Supersize Me: Intangibles and Industry Concentration

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BETTER POLICIES FOR BETTER LIVES

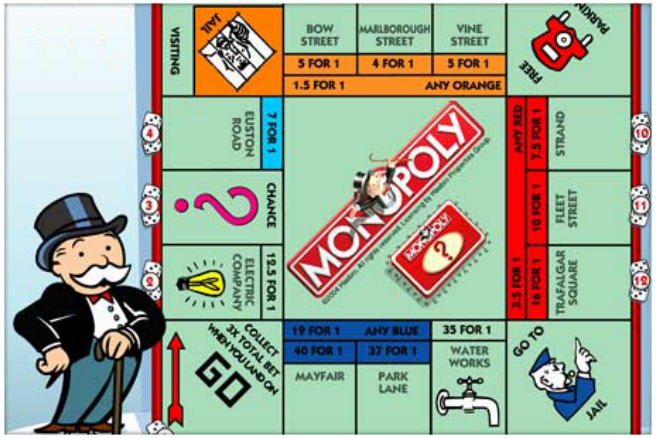
Big firms are getting bigger

Source: https://www.artstation.com/artwork/x2xR4

- Evidence of increasing industry concentration
  - **US**: e.g. Furman and Orszag (2015), Grullon et al. (2019) and Autor et al. (2019)
    - National vs. local (Rossi-Hansberg, Sarte, Trachter, 2018)
  - **Europe**: Bajgar et al. 2019 BUT Valletti et al., 2017; Social Market Foundation, 2017; Gutiérrez and Philippon, 2018

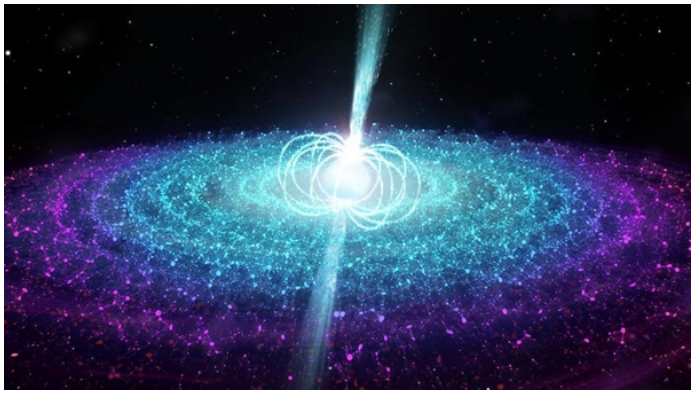
Good vs. bad concentration?

Market power



- US concentration after 2000 associated with lower investment and higher prices (Gutierrez and Philippon, 2019a)
- Elasticity of entry to Tobin's Q related to lobbying and regulations (Gutierrez and Philippon, 2019b)
- BUT increasing concentration associated with *higher* innovation and productivity growth (Bessen, 2017; Ganapati (2018)

