

Inequalities among firms: Implications for Labour Markets

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CEPR Labor Annual symposium, June 10th 2022



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■



Programme on
Innovation and Diffusion

Draws on (ongoing) work with many coauthors, especially:

- de Loecker, Obermeier and Van Reenen (2022) “Firms and Inequality” *Deaton Inequality Review*
- Amiti, Duprez, Konings and Van Reenen (2022) “Superstar Spillovers”
- Autor, Dorn, Katz, Patterson and Van Reenen “The Fall of the Labor Share and the Rise of Superstar Firms” (2017, 2020, QJE) & ongoing work
- Bloom, Sadun, Schuh and Van Reenen (2022) “Management as Capital”; “Natural Laws of Management”

Forbes

*Apple Becomes First
Company Worth \$3 Trillion—*



Forbes, Jan 3rd 2022

<https://www.forbes.com/sites/zacharysmith/2022/01/03/apple-becomes-1st-company-worth-3-trillion-greater-than-the-gdp-of-the-uk/?sh=2468cc8d5603>

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Market Valuation at start of 2022 (“GAFAMs”)

- **Apple** \$3 Trillion



- **Microsoft** \$2.53 Trillion



- **Google/Alphabet** \$1.92 Trillion



- **Amazon** \$1.69 Trillion



- **Facebook/Meta** \$0.93 Trillion



- Growth has been supercharged by COVID’s push to online, but has been going on long before the Pandemic

Introduction

- Vast **heterogeneity** across firms in terms of their size, productivity, etc.
- These differences are **increasing** as superstars pull away from the rest
- Why important?
 - Matters for **average wages** via macro productivity
 - Matters for **inequality**
 - Between workers (via firm *wage* effects) and between labor and capital (via labor share of GDP)
- Although causes of changes are fundamentally technological,
 - But have important implications: e.g. anti-trust policy & labor market policy

Agenda

Firm Inequality: Cross Section

Firm Inequality: Time Series

Explanations for increasing inequality

Framework: product & labor markets

Assessment and Policy

FIRM HETEROGENEITY HAS LONG BEEN RECOGNIZED

“...we have the phenomenon in every community and in every trade, in whatever state of the market, of some employers realizing no profits at all, while others are making fair profits; others, again, large profits; others, still, colossal profits.”

Francis Walker (*Quarterly Journal of Economics*, '87)

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Introduction

- Explosion of micro data shows huge differences across firms in terms of size, management practices, productivity, profits, exports,

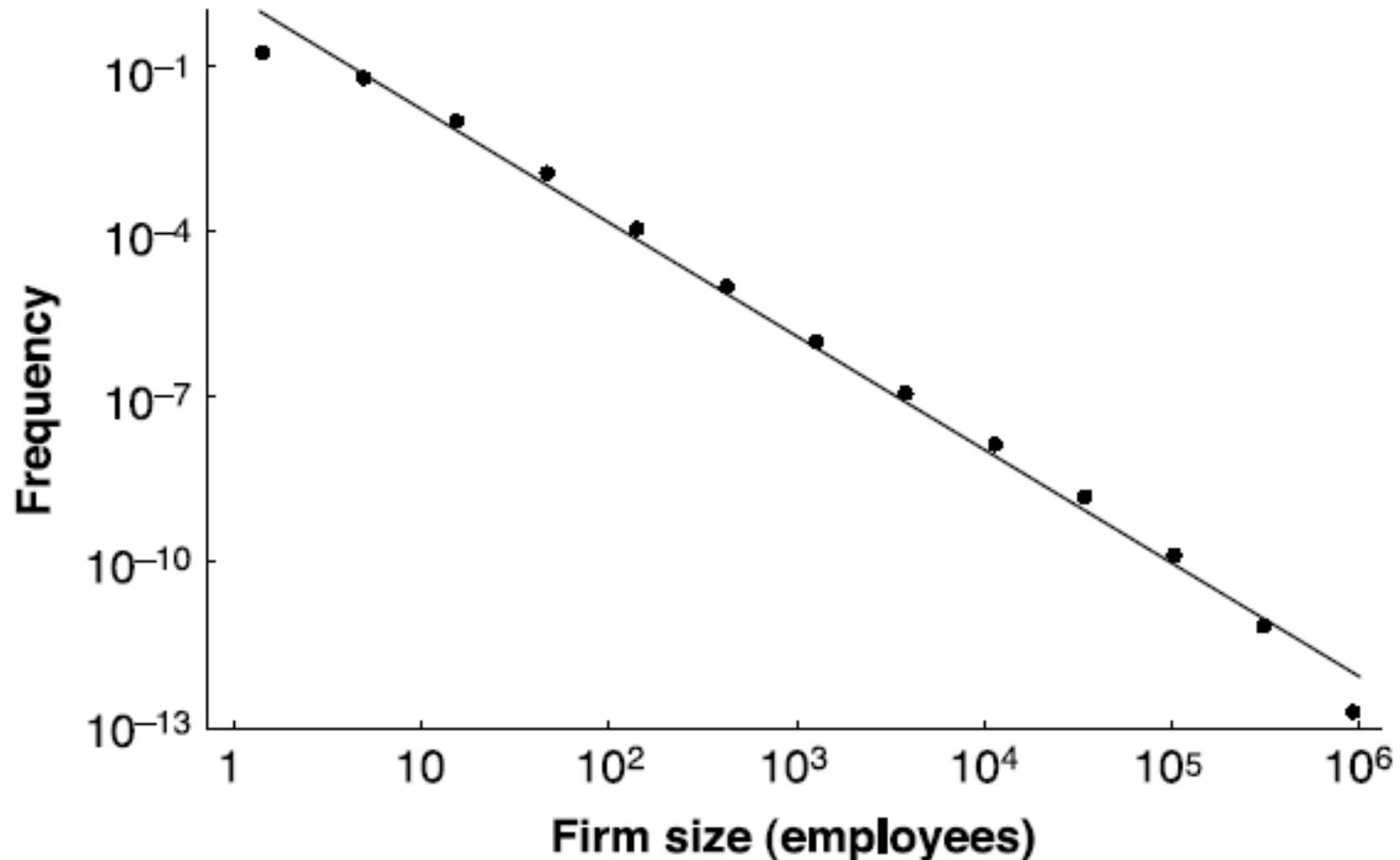
Francis Walker



Robert Gibrat



Firm Size distribution (mainly) follows a power law



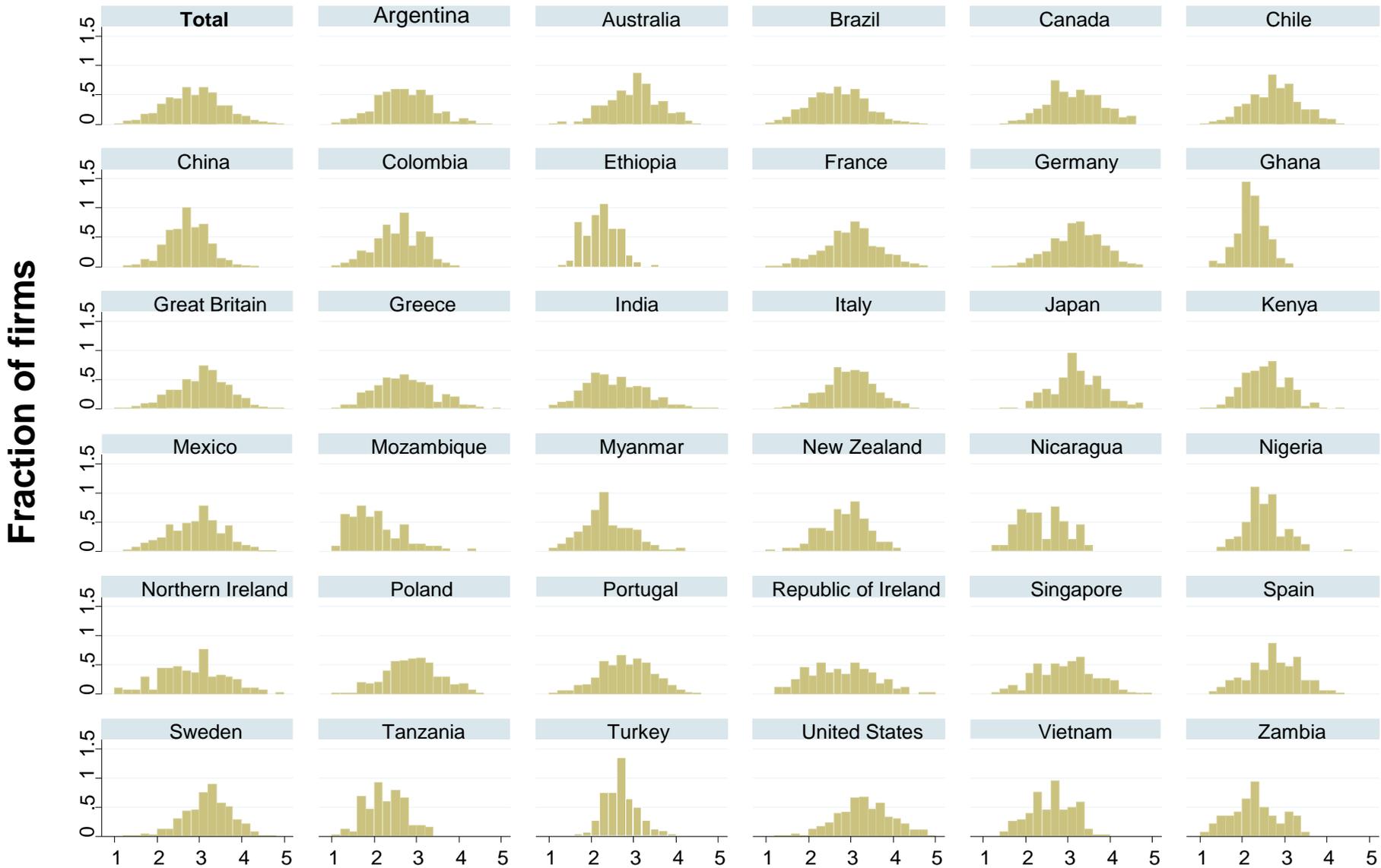
Source: Robert Axtell, *Science* (2001), US Economic Census, 1997

Big firms account for large fraction of activity. Example: over a third of US employees in firms with >5k workers

Size class	Share firms	Share jobs	#Firms	employees
<i>Under 10 workers</i>	76.46%	10.27%	4,075,445	13,535,611
<i>10 to 4,999 workers</i>	23.49%	54.96%	1,252,121	72,437,381
<i>5,000+ workers</i>	0.05%	34.76%	2,688	45,815,820
Total	100.00	100.00	5,330,254	131,788,812

Source: US Business Dynamics Statistics (2019),
<https://www.census.gov/data/datasets/time-series/econ/bds/bds-datasets.html>

Management quality also varies enormously across firms



Notes: Firm level average management scores, 1 (worst practice) to 5 (best practice). [World Management Survey](#) data from Scur et al (2021)

And productivity very unequal across firms too...

- Typical gap between 10th and 90th percentiles plants within same US four-digit industry (Syverson, 2011)
 - Labor Productivity (output per worker) 4:1 ratio
 - Total Factor Productivity 2:1 ratio
- Productivity dispersion generally **larger** in other countries
 - Hsieh & Klenow (2009) China and India 5:1 ratio
 - Bartelsman, Haltiwanger & Scarpetta (2013) 9 OECD countries.
 - Replicated in very many countries: OECD Multiprod data initiative (Criscuolo et al, 2016); ECB CompuNet; World Bank, etc.

Firm Performance Differentials are Persistent

- If productivity differences completely transitory, may be of less interest
- Not completely persistent as there is turnover.
- **But** this does not happen immediately (competition works “at a distance”)
 - Examples: 2/3 of establishments in top TFP quintile remain there 5 years later (e.g. Bailey et al, 1993)
- Persistent Performance Differentials always at heart of IO and Org Econ, but now fundamental in Trade, Macro, etc.
 - **and increasingly in Labour!**

Why look at inequality between *firms*?

- Many reasons to be concerned about inequality of opportunity & outcomes for families & communities
 - But firms are not households!

Some reasons why firm inequality matters

1. Lobbying strength of large firms

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3. Superstar firms have low labor shares of value added (high profit markups) – see later
 - If more market share shifts to superstars, this reallocation reduces labor's share of GDP
 - Since most income is earnings, lower labor share increases inequality between households

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4. Where you work matters for your wages (& wellbeing). Increased inequality between firms means upward pressure on pay inequality

Where you work matters for your wages

- Even holding worker individual characteristics constant, firms change wages
 1. **AKM approaches**
 - Two-way fixed effect models
 2. **“Rent-sharing” approaches**
 - Trace impact of an observable firm performance shock on (incumbent) wages
 - Examples of shock are technological **innovations** (Van Reenen, 1996; Kline et al, 2019) or trade (Abowd & Lemieux, 1993)

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- What models rationalize these firm effects on wages?
 - Wage **Bargaining**: Collective (unions) or Individual (search & matching)
 - Wage **Posting**: Manning (2003) on dynamic monopsony; Card et al (2018) on static (BLP-style) monopsony. E.g...

Example: Lamadon, Mogstad and Setzler (2022)

- Combines AKM and rent-sharing in general static wage posting monopsony model
- Workers of heterogeneous quality; Firms with heterogeneous productivity (at entry, but also subject to idiosyncratic & market-level value added shocks)
- Firm amenities (e.g. job flexibility, commuting distance, etc.)
 - Workers have heterogeneous valuation of amenities, so firm faces upward sloping supply curve (monopsony)

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- Wage posting means that firm productivity shocks are translated through to workers' wages
 - Firms receive positive shock so want to grow, and must raise wage to attract more workers
- Firm size distribution partially determines firm wage distribution

Lamadon, Mogstad and Setzler (2022)

- Ln(Wages) of individual i in firm j at time t : $W_{ij,t} =$

$$\tilde{x}_i + \tilde{\psi}_j + \tilde{\psi}_{jt} + \rho_{ij} + e_{ij,t}$$

Worker
Quality

Time-average
firm effect

Time varying
firm shocks
pass-through

Sorting: interaction
of worker quality &
firm productivity

Lamadon, Mogstad and Setzler (2022)

- US IRS employer-employee data 2001-2015
- Identification from:
 - **Internal IVs:** assume TFP a random walk
 - **External IVs:**
 - Procurement auctions (Kroft et al, 2022)
 - Bartik approaches
- Tackle “limited mobility bias” in AKM models (e.g. Andrews et al, 2008) using
 - Bonhomme et al (2019) k-means clustering
- Uses Card et al (2013) diagnostics to look at endogenous movement

General Bottom line from literature

- Although in cross section worker quality effects dominate, firms matter (both raw firm effects & via sorting)

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- Although in cross section worker effects dominate, firms matter (both raw firm effects & via sorting)
- **But where** do firm effects come from?
 - Technology; Management; Demand niches
 - **Bundles of capabilities** – see Org Econ (Penrose, 1959; Winter, 1988; Gibbons & Henderson, 2013)
- **And how** do firm effects persist?
 - Frictions in product market mean less productive firms are not immediately driven out
 - Copying successful firms is not trivial
 - Diffusion of technological innovations slow
 - Emulation of management practices hard

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Firm Inequality: Cross Section

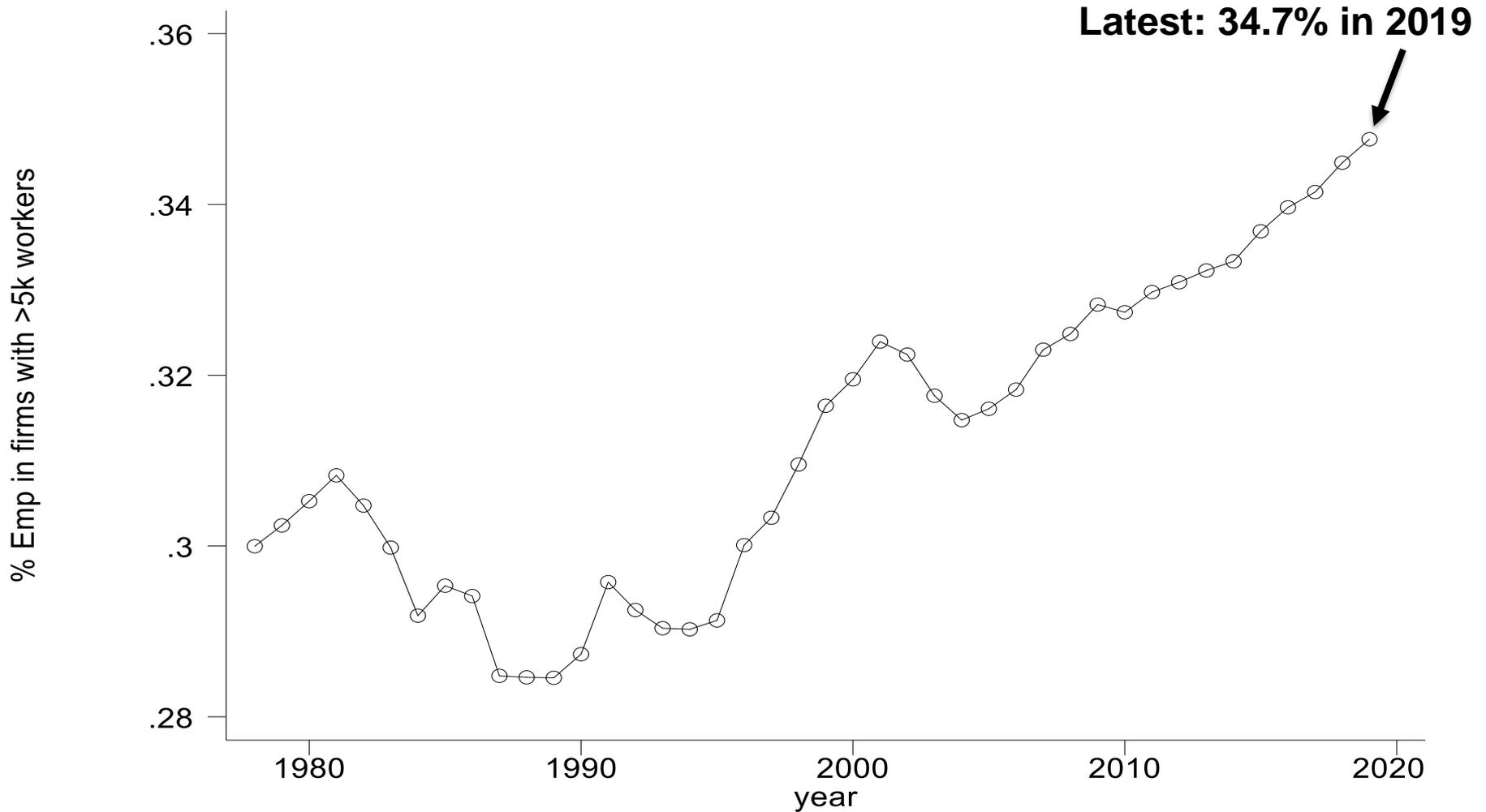
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Since mid '80s Big Firms getting bigger: % jobs in US firms with 5,000+ workers rose from ~28% in 1987 to ~35% in 2019

