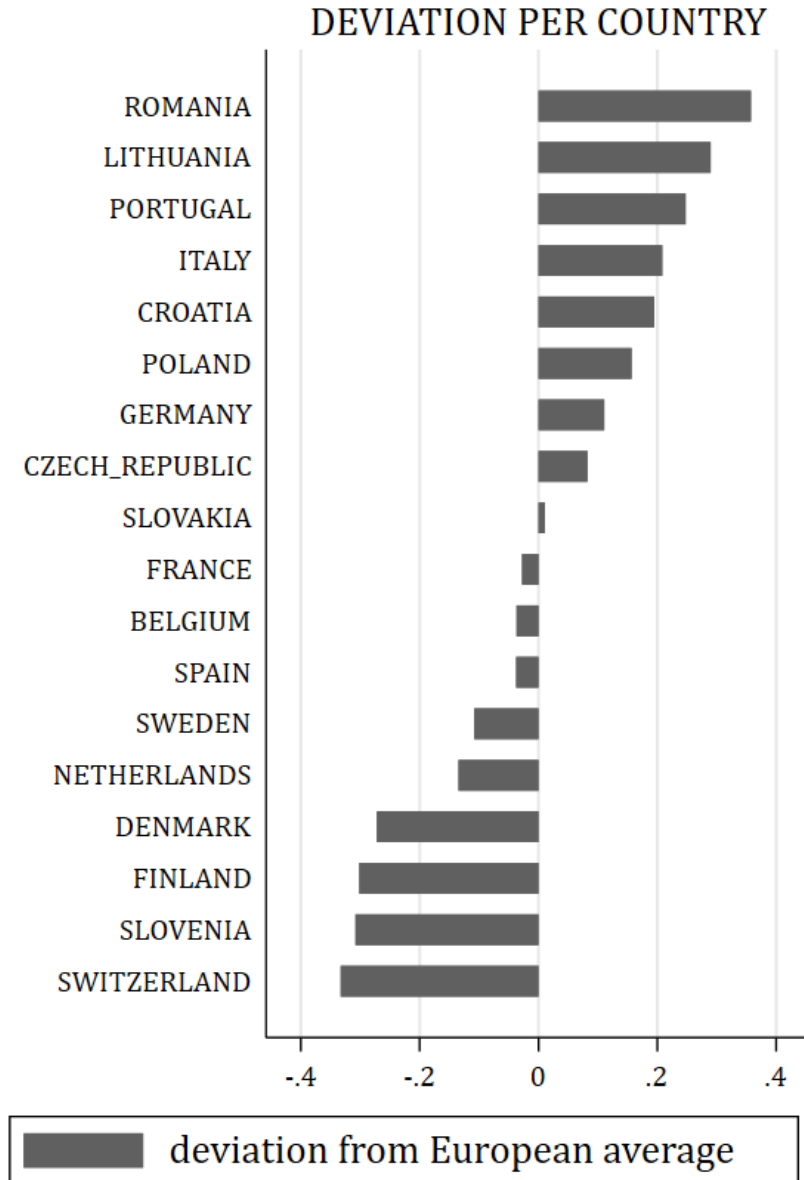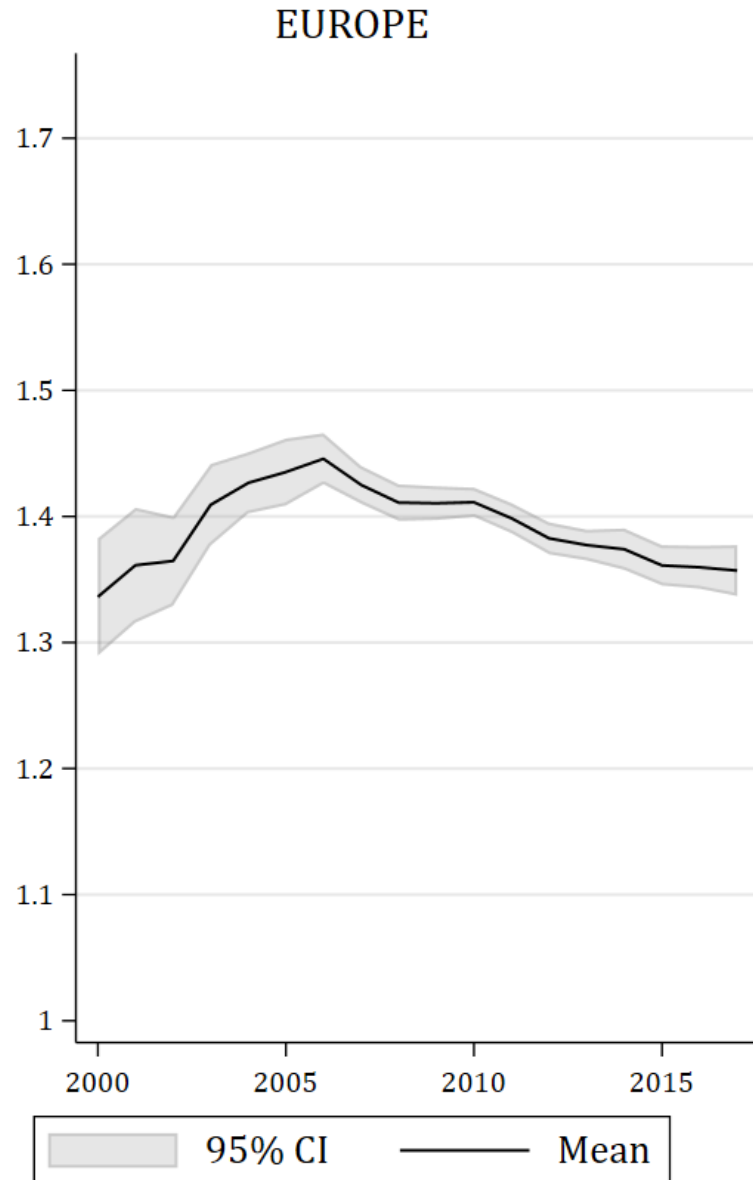# Aggregated *HHI* decomposition