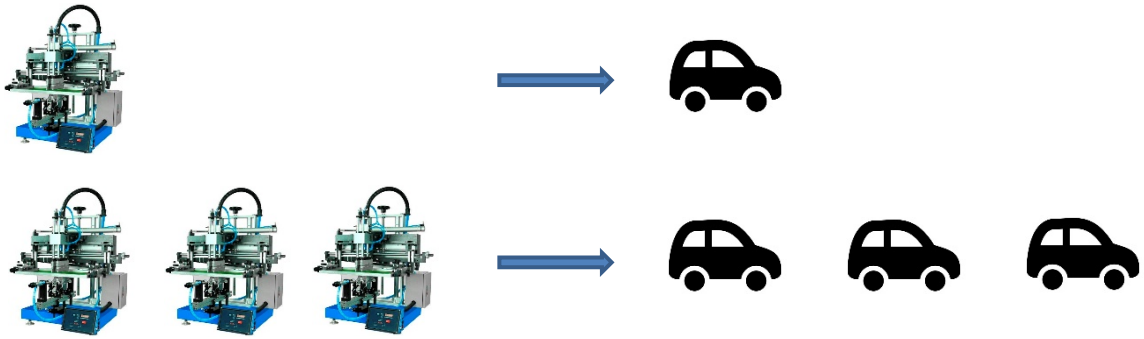
Superstars



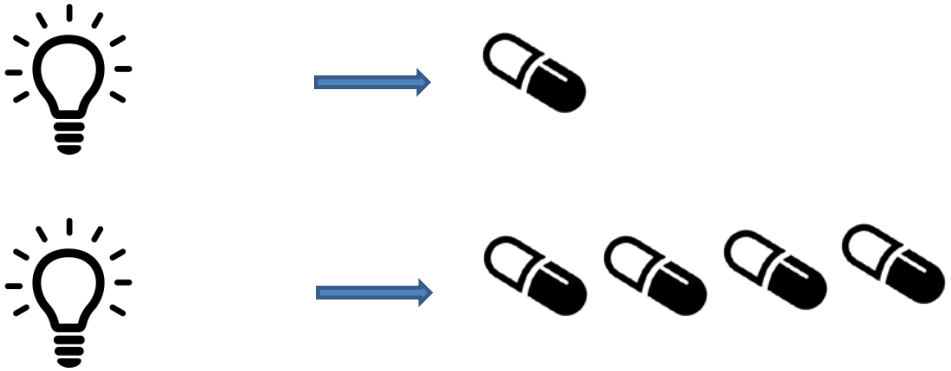
- BUT increasing concentration associated with *higher* innovation and productivity growth (Bessen, 2017; Ganapati (2018)
- Structural change disproportionately benefits large/productive firms
  - e.g. technology, globalisation, low interest rates
  - Autor et al., 2019; Liu et al., 2019
  - Proprietary software important (Bessen, 2017)
  - **Intangibles assets** (Crouzet, Eberly (2018)

Scalability of intangible capital

Tangible capital



Intangible capital



Haskel and Westlake, 2017

Is the increase in concentration related to the rising role of intangible investment?

Paper overview

What we do

- Link changes in industry concentration to intangibles investment and other potential determinants
- 7 European economies (Belgium, Spain, France, Finland, Italy, Great Britain and Sweden) + United States + Japan (*Greece, (Hungary), Denmark about to be added)*

Preview of results

- Concentration increased by 5p.p. on average
- Intangible investment a strong predictor of concentration changes
- Effects especially strong in open, concentrated and digital country-industries
- Industry-level results supported by firm-level evidence (patents)

Related literature

- Macro trends
  - Declining **business dynamism** (e.g. Haltiwanger et al., 2017);
  - **Productivity** divergence (e.g. Andrews et al., 2016); Berlingieri et al. (2017)
  - Increase in **profit** dispersion (Bessen, 2017; Eggertsson et al., 2018);
  - Increase in **mark-ups** (De Loecker and Eeckhout, 2017; Traina, 2018)
  - Decline in **labour share** (Autor et al., 2017) and **investment** (Gutierrez and Philippon, 2016, 2017b; Crouzet and Eberly, 2018).
- **Role of Intangibles?**
  - Positively associated with market shares in US (Crouzet and Eberly, 2018)
  - More important in US before 2000? (Gutierrez and Philippon, 2019)

DATA AND MEASUREMENT

How do we measure concentration?

Measure: share of sales due to 8 (4, 20) largest business groups

Level: country-industry

- see Bajgar et al. (2019) for world region-industry analysis
- A64 industries -> differ from *product markets*

