Income Inequality

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Outline

- Decline in the wage share: Theory & Empirics
- Wage inequality: Theory & Empirics
- Summary
- Policy implications

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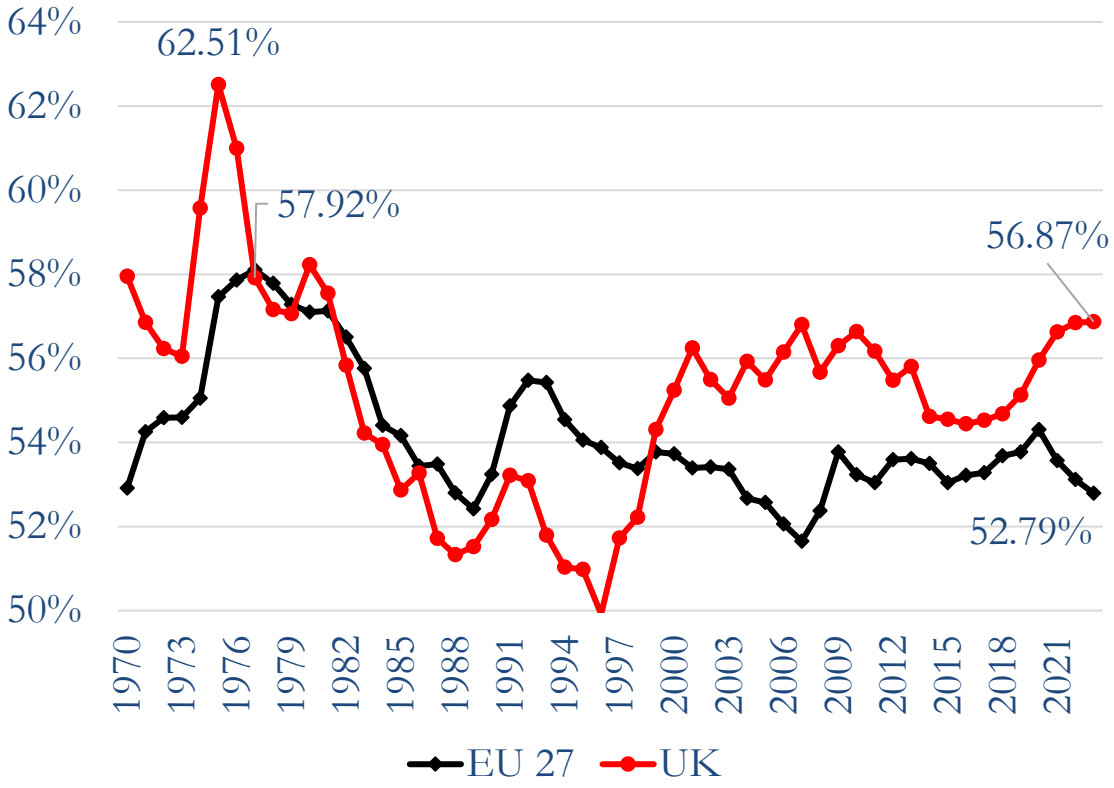
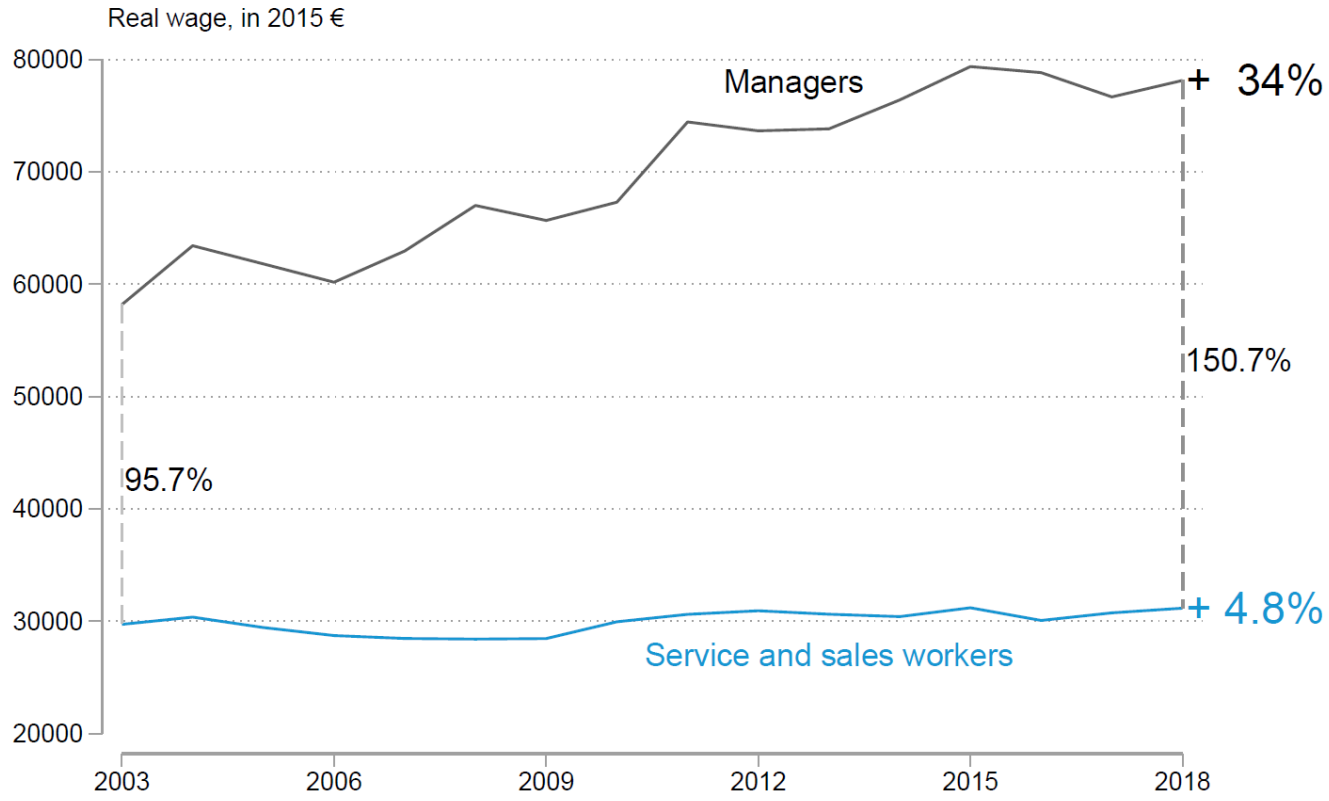
What are we trying to explain?