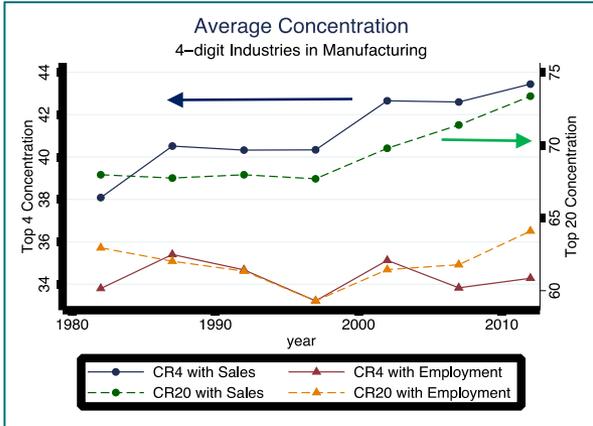


Source: US Business Dynamics Statistics (2021),

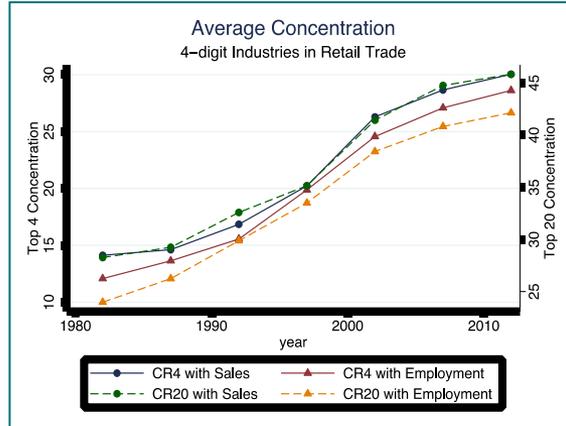
<https://www.census.gov/data/datasets/time-series/econ/bds/bds-datasets.html>

Rising Sales Concentration in US SIC4 since 1982

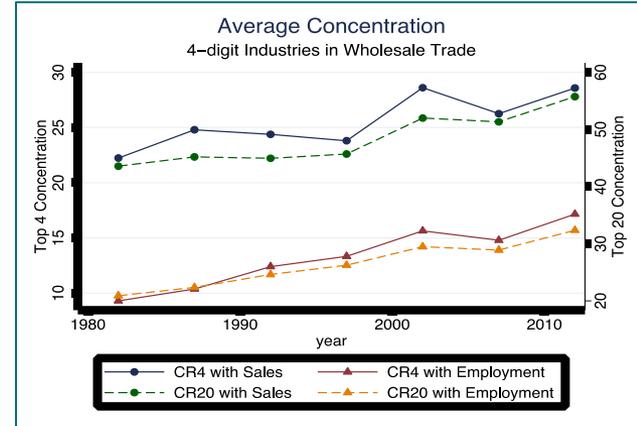
Manufacturing



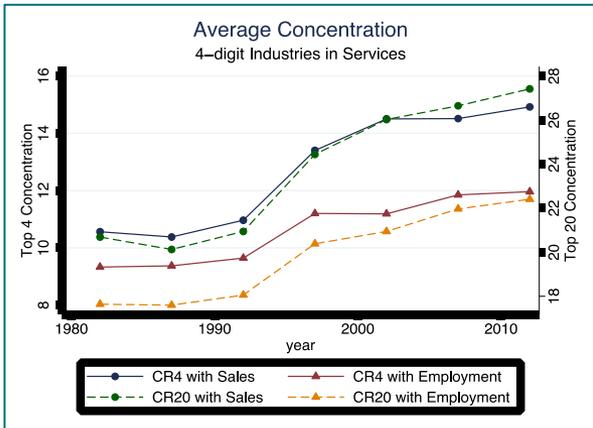
Retail Trade



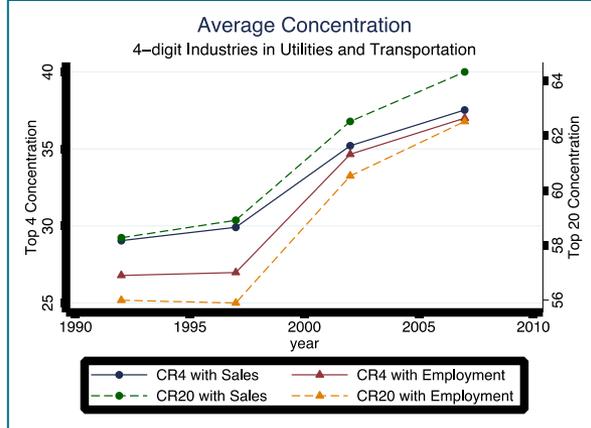
Wholesale Trade



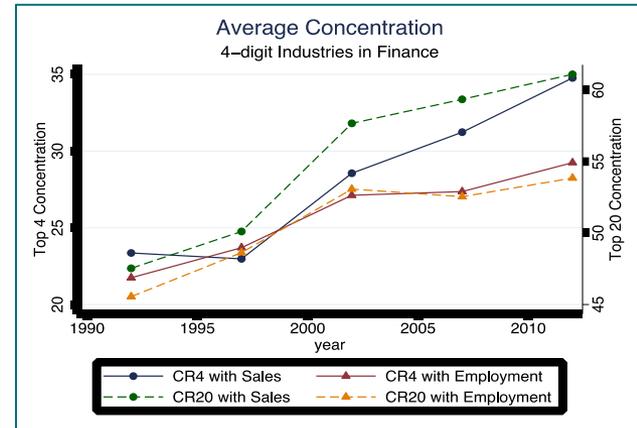
Services



Utilities + Transportation

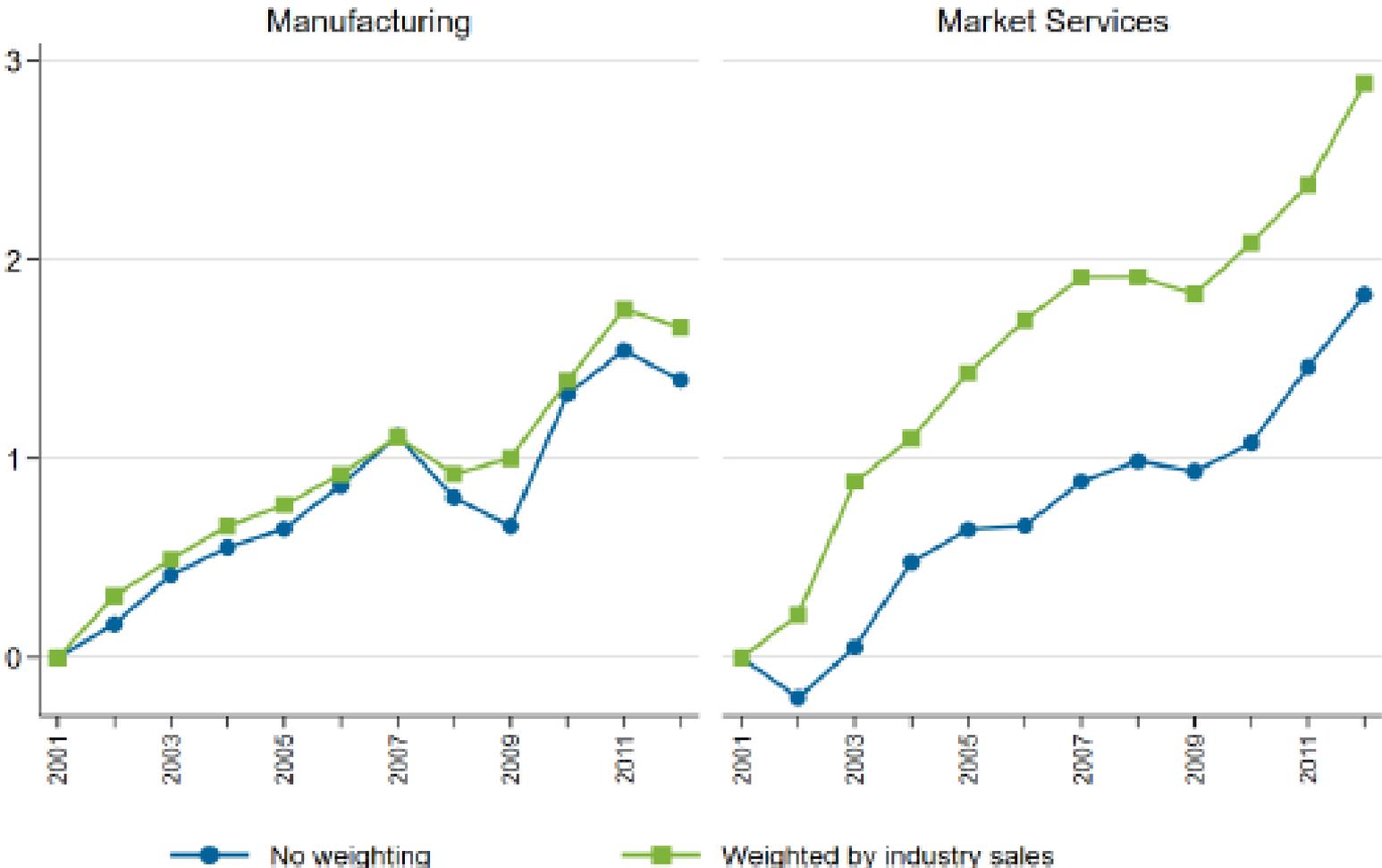


Finance



Notes: Autor, Dorn, Katz, Patterson & Van Reenen (2020) from Economic Census; Weighted av. of concentration across the SIC-4's within each sector. 676 SIC4 industries underlying this.

Like US, Sales Concentration seems to have increased in Europe (country-industry Census micro data)



Source: OECD Multiprod; Bajgar et al (2019); **Notes:** Share of top 10% firms in industry gross output. Year effects from regressions with country-industry dummies and year dummies (AUT, BEL, DEU, DNK, FIN, FRA, HUN, NOR, PRT, SWE). Weights give more importance to larger industries

<https://www.oecd-ilibrary.org/docserver/2ff98246->

Product Market Power

- Industrial Concentration is not the same as market power
 - Use better defined (narrower) anti trust markets (e.g. Benkard, Yurukoglu & Zhang, 2021)
 - Taking imports into account (e.g. Amiti & Heise, '21)
 - Examine price-cost markups

Aggregate Price-Marginal Cost Markups in US listed firms rose substantially after 1980

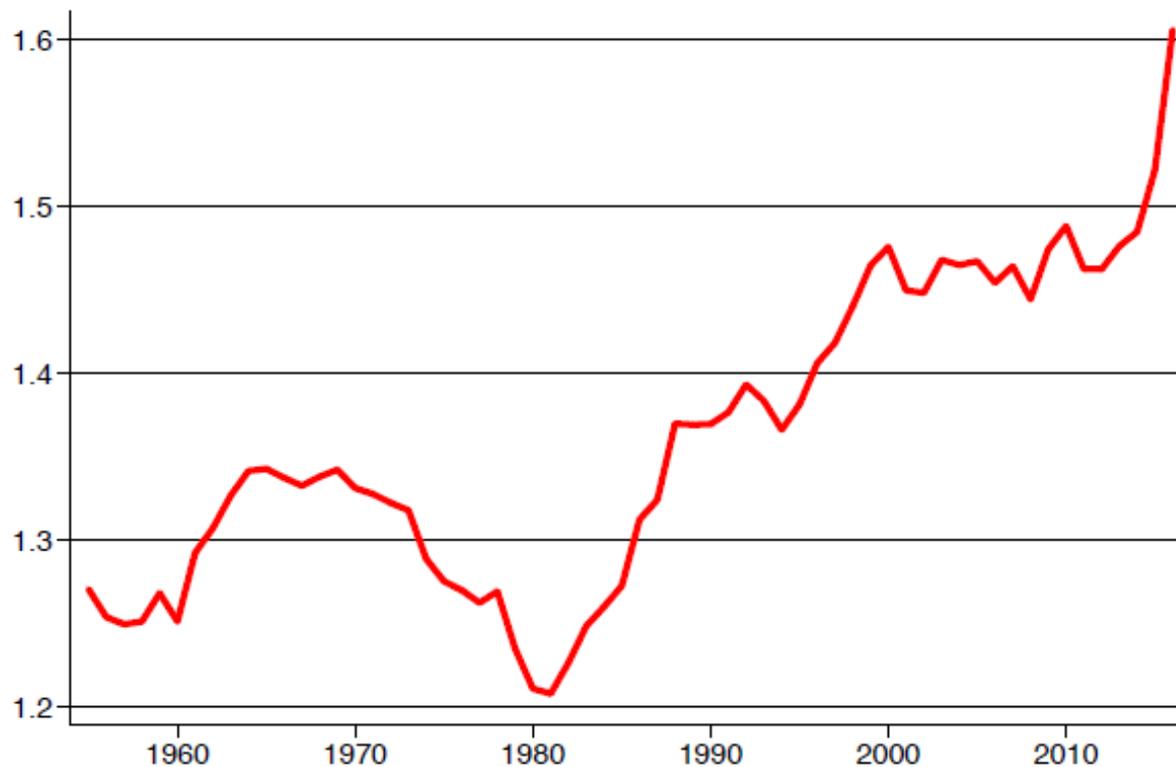
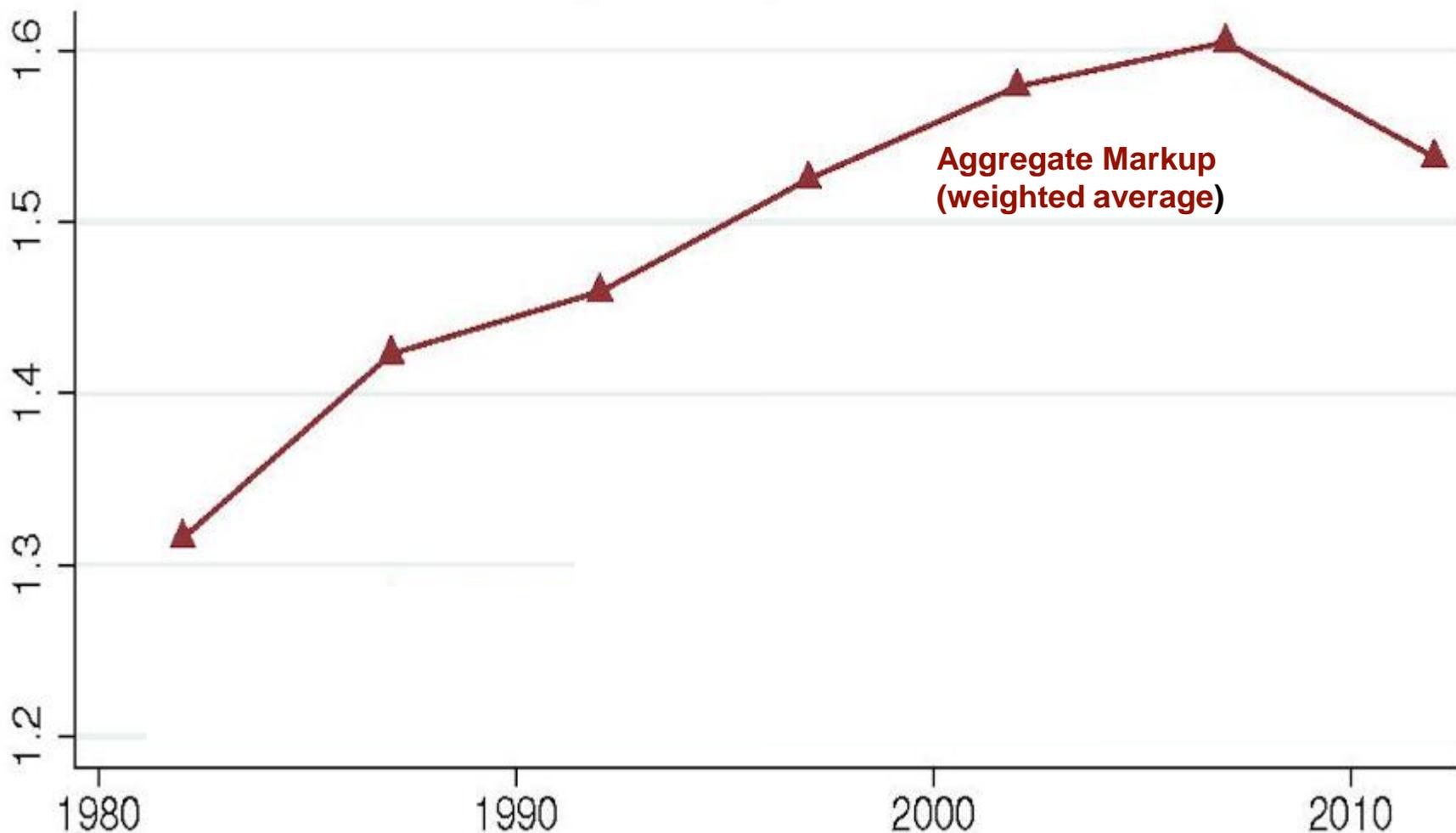


Figure 1: Average Markups for Conventional Production Function. Output elasticities θ_{st} from estimated PF1 are time-varying and sector-specific (2 digit). Average is sales weighted. Evolution 1955-2016.

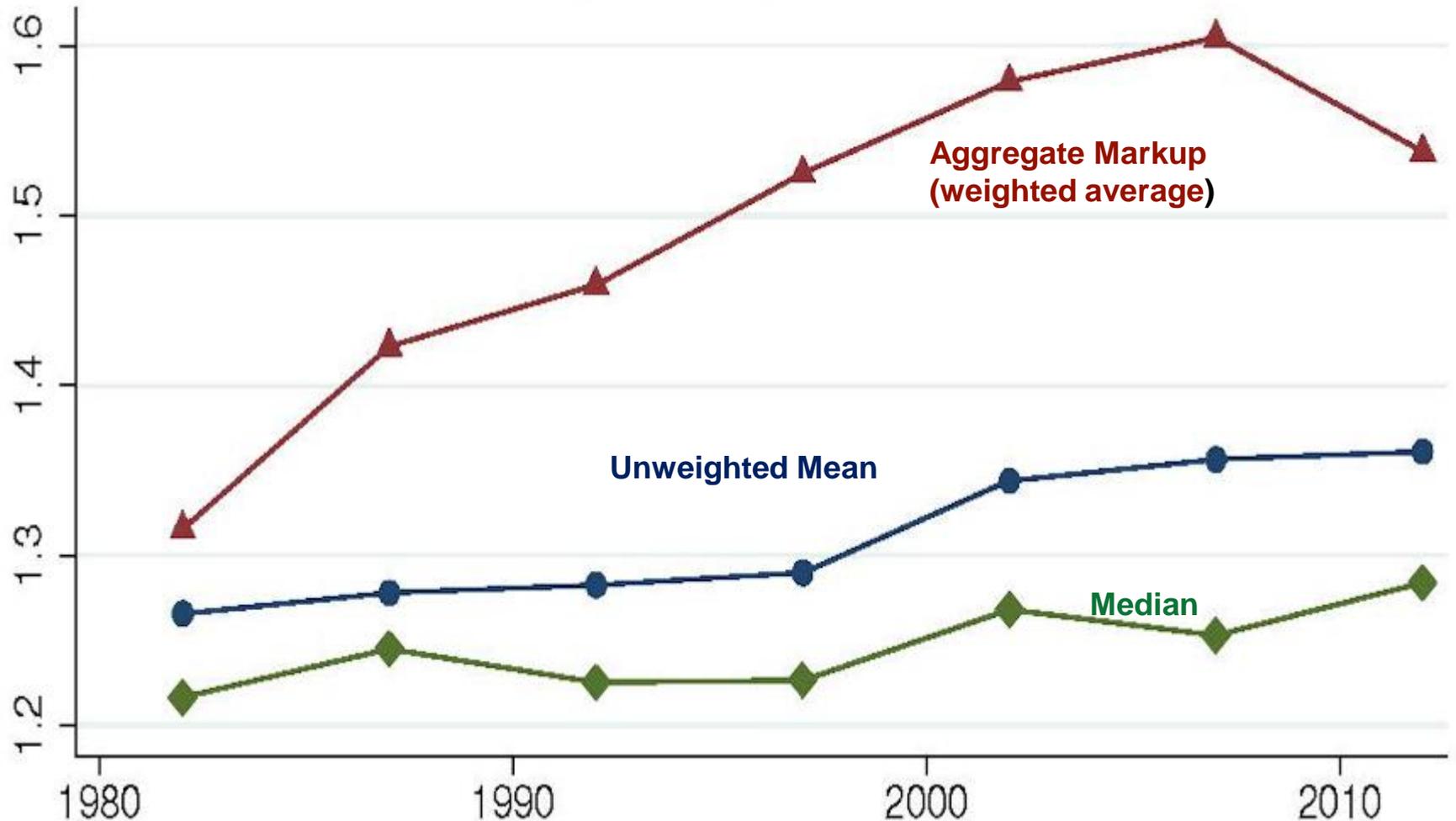
Source: de Loecker, Eeckhout and Unger (2020) on Compustat