Data: matched Orbis-Zephyr-Worldscope data

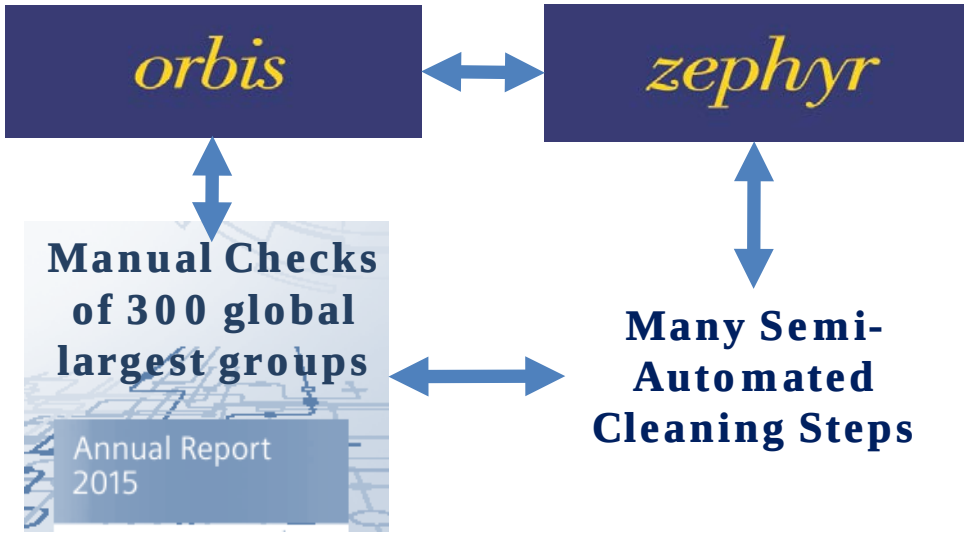
Industry sales (denominator): OECD STAN

- dangers of other choices with coverage changes

Data for concentration

Group-Subsidiary Ownership Data
(2.8 million firms 2002-2014)

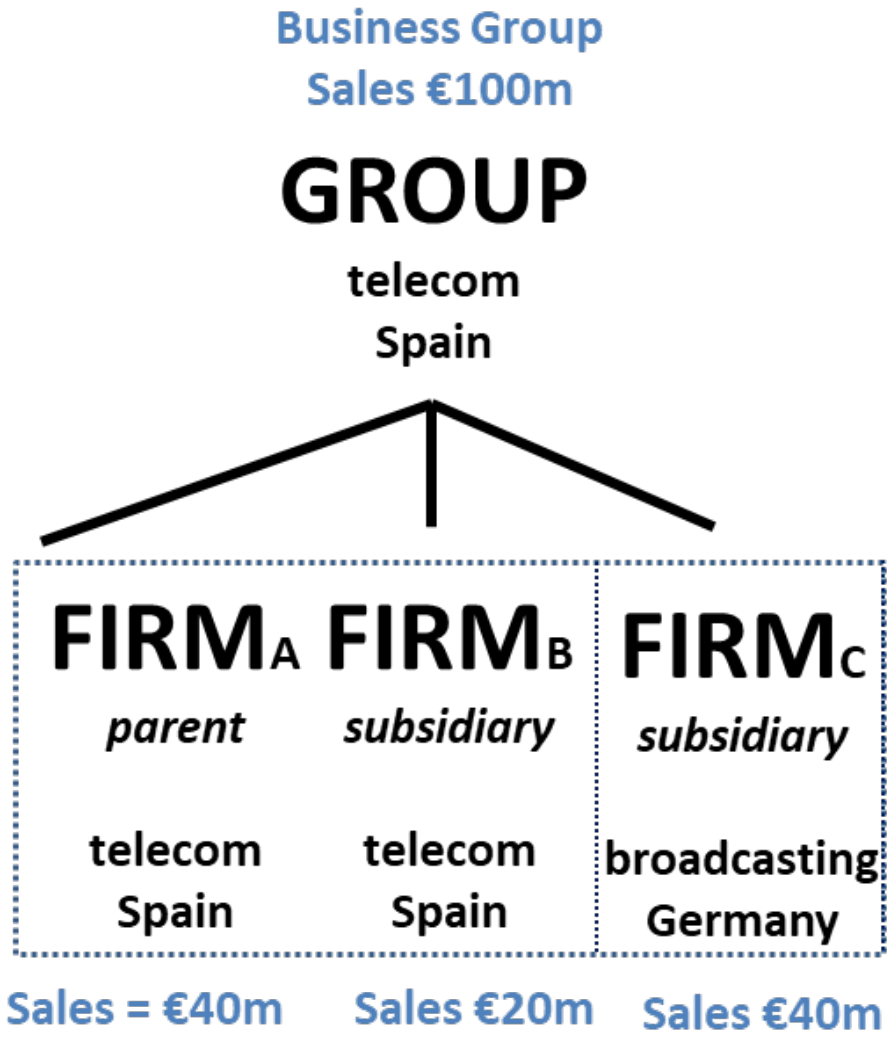
Sales Data for Subsidiaries, Parent & Group
(100 Countries)