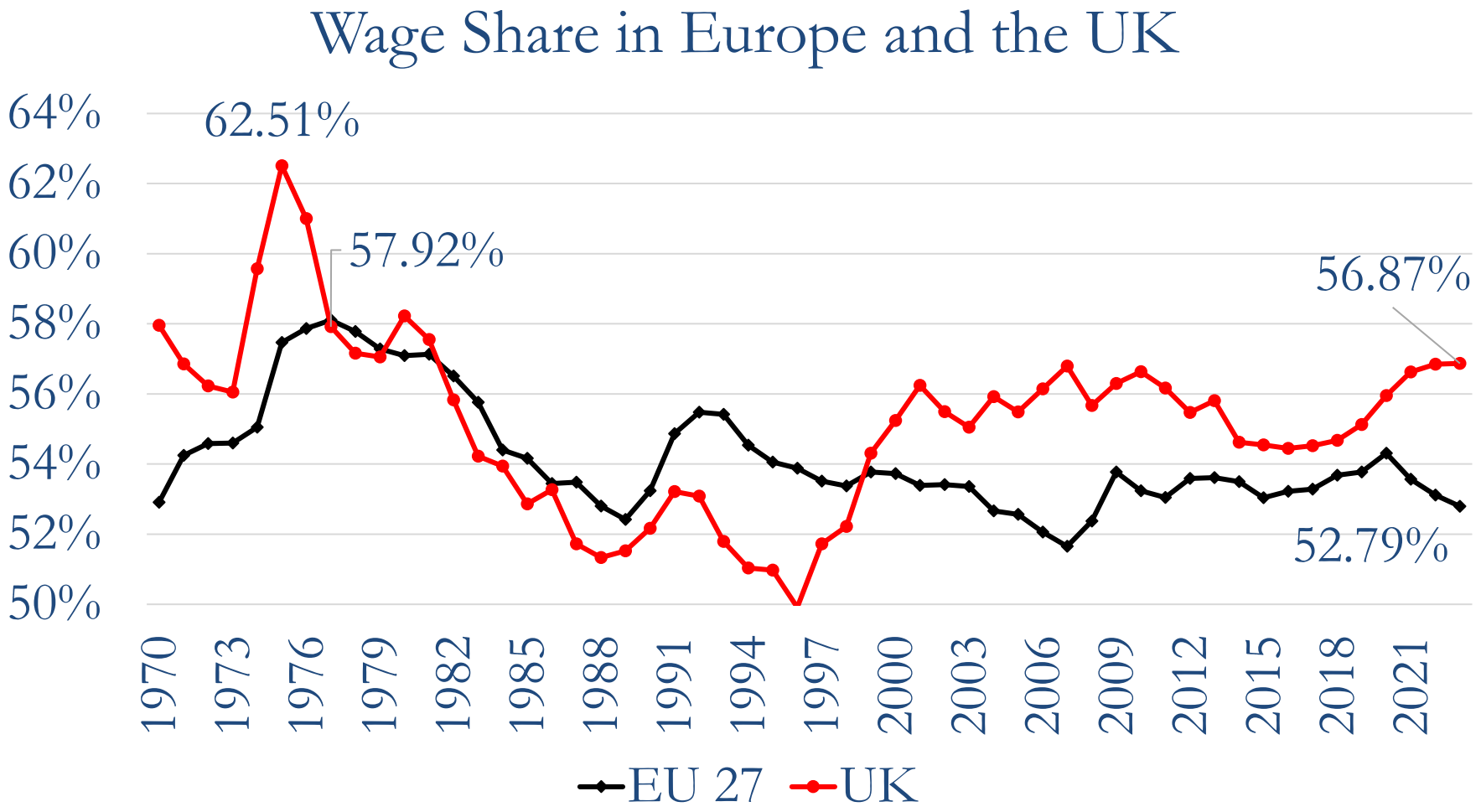
Declining Wage Share



Increasing Wage Inequality



Declining Wage Share



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Theories of Functional Income Distribution