by country
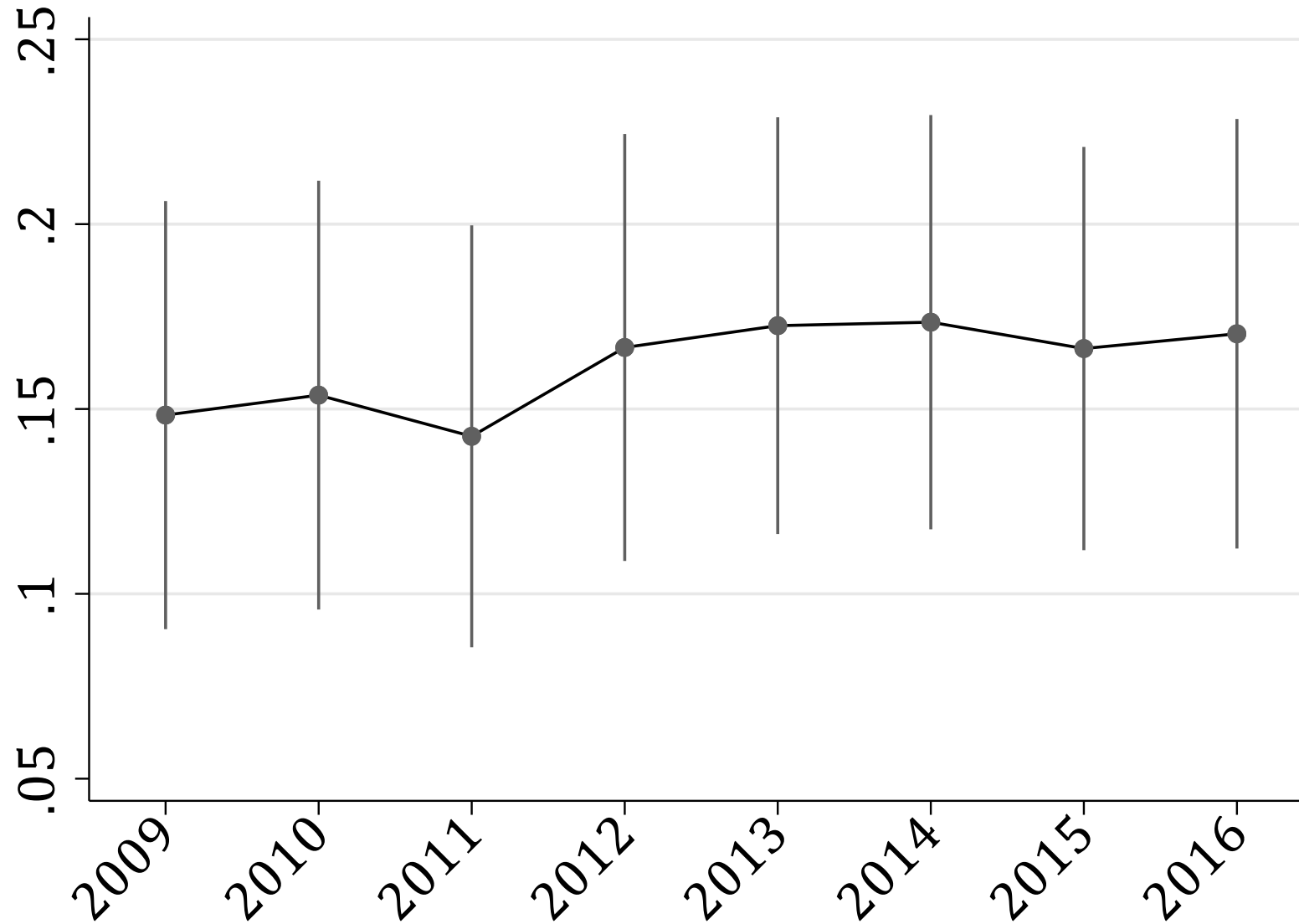
Aggregated *HHI* decomposition by Sector