Sample

- Manufacturing + non-financial market services
- 9 countries (so far): BEL, ESP, FRA, FIN, ITA, GBR, JPN, SWE, USA
- 2002-2014

Apportion business-group sales to industries & countries



Drivers of concentration: measures

Intangible investment: INTAN-Invest

- overall, innovation, software, economic competencies, tangible investment
- by country and A21 industry

Tangible investment (GFCF): OECD STAN

Openness to trade: OECD TiVA database

- openness = (exports+imports) / value added. final goods vs. intermediates

Exposure to FDI: OECD FDI statistics

- exposure = (outward FDI+inward FDI) / value added

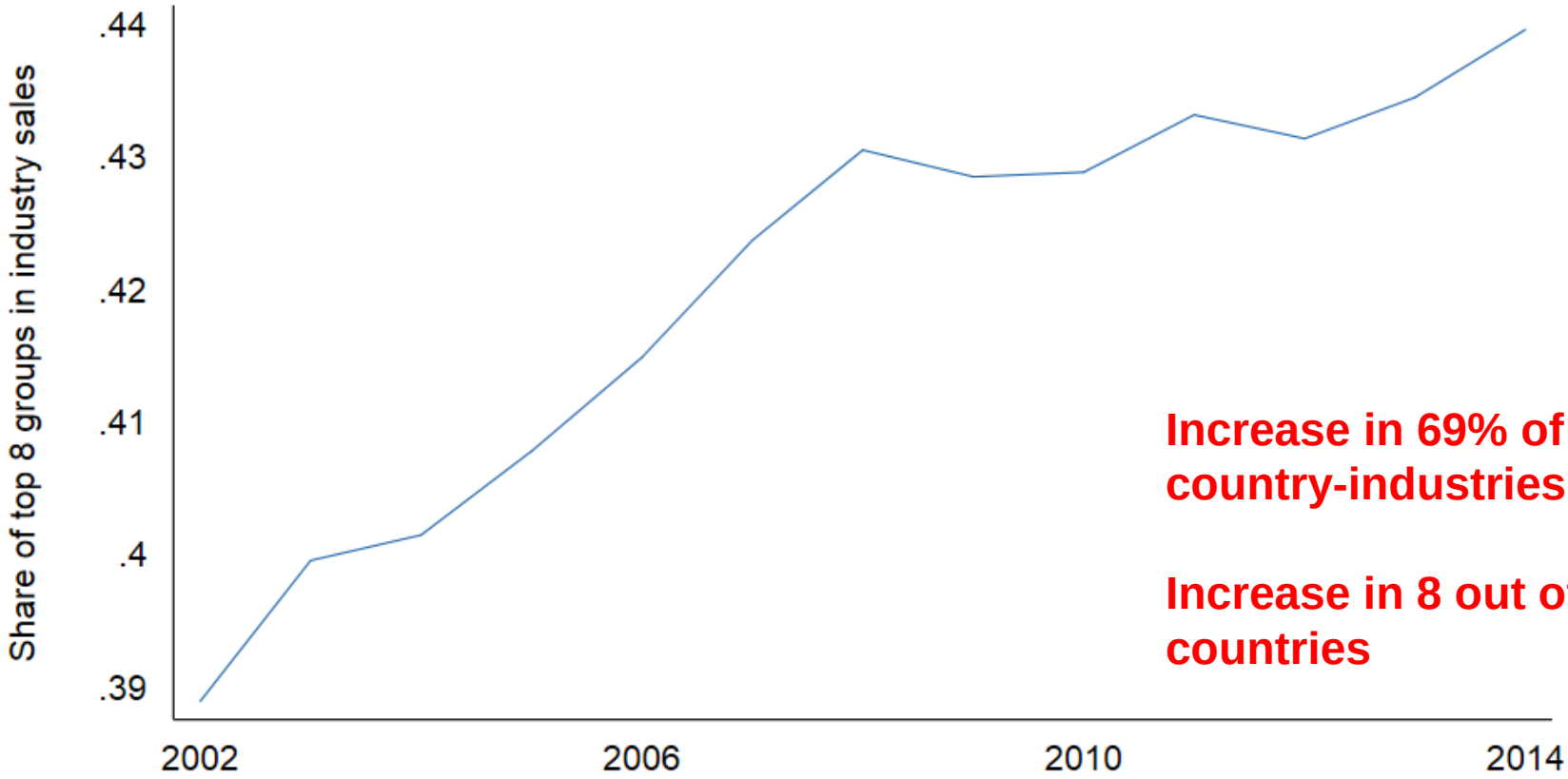
Industry digital intensity: Calvino et al. (2018)