Aggregate size-weighted markup also rose in US Census Data



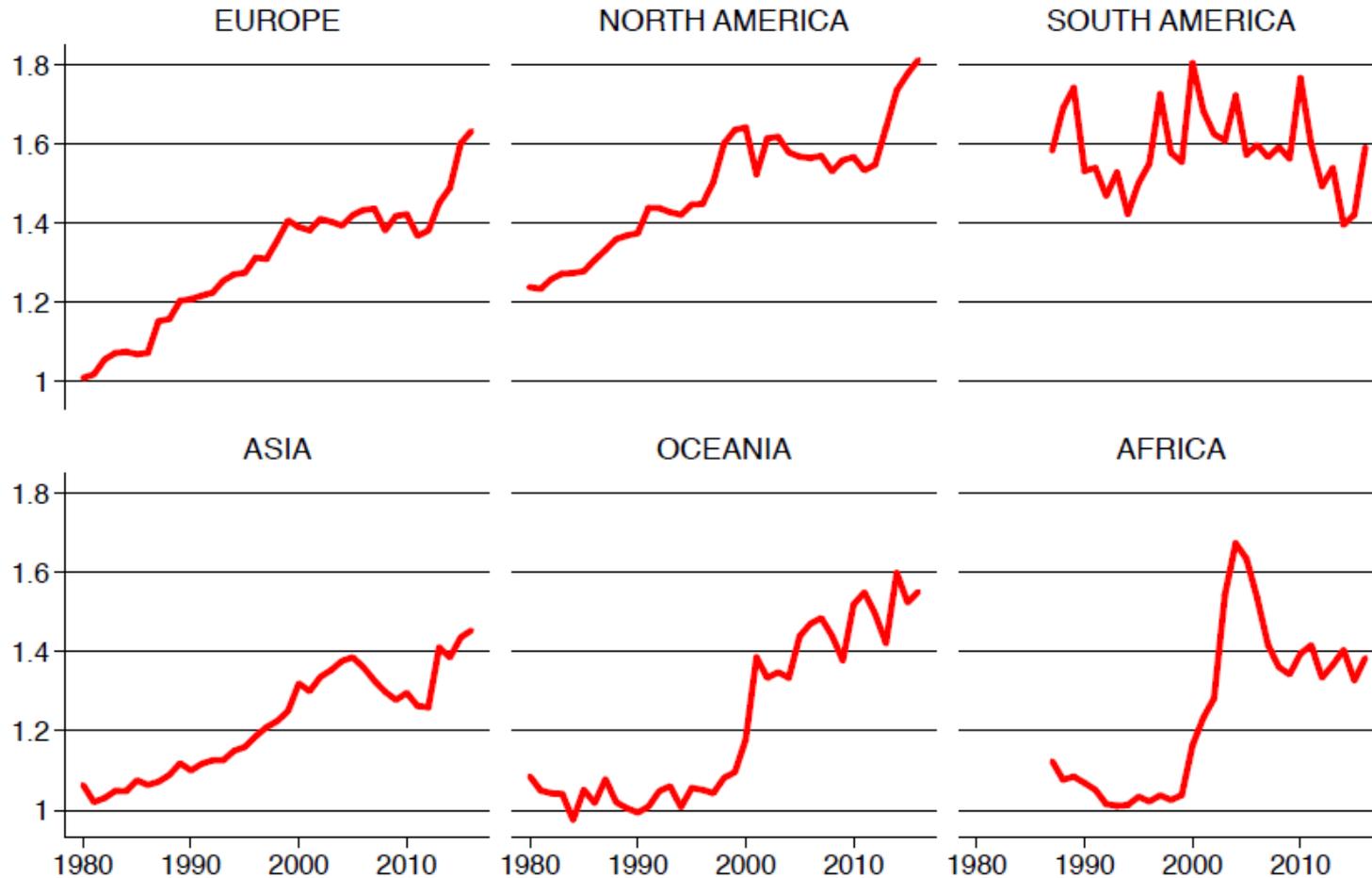
Notes: Accounting markup is defined as sales over total costs. Weight is the sales share of the establishment. **Source:** Autor et al (2020) on Census of Manufactures

Aggregate US markup rises, but median does not (US Census Data)



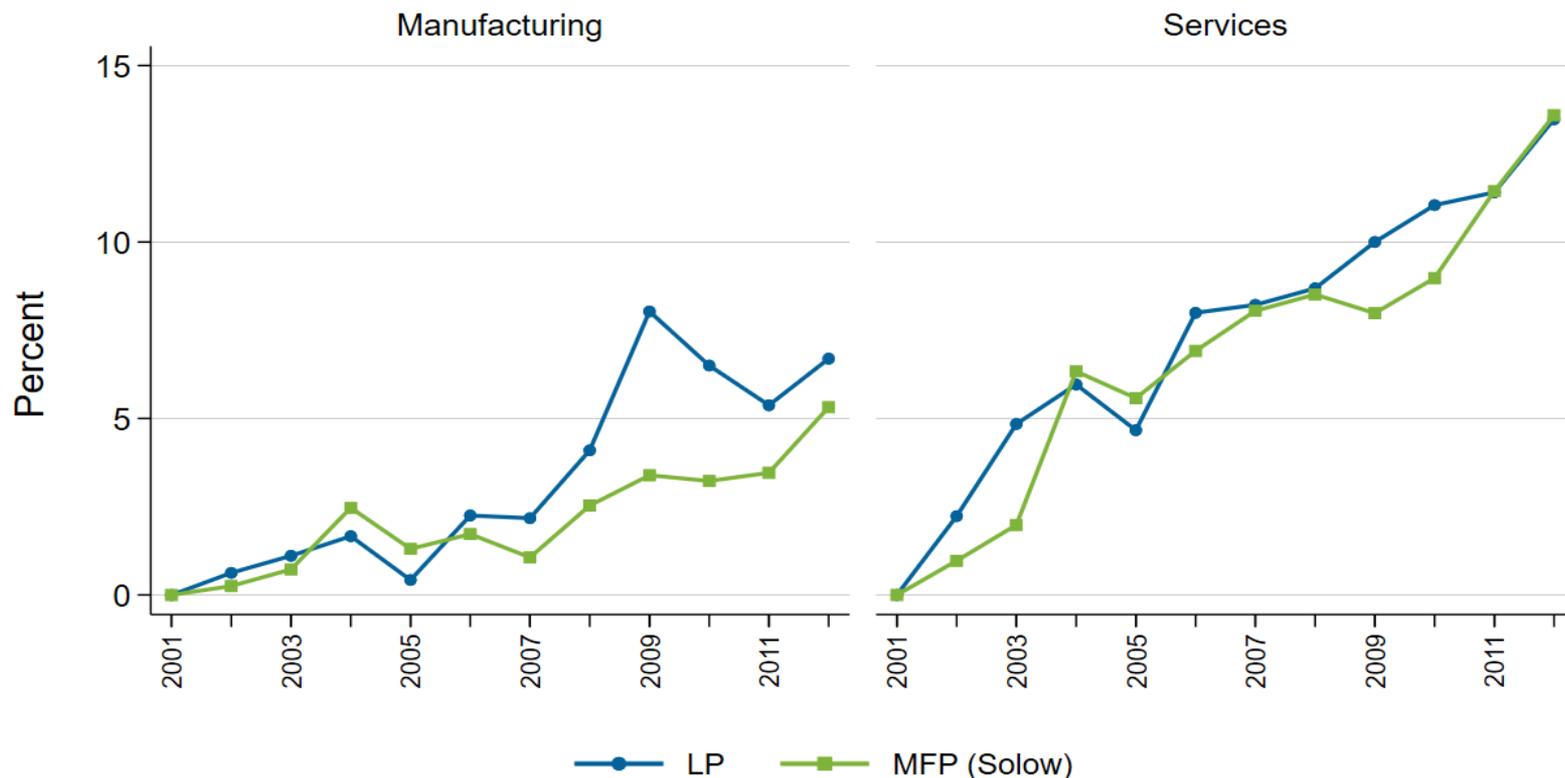
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Price-Cost Markups rising around the world (listed firms)



Source: Eeckhout and de Loecker (2018) using Worldscope

Rising firm-level productivity dispersion (16 OECD countries), 2001-2012



Source: OECD Multiprod, <https://www.oecd.org/sti/ind/multiprod.htm>

Notes: Coefficients on year dummies from regression of 90-10 log(productivity) within an industry-year cell in 16 OECD countries (AUS, AUT, BEL, CHL, DEU, DNK, FIN, FRA, HUN, ITA, JPN, NLD, **NOR**, NZL, PRT, SWE)

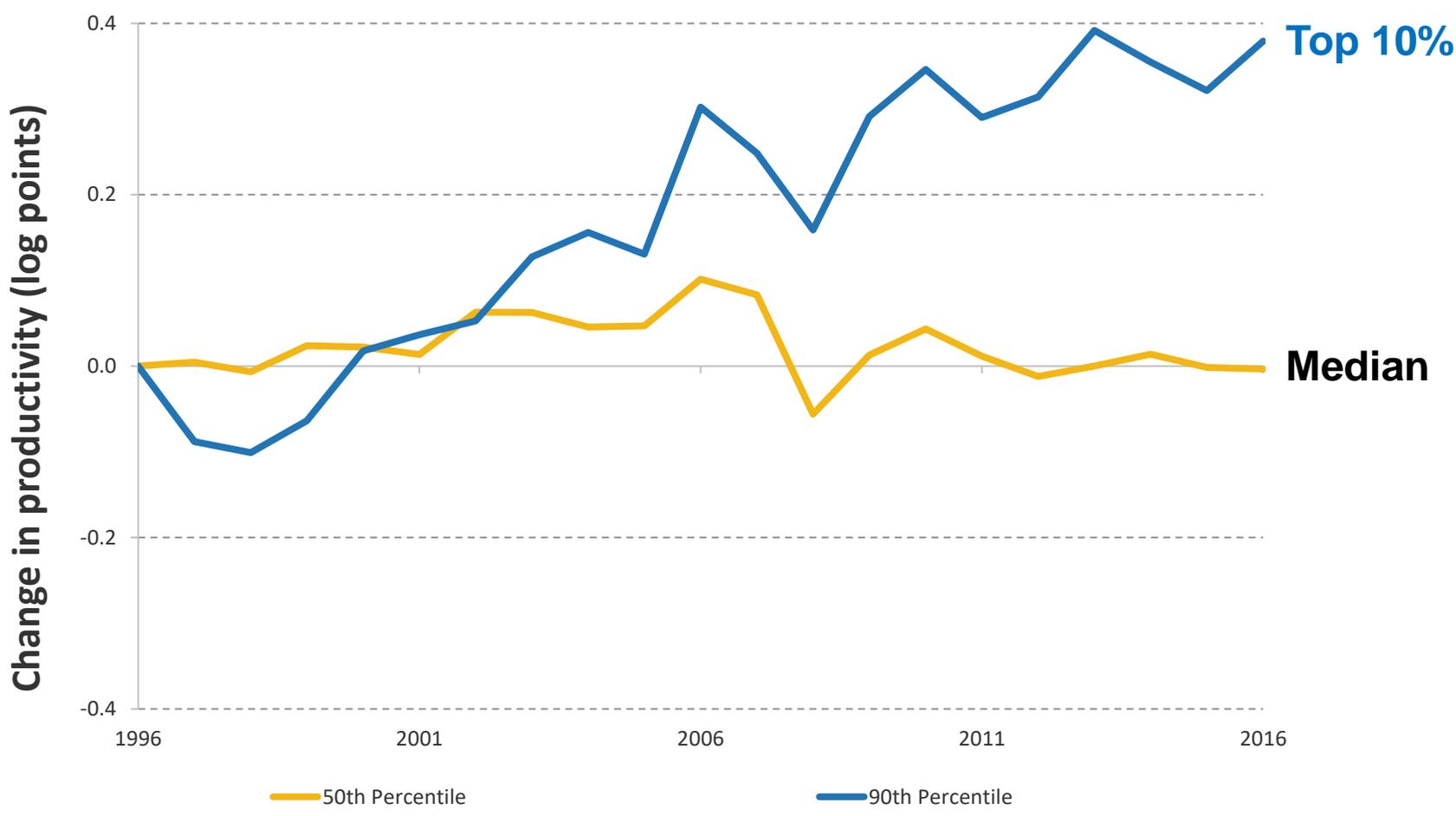
UK Productivity growth since 1996: Stagnation after Financial Crisis clear for median firm



Source: de Loecker, Obermeier and Van Reenen (2022)

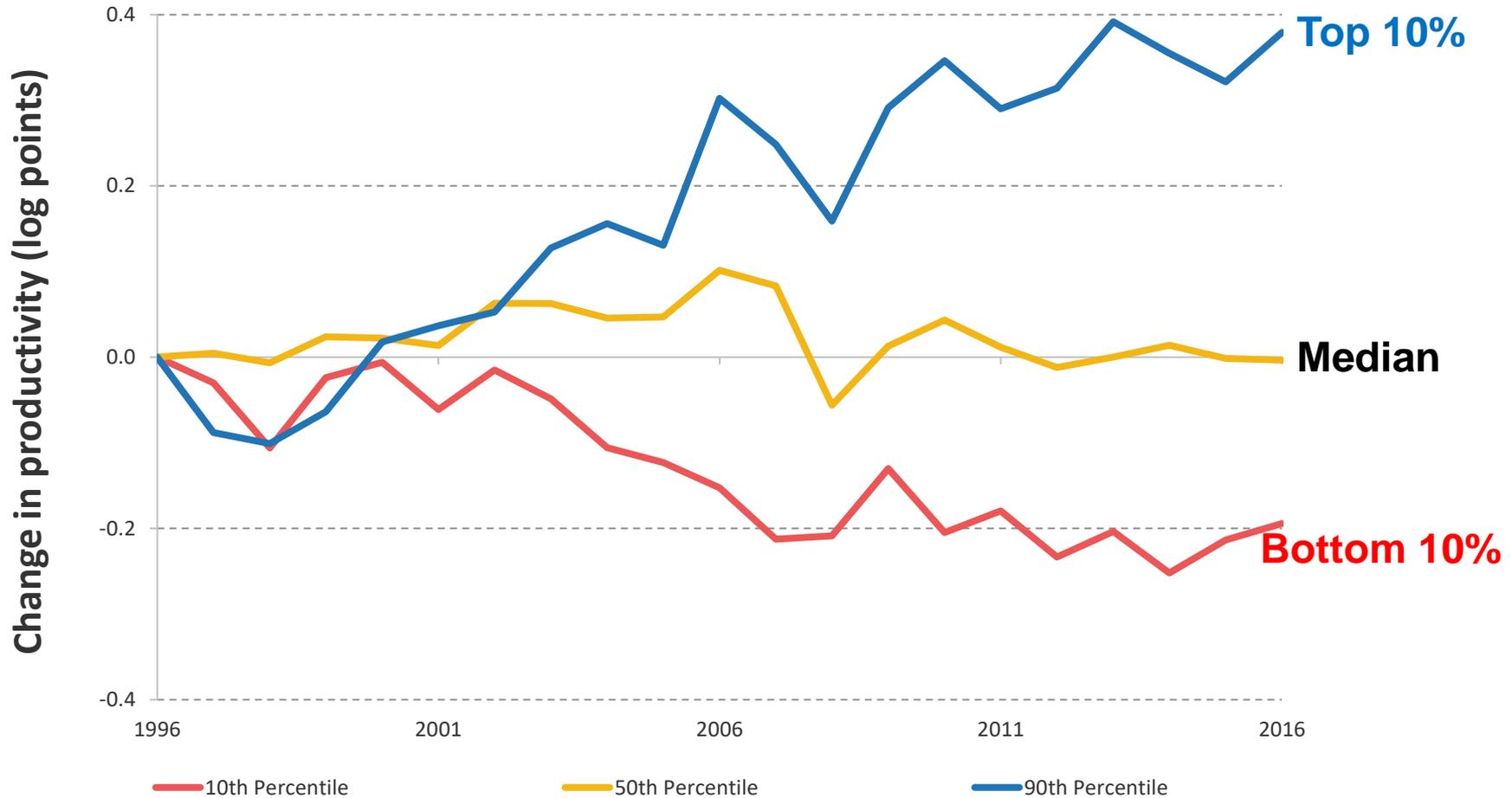
Notes: Historical ORBIS, $\ln(\text{value added}/\text{employee})$, quantiles weighted by firm employment; values indexed to zero in 1996; Changes in log points, so 0.05 = about 5% growth; $0.4 = (e^{0.04} - 1) * 100 = 50\%$

“The Best pull away from the Rest”: Superstar Firms have strong productivity growth



Source: de Loecker, Obermeier and Van Reenen (2022)
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And poor productivity performance at the bottom of the distribution



Source: de Loecker, Obermeier and Van Reenen (2022)

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Increasing between establishment variance of productivity and wages (US LEHD)