Changes in concentration within (narrow) sectors and countries

Productivity dispersion

Size-productivity premium

Size-productivity premium by sector
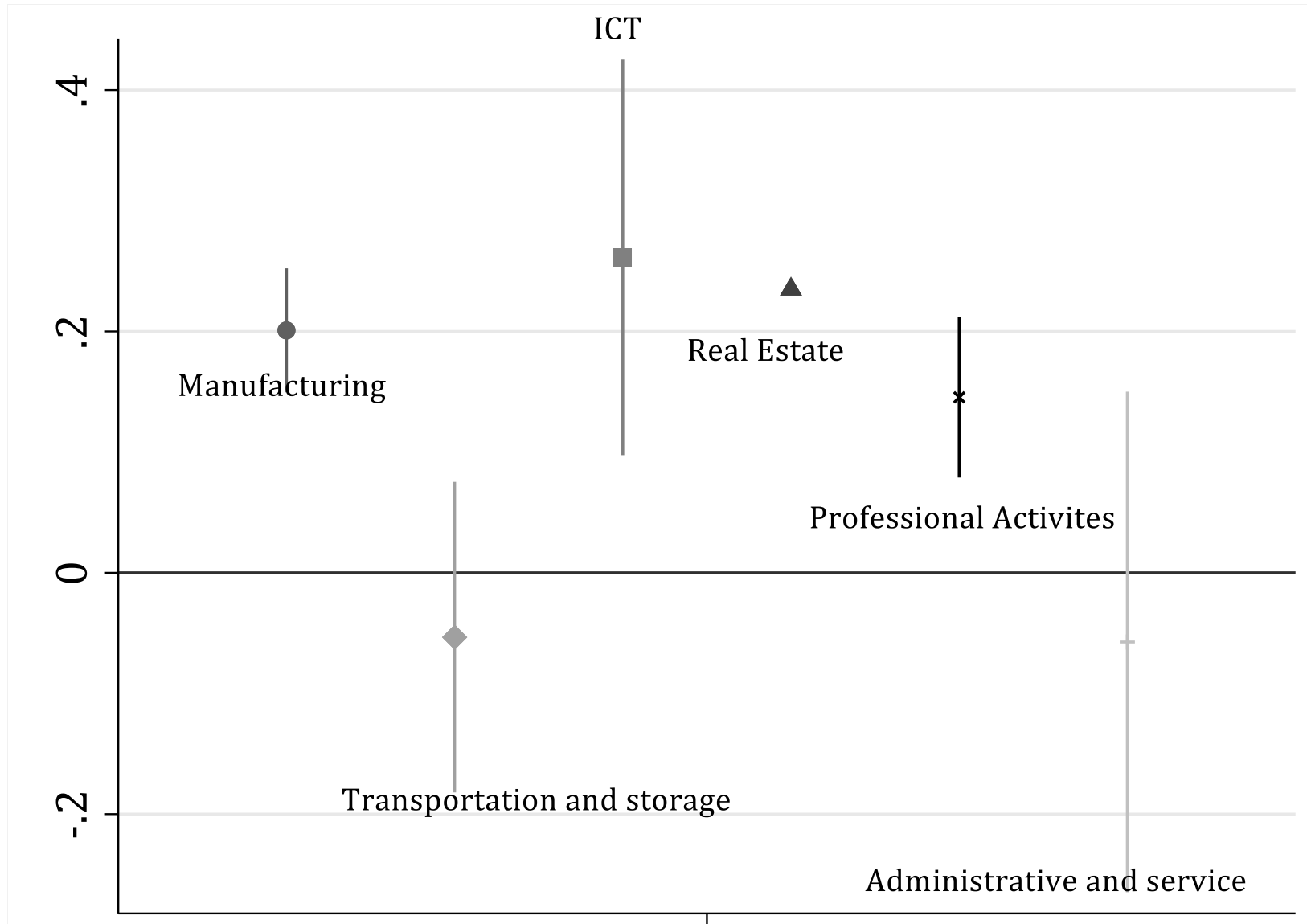
Size-productivity premium by country
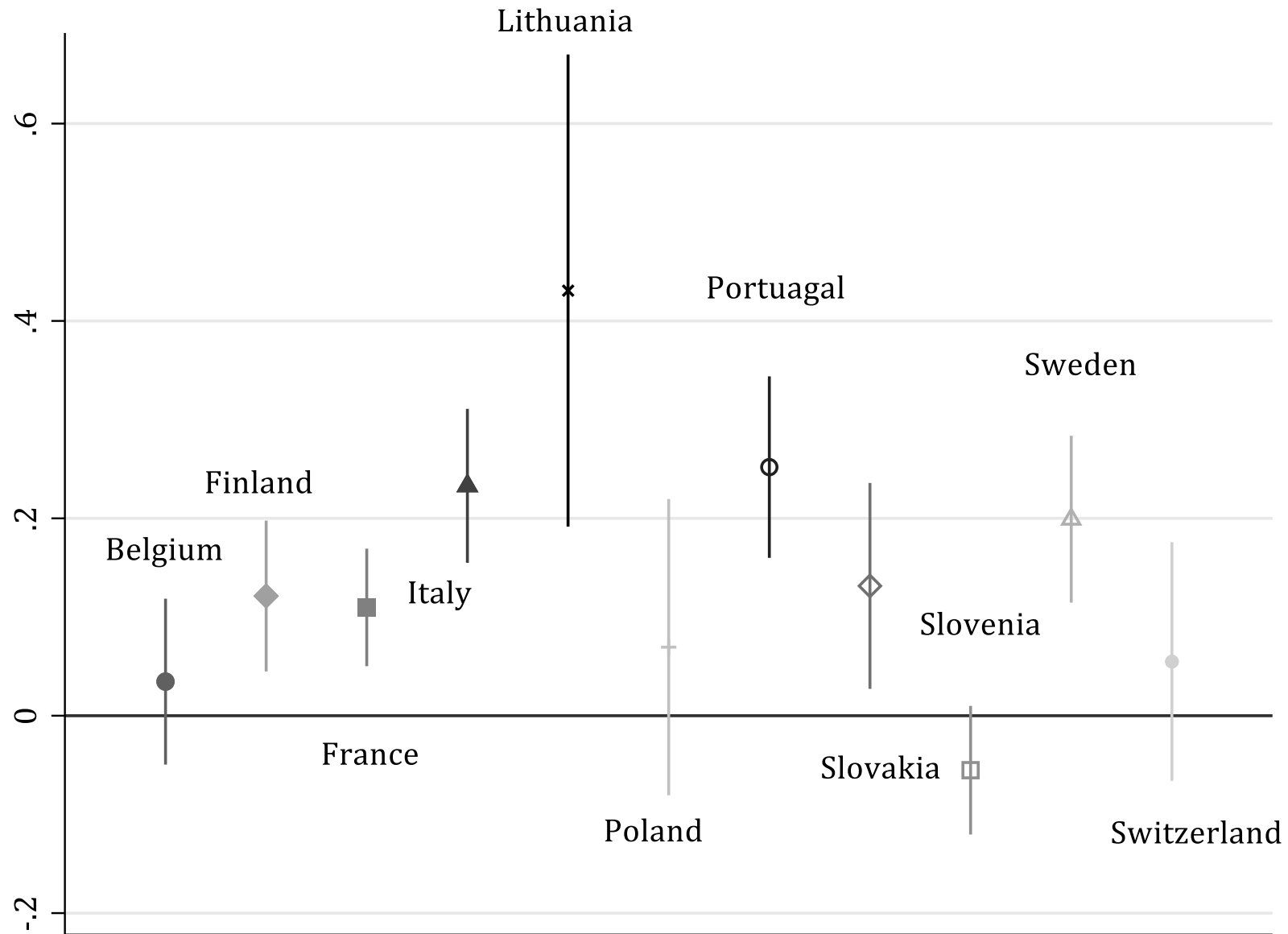
Concentration and sector productivity

