Wage inequality

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1. Who/what sets your wage?
2. What happened to the wage distribution in high-income countries? And why?
3. Our contribution

Intro

Why study wage inequality I

Labour market: arena for income distribution

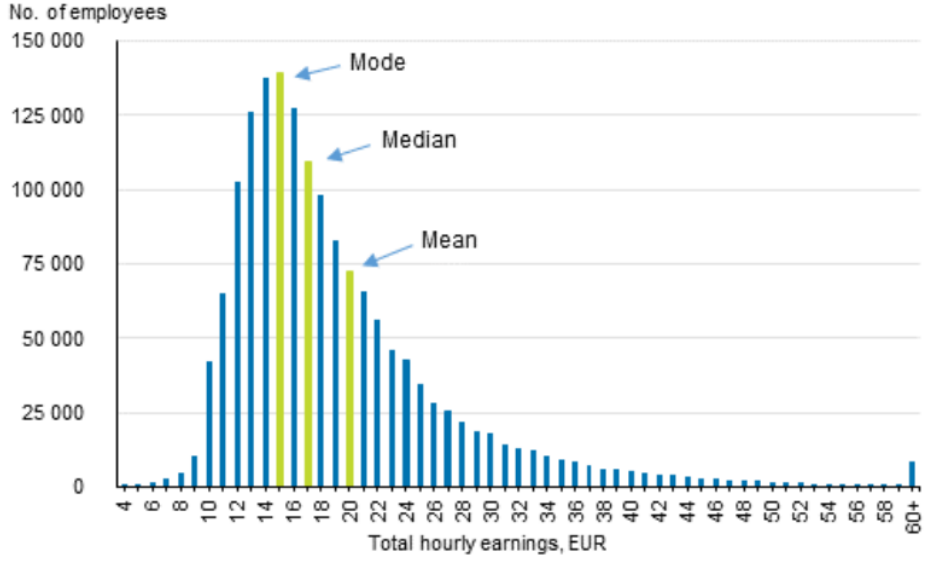
Most people get their income from labour

People spent a lot of time and energy at work

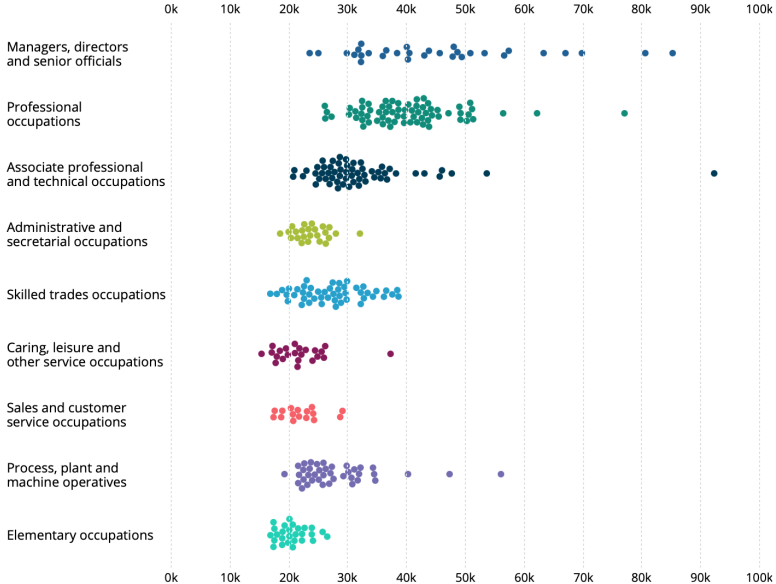
Status and dignity $\leftrightarrow$ power and autonomy at workplace

Labour markets are complex and multifaceted (far from perfect)

Some workers earn more than others



Some workers earn more than others



Some workers earn more than others

Wage distribution is positively skewed

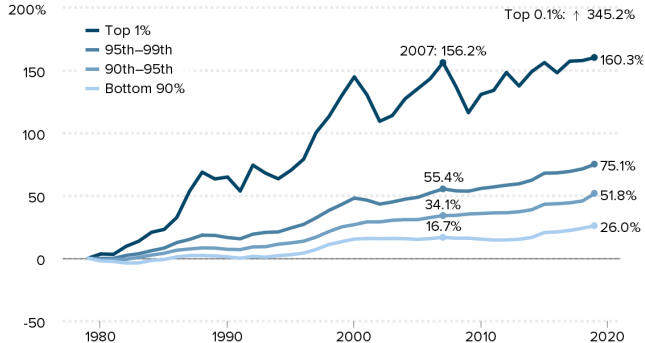
A fraction of workers earns disproportionally large rewards for labour

Why?

- Productivity differences (human capital, skill)
- Preferences
- Rate of return to skills/talents differs
- Age, experience, firm- or job-specific tenure
- Social norms
- Market power

Why study wage inequality II

Cumulative percent change in real annual wages, by wage group, 1979–2019



Source: Authors' analysis of Kopczuk, Saez, and Song (2007, Table A3) and Social Security Administration wage statistics. State of Working America Data library: **Wages for Top 1.0%, 0.1%, and Bottom 90%**. See Mishel and Kandra (2020) for details.

Economic Policy Institute

Why study wage inequality II

Wage inequality has been rising in US (and UK) since early 1980s

Other high-income countries with a lag

Distributional issues inherently interesting - political/policy implications

Distributional issues set agenda in labour, macro, trade, public economics

Wage determination

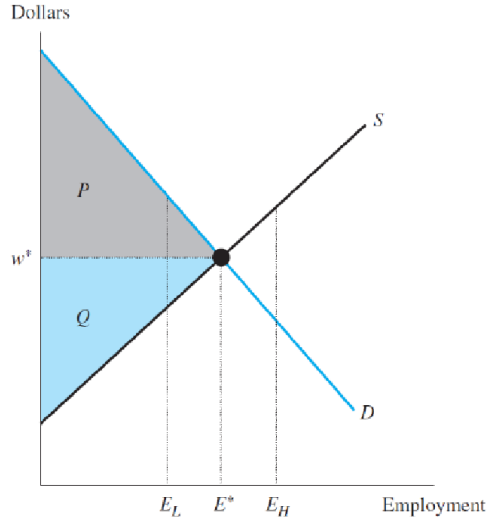
Neoclassical labour economics

$w = MPL$

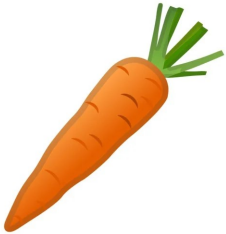
Supply and demand

Strong focus on individual aspects:

- Productivity differences
- Preferences
- Skills, age, experience



Neoclassical labour economics



Neoclassical labour economics: deviations

Imperfect competition: $w \neq MPL$

Monopsony

Efficiency wages (labour discipline)

Bargaining (Bhuller et al. 2022)

Changing opinion among economists:

Do minimum wages substantially lower employment among low-wage workers?