- Theory → Empirical hypothesis → Policy implication
  - "The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist" (Keynes, 1936)
- Theories
  - Neoclassical → Technology
  - Keynesian → Effective demand
  - Kaleckian → Degree of monopoly
  - Marxian → Class struggle

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General framework for discussion

$$\text{Wage Share} = S_L = \frac{\text{wage bill}}{\text{GDP}} = \frac{w_r L}{Y}$$

w_r = real wage; L = hours worked

- Closed economy, no government
- Vertically integrated economy (no intermediate goods).
  - Note: prices & shares of intermediate goods determine distribution in all theories (Lavoie, 2023)

A neoclassical model

- Profits: $\pi = pY - f_0 - wL$
- FOC for profit max: $\frac{d\pi}{dL} = p\frac{dY}{dL} - w = 0 \leftrightarrow \frac{dY}{dL} = \frac{w}{p} = w_r$
- Wage Share $= S_L = w_r \frac{L}{Y} = \frac{dY}{dL}\frac{L}{Y} = \frac{dY}{Y} / \frac{dL}{L}$ = Labour elasticity of output
- Exact definition depends on production function
- Cobb-Douglas: $Y = AL^{\alpha}K^{1-\alpha} \rightarrow \frac{\partial Y}{\partial L} = A\alpha\left(\frac{K}{L}\right)^{1-\alpha} \rightarrow S_L = \alpha$
- CES: $Y = [b.(AK)^{\rho} + (1-b).(BL)^{\rho}]^{\frac{1}{\rho}}$

$$\rightarrow \text{Wage Share} = 1 - \frac{\partial Y}{\partial K}.\frac{K}{Y} = 1 - \left(b.A.\left(\frac{K}{Y}\right)^{\rho}\right)$$

Y=output; A, B=capital, labour augmenting technological change; b=distribution parameter; ρ =substitution parameter; K=capital; L=labour, w=wage rate, p=price

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A neoclassical model – Main features

- Distribution determined by technology!
  - CD: α = constant
  - CES: $S_L = f(A, \frac{K}{Y})$
- No demand constraint!

A Keynesian/ Kaldorian model

- Keynes not really interested in income distribution
- Kaldor (1955): Keynesian model based on mechanism of effective demand
- $Y \equiv I + C \equiv W + \pi$
- Goods market equilibrium implies: $S = I$
- (investment determines saving)
- Only capitalists save: $S = s_p \pi$
- Plug into goods market equilibrium: $s_p \pi = I \leftrightarrow S_C = \frac{\pi}{Y} = \frac{I}{s_p Y}$
- Wage Share $= S_L = 1 - \frac{I}{s_p Y}$

I = investment; C = consumption; s_p=saving rate; π = profit bill; Y = GDP

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A Kaldorian model – main features

- Distribution determined by capitalists' consumption and investment (animal spirits) → MPL not useful reference point
- Distribution is a result of what happens in the goods market → hierarchy of markets

A Kaleckian model

- Kalecki: effective demand & imperfect competition
- Distribution determined by cost structure and the pricing behaviour → assume simple mark-up pricing
- $p = (1 + \theta)UVC$

  p = price; θ = mark-up; $UVC = \frac{wL}{Y}$ = unit variable costs
- $p = (1 + \theta)\frac{wL}{Y} \rightarrow \frac{1}{(1+\theta)} = \frac{w}{p}\frac{L}{Y} = S_L$

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A Kaleckian model – main features

- Distribution determined by
- Mark-up (θ) determined by 'degree of monopoly' which is a function of
  - Competition
  - Bargaining power (labour unions, financialisation, institutions, …)
  - …

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Marxian theory

- Marx (Capital Vol. 1): socially determined subsistence wage
- "The value of labour-power is determined, as in the case of every other commodity, by the labour time necessary for the production, and consequently also the reproduction, of this special article. (…) In contradistinction therefore to the case of other commodities, there enters into the determination of the value of labour-power a historical and moral element." (Marx 1867: 120f.)
- Goodwin (1967): dynamic model with the wage share and employment as the two state variables

Theory	Main determinants of the wage share	Additional factors
Neoclassical/ New Keynesian	Technological progress; substitutability between capital and labour	Bargaining power; Competition
Keynesian/ Kaldorian	Animal spirits; capitalist consumption	
Kaleckian	Degree of monopoly (bargaining power; competition; …)	Overhead labour Technology
Marxian	Bargaining power (class struggle) Employment	Technology

Why did the wage share decline?

- Different theories → different empirical hypotheses
- Empirical evidence

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Why did the labour share decline?