Product market regulations & Employment protection legislation index: OECD

TRENDS

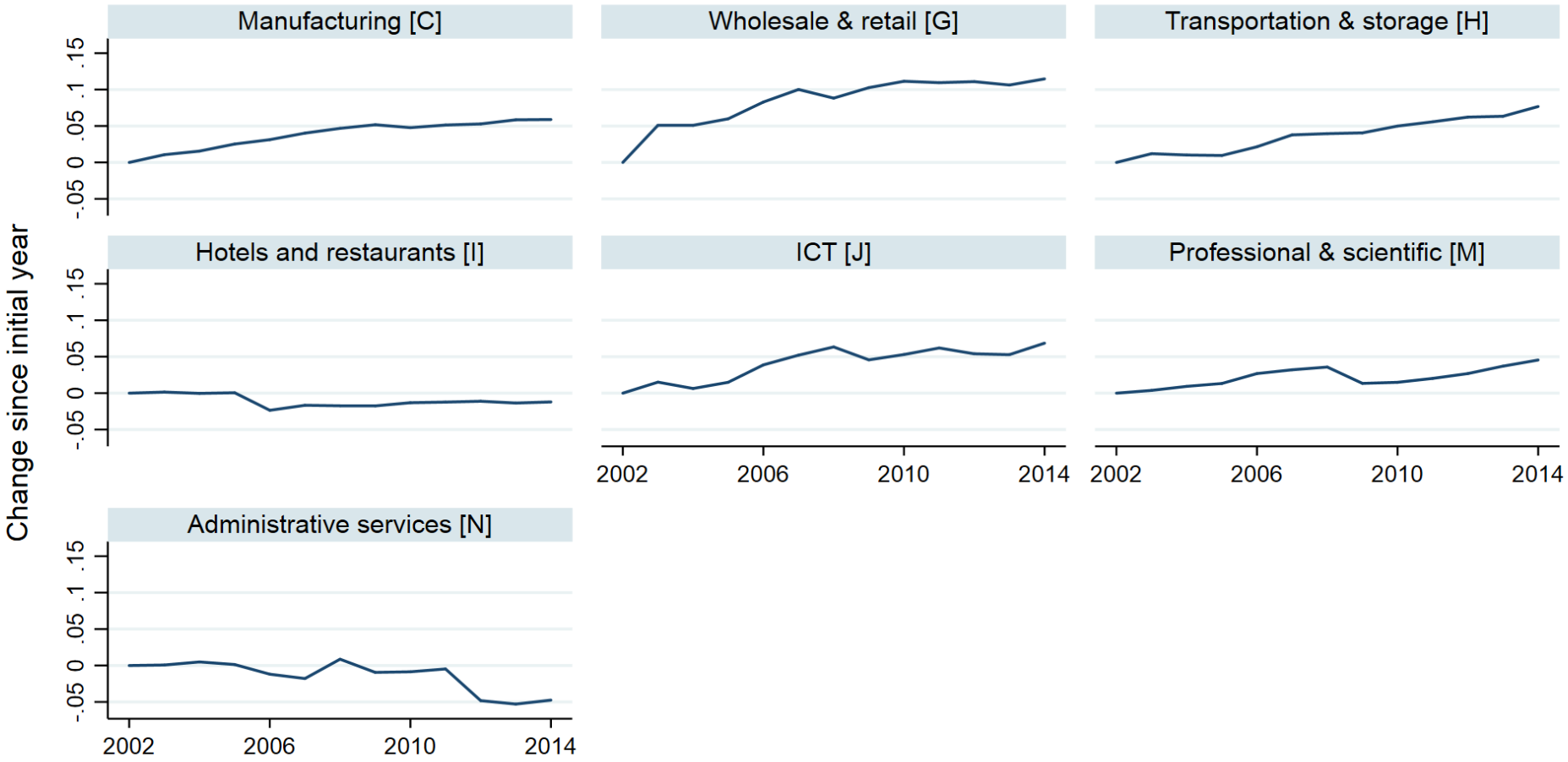
Industry concentration is increasing