- **1978** AEA Member Survey: **90%** agreed
- **1992** AEA Member Survey: **72%** agreed
- **2000** AEA Member Survey: **46%** agreed
- **2013** IGM Panel (**$9**/hr): **34%** agreed
- **2015** IGM Panel (**$15**/hr): **26%** agreed

Analysis of petition signers (O'Neill 2014):

Labor economists, recent PhDs *more* likely to support raising minimum wages

Institutionalist/industrial relations literature

$w \neq MPL$

Institutions, social norms, culture

$\rightarrow$ Power

Labour market = conflict

Control and discipline

But also persuasion and coordination

Collective bargaining institutions

- unions
- bargaining coverage (horizontal/vertical)
- employer organisations
- government

More critical approaches

Role of exploitation

Divide and conquer

Class interests irreconcilable (Botwinick 2018)

7 principles of institutionalist labour economists (Kaufman 2004)

1. The labour market is the antithesis of a perfect market
   - Asymmetric information
   - Mobility costs
   - Externalities
2. These "imperfections" create unequal bargaining power
3. $w \neq MPL$, workers are usually underpaid
4. Labour markets unlikely to clear
   - lower wages are unable to reduce unemployment,
   - but reduce AD and hence employment
5. Work conditions matter (autonomy)
6. Beyond efficiency: Focus on equity and well-being
7. Behaviour is interdependent: relative comparisons/hierarchies

What about post-Keynesians?

No specific pK view of the microeconomics of labour markets

Employment set in goods market

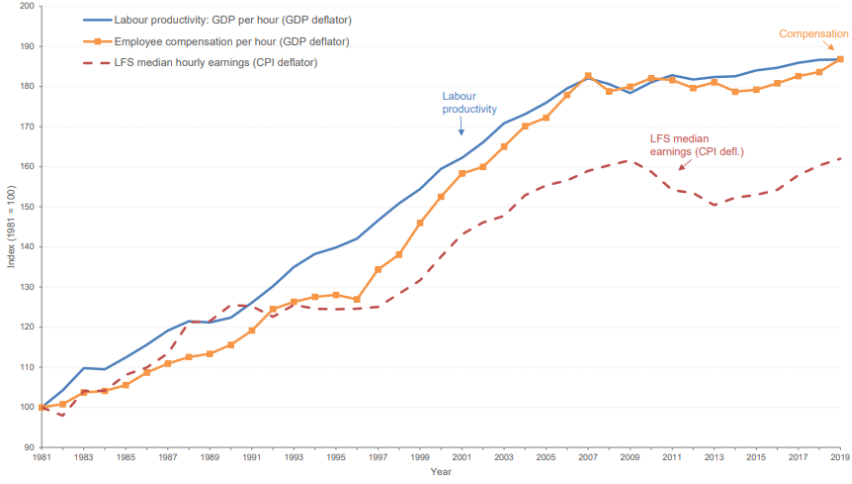
Most pK endorse views of institutionalist and industrial relations labour economists (Appelbaum 1979)

The rise in wage inequality

Rich countries: four decades of rising wage inequality

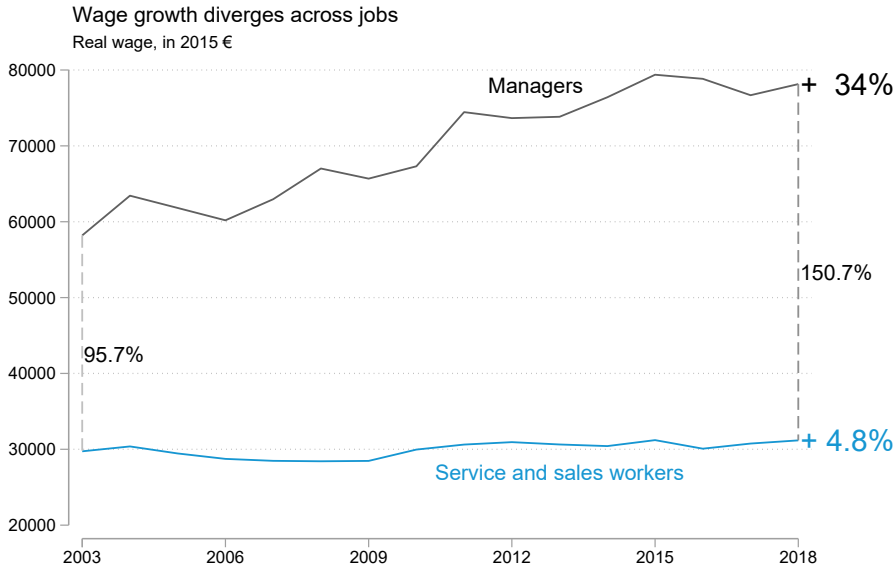
- Wage and labour productivity growth slowed after 1970s
- Labour share of GDP declined
- Wage inequality up after 1970s in US, UK, other high-income countries with a lag
- Polarisation in some countries (top $\uparrow$, middle $\downarrow$)
- Returns to education rose sharply in the US in 1970s-1990s, slowing down after

Median wages have decoupled from productivity growth in the UK



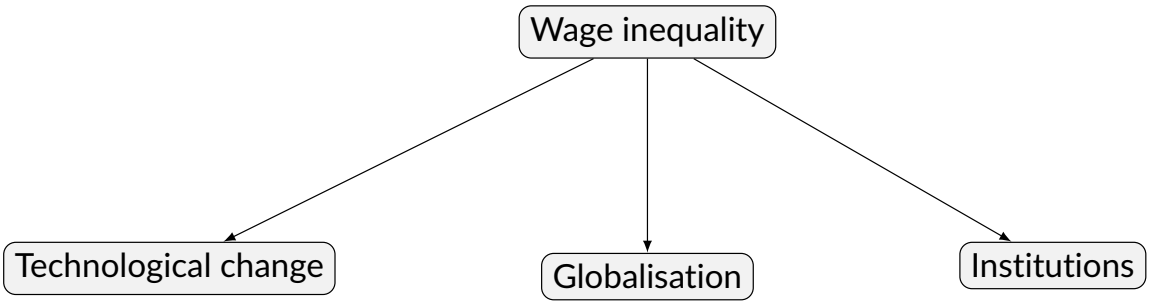
Note: *LFS, ONS, and OECD data (see Appendix for details). Values are shown as an index (1981=100). Labour productivity is total GDP divided by total hours worked deflated by the GDP deflator. Employee compensation is divided by total employee hours and also deflated by the GDP deflator. LFS median hourly earnings are deflated by the CPI deflator. We refer to the difference between the growth rates of labour productivity and average compensation as "net decoupling", and the difference between labour productivity and LFS median earnings as "overall decoupling".*

Unequal wage growth in Western Europe



Why has wage inequality increased?

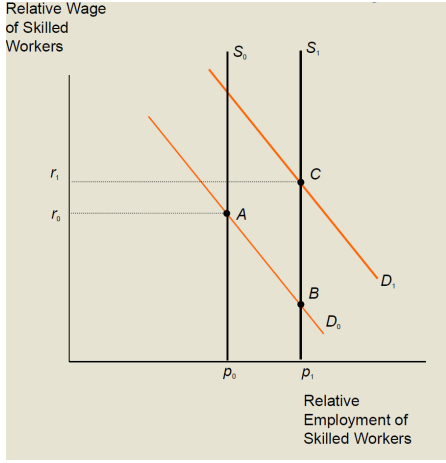
Why has wage inequality increased?