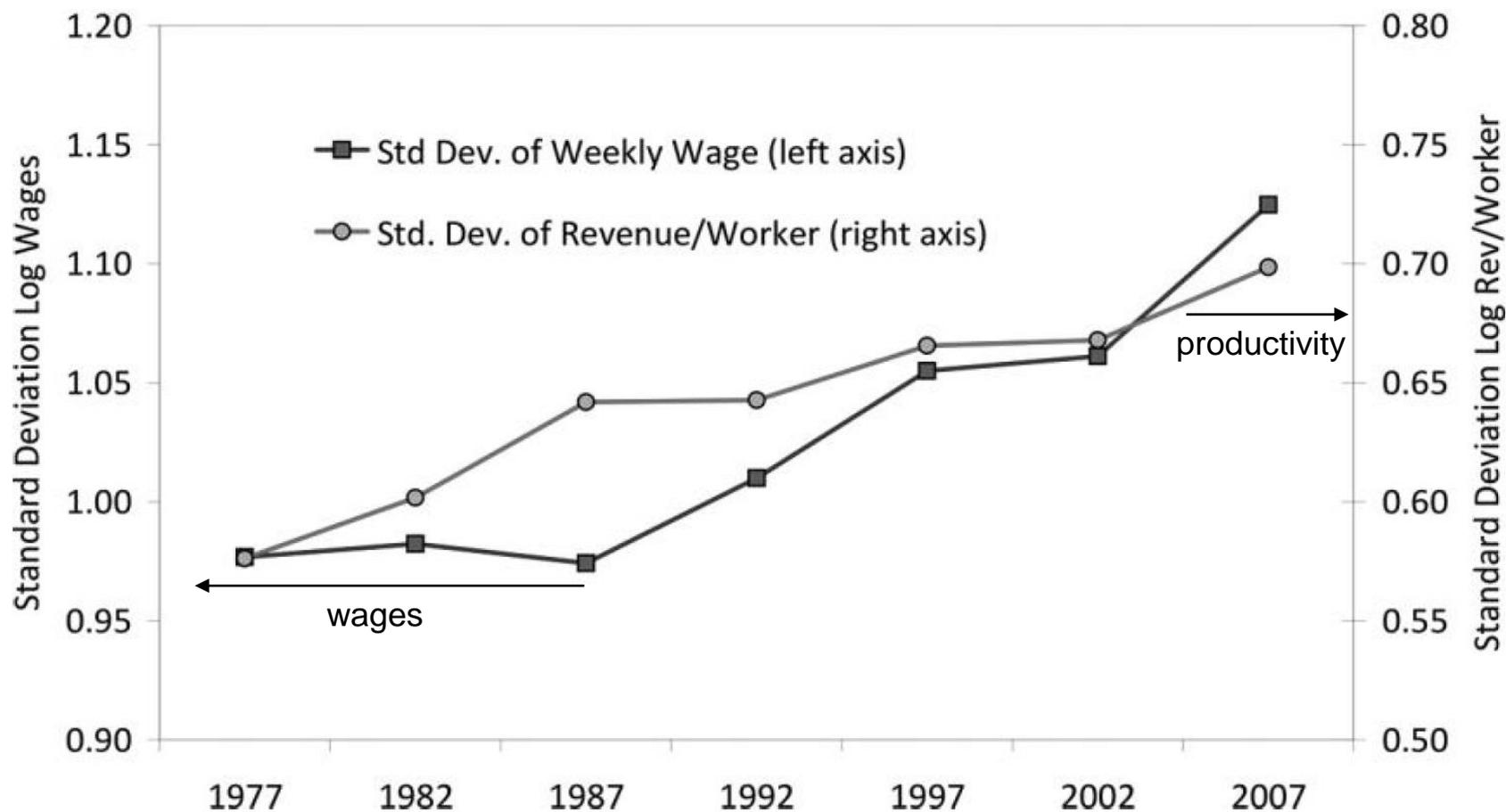
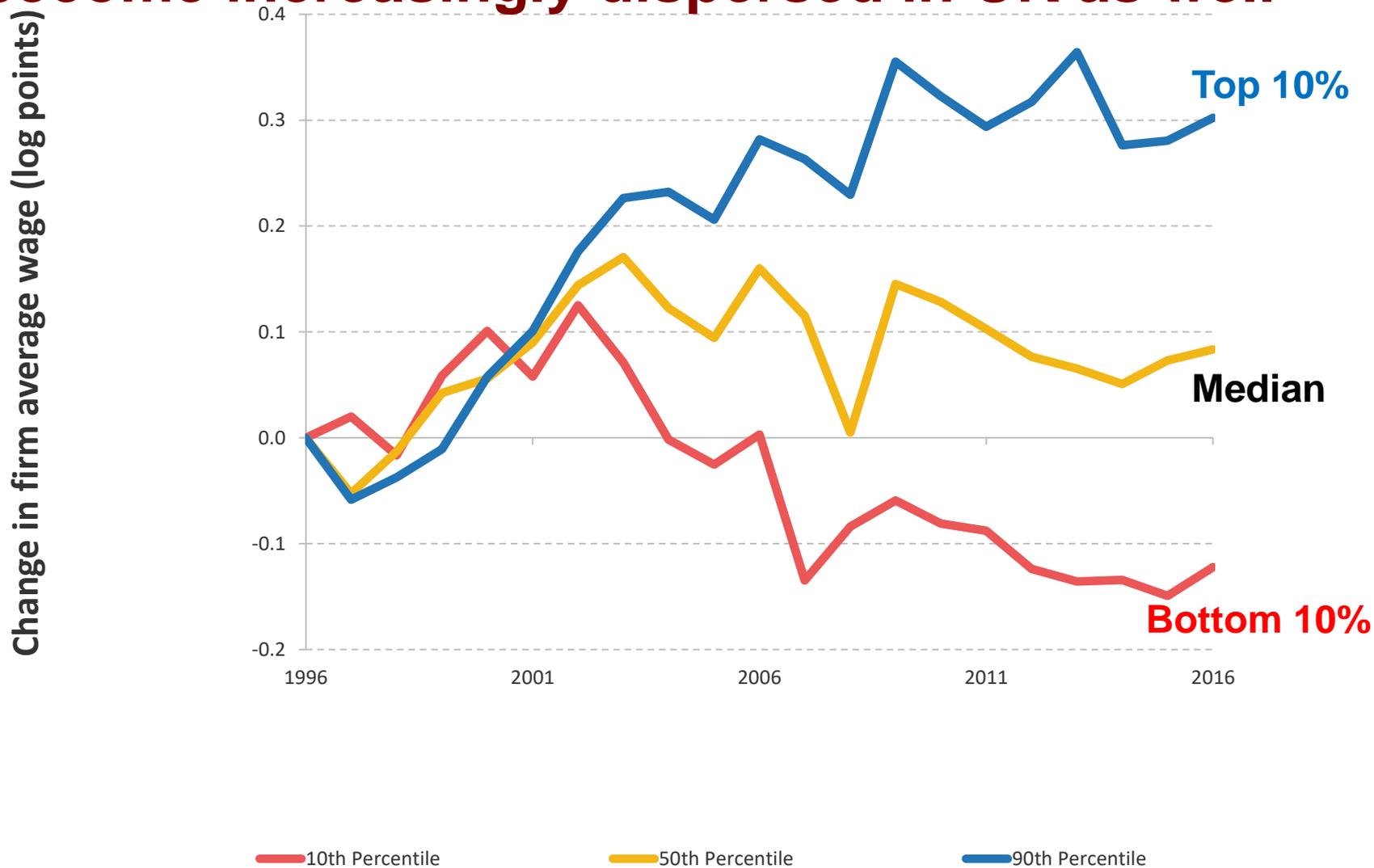


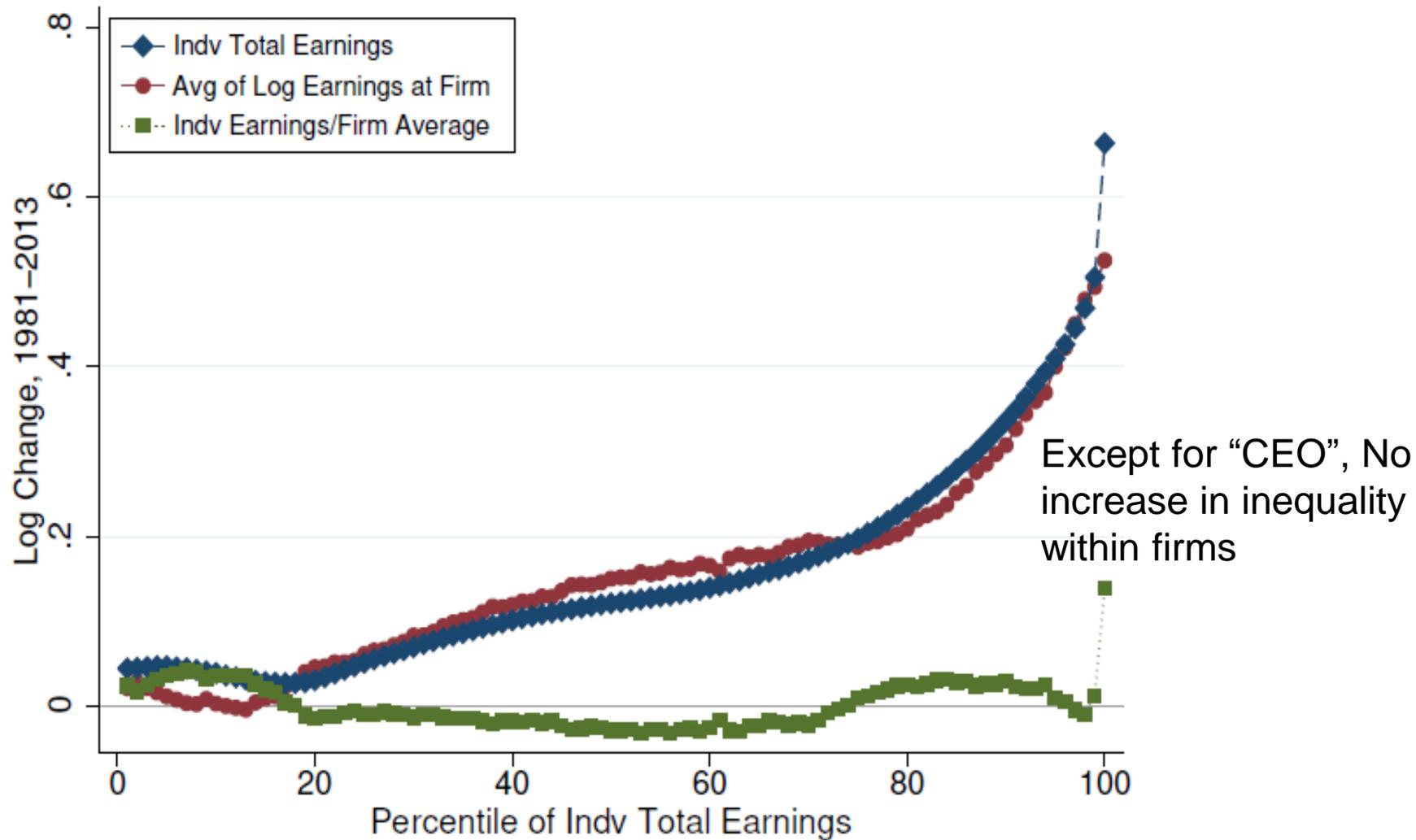
FIG. 1.—Trends in between-establishment dispersion in wages and productivity. Source: Barth et al. (2016). A color version of this figure is available online.

Like productivity, average wages by firm have become increasingly dispersed in UK as well



Notes: Historical ORBIS, $\ln(\text{wage bill}/\text{employment})$, quantiles weighted by firm employment; values indexed to zero in 1996; Changes in log points, so 0.05 = about 5% growth; $0.4 = (e^{0.40} - 1) * 100 = 50\%$ 43

Change in individual US earnings inequality is almost all between firm (rather than within firm), 1981-2013



Source: Song et al (2019), SSA data

Decomposing Growth of individual wages

- Recall earlier discussion on extended AKM style models
- Decompose changes into:
 1. **Segregation:** covariance of worker effects within firm
 2. **Sorting:** covariance of worker & firm effects
 3. **Pure firm effects:** variance of firm effects
- In US (Song et al '19 on SSA; Lamadon et al '22 on IRS and Haltiwanger et al '22 on LEHD) find segregation increase main effect
- In Germany, Card et al (2013) find bigger role for firm effects

Summary

- Firms have become increasingly different in terms of size, productivity & pay in recent decades
- Macro trends of higher industrial concentration and price-cost mark-ups; slowing productivity and wage growth since 1980s
- This seems to have happened in other OECD countries like UK and EU, as well as US
- What accounts for the rise of superstar firms?

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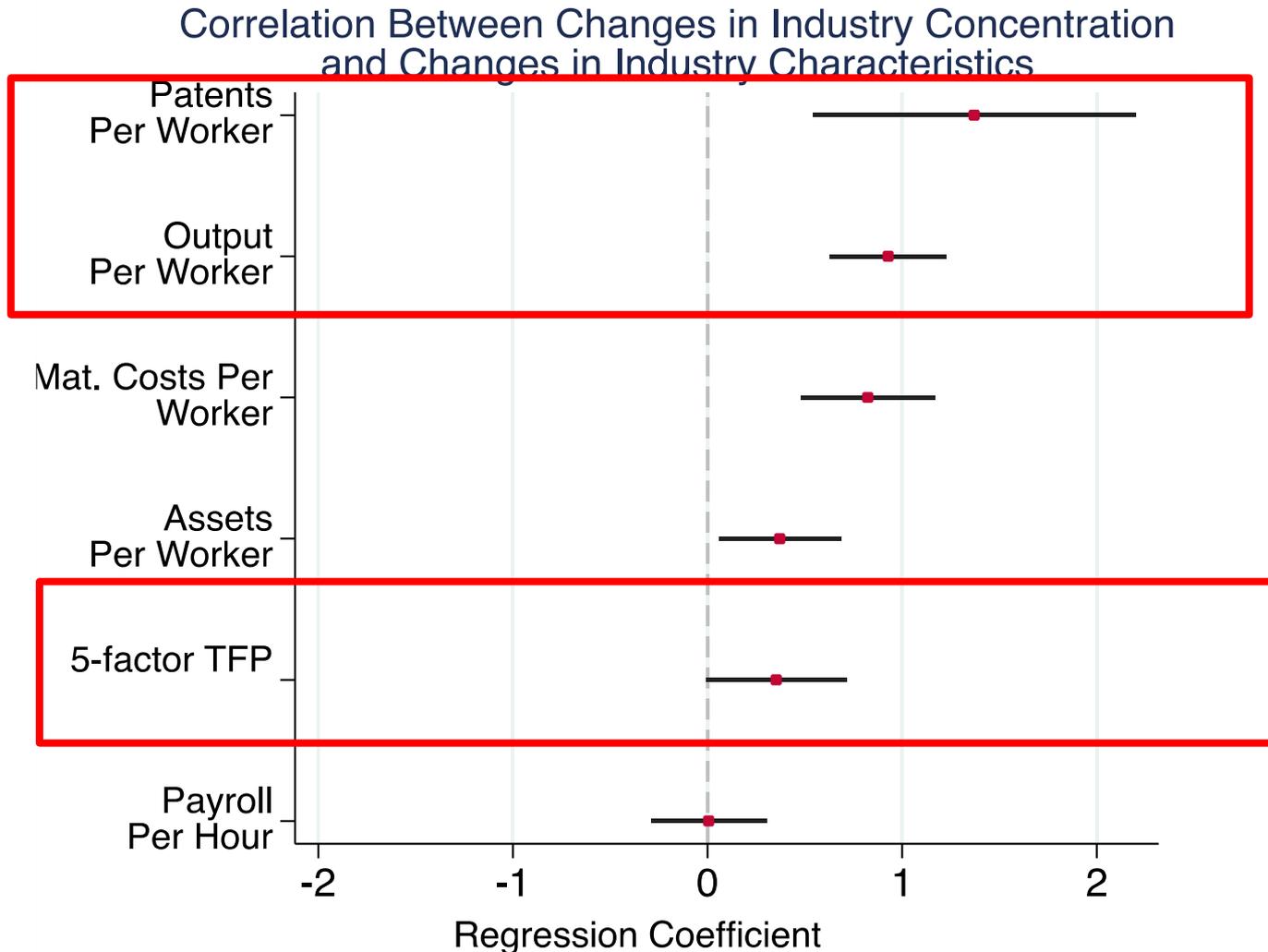
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- Many macro models seeking to reconcile these facts (e.g., Akcigit & Ates, '21; de Ridder '21; Aghion et al, '21)
 - But maybe different explanations in different industries

Is the rise of Superstar Firms good or bad?

Benefits

1. Superstar Firms more productive, so reallocation towards them implies higher aggregate productivity
2. Superstars not classical monopolists: lots of innovation and low prices

Industries with stronger growth of superstars see larger increases in Innovation & Productivity



Source: Autor, Dorn, Katz, Patterson & Van Reenen (2020)

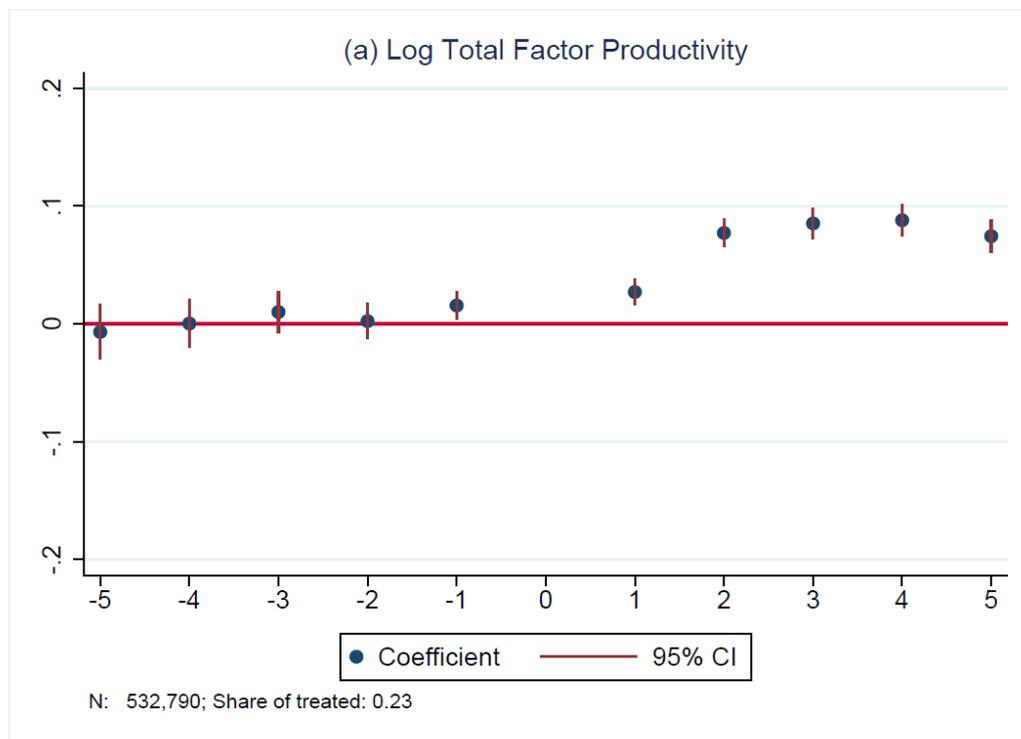
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3. **Positive productivity spillovers? Examples of multinational literature**
 - Amiti, Duprez, Konings and Van Reenen (2022) see this for all Superstar firms, not just those who are globally engaged

The spillover benefits of trading with Superstars

Selling to MNE firm increases TFP by ~8% after 4 years



Notes: $t = 1$ first year of treatment; $t = 5$ is all years ≥ 5 (i.e. 4+ years after event). Regressions include 4-digit industry by year dummies and firm fixed effects. TFP estimated by Wooldridge (2009) method.

Source: Amiti, Duprez, Konings and Van Reenen (2022); Event study Diff in Diffs 532,000 obs from Belgian B2B data 2002-14.

Is the rise of Superstar Firms good or bad?

Costs

- Ability to exercise market power could lead to negative outcomes: prices, wages, innovation
- Have Superstars attained their size due to exercise of this power? Are they becoming better at creating barriers to smaller rivals growing?
 - Patents/IP, etc to create barriers to diffusion
 - Lobbying to change rules of game (regulation, subsidies, anti-trust)
- Implications for labor markets and inequality

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Imperfect Competition in Labor & Product Market

- Generalizes model in Autor et al (2020)
 - Firms have heterogeneous productivity
 - Some product market power: firms face downward sloping (residual) product demand curve
- Also some labor market power: face upwards sloping labor supply curve (wage posting monopsony)
- Builds on large recent literature:
 - e.g.: Berger, Herkenhoff & Mongey (2021); Kroft, Luo, Mogstad & Setzler (2021); de Loecker, Eeckhout & Mongey (2021); Yeh, Macaluso & Hershbein (2022)

A Simple Framework

- Static FOC wrt to labor yields labor (WL) share of revenue (PY) for firm i

$$S_i \equiv \left(\frac{WL}{PY} \right)_i = \frac{\alpha_i}{\mu_i \psi_i}$$

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- **Markup**, $\mu_i = \left(\frac{P}{C} \right)_i$: Price over marginal cost
 - Monopoly power depends on product demand elasticities

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- **(Inverse) Markdown**, $\psi_i = \left(\frac{MRPL}{w} \right)_i$: Marg. Prod. of L over Wage
 - Monopsony power depends on firm labor supply elasticities

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- **Technology**, α_i : elasticity of output, Y wrt labor, L
- **Markup**, $\mu_i = \left(\frac{P}{C} \right)_i$: Price over marginal cost
 - Monopoly power depends on product demand elasticities
- **(Inverse) Markdown**, $\psi_i = \left(\frac{MRPL}{w} \right)_i$: Marg. Prod. of L over Wage
 - Monopsony power depends on firm labor supply elasticities
- Change in labor share for firm i

$$\Delta \ln S_i = \Delta \ln \alpha_i - \Delta \ln \mu_i - \Delta \ln \psi_i$$

Aggregate Labor Share, S

$$S \equiv \sum_i \omega_i S_i = \sum_i \omega_i \frac{\alpha_i}{\mu_i \psi_i}$$

- Where ω_i is the relative size (market share) of firm i
- Change in aggregate labor share depends on changes in the firm size distribution $F(\omega)$ & covariance of size with labor share

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- Where ω_i is the relative size (market share) of firm i
- Change in aggregate labor share depends on changes in the firm size distribution $F(\omega)$ & covariance of size with labor share
- If environment changes to favor superstars (who generally have higher markups) this can depress labor share without changes to individual α_i, μ_i , or ψ_i
- Implies that a rise in size-weighted markups will tend to depress the aggregate labor share.