Three main narratives

1. Human labour is substituted by machines
   - Declining relative price of capital (Karabarbounis & Neiman 2014)
   - Automation as task replacement (Acemoglu & Restrepo 2021)
   - 'Inequality is natural consequence of technological progress'
2. Bargaining relations (Guschanski & Onaran 2021, Stockhammer 2017, Stansbury & Summers 2020)
   - Changes in labour market institution [strike laws – immunities(!), collective bargaining coverage, union density, race]
   - Globalisation – in capital (offshoring) (migration)
   - Financialisation
3. Changes in concentration
   - Superstar firms (Autor et al. 2
   - Monopsony power (Benmelech et al. 2

Pluralism

neoclassical

Marxian/ Kaleckian

Various approaches

Empirical evidence
(with Ozlem Onaran)

- We find that the reasons for decline in the wages share are:
  - Mainly 'institutional' → labour market institutions (union density) & financialisation
  - Globalisation & Global value chains → hurts workers in advanced & emerging economies
  - Gender wage gap: female workforce participation↑ → wage share↓
  - No effect of migration
  - Technological change: not able to explain decline in the wage share
  - There is nothing "natural" about increasing income inequality

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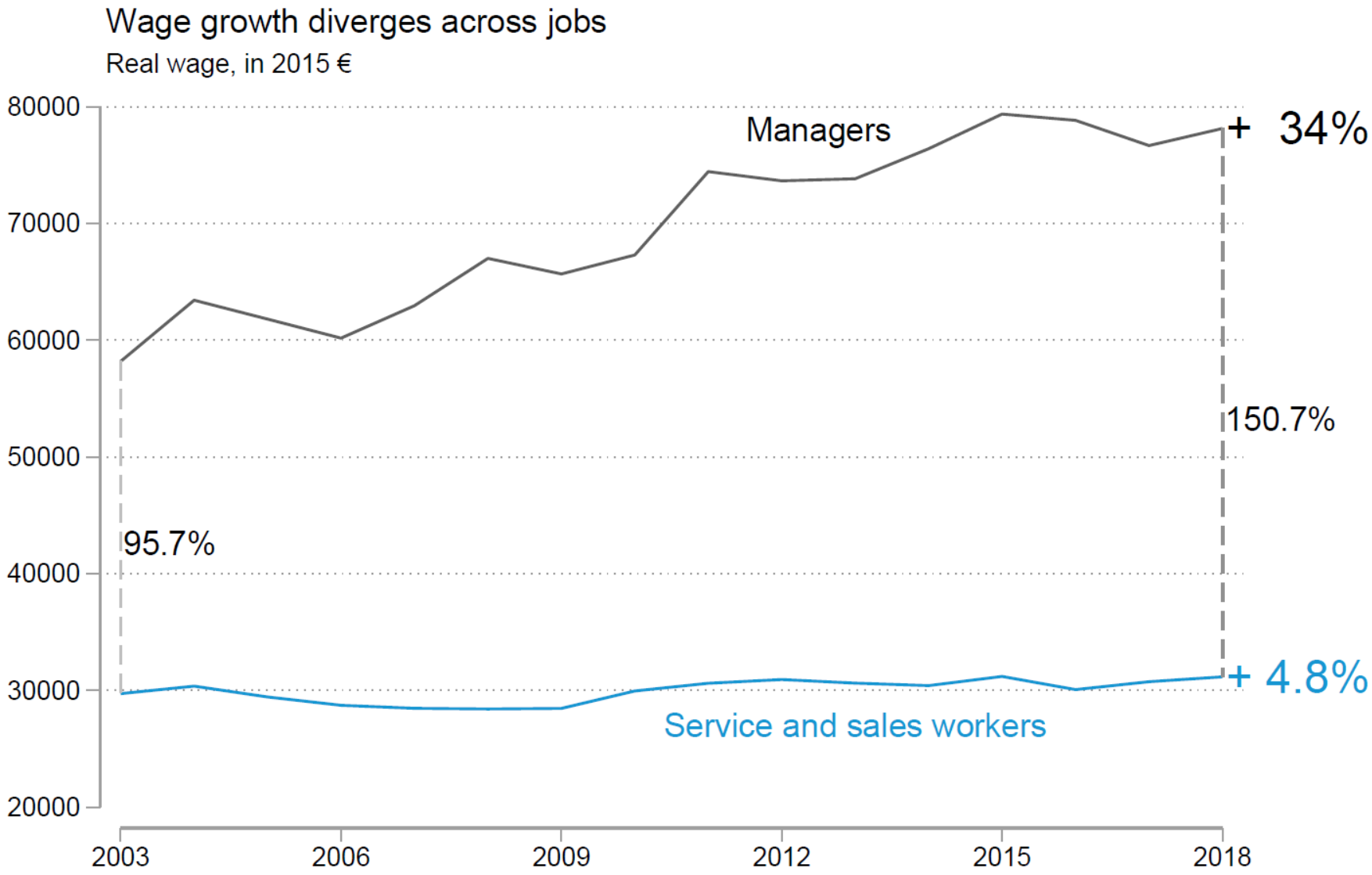
Increasing Wage Inequality



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Research questions

1. Does occupational autonomy predict wage growth differences across in Western Europe?

2. How are technology and labour market institutions related to occupational wage growth differences?

Literature and contribution

Changes in wage and employment structures

- Routine (Autor et al. 2003, Acemoglu and Autor 2011)
- Offshoreable (Firpo et al. 2011)

Research gap:

- **Low-income occupations? (Mishel et al. 2013, Autor 2015)**
  - Cleaners, janitors, guards, customer-facing service and sales workers, care workers
- **No power relationships**
  - Power-biased technological change (monitoring, fissuring)
  - Deregulation of labour markets (decline in union density, bargaining coverage)

→ Autonomy

Occupational autonomy

Low autonomy occupations: easy to monitor and discipline, low potential to disrupt $\rightarrow$ low bargaining power

Labour discipline model (Shapiro and Stiglitz 1984, Bowles, 1985), but already in Smith and Marx

Skott & Guy (2007): **Power-Biased Technological Change**

Technological change (ICT) $\rightarrow$ monitoring costs $\downarrow$ $\rightarrow$ Wages of 'monitorable' workers $\downarrow$

Decline in **labour market institutions** adversely affects workers with low bargaining power (Farber et al. 2021; Guschanski & Onaran, 2022)

Our contribution:

Empirically test the relationship between autonomy and wage growth
Empirically test the role of institutions and technology

Power-bias hypothesis plausible?