No single explanation accounts for all changes, limited convincing causal evidence

Technological change: skill-biased

- Perfect competition
- Relative supply of skilled workers increased (1940-2000) AND the skill premium increased
- Tinbergen: race between technology and education
- Bursts of supply and/or technologically-induced demand accelerations/decelerations cause skill premium to rise or fall
- Always skill-biased? 20th century evidence: new tech favours skilled workers



Technological change: routine-bias

SBTC limitations

Real wages of some workers stagnating

$\rightarrow$ routine-biased technological change

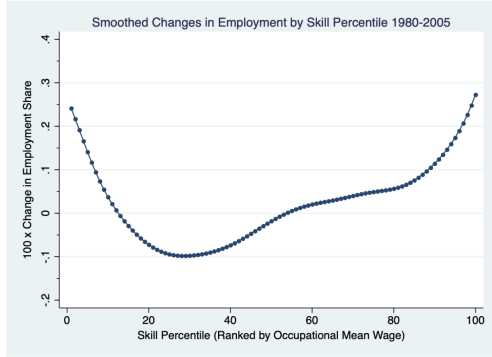
RBTC (Autor et al. 2003):

> Computer capital/automation substitutes for humans in routine tasks

Lower labour demand for routine jobs

Jobs affected: clerical, payroll, accounting, human resources, and basic legal tasks, productive and operating jobs

Figure 1: Job Polarization: Ranking Occupations by Wages



Notes: Smoothed changes in occupational employment share by wage percentile. This figure is reproduced from Autor and Dorn (2013). See text for details.

Technological change and offshoring

Globalisation: offshoring of jobs that do not require to be performed at specific domestic production sites

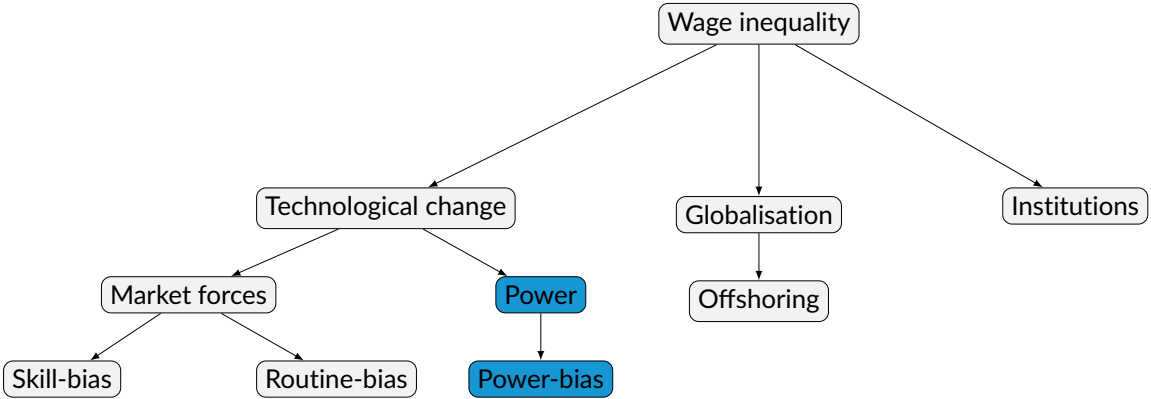
New technology (ICT) enables the relocation of tasks and jobs

Labour demand for offshoreable jobs $\downarrow$

Technological change $\leftrightarrow$ task offshoring

Decrease in the demand for middle-skilled occupations

Jobs at risk from offshoring: IT jobs, production jobs


Wage inequality
Technological change
Globalisation
Institutions
Market forces
Power
Offshoring
Skill-bias
Routine-bias
Power-bias

Is technological change power-neutral?

- Technological change may not improve productivity and living standards
- Deliberate strategy to control and discipline labour
- Division of labour, managerial control, monitoring of work process etc. (e.g. Marglin 1974)
- Technological change affects power across workers (and, hence, wages)

Power-biased technological change

- Skott and Guy (2007)
- Labour discipline model
- Conflict, agency problem

Labour discipline model

- Marx: distinction between labour and labour power: labour itself cannot be bought and hence lacks a price
- Instead, what workers sell is their labour power
- Firm problem: effective monitoring of workers
- Workers may shirk, sabotage, *quiet quitting*
- Employer solution
  - Pay higher wages than workers next best alternative $\rightarrow$ make getting fired costly (fear is what keeps them working)
  - OR police, supervise, monitor
- Macro conditions matter: When unemployment too low, worker discipline weakens, insubordination towards employers rises (Kalecki, 1943)

Power-biased technological change

Skott and Guy (2007):

Technological change (ICT) $\downarrow$ monitoring costs

Workers that can easily be monitored hit disproportionately

Lowers relative wages of workers that can easily be monitored

Higher effort of low-power workers

PBTC 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

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

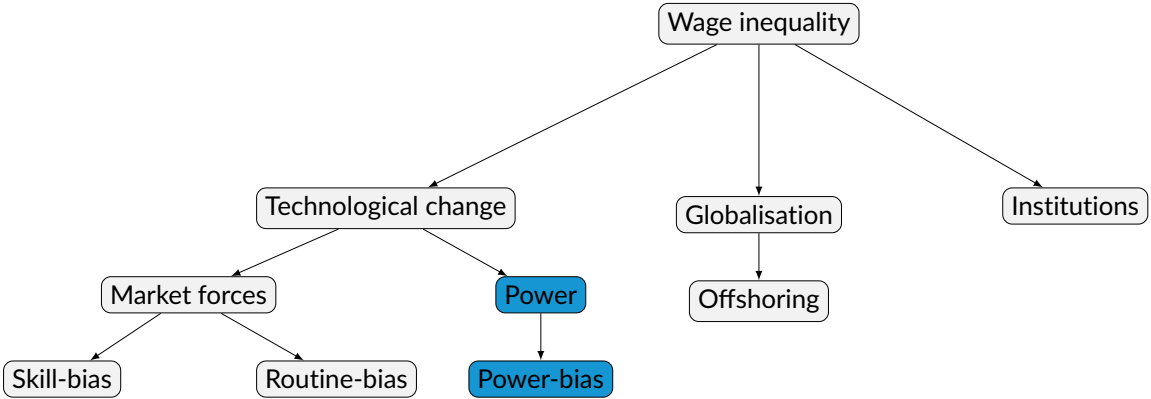
Technological change: Market or power?

Market view: how does tech complement/substitute different types of workers?

Power view: changes in wage structure not solely related to skill compensation

How to separate a pure skill-compensating effect of technological change from a pure monitoring-intensifying effect?