	All sectors		
	(1)	(2)	(3)
	HHI	HHI	HHI
Sector Labor Productivity	0.390***	0.459***	0.379**
	(0.107)	(0.116)	(0.160)
Capital Intensity	-0.0788	-0.0733	-0.0558
	(0.0747)	(0.0669)	(0.0648)
Median Firm size		0.130	0.168
		(0.0914)	(0.112)
Weighted Average Markup		-0.399	-0.255
		(0.239)	(0.203)
Intangible K intensity			-0.00305
			(0.0250)
Observations	6,890	6,643	4,145
Year FE	YES	YES	YES
Sector- Country FE	YES	YES	YES
R-squared	0.867	0.873	0.881
# of Clusters	48	47	46

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Concentration and sector productivity: manufacturing

	Manufacturing			
	(1)	(2)	(3)	(4)
	HHI	HHI	HHI	HHI
Sector Labor Productivity	0.326***	0.245**	0.105	0.166
	(0.102)	(0.0954)	(0.111)	(0.125)
Capital Intensity	-0.299**	-0.290**	-0.149	-0.196
	(0.115)	(0.112)	(0.123)	(0.146)
Median Firm size		0.174	0.251	0.326*
		(0.170)	(0.174)	(0.180)
Weighted Average Markup		0.524	0.306	0.287
		(0.570)	(0.754)	(0.851)
Intangible K intensity			0.0252	0.0383
			(0.0514)	(0.0611)
Exporting Firms share				0.0136
				(0.531)
Observations	3,782	3,699	2,311	1,776
Year FE	YES	YES	YES	YES
Sector- Country FE	YES	YES	YES	YES
R-squared	0.901	0.899	0.914	0.893
# of Clusters	23	22	22	22

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Measuring allocative efficiency: Olley- Pakes decomposition

- Let y_{st} be the productivity in sector *s* at time *t*, measured as the weighted average of firm-level productivity y_{it} with weight s_{it} given by firm size

- y_{st} can be decomposed as follows:

$$y_{st} = \bar{y}_{st} + \sum_{i \in s} (s_{it} - \bar{s}_t)(y_{it} - \bar{y}_t)$$

- The second term is a covariance between productivity and firm size. It is an index of *allocative efficiency*

Concentration and allocative efficiency

	All sectors		
	(1)	(2)	(3)
	HHI	HHI	HHI
Covariance between Labor Prod and Firm Size	0.00614***	0.00654***	0.00748***
	(0.00119)	(0.00137)	(0.00107)
Capital Intensity	-0.00425	0.0199	0.0124
	(0.0666)	(0.0583)	(0.0547)
Median Firm size		0.109	0.147
		(0.0938)	(0.112)
Weighted Average Markup		-0.317	-0.187
		(0.221)	(0.149)
Intangible K intensity			-0.00135
			(0.0233)
Observations	6,890	6,643	4,145
Year FE	YES	YES	YES
Sector- Country FE	YES	YES	YES
R-squared	0.874	0.880	0.889
# of Clusters	48	47	46

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Concentration and allocative efficiency: manufacturing

	Manufacturing			
	(1)	(2)	(3)	(4)
	HHI	HHI	HHI	HHI
Covariance between Labor Prod and Firm Size	0.0130***	0.0140***	0.0125***	0.0124**
	(0.00226)	(0.00319)	(0.00413)	(0.00468)
Capital Intensity	-0.197*	-0.186*	-0.117	-0.147
	(0.101)	(0.0983)	(0.113)	(0.128)
Median Firm size		0.0793	0.172	0.242
		(0.149)	(0.146)	(0.157)
Weighted Average Markup		-0.0254	-0.322	-0.225
		(0.740)	(0.786)	(0.889)
Intangible K intensity			-0.00225	0.0115
			(0.0475)	(0.0559)
Exporting Firms share				0.226
				(0.511)
Observations	3,782	3,699	2,311	1,776
Year FE	YES	YES	YES	YES
Sector- Country FE	YES	YES	YES	YES
R-squared	0.910	0.908	0.919	0.898
# of Clusters	23	22	22	22

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Conclusion

- European concentration has increased over the last 10 years
  - Mainly driven by changes in a few big countries
- Increases in concentration are strongly correlated with increases in sector productivity and increases in allocative efficiency
- Thus:

Rising European concentration should not be viewed as a signal of a weak competitive environment with rising market power

Rather, it is an indication of a changing competitive environment where more efficient firms are rewarded with increasing market shares

Going forward…

- Analysis using German firm-level data to study the channels for changing concentration

- Effects of trade on concentration and productivity

- New measures of concentration: HHI employment, HHI value addedd, HHI intangibles (available in the next CompNet 8th Vintage)