Improved monitoring

Video cameras at work

GPS trackers, onboard computing (OBC)

Warehouse worker sensors

Call monitoring (AWS)

UK: electronic monitoring on homecare workers (Hayes and Moore, 2017)

Working from home

Fissuring of the workplace (Weil 2014)

Better monitoring: coordination costs $\downarrow$, enforce standards $\uparrow$ (e.g., on-time delivery) without employing workers $\rightarrow$ outsourcing

Occupational autonomy index

Captures monitorability and individual (hold-up) power

Key assumption: autonomy as an inherent feature of an occupation

Measuring autonomy

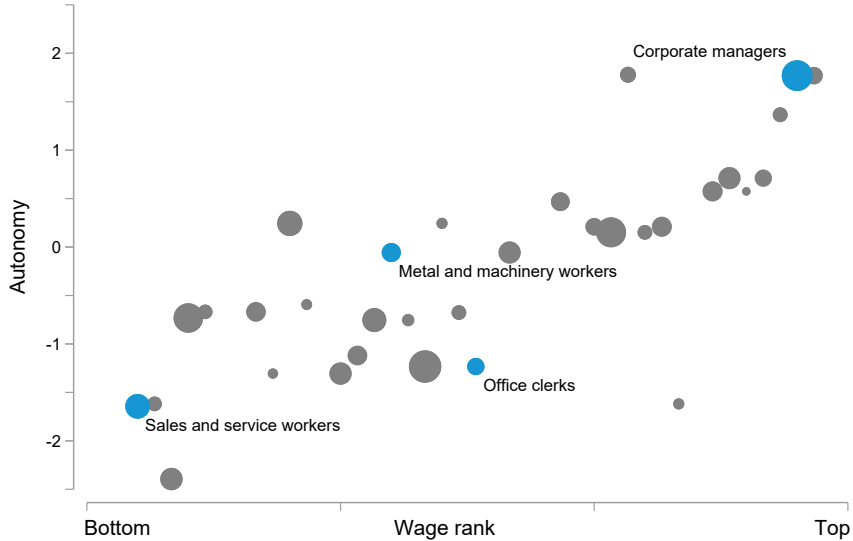
- Making Decisions and Solving Problems
- Thinking Creatively
- Developing Objectives and Strategies
- Responsibility for Outcomes and Results
- Frequency of Decision Making

O*NET (Bureau of Labour Statistics)

Firpo et al. (2011) use index to measure decision-making

Alternative measure from European Work Conditions Survey

High autonomy occupations are at the top of the wage distribution



Wage data

European Union Survey of Income and Living Conditions (EU SILC)

Repeated cross-section, 800k observations

2003-2018, 15 countries; full-time, full-year employees, private sector only

Empirical analysis

1. Is occupational autonomy related to wage growth differences in Western Europe?

Empirical strategy

$$\ln(w_{ijkct}) = \beta_1(A_j \times t) + \beta_2(X_j \times t) + \mathrm{B}M_{ijkct} + \lambda_{jkc} + \theta_{kct} + \varepsilon_{ijkct}$$

$\ln(w_{ijkct})$, real wage of worker i in occupation j, industry k, country c, year t

A_j, autonomy index

t, linear time trend

X_j, other task-based measures (routine, offshoreable)

M_{ijkct}, demographic control variables (Mincer)

λ_{jkc}, occupation-industry-country dummy

θ_{kct}, industry-country-year dummy

Main finding

	ln wage
Autonomy	0.0027
	(0.0006)
Routine	0.0004
	(0.0006)
Offshoreable	0.0003
	(0.0004)
Education	*Yes*
Age	*Yes*
Gender	*Yes*
Migrant	*Yes*
FE	
Occupation-industry-country	*Yes*
Industry-country-year	*Yes*
Number of observations: 808122	
R-squared (adj.): 0.853	
Standard errors in parentheses	