How to measure ease of monitoring workers?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Institutions

Long standing market vs. institutions debate

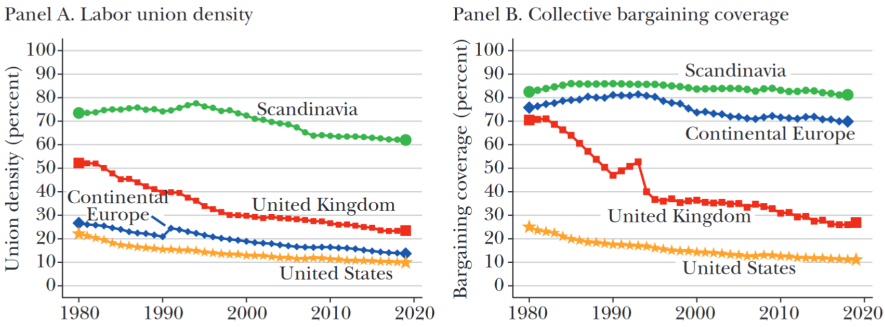
Union density, wage coordination, collective wage negotiations, union involvement in policy making, employment protection, minimum wage

Power vis-a-vis capital, but also among workers: unions compress wage distribution, restrain management pay

Supply and demand explain little of cross country differences in wage inequality (Blau and Kahn 1996)

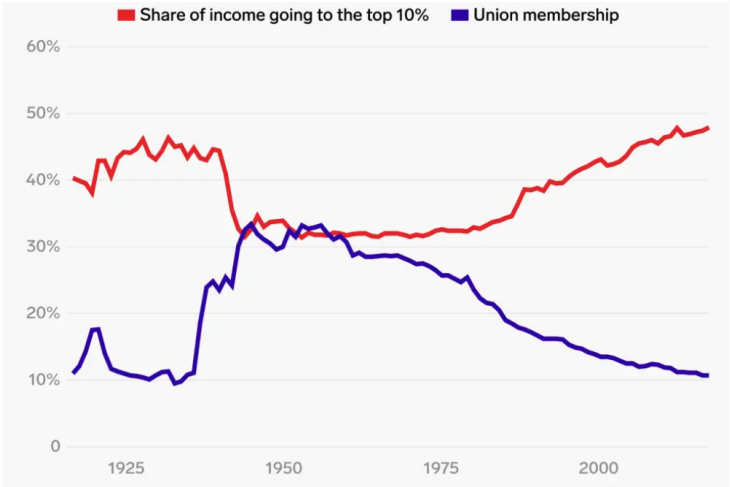
Decline in collective worker power

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).

Unions and income inequality



Our work

Contribution

Changes in wage and employment structures: focus on tasks in middle-income occupations

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

Offshoreable (Firpo et al. 2011)

Our contribution:

Low-income occupations? (Mishel et al. 2013, Autor 2015)

Low wage growth of cleaners, janitors, guards, customer-facing service and sales workers, care work . . .

No power relations

$\rightarrow$ Autonomy

Ease of monitoring: autonomy

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

Our contribution:

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

Occupational autonomy index

Key assumption: autonomy as 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)

Alternative measure from European Work Conditions Survey

Wage data

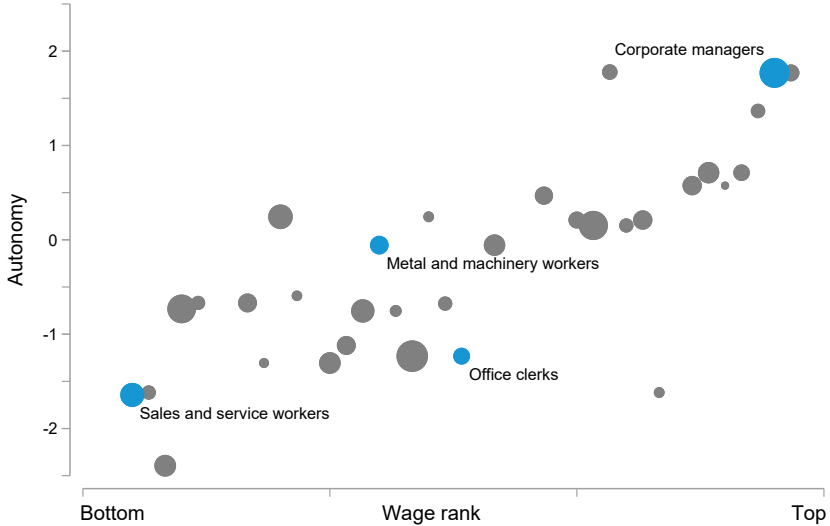
European Union Survey of Income and Living Conditions (EU SILC)

Repeated cross-section, 800k observations

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

High autonomy occupations are at the top of the wage distribution

High autonomy occupations are at the top of the wage distribution



Empirical analysis

1. Does occupational autonomy predict 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)
Routinisation	0.0004
	(0.0006)
Offshoring	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**

This effect is statistically significant at the 1%-level

Economic interpretation

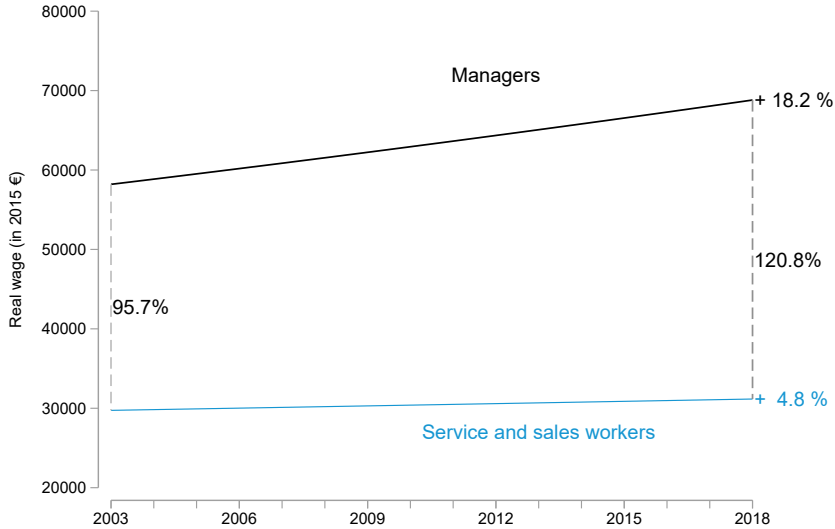
Wages in a mean autonomy occupation grow by 1%