Share of sales due to 8 largest groups



Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

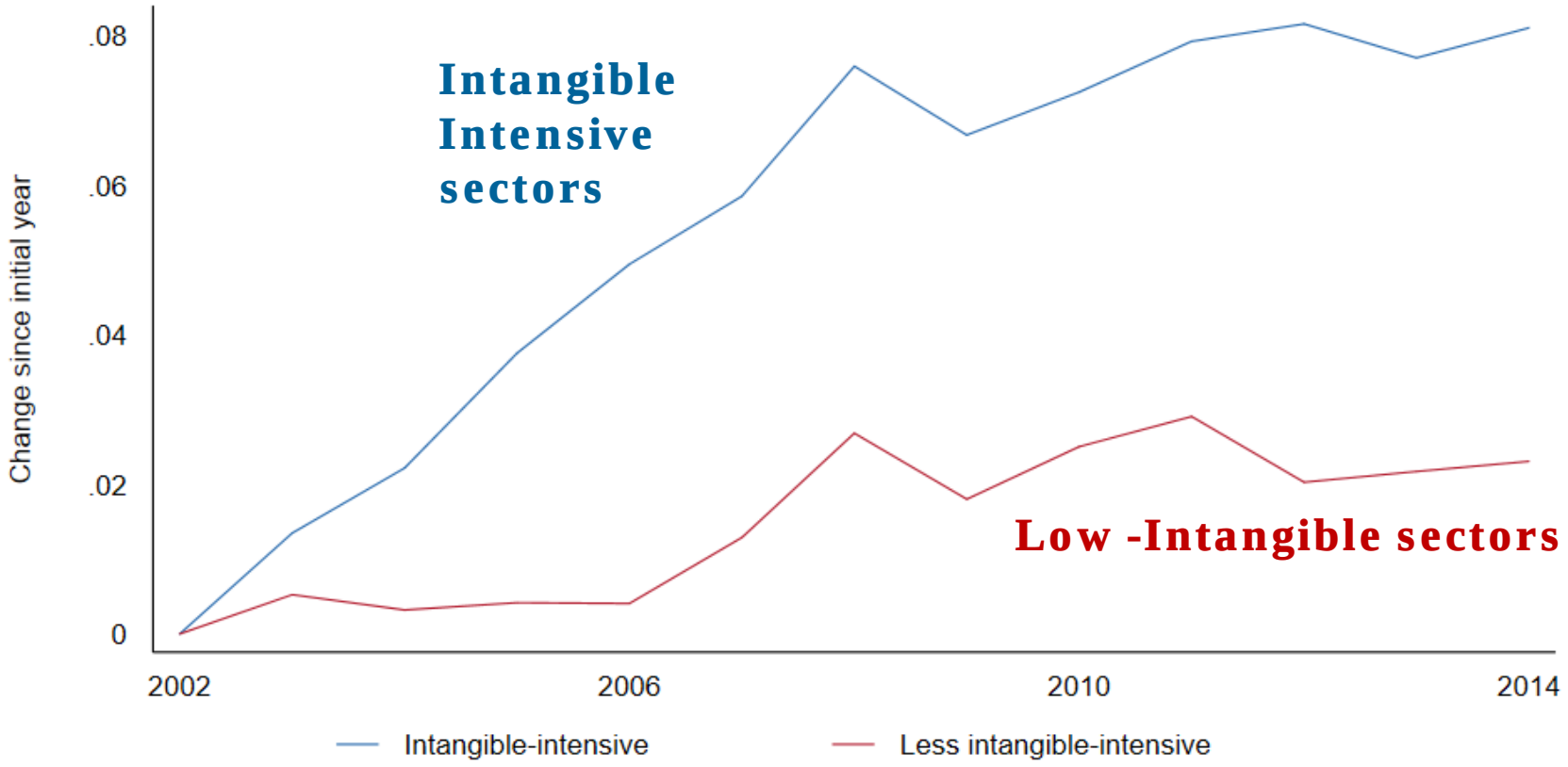
Systematic variation in concentration changes across industries



Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

Increase in concentration much larger in intangible-intensive industries

Change in the share of sales due to 8 largest groups (rel. to 2002)



Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

ECONOMETRIC RESULTS

Baseline specification

Baseline:

Relate 4-year changes in concentration to “potential drivers”(correlations no causality!):

$$\Delta CR^{8}_{ci\,(t+k,t-1)} = \beta_1 Intan_{cit} + \beta_3 \Delta \log S_{ci\,(t+k,t-1)} + \delta_c + \delta_i + \delta_t + \varepsilon_{cit}$$

Robustness:

- 2-year and 6-year changes in concentration
- CR4, CR20

Changes in concentration strongly correlated with intangible investment

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intangible Investment	0.149***	0.221***	0.147***	0.386***	0.133***	0.221***	0.144***	0.151***	0.232***
	(0.040)	(0.070)	(0.039)	(0.085)	(0.039)	(0.070)	(0.041)	(0.040)	(0.074)
Tangible Investment			0.025	-0.186***					
			(0.040)	(0.055)					
Trade Openness					0.012**	0.004			
					(0.005)	(0.010)			
High Digital Intensity							0.007		
							(0.008)		
Product Market Regulation								0.015	0.091
								(0.021)	(0.058)
Country and Industry FE		Y		Y		Y			Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	2709	2709	2709	2709	2708	2708	2709	2708	2708

10 pp increase in intangible investment to value added ratio is linked to 1.3-2.2 pp increase in concentration

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

The effect of intangibles stronger in globalised, digital and concentrated sectors

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure Variable:	Initial Trade Openness		High Digital Intensity		Initial Concentration		Initial Product Market Regulation	
Intangible Investment (II)	0.150***	0.213***	0.045	0.155*	0.157***	0.246***	0.168***	0.209***
	(0.033)	(0.068)	(0.042)	(0.079)	(0.045)	(0.068)	(0.046)	(0.072)
II * Exposure Variable	0.196***	0.195**	0.345***	0.174*	0.362**	0.424***	0.114	-0.083
	(0.069)	(0.075)	(0.076)	(0.104)	(0.162)	(0.142)	(0.199)	(0.181)
Exposure Variable	-0.014	-0.017	-0.049***	-	-0.089***	-0.141***	-0.017	-
	(0.011)	(0.019)	(0.014)		(0.026)	(0.028)	(0.032)	
Country and Industry FE		Y		Y		Y		Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2684	2684	2709	2709	2702	2702	2702	2702

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

Effect strongest for innovative property

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Innovative Property Investment	0.200***	0.337***					0.173**	0.395***
	(0.062)	(0.103)					(0.074)	(0.112)
Computer and Software Investment			0.413**	-0.043			0.212	-0.195
			(0.166)	(0.236)			(0.151)	(0.289)
Economic Competencies Investment					0.292**	0.260	0.065	0.028
					(0.127)	(0.182)	(0.146)	(0.180)
Country and Industry FE		Y		Y		Y		Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2709	2709	2601	2601	2709	2709	2601	2601