US Labor Share of GDP

Figure 1. Labor's share of output in the nonfarm business sector, first quarter 1947 through third quarter 2016



Note: Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.

Source: U.S. Bureau of Labor Statistics.

Falling Labor Share of Corporate sector Value-Added Evident in Many Countries

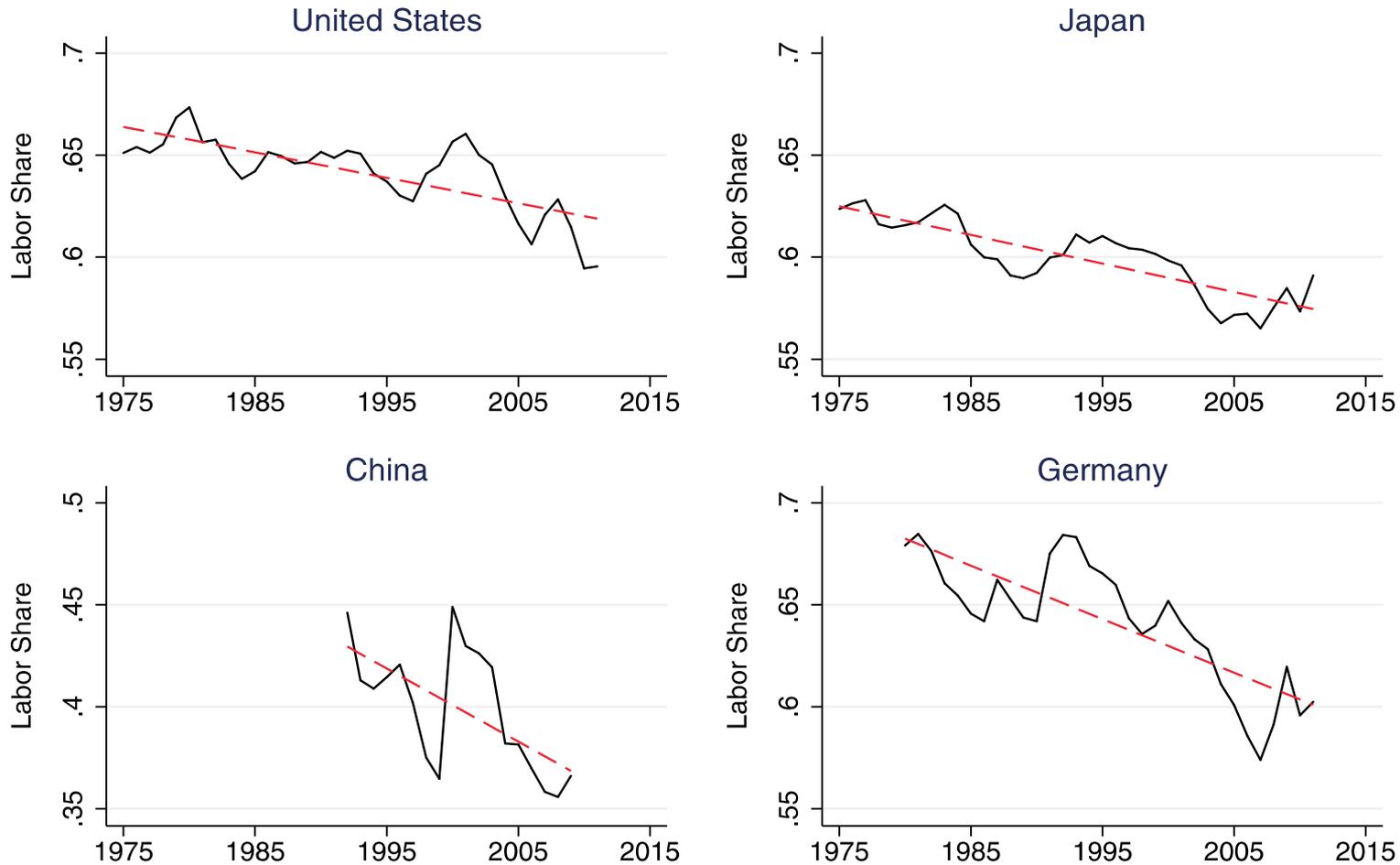
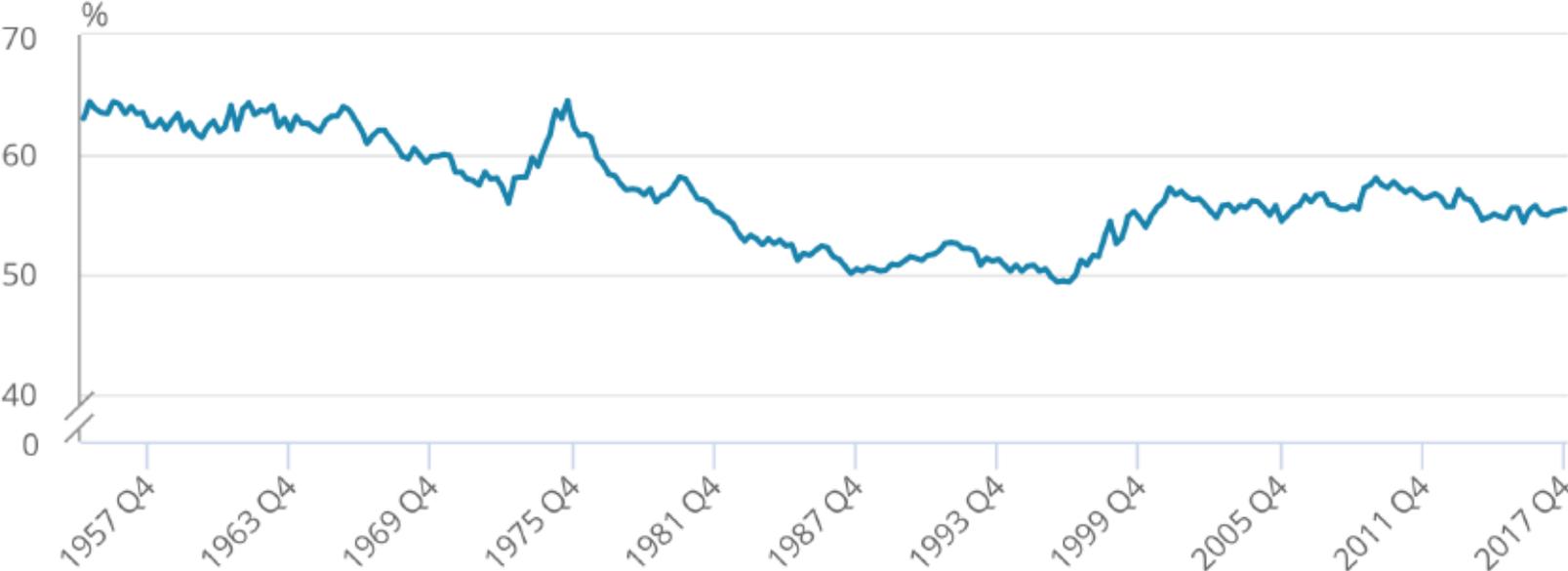


FIGURE II

Declining Labor Share for the Largest Countries

Labor Share of GDP in the UK



Source: Dunn, Heys and Sidhu, 2018; UK Office of National Statistics
Note: No adjustment for Mixed Income

Application of framework to UK (1981-2019)

- de Loecker, Obermeier & Van Reenen (2022).

Change in aggregate labor share $\Delta S = \Delta \left(\sum_i \omega_i \frac{\alpha_i}{\mu_i \psi_i} \right)$

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- If stable technological bias and mark-downs

$$\Delta S = \frac{\alpha}{\psi} \Delta \left(\sum_i \omega_i \frac{1}{\mu_i} \right)$$

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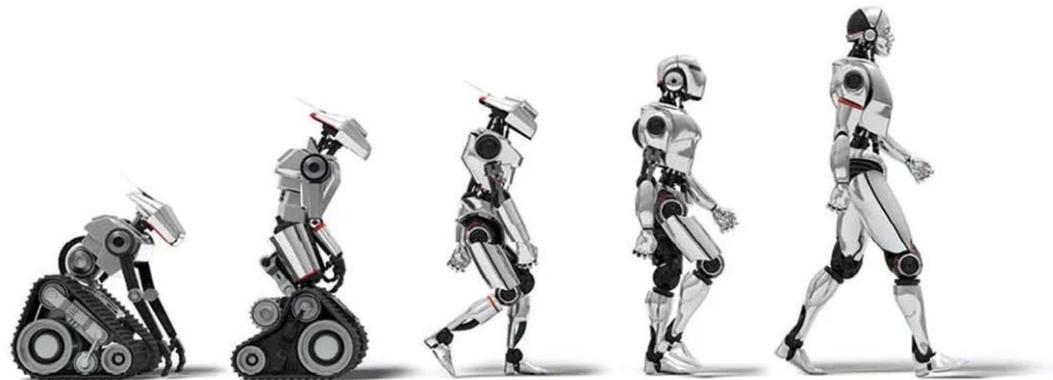
- If stable technological bias and mark-downs

$$\Delta S = \frac{\alpha}{\psi} \Delta \left(\sum_i \omega_i \frac{1}{\mu_i} \right)$$

- Size weighted markups rose by about 0.44% per annum
 - Implies a fall in UK labor share of **7.1 pp**
 - **Actual fall** was only about half this, **3.5 pp**
- Differs from US where we explain only about half of falling labor share by markup rise (Autor et al, 2020)

Application of framework to UK (1981-2019)

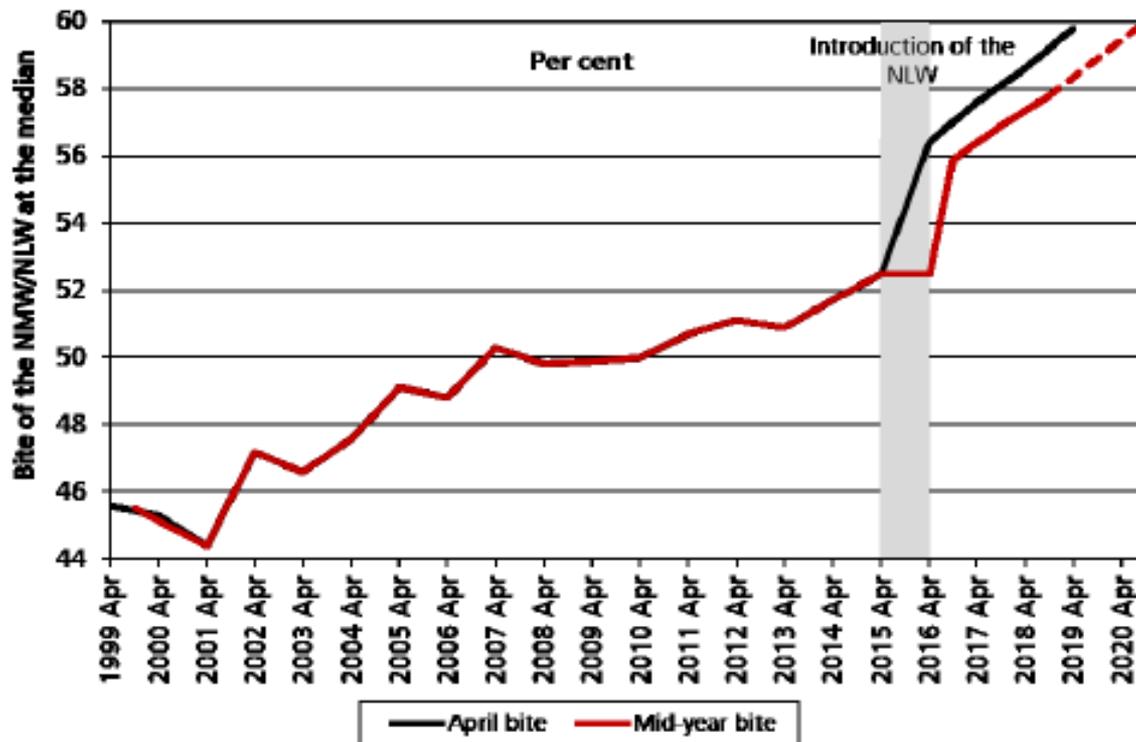
- Suggests some offsetting factors in UK, which in our framework is either **biased technology** or monopsony
- Technical change biased **towards** labor, $\Delta\alpha > 0$?
 - *Unlikely* as automation (e.g. robots) generally thought to be biased **against** labor (e.g. Acemoglu & Restrepo, 2019, 2020)



Monopsony Power

- **Fall in monopsony power** (smaller markdowns), $\psi < 0$?
 - UK introduced first National Minimum Wage in 1999.
 - “Bite” of this has become increasingly strong over time

Chart 1.B: The ‘bite’ of the NMW/NLW for workers aged 25 and over (1999-2020)



Source: Dube (2019)

Monopsony Power

- **Fall in monopsony power** (smaller markdowns), $\psi < 0$?
 - UK introduced first National Minimum Wage in 1999. “Bite” of this has become increasingly strong over time
 - Evidence (e.g. Draca, Machin & Van Reenen, 2011) that this wage floor:
 - Increased **wages** at bottom of distribution without significantly reducing **jobs**
 - But **did** squeeze profits, especially when firms had some product market power

Monopsony Power

- **But** doesn't growth of Superstar firms imply more monopsony power? Not necessarily:
 - Sales concentration increases much more than employment concentration
 - In US, no increase in employment concentration at local level (Rinz, 2020)
 - and markdowns not simply due to concentration (elasticities of supply)

Monopsony Power

- **But** doesn't growth of Superstar firms imply more monopsony power? Not necessarily:
 - Sales concentration increases much more than employment concentration
 - In US, no increase in employment concentration at local level (Rinz, 2020)
 - and markdowns not simply due to concentration (elasticities of supply)
- Evolution of markdowns controversial
 - Most US estimates find little change (e.g. Lamadon et al, 2022) despite non-competes, etc. But Yeh et al (2022) find markdown rise in mnfg 2002-2012

Agenda

Introduction

Increasing differences across firms

Markups

Framework: product & labor markets

Assessment

Explanations of the rise of superstar firms

- **Institutional**
 - Weak anti-trust enforcement, lowering competition
- **Technological**
 - Innovation (digital sectors)
 - Diffusion (adoption of ICT, digital)
- **Globalization**
 - Falling trade costs
 - Global Value Chains

Assessment of causes

- The similar qualitative patterns across countries suggests some common underlying forces
- Unlikely that country-specific institutions such as weaker US anti-trust enforcement are the dominant explanation (cf. EU DG-COMP)
 - Can help explain different magnitudes of some effects in different countries
- Technology stories
 - Platform competition (sectors intensively producing digital, GAFAMs)
 - Adoption of digital, growth of intangible capital fixed costs (sectors intensive in using digital)

Policy Implications I: Anti-Trust

- Knee-jerk restraints on superstar firm growth or breaking them up is likely to be very costly

Policy Implications I: Anti-Trust

- Knee-jerk restraints on superstar firm growth or breaking them up is likely to be very costly
- Even if superstar success not due to weaker institutions, in our “winner take most world”, important to modernize **anti-trust policy** to reduce risks of harm:
 - **Ex ante regulation**: EU Digital Markets Act, UK DMU, etc. Interoperability, data portability/access
 - Key role for **innovation/future competition** in assessing anti-trust enforcement
 - **Standards of proof** to shift more towards acquirers instead of government regulators
 - Finding ways to increase **structural competition** (e.g. EU Single Market for Services; trade agreements)

Policy Implications II: Labor markets

- Counter-balancing firm power through **labor market policy**
- Institutions such as
 - Minimum wages
 - Collective bargaining
 - Labor standards (e.g. Gig economy)
- Strengthen job mobility (stopping non-competes; poaching agreements, etc.)
- Increasing human capital (especially through education and training)

Conclusions

- Huge heterogeneity between firms in terms of size, productivity & wages
 - And this inequality has expanded in recent decades in many countries
- The widening differences between superstar firms and rest of economy revealed by increased concentration & markups
- Helps explain falling labor share, but also need to consider imperfect competition in labor market
- Growth of superstar firms probably driven by technology, but still implies an important role for competition and labor market policy
- A very rich research area!

Thank you!