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%⇑



Other occupational wage growth determinants

~~Routineness~~

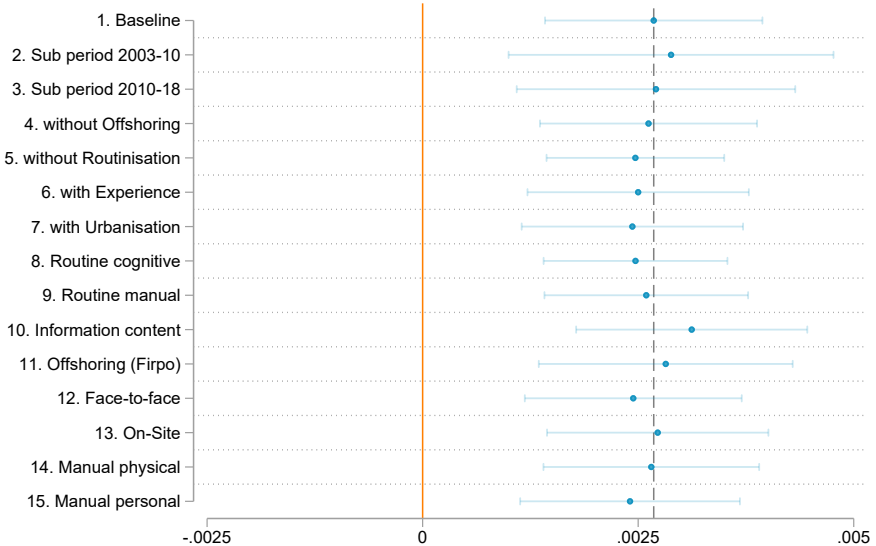
~~Offshoreability~~

~~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

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

Potential channels

Economic theory: technological change and institutions affect the relationship between autonomy and wages

Institutions

- Decline in collective bargaining

Technological change: power view

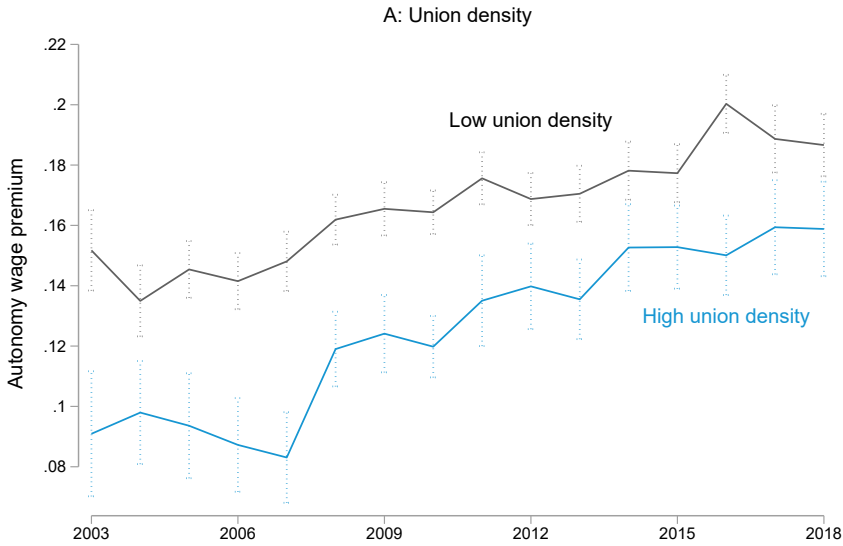
- ICT, computers $\rightarrow$ monitoring (Skott and Guy 2007)

Technological change: market view

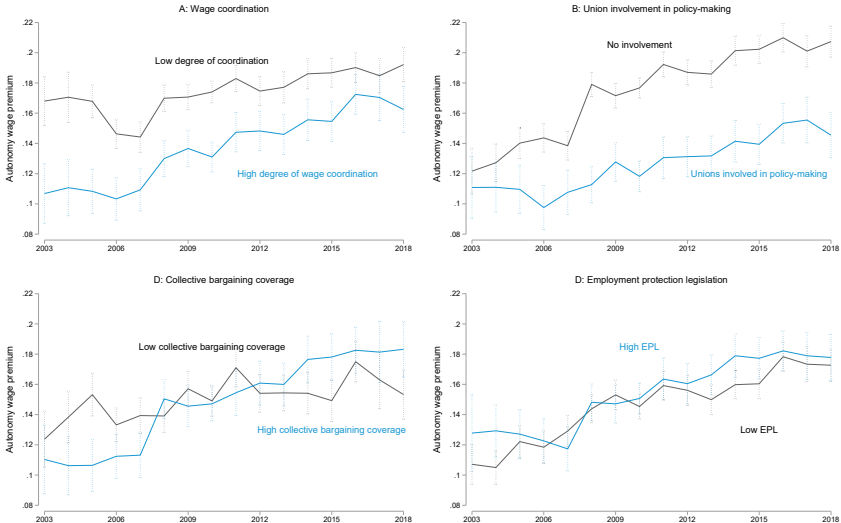
- ICT, computers $\rightarrow$ productivity (Katz and Murphy 1992)

Data: European Social Survey, European Working Conditions Survey, European Company Survey, KLEMS database

The autonomy wage premium and labour unions

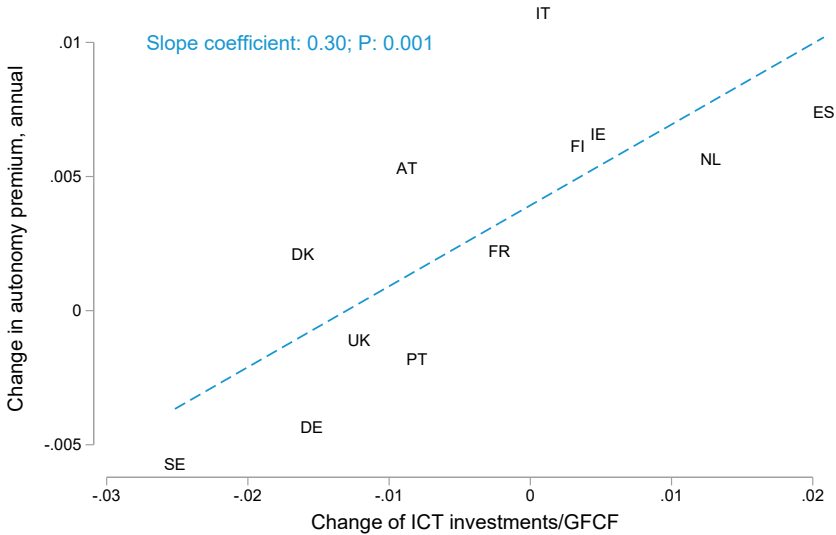


The autonomy wage premium and collective bargaining



Source: EU SILC, own calculations

The autonomy premium and technological change



The autonomy premium and computer use

Table: Computer use and the autonomy wage premium

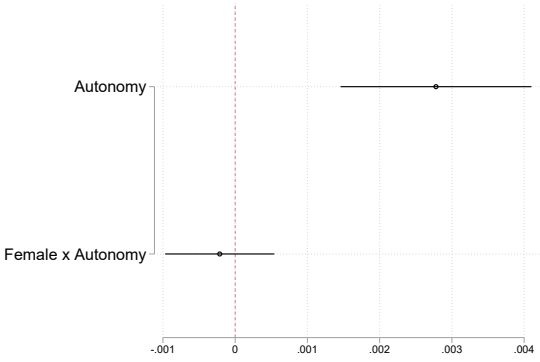
	(1) Δ Autonomy wage premium
Δ Computer use	0.0265**
	(0.0131)
Observations	90
r2	0.2911
Country FE	Yes