Annual wage growth difference

High vs. mean autonomy occupation: **0.27 pp**

Statistically significant at the 1%-level

Economic interpretation

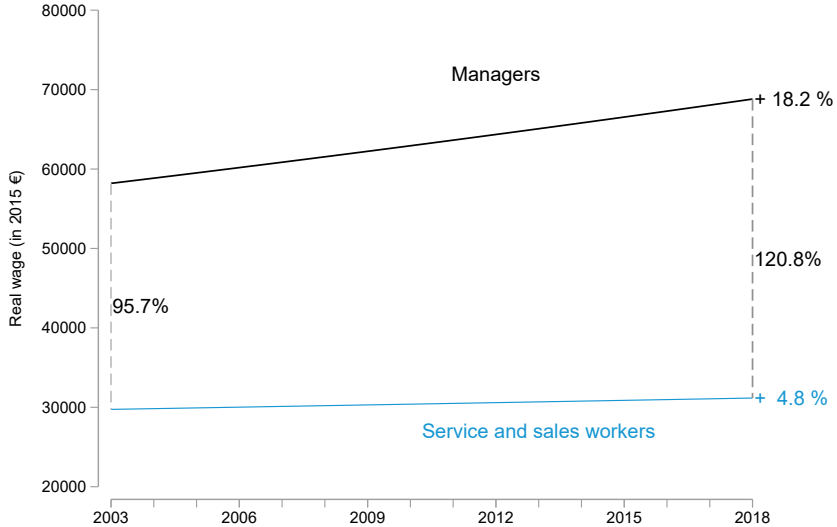
Wages in an average autonomy occupation grow by 1%

Wages in a high autonomy occupation grow by 1.27%

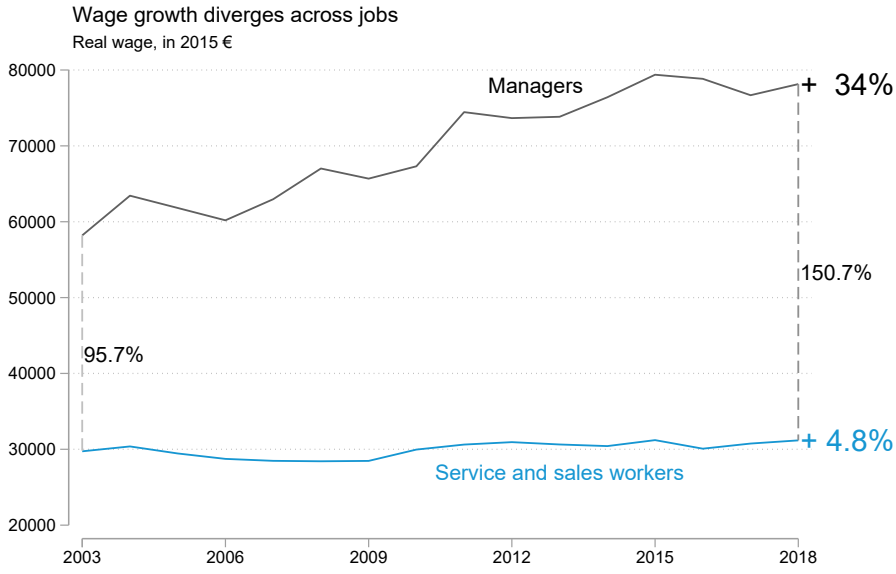
Compounded over 12 years:

Wage level difference of 3.3% (if occupations have same initial wage level)

Autonomy: wage gap between *Managers* and *Service workers* 25.1%⇑



Wage growth in Western Europe



Other occupational wage growth determinants

~~Routine~~

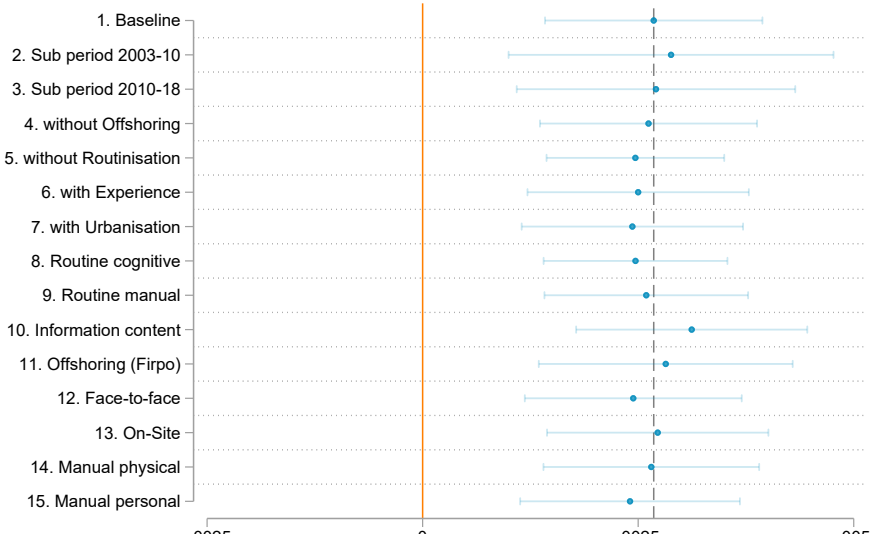
~~Offshoreable~~

~~Increasing returns to education (SBTC)~~

~~Increasing return to STEM occupations (cognitive analytical)~~

But we find increasing returns to autonomy

Robustness



Notes: CI = 95%. The vertical dashed grey line shows our baseline autonomy estimate.

Additional robustness checks

Different measures of autonomy

Variations of Mincer variables (experience, urbanisation, ...)