Further reading

- de Loecker, Obermeier and Van Reenen (2022) “Firms and Inequality” *Deaton Inequality Review*
- Amiti, Duprez, Konings and Van Reenen (2022) “Superstar Spillovers”
- Autor, Dorn, Katz, Patterson and Van Reenen “The Fall of the Labor Share and the Rise of Superstar Firms” (2020) [Quarterly Journal of Economics](#)
- Bloom, Sadun, Schuh and Van Reenen (2021) “Management as Capital” <http://cep.lse.ac.uk/pubs/download/dp1433.pdf>
- Bloom, Nick and John Van Reenen) “Measuring and Explaining Management practices across firms and nations” [Quarterly Journal of Economics](#) (2007) 122(4), 1351–1408.
- Scur, Sadun, Van Reenen, Lemos & Bloom (2021) “The World Management Survey at 18, *Oxford Review of Economic Policy* <https://poid.lse.ac.uk/textonly/publications/downloads/poidwp002.pdf>
- World Management Survey <http://worldmanagementsurvey.org/>
- Van Reenen (2018) “Increasing Difference Between Firms” *Changing Market Structures and Implications for Monetary Policy*, Jackson Hole Symposium 19-65 <http://cep.lse.ac.uk/pubs/download/dp1576.pdf> [NYT](#) [NPR](#)
- Draca, Mirko, Steve Machin & John Van Reenen (2011) “The Impact of the National Minimum Wage on firm profitability” *American Economic Journal: Applied Economics* 3(1) 129-51 <http://cep.lse.ac.uk/pubs/download/dp0715.pdf>

Market Valuation at June 5th 2022 (“GAFAMs”)

- **Apple** \$2.53 Trillion



- **Microsoft** \$2.09 Trillion



- **Google/Alphabet** \$1.51 Trillion



- **Amazon** \$1.24 Trillion

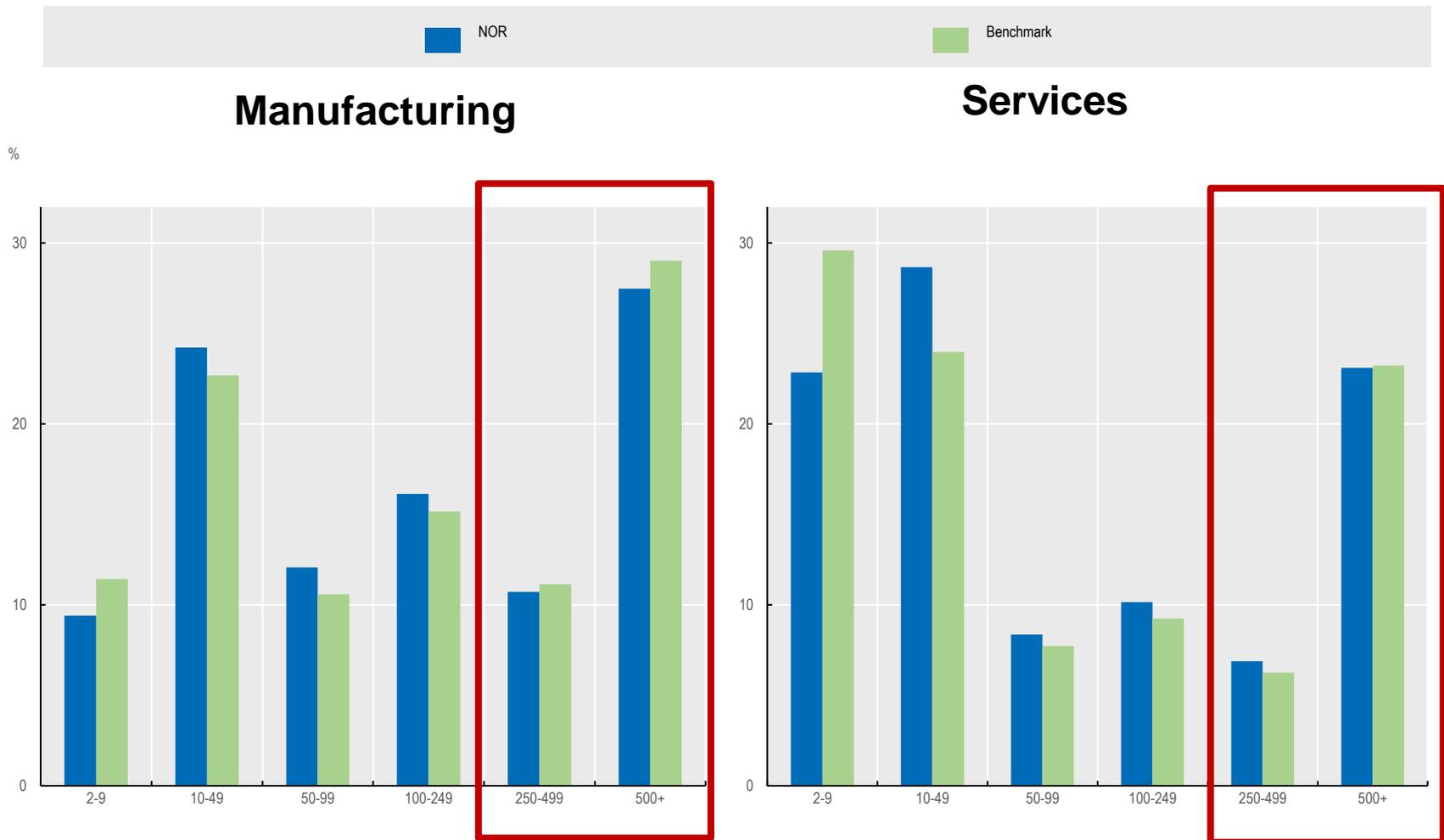


- **Facebook/Meta** \$0.54 Trillion



- Growth has been supercharged by COVID’s push to online, but has been going on long before the Pandemic

Similar in Norway & EU: firms with 250+ workers also account for about 2 in 5 jobs of all jobs



Source: OECD DynEmp and MultiProd, <https://www.oecd.org/sti/ind/oecd-insights-on-productivity-and-business-dynamics.htm>. “Benchmark” are 6 EU countries 88

Some Macro implications of firm inequality

- Hsieh & Klenow (2009) India TFP (and wages) would be 50% higher if reallocation was at US levels
- About half of all US TFP growth is reallocation from low to high productivity firms (Bailey et al, 1993)
- Management capabilities account for a third of TFP gaps with US (Bloom, Sadun, Schuh & Van Reenen, 2022)

Lots of extensions of AKM model

- **Extensions of AKM model**

- Germany (Card, Hening & Kline, 2013): since early 1990s big part of rise in inequality is increased between firm dispersion.
- US (Song et al, 2019): ~70% of individual wage inequality increase is between firms. Mainly segregation & sorting?
- Gender pay gaps: Card et al (2016)
- Methodological issues: e.g. Bonhomme et al (2019)

- **Rent sharing**

- Explicit characteristics of firms that could shift quasi-rents to be shared with workers
- Productivity/profits or more fundamental shifters such as technological innovation (Van Reenen, 1996; Kline et al, 2019) or trade (Abowd & Lemieux, 1993)

Lamadon, Mogstad and Setzler (2022)

- Ln(Wages) of individual i in firm j at time t : $W_{ij,t} =$

$$\tilde{x}_i + \tilde{\psi}_j + \tilde{\psi}_{jt} + \rho_{ij} + e_{ij,t}$$

Worker
Quality

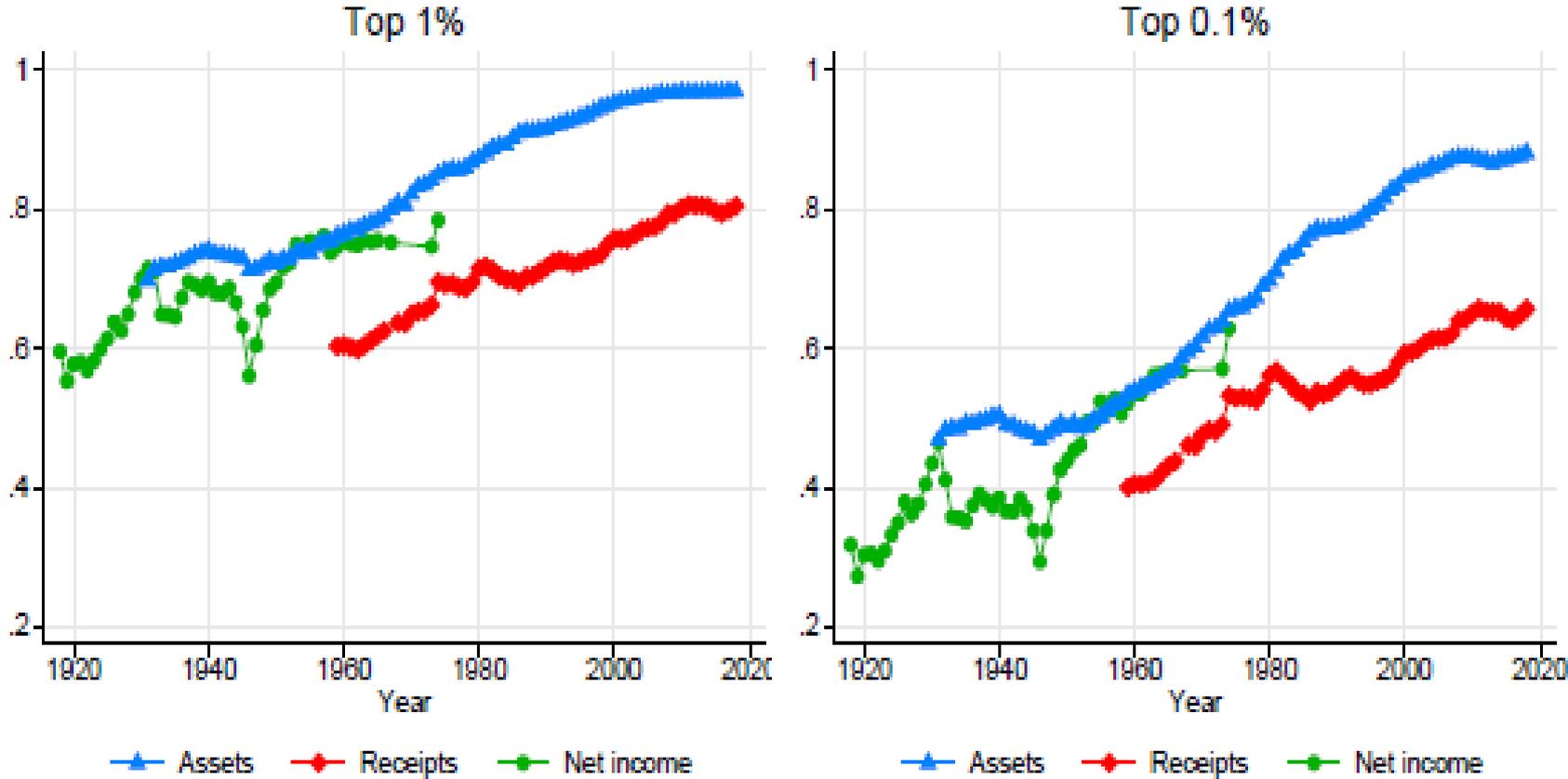
Time-average
firm effect

Time varying
firm shocks
Pass-through

Sorting: interaction
of worker quality &
firm productivity

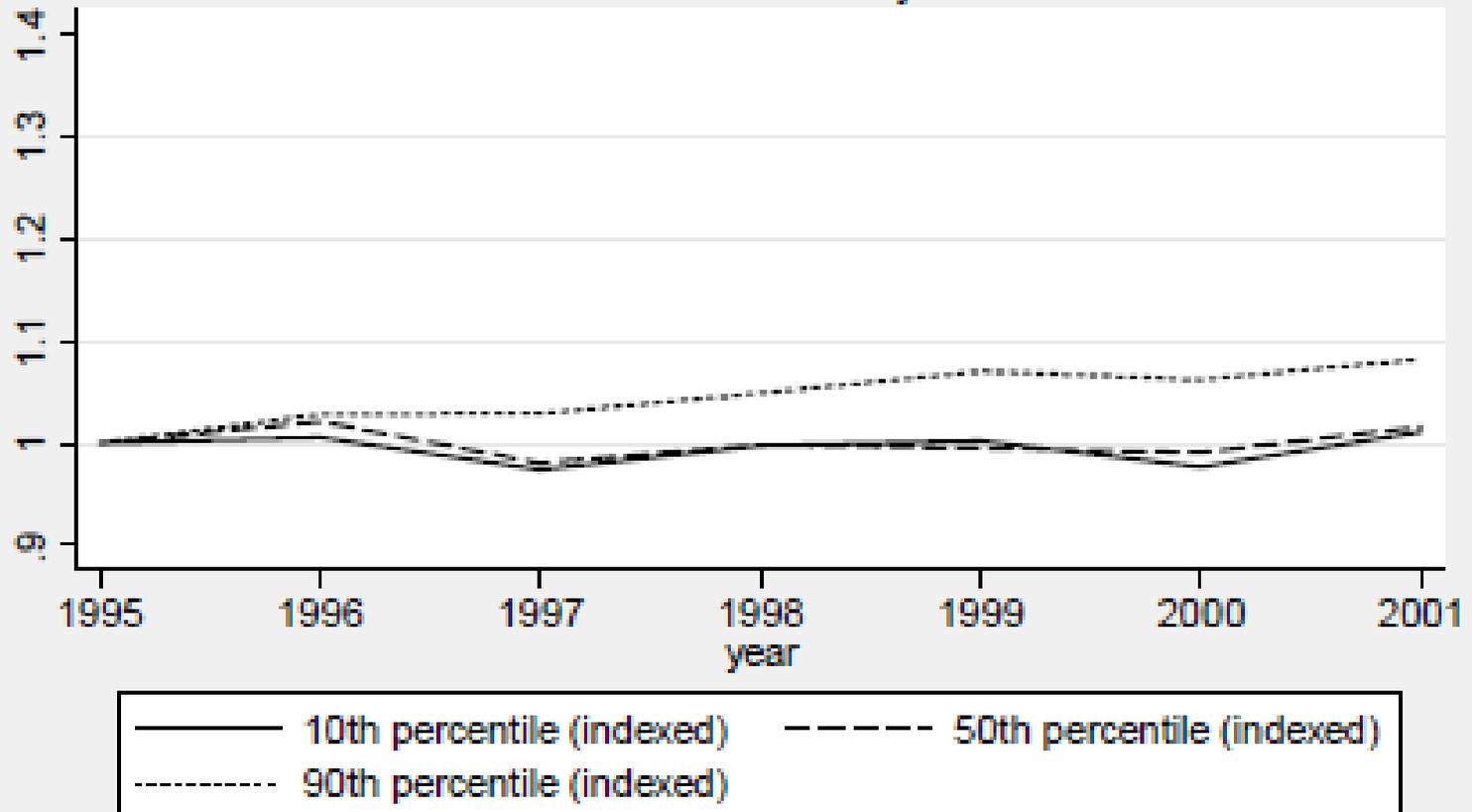
- $\tilde{x}_i = \bar{\theta}(x_i - \bar{x})$ = direct effect of worker quality evaluated at the average firm (bars denote means)
- $\tilde{\psi}_{j(i,t)} = \psi_{j(i,t)} + \theta_{j(i,t)}\bar{x}$ = average effect of firm j (evaluated at average worker quality \bar{i})
- $\tilde{\psi}_{j(i,t),t} = \psi_{j(i,t),t} - \tilde{\psi}_{j(i,t)}$ = time variation in the firm premium due to the pass-through of value-added shocks
- $\rho_{ij} = (\theta_{j(i,t)} - \bar{\theta})(x_i - \bar{x})\psi_{j(i,t)}$ = interaction effect between productivity of firm j and quality of worker i

In US corporate concentration seems to have risen over the last 100 years



Source: Kwon, Ma and Zimmerman (2021)

Fig.20: Change in Norwegian Firm Productivity Dispersion 1995-2001
Whole Economy



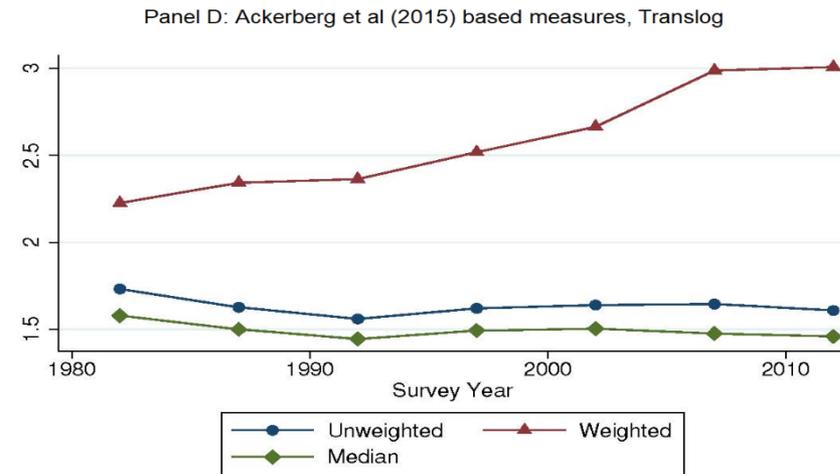
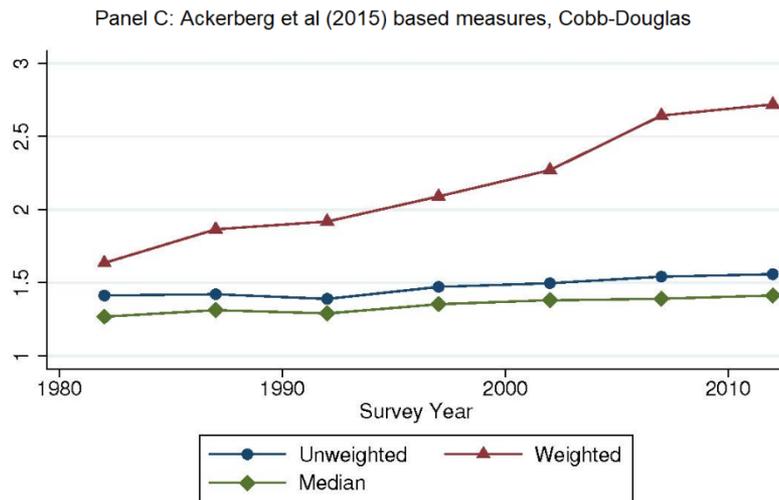
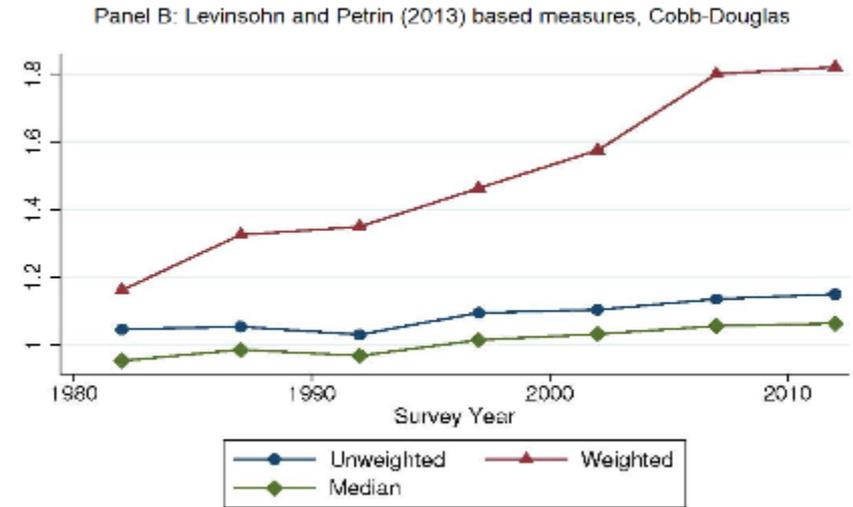
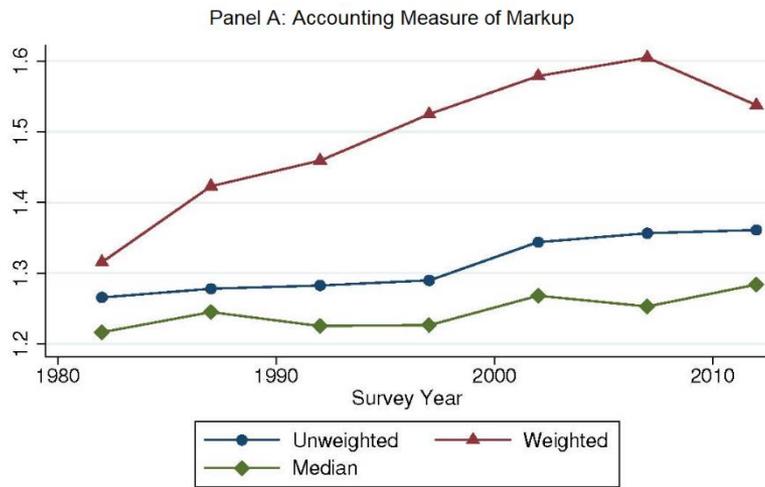
Source: REGN dataset.

Sample of firms with $emp \geq 10$; $\ln(va/emp)$.