Standard errors in parentheses

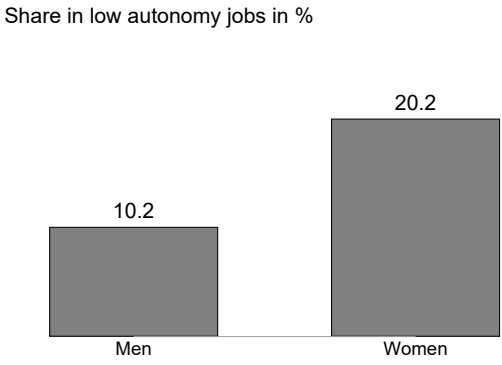
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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

Collective bargaining: *lower* autonomy premium

Technological change: *rising* autonomy premium

Implications

Policy

Collective bargaining: Strengthen worker coordination across occupations

Technology: re- and upskilling
(but can everyone have a high-autonomy occupation?) $\rightarrow$ direct tech change towards creating *good* jobs

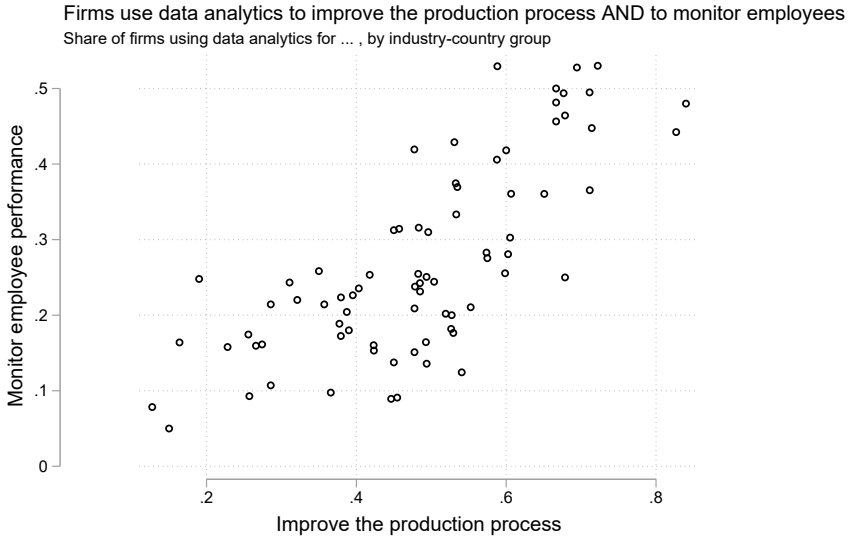
Research

Why do firms adopt digital technologies?

Employee monitoring or productivity improvements?

Why does the autonomy premium increase in high-bargaining countries?

Why do firms adapt digital technologies?



Research on wage inequality

Causal factors hard to isolate

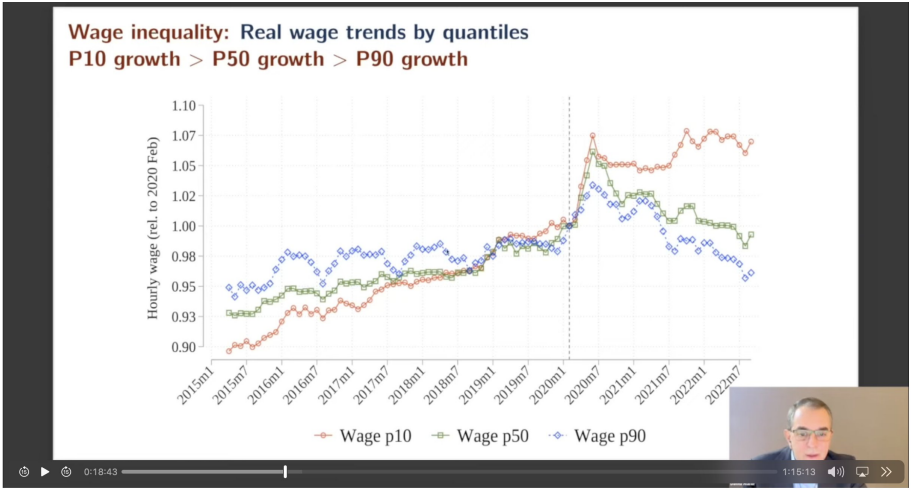
Mainstream:

- Empirical turn: monopsony, firms have power, similar workers do not get paid similar wages, discrimination, gender/care penalty, etc.
- But methodologically very narrow
- "Deviations" of perfect competition, little questioning of underlying theory

Pluralism:

- Social reality is complex, multi-causal
- Theories: cover a broad spectrum of potential channels
- Alternatives necessary for scientific discovery
- Access to high-quality datasets
- Methods: qualitative methods, mixed approaches, interdisciplinary work

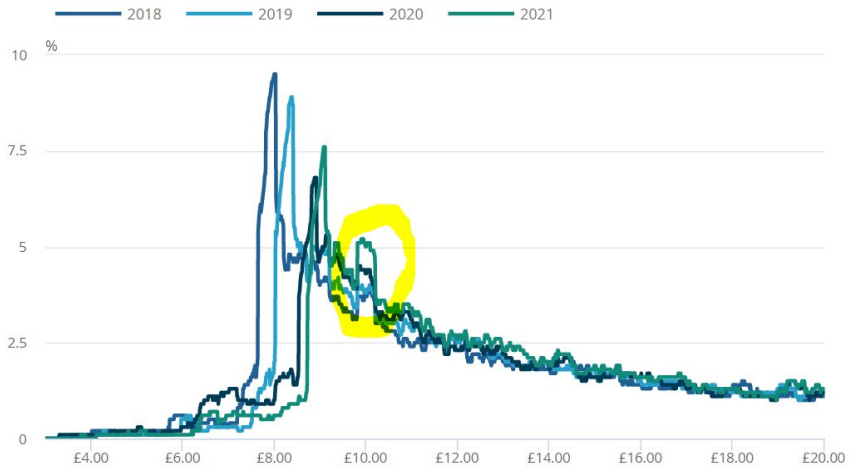
Unexpected compression



David Autor on The Unexpected Compression: Competition at Work in the Low Wage Economy

Minimum wage/living wage are affective

Distribution of hourly earnings (excluding overtime) for all employees, from 2018 to 2021, UK (proportion of jobs within plus or minus 20 pence of shown pay rate)



Get in touch

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Appendix

Related literature

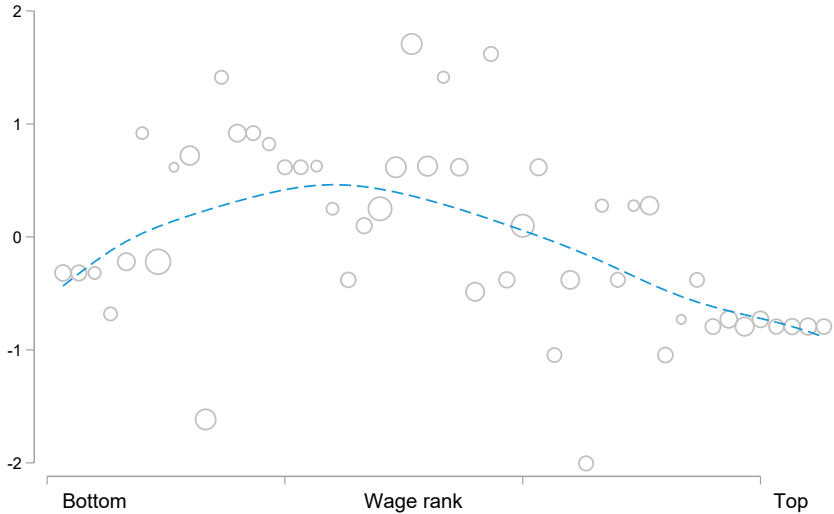
Occupations matter (Autor et al. 2003)