Time periods

1-digit occupation level

Alternative industry classification

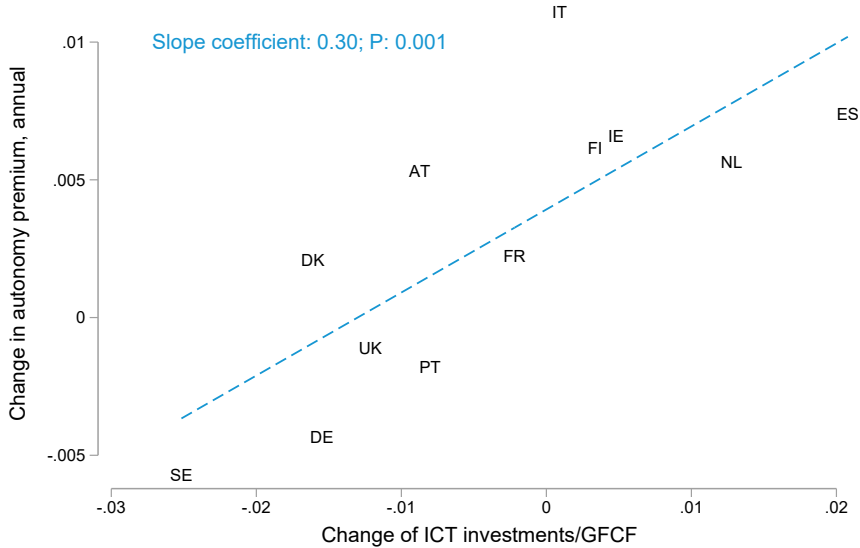
Country exclusion

Industry exclusion

Drop top 0.1, 1, and 5% of observations

2. How are technology and institutions related to occupational wage growth differences?

The autonomy premium and ICT investment



The autonomy premium and computer use

Table: Computer use and the autonomy wage premium

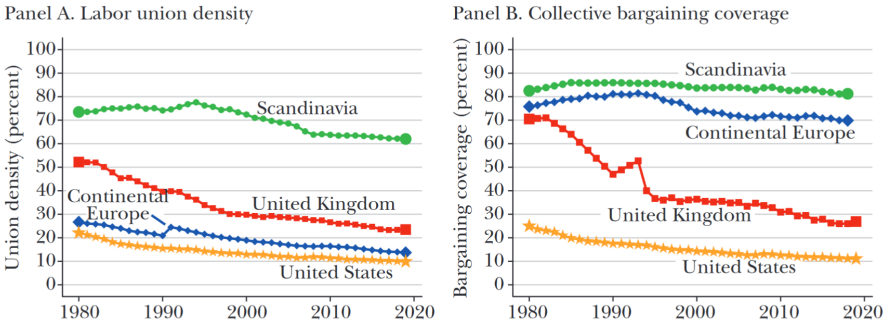
	(1) Δ Autonomy wage premium
Δ Computer use	0.0265**
	(0.0131)
Observations	90
r2	0.2911
Country FE	Yes

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Decline in collective worker power

Trends in Union Density and Bargaining Coverage in Europe and the United States



Source: The figure is based on the OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS), as documented in OECD and AIAS (2021) and the OECD Labor Force Statistics (OECD 2022).

The autonomy wage premium and collective bargaining decline

Table: Collective bargaining, changes, continuous

	(1) Δ Union density	(2) Δ Wage coord	(3) Δ CB coverage	(4) Δ EPL
Autonomy	0.0031***	0.0025***	0.0030***	0.0025***
	(0.0009)	(0.0005)	(0.0006)	(0.0005)
Autonomy × Δ Union density	0.0001			
	(0.0001)			
Autonomy × Δ Wage coord.		−0.0008**		
		(0.0003)		
Autonomy × Δ CB coverage			0.0001	
			(0.0002)	
Autonomy × Δ EPL				0.0057
				(0.0150)
Observations	808122	786972	657278	808122

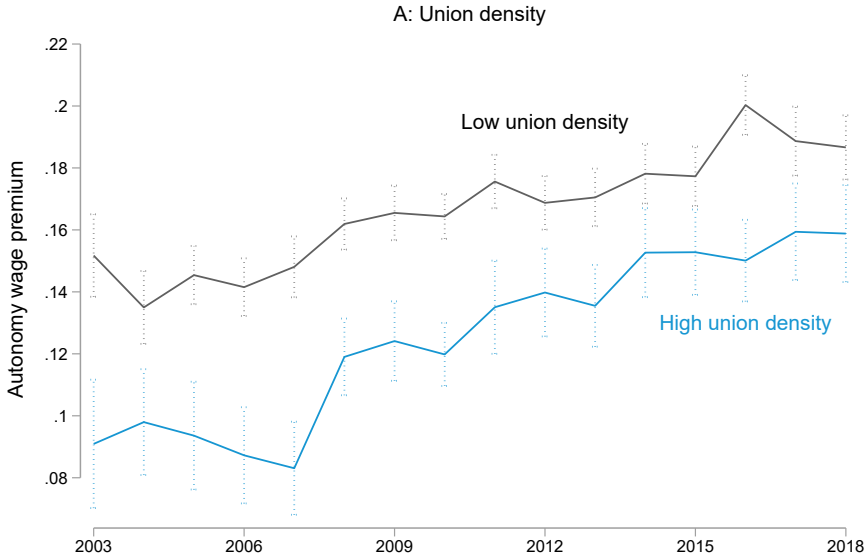
Controls include gender, age, education and migrant status.