Methods for estimating (price-marginal cost) markups

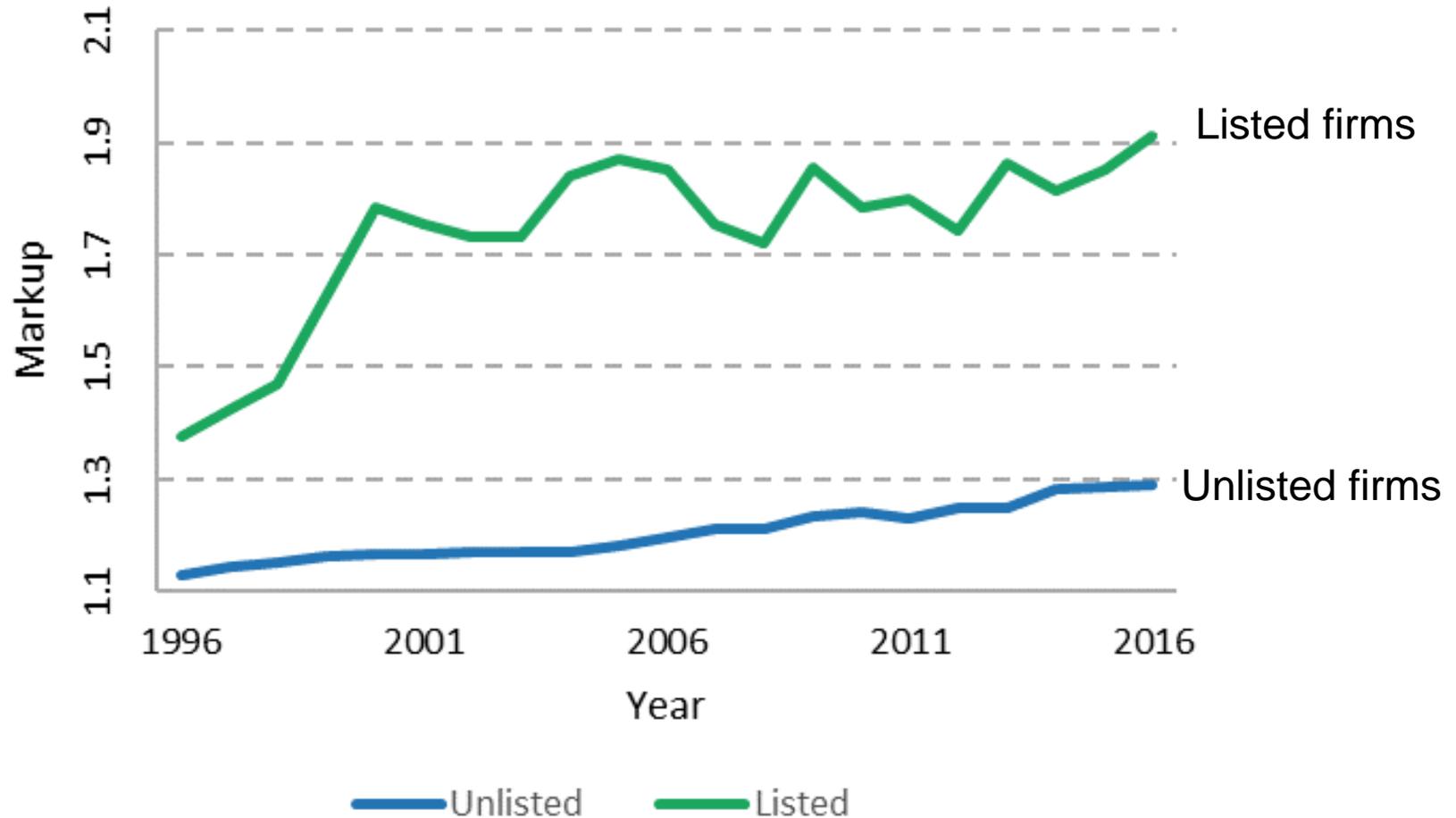
- **Demand equation** approach + supply assumption (e.g. BLP)
 - Requires brand specific prices (unavailable across large parts of economy)
- **Production function** based approach (Hall, 1988, 2018)
 - Use “wedge” between output elasticity for a factor of production and its share in revenue
 - Accounting methods
 - Econometrically estimate production function (e.g. de Loecker and Warzynski, 2012)

Aggregate US Markup rises, driven by reallocation. Median firm markup stable



Source: Autor et al (2020); Census of Manufactures; **Notes:** Panel A uses Antras et al (2017) method; Panels B-D use production function, de Loecker and Warzynski (2012).

Aggregate Markups in UK population data also rise

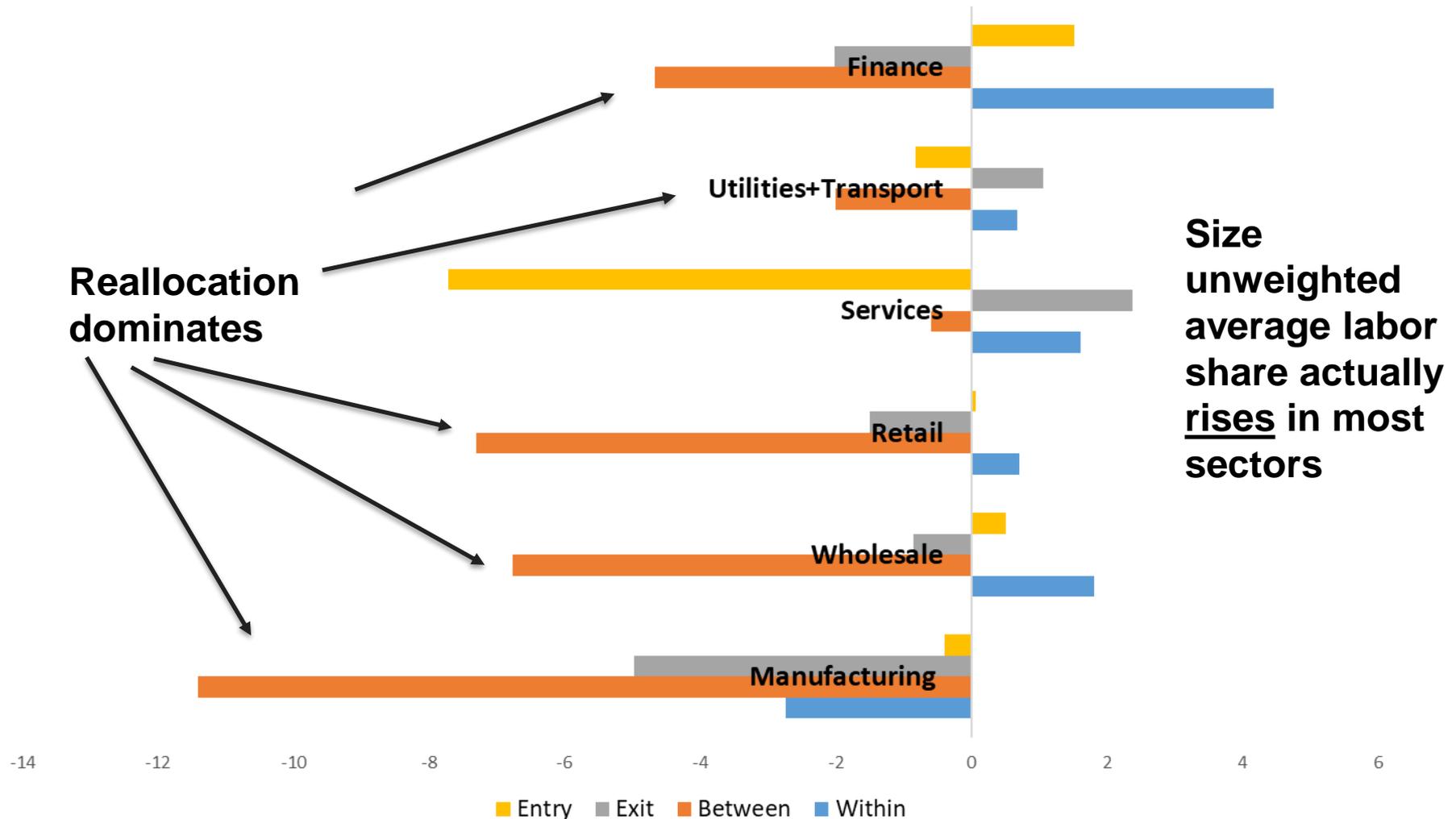


Source: de Loecker, Obermeier and Van Reenen (2022), Deaton Inequality Review

Implications for inequalities II: wage inequality

- Pay at the very top (Gabaix on CEOs)
- More generally on the wage distribution:
 - AKM two-way fixed effects models
 - Card, Heining & Kline (2013) find important component from increased variance of firm effects in Germany
 - Song et al (2018) find different result in US: it's almost all increased (i) correlation of high ability workers employed together; (ii) high ability workers employed in high fixed effects firms
 - But general issue of interpretation of AKM fixed effects

Firm-level Census decompositions of labor share fall: It's all reallocation

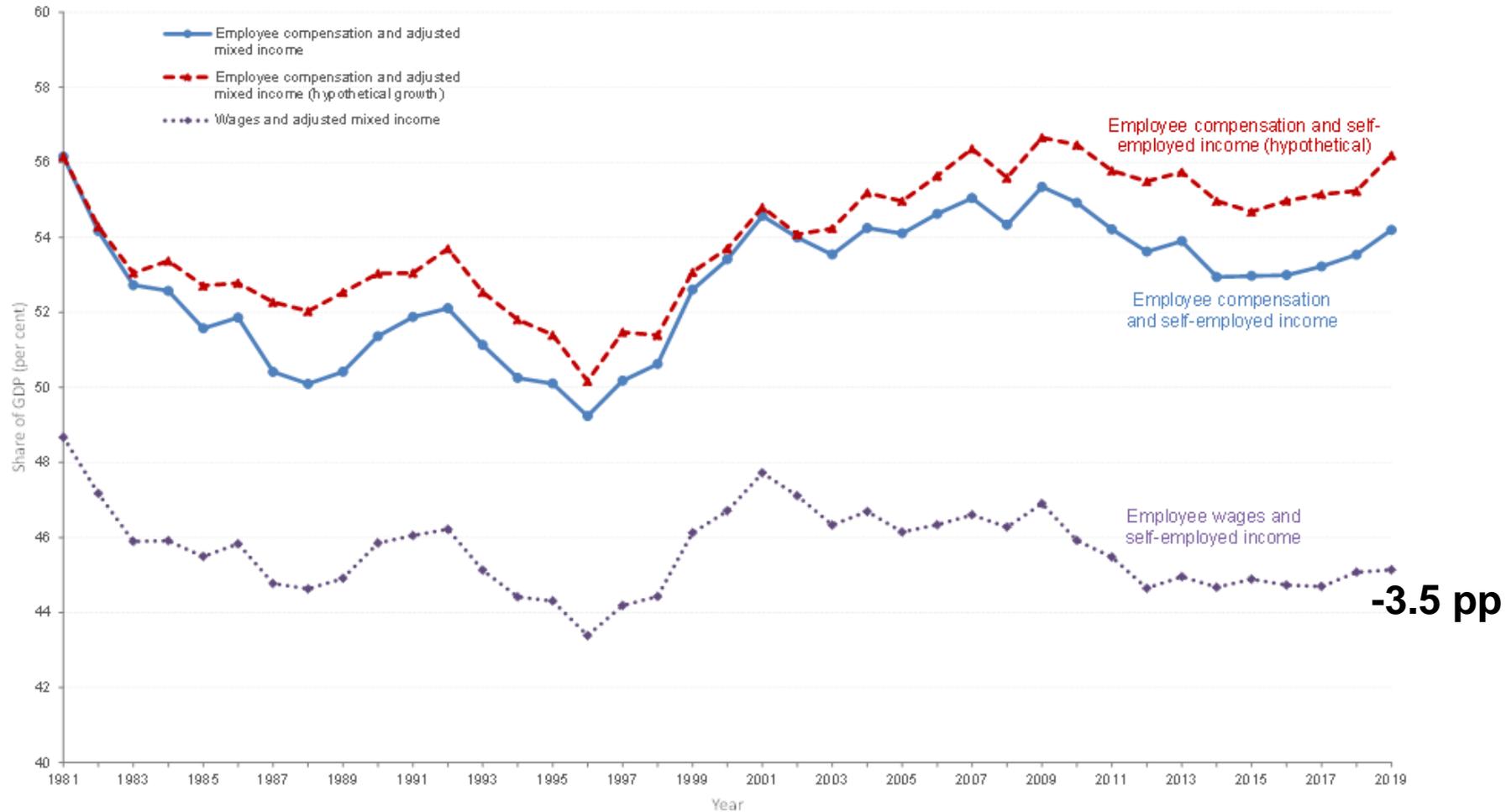


Notes: Meltitz-Polanek (2015) decompositions 2012-1982. Use NIPA to adjust Census for intermediates (~4 million firms); Autor et al (2020)

Concerns

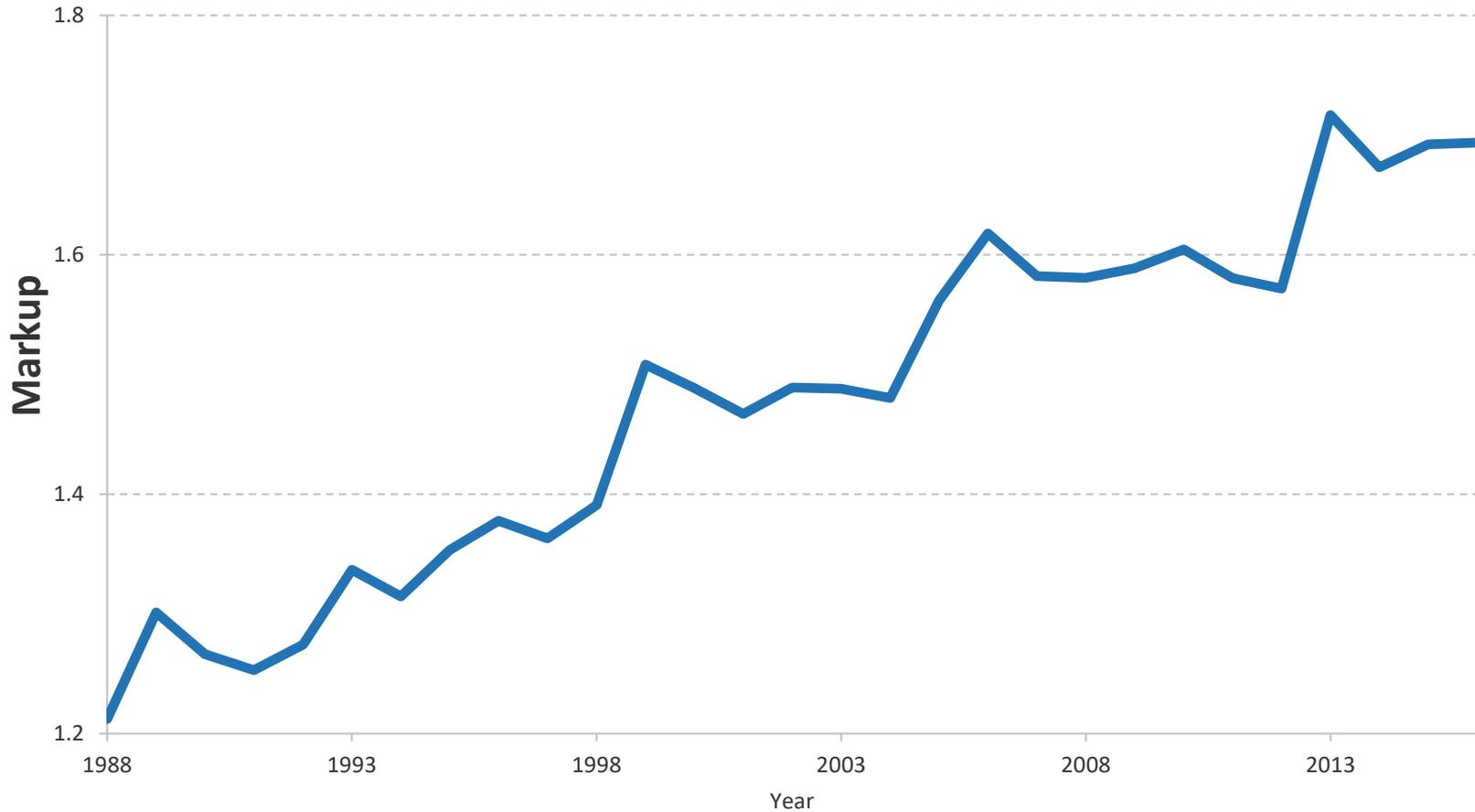
- Compustat covers a special sample of firms
 - Publicly listed (so covers under a third of US employees)
 - Only has very large firms, so very selected and type of firm listed differs a lot over time
 - Doesn't break down COGS into cost components (e.g. labor, intermediates, etc.)
 - Consolidated accounts (so includes overseas activity)
- Can replicate methods in Census Data which deals with all of these problems
 - Cleanest to do in Census of Manufactures

UK Labor Share, 1981-2019



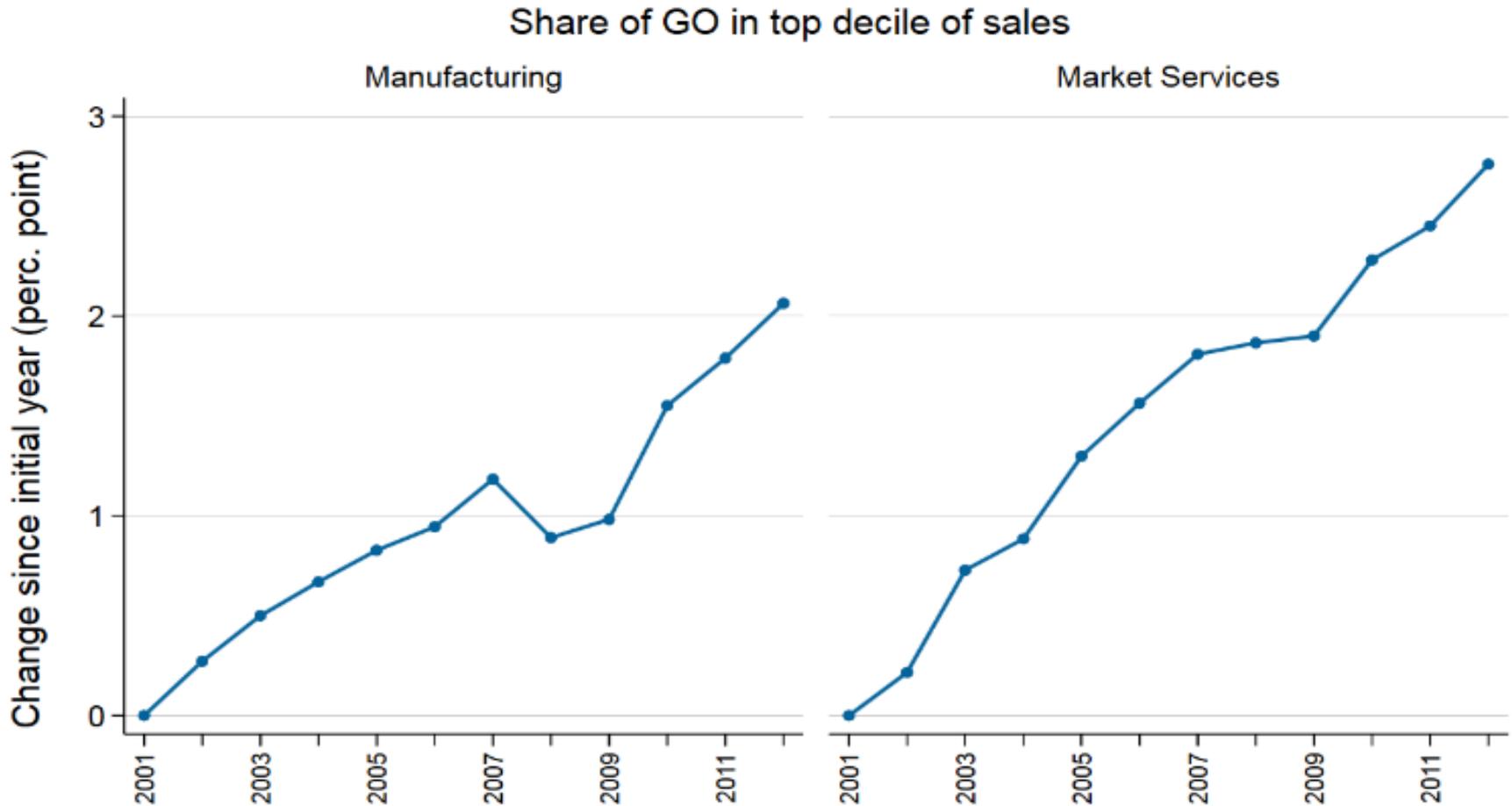
Source: Teichgraeber and Van Reenen (2022)