Focus on routinisation and offshoring (Acemoglu and Autor 2011, Firpo et al. 2011)

Increasing importance of worker autonomy for labour market outcomes (Blundell et al., 2022; Deming, 2021)

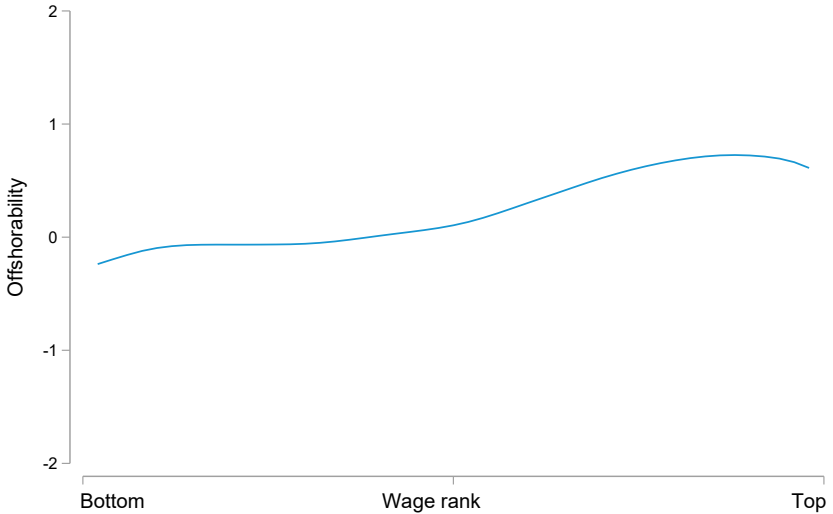
Collective bargaining as important determinant of the wage distribution (Farber et al., 2021)

Routinisation index vs wage rank, lowess smooth



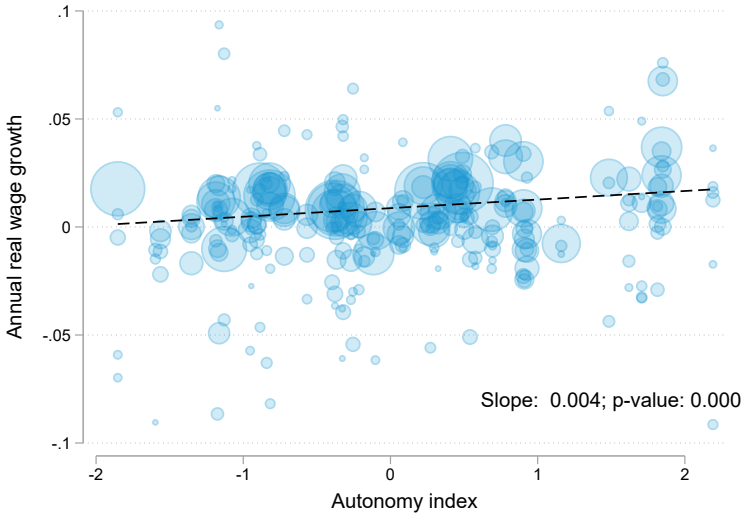
EU SILC, own calculation. Wage ranking is based on average occupation-industry wages across countries. Circle sizes reflect employment shares.

Offshoring index vs wage rank, lowess smooth



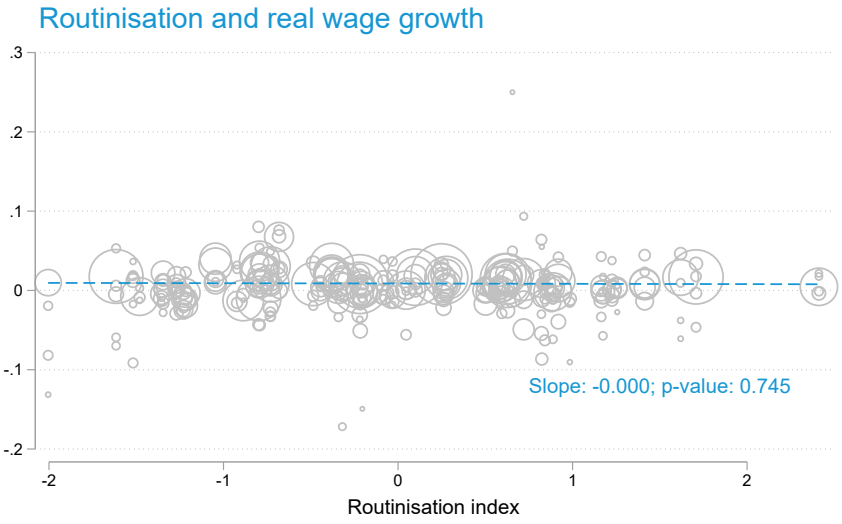
EU SILC, own calculation. Wage ranking is based on average occupation-industry wages across countries.

Annual wage growth vs autonomy index, 2003 - 2018



The linear fit is weighted by employment shares. Circle sizes represent employment shares.

Annual wage growth vs routinisation index, 2003 - 2018



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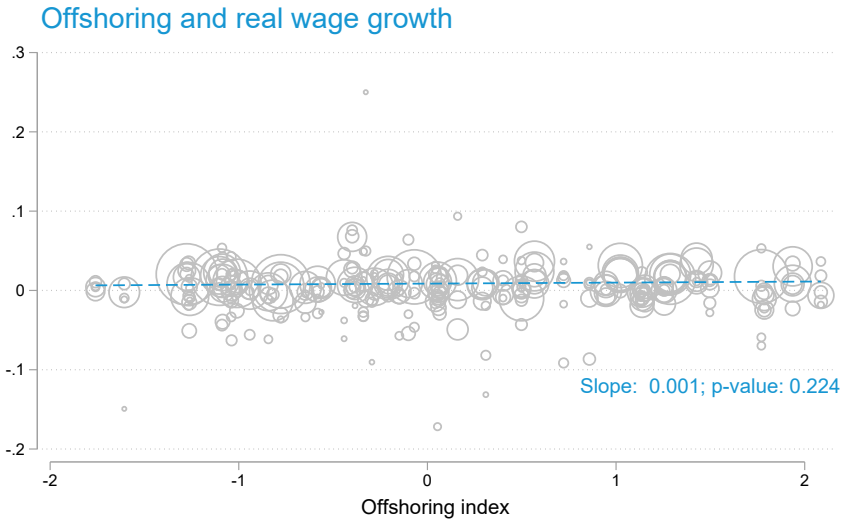
Annual wage growth vs offshoring index, 2003 - 2018