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

From industries to business groups

Relate 4-year changes in market shares to growth in patent stock (and also industry-level intangibles):

$$\begin{aligned}\Delta s_{gci\,(t+k,t-1)} = {} & \alpha_1 \Delta \ln(1+Patent)_{git\,(t+k,t-1)} \\ & + \alpha_2 \Delta \ln(1+Patent)_{git\,(t+k,t-1)} * s_{git-1} + \alpha_3 s_{git-1} \\ & + \alpha_1 \Delta Dummy_{HasPatents\ git\,(t+k,t-1)} \\ & + \alpha_2 \Delta \log S_{ci\,(t+k,t-1)} \\ & + \gamma_c + \gamma_i + \gamma_t + \varepsilon_{cit}\end{aligned}$$

Changes in market shares linked to patenting

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)
Group Patent Growth (GPG)	0.003***	0.001***	0.001***
	(0.001)	(0.000)	(0.000)
GPG * Group Market Share		0.075***	
		(0.012)	
GPG * Top 8 Group			0.006***
			(0.002)
Country and Industry FE	Y	Y	Y
Year FE	Y	Y	Y
N	200991	200991	200991

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

Does size trump productivity and markups?

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)	(4)
Group Patent Growth (GPG)	0.001***	0.002***	0.003***	0.001
	(0.000)	(0.001)	(0.001)	(0.000)
GPG * Top 8 Group Market Share	0.010***			0.007***
	(0.003)			(0.002)
GPG * Top 8 Group MFP		0.007*		0.002
		(0.003)		(0.002)
GPG * Top 8 Group Mark-ups			0.007**	0.004
			(0.003)	(0.003)
Country and Industry FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	116962	116962	107018	107018

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP

SUMMARY

Summary of results

- Concentration increased by 5p.p. on average (70% of country-industries)
- Intangible investment a strong predictor of concentration changes
- Effects especially strong in globalised, concentrated and digital country-industries
- Driven by investment in

  innovative assets
- Who benefits determined by size

  more than by productivity or mark-ups

Implications

- Taken at face value, evidence of "good" concentration

BUT more analysis needed:

- Same or different drivers of concentration increases in US vs international? (Crouzet and Eberly, 2018; Gutierrez and Philippon, 2019)
- Need finer measures of regulations, entry barriers etc.
- Firm growing through innovation may nevertheless try to entrench their position with entry barriers (Van Reenen, 2018; Ayyagari et al., 2019)
- Break-down of knowledge diffusion? (Andrews et al., 2016; Akcigit and Ates, 2019a,b; Berlingieri et al., forthcoming)
- Need for policies that encourage broader investment in intangibles; level-playing field (large incumbents vs start-ups) and knowledge diffusion (re-think IP?)

ANNEX

Systematic variation in concentration changes across industries

Change in the share of sales due to 8 largest groups (2002-2014)

1	26: Manufacture of computers	0.23
2	13: Manuf. of text., apparel & leathe	0.17
3	61: Telecommunications	0.16
4	29: Manufacture of motor vehicles	0.15
5	47: Retail trade	0.11
6	52: Warehousing	0.11
7	28: Manufacture of machinery eq.	0.10
8	16: Manufacture of wood	0.09
9	50: Water transport	0.09
10	58: Publishing	0.09
...		
33	55: Accommodation & food services	-0.01
34	68: Real estate activities	-0.01
35	24: Manufacture of basic metals	-0.02
36	19: Manufacture of coke / petroleum	-0.16
37	79: Travel agency and related	-0.18

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP. **Industries**: Manufacturing & Non-Financial Market Services

Changes in market shares of large groups correlated with intangibles

Dependent variable: 4-year change in industry concentration

	(1)	(2)	(3)	(4)	(5)	(6)
Innovative Property Investment	0.003***	0.006***	0.003***	0.006***	0.001**	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
* Group Market Share			0.577*	0.582*		
			(0.301)	(0.304)		
* Top 8 Group					0.025**	0.025**
					(0.011)	(0.011)
Country and Industry FE		Y		Y		Y
Year FE	Y	Y	Y	Y	Y	Y
N	200991	200991	200991	200991	200991	200991

Countries: SWE, JPN, FRA, FIN, USA, ITA, GBR, BEL, ESP