Aggregate markups (Prices/marginal cost) have also been increasing, 1988-2016



Notes: Worldscope (publicly listed firms), estimate of price/marginal costs using COGS/Sales and calibrated elasticity of output to variable costs of 0.85

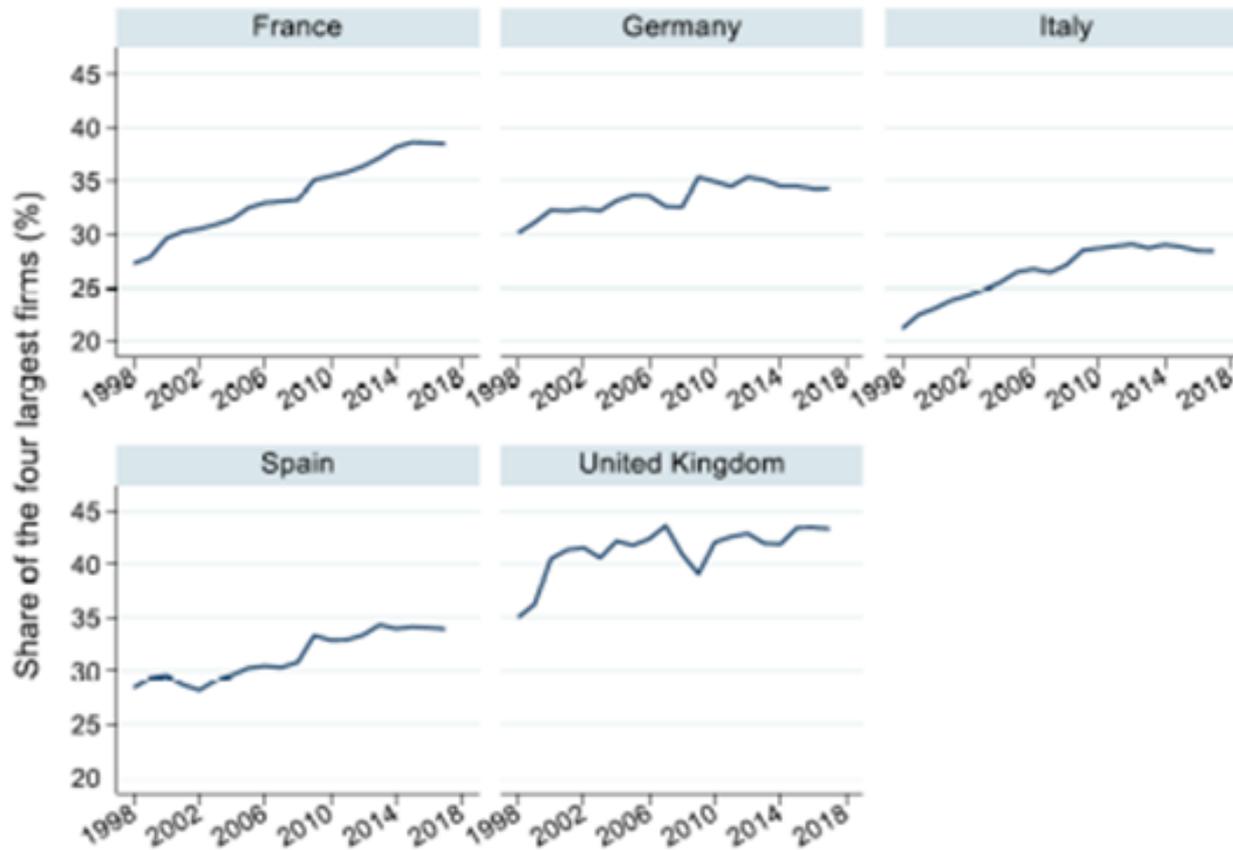
Like US, Sales Concentration seems to have increased in Europe (country by industry Census micro data)



Source: OECD Multiprod, <https://www.oecd.org/sti/ind/multiprod.htm>; Criscuolo (2018)

Notes: Year effects from regressions with country-industry dummies and year dummies (BEL, DEU, DNK, FIN, FRA, HUN, **NOR**, PRT, SWE). <https://www.oecd-ilibrary.org/docserver/2ff98246-en.pdf?expires=1650918252&id=id&accname=quest&checksum=41F36FA0DA6836CB79360195B>

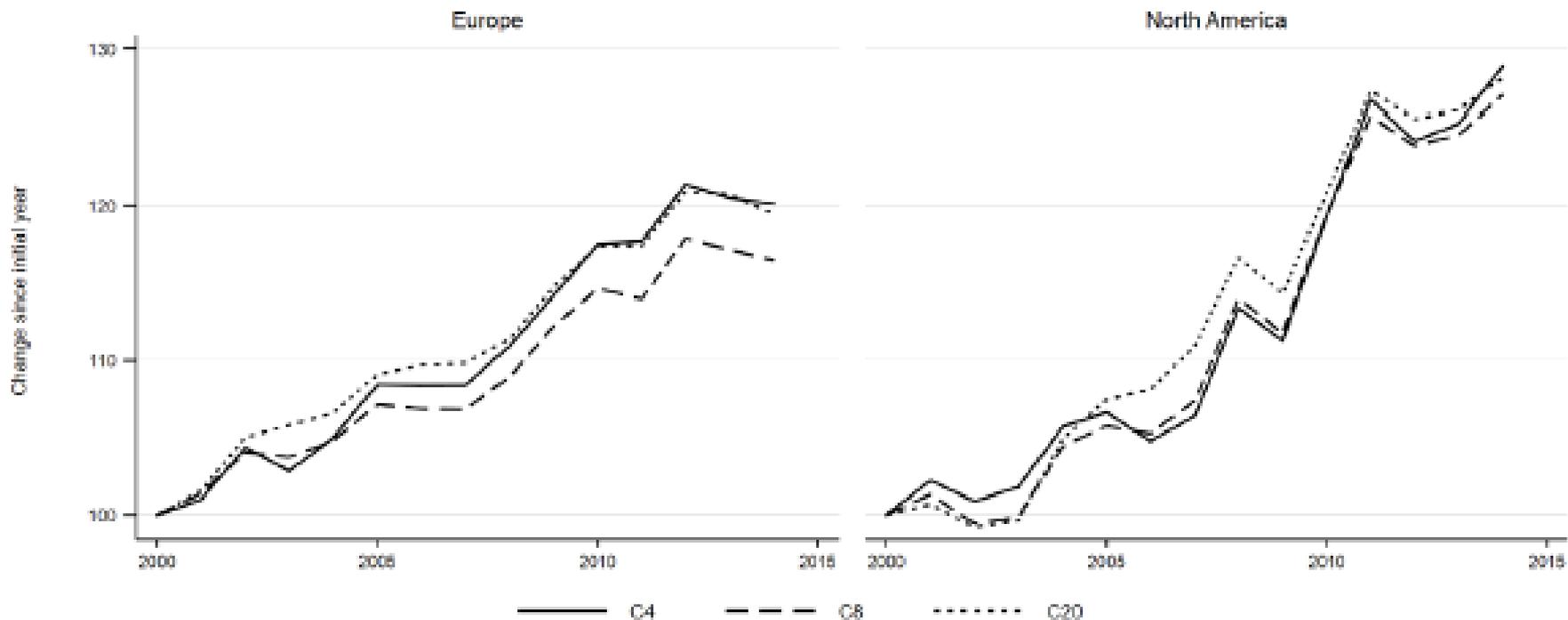
Like US, Sales Concentration seems to have also increased in Europe (company accounts data)



Source: Authors' calculations based on Euromonitor International's Passport Industrial database.

Source: Koltay, Lorincz and Valletti (2020) DG-COMP Chief Economist Team using ORBIS, Euromonitor Industrial Passport and STAN

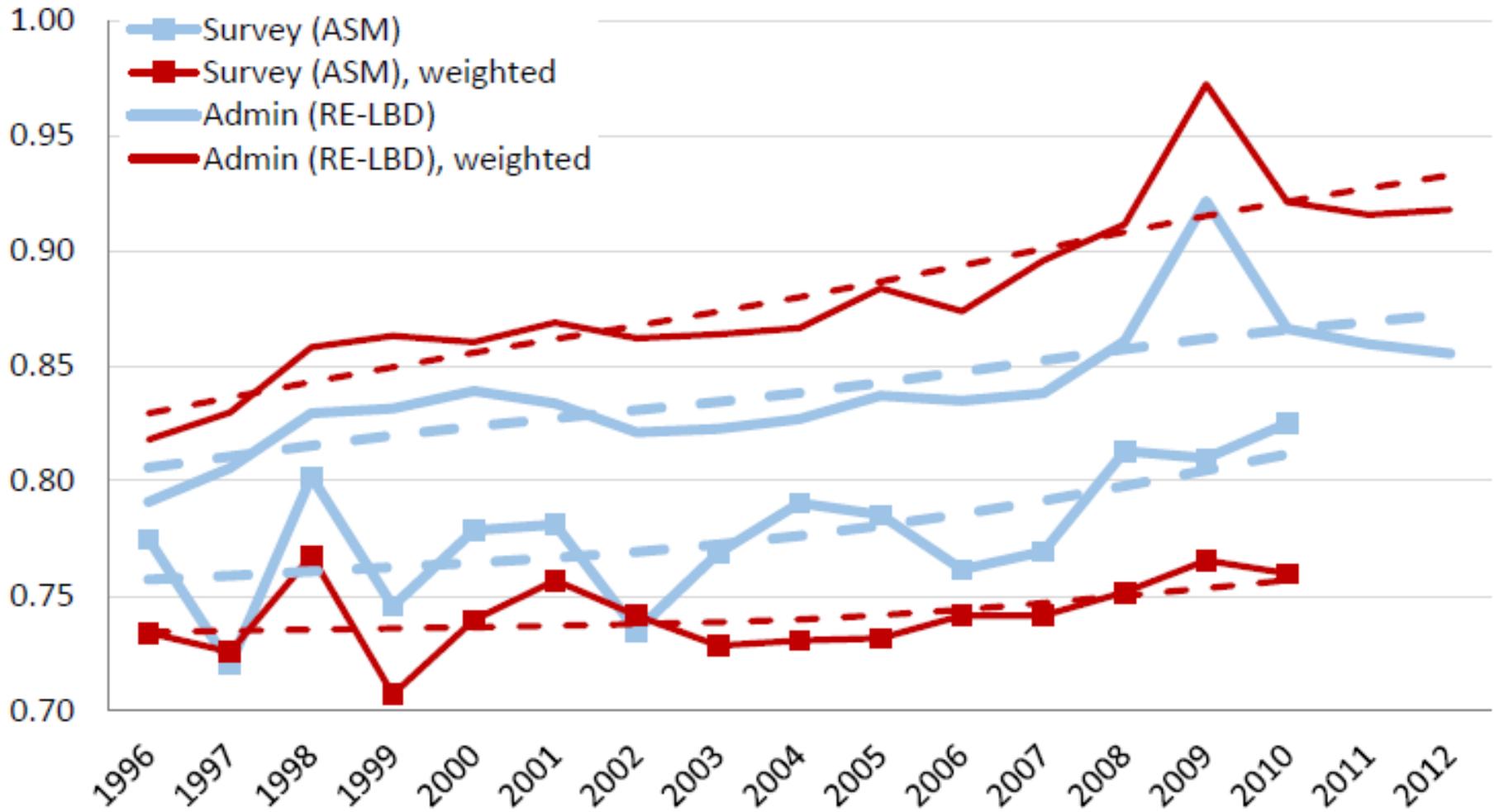
Figure 8. Differing Concentration Metrics (CR4, CR8, CR20) in Europe & North America



Source: OECD Multiprod, <https://www.oecd.org/sti/ind/multiprod.htm>; Criscuolo (2018)

Notes: Year effects from regressions with country-industry dummies and year dummies (BEL, DEU, DNK, FIN, FRA, HUN, **NOR**, PRT, SWE). <https://www.oecd-ilibrary.org/docserver/2ff98246-en.pdf?expires=1650918252&id=id&accname=quest&checksum=41F36FA0DA6836CB79360195B>

Rising US productivity dispersion (manufacturing)

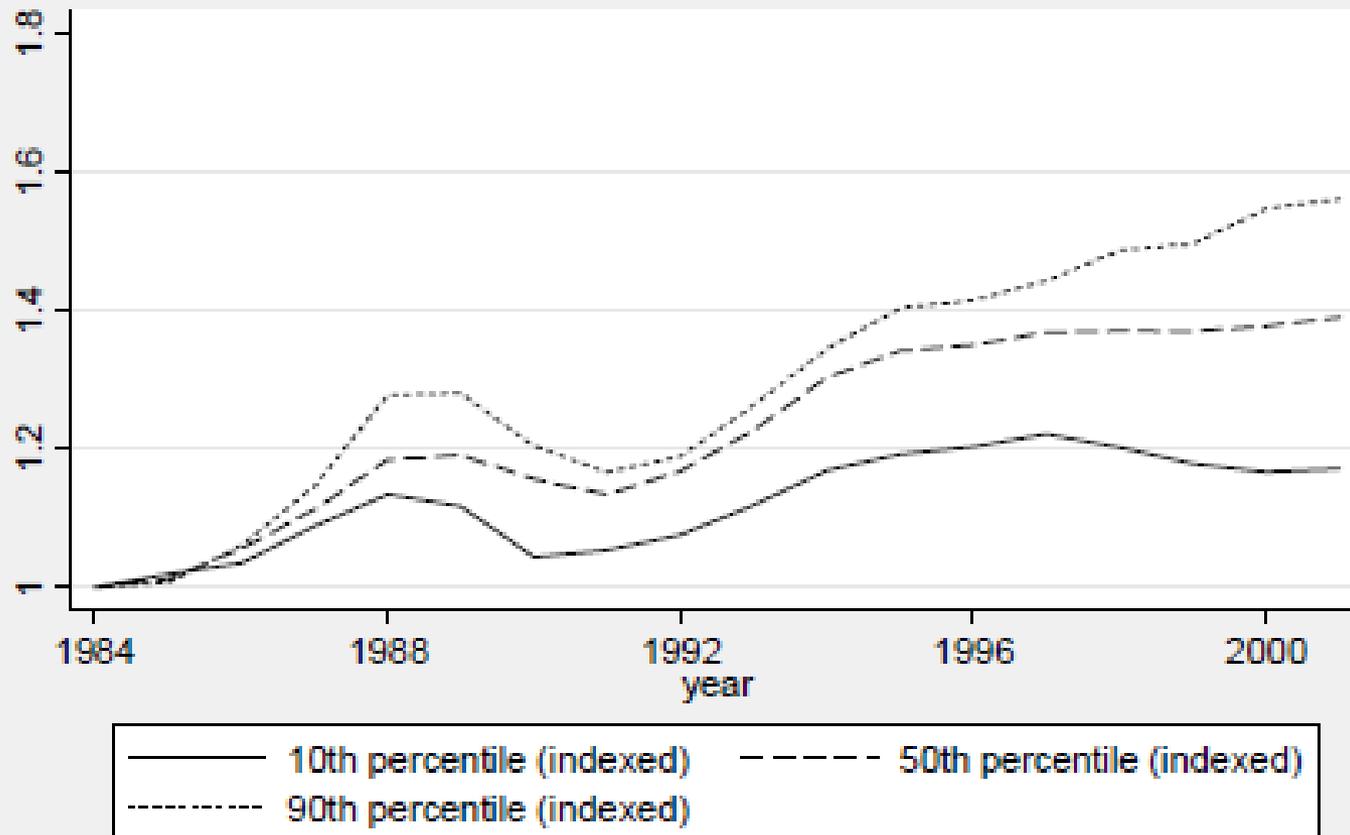


Source: Decker, Haltiwanger, Jarmin & Miranda (2018, Figure A6)

Notes: Standard Deviation of $\log(\text{real sales}/\text{employment})$ normalized in a NAICS 6 digit industry-year. HP filtered series in dashed lines. LBD is population whereas ASM is corrected for sample selection. Weights are employment weights.

This continues a trend we first noticed starting beginning in 1980s (joint with Kjell Salvanes....)

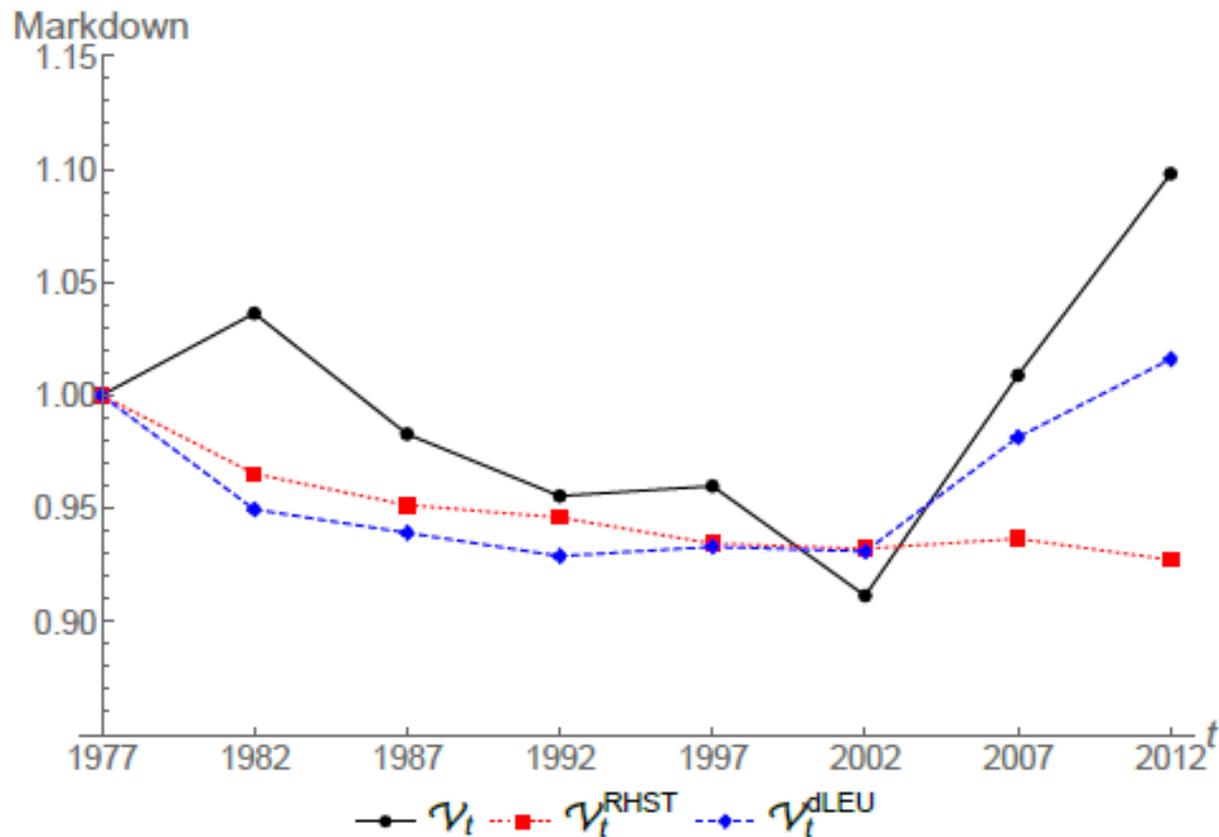
Fig.5b: Productivity dispersion in manufacturing and private services
FAME data 1984-2001



Source: Faggio, Salvanes and Van Reenen (2010)

Note: Productivity is value added per worker. All quantiles weighted by firm size (employment). FAME/Historical ORBIS data.

Yeh et al (2022) estimates of markdown in US manufacturing



Markdowns are constructed under the assumption of translog production and aggregated according to expressions equation (14), equation (15), and equation (16), respectively. All measures are normalized relative to their initial value in 1977. Source: Authors' own calculations from quinquennial CM data from 1977–2012.