The linear fit is weighted by employment shares. Circle sizes represent employment shares

Alternative autonomy index I

The decision-making index from Deming (2021) includes the following elements:

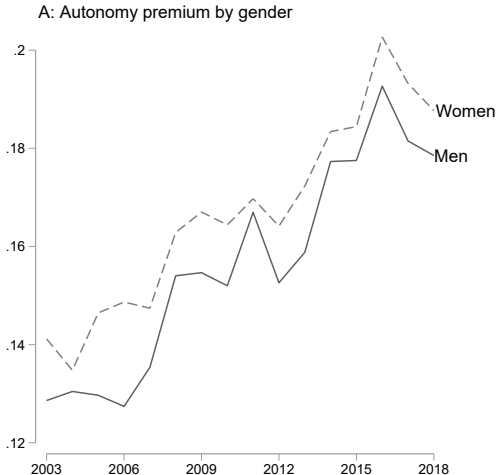
- 4.A.2.b.1 Making Decisions and Solving Problems
- 4.A.2.b.4 Developing Objectives and Strategies
- 4.A.2.b.6 (Organizing), Planning and Prioritizing Work

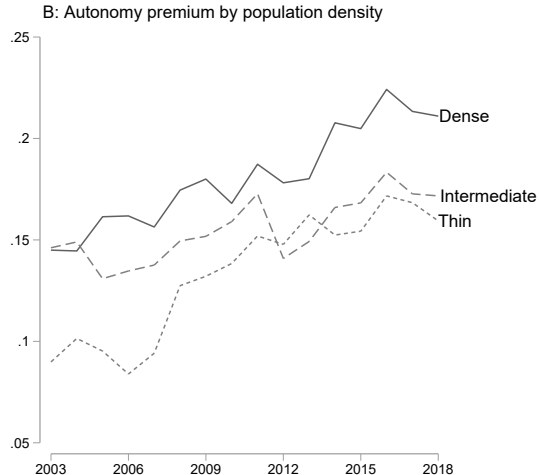
Alternative autonomy index II

The extended autonomy index includes the following nine elements:

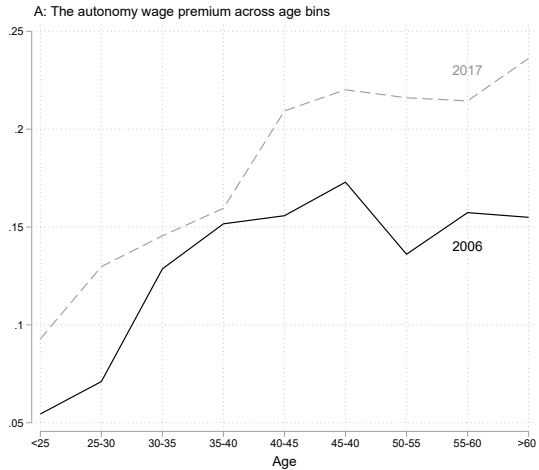
- 4.A.2.b.1 Making Decisions and Solving Problems
- 4.A.2.b.2 Thinking Creatively
- 4.A.2.b.4 Developing Objectives and Strategies
- 4.C.3.a.2.b Frequency of Decision Making
- 4.A.2.b.6 Organizing, Planning and Prioritizing Work
- 2.A.2.a Critical Thinking
- 2.A.2.d Monitoring
- 4.C.3.d.3 Pace determined by Speed of Equipment (reversed)
- 4.C.3.a.4 Freedom to make decisions

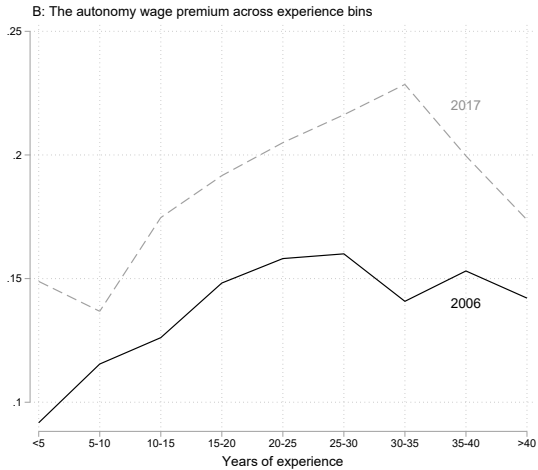
The autonomy premium over time for gender and population density





The autonomy premium along age and experience





High autonomy occupations are at the top of the wage distribution

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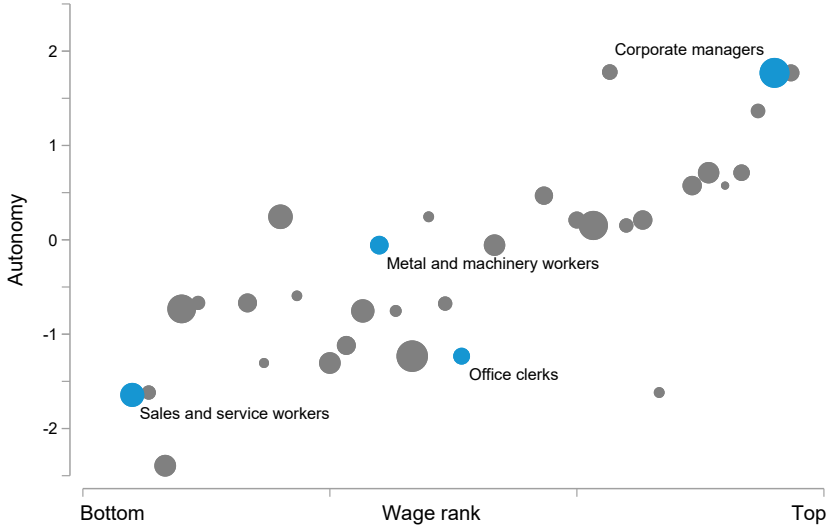

Monopsony

a. absence of immediate substitute jobs for workers,

b. internal constraints on employer wage policies (fairness)

Key feature: low labour supply elasticity to the firm - (how responsive is worker turnover to changes in their wages)

If no frictions: LSEF should be very high (around 10: 5 % cut in wages $\rightarrow$ 50 % increase in turnover)

Empirical work: linked worker-firm data from administrative sources (LSEF in US around 2-5 range even for low-wage workers (Bassier et al.)

Labour markets are not frictionless, bosses have power ($w < MPL$)

$w = MPL$ is more of a *suggestion*

Labour discipline: higher wages and lower employment

Monopsony: lower wages and lower employment

Developing countries

- Higher levels of income and wage inequality
- Informal labour markets
- Tech. change favours high-skill labour (Goldberg and Pavcnik 2017)
- Urbanisation reduces poverty, emergence of middle class since the early 1990s have led to significant reductions in poverty rates
- Mixed evidence on changes in wage inequality over recent years
- Income inequality has declined in: Chile, Uruguay, Slovakia, El Salvador, Ecuador . . .