All regressions include occupation-industry-country and industry-country-year fixed effects.

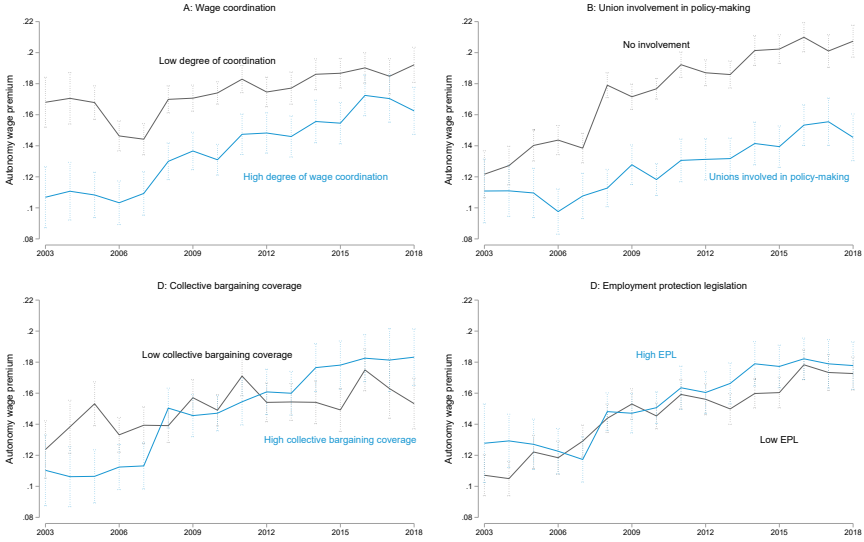
Standard errors in parentheses

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

The autonomy wage premium and labour unions



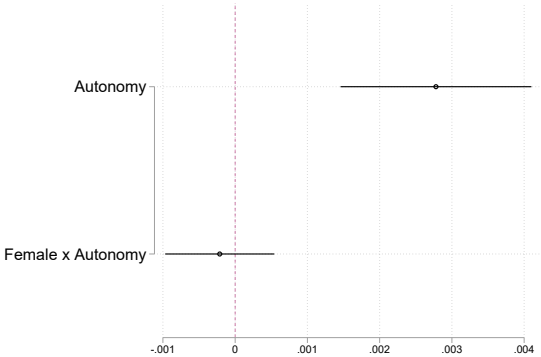
The autonomy wage premium and collective bargaining



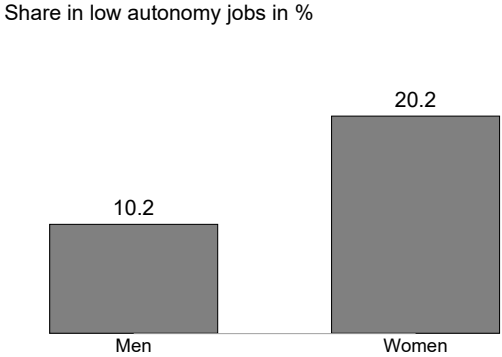
Source: EU SILC, own calculations

The autonomy wage premium and gender inequality

The autonomy wage premium does not affect women and men differently



But women are more often employed in low-autonomy occupations



Bottom line

Higher occupational autonomy is related to higher wage growth

$\rightarrow$ wage inequality increases

Technological change: *rising* autonomy premium (monitoring, fissuring)

Decline in collective bargaining: weak (no) effect on autonomy premium

BUT: Countries with strong collective bargaining $\rightarrow$ *lower* autonomy premium (*levels*)

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Summary

- Functional and personal income inequality increased
- Different theories of income distribution
  - Neoclassical: Technology
  - Keynesian: Effective demand
  - Kaleckian: Degree of monopoly
  - Marxian: Class struggle
- → implications for employment
- Different empirical hypotheses
  - Technology
  - Bargaining power
  - Concentration
- Ongoing empirical debate
- Different theories → different empirical hypotheses → different policies

Policy implications I

- Short term: cost of living crisis
  - Workers have been losing out:
    - Price increase since 2021 Q1: 18% ULC vs 54% unit profits
    - Regular pay↓, executive pay/ bonuses↑ → wage inequality ↑
- Policy of the day
  - Contractionary monetary policy
  - Wage suppression (Domash & Summers, 2022)
- Instead
  - Proper windfall tax & transfer payments (Wildauer, Kohler, Guschanski, Aboobaker, 2023)
  - Supporting tools: minimum wage↑, price controls (energy, rent, public transport); more progressive taxes & wealth tax
    - Political reality…

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Policy implications II

- Long-term context
  - Declining labour share, increasing wage inequality
  - Driven by: Declining bargaining power of labour → important, yet underappreciated
    - (Guschanski and Onaran 2022,2023; Rabensteiner & Guschanski, 2024)
- Policy: regain bargaining power
  - Union density, collective bargaining coverage can
    - increase the wage share (Guschanski and Onaran, 2022)
    - reduce wage inequality (Rabensteiner and Guschanski 2022)
  - Globalisation has negative impact in advanced and emerging economies
    - scope for international cooperation, in case the coordination failure can be overcome (Guschanski and Onaran, 2021, 2023)

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