technische universität
dortmund

Lecture 6b:
Why is Wage Inequality now Declining?

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Empirical Economics

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Course Overview

1. Introduction
2. Labour supply
3. Firms and labour demand
4. Job Search
5. The Role of Human Capital
6. **Technological Change and Wage Inequality**
   a. Wage Inequality
   b. **Declining Inequality**

German Labour Market Inequality, 1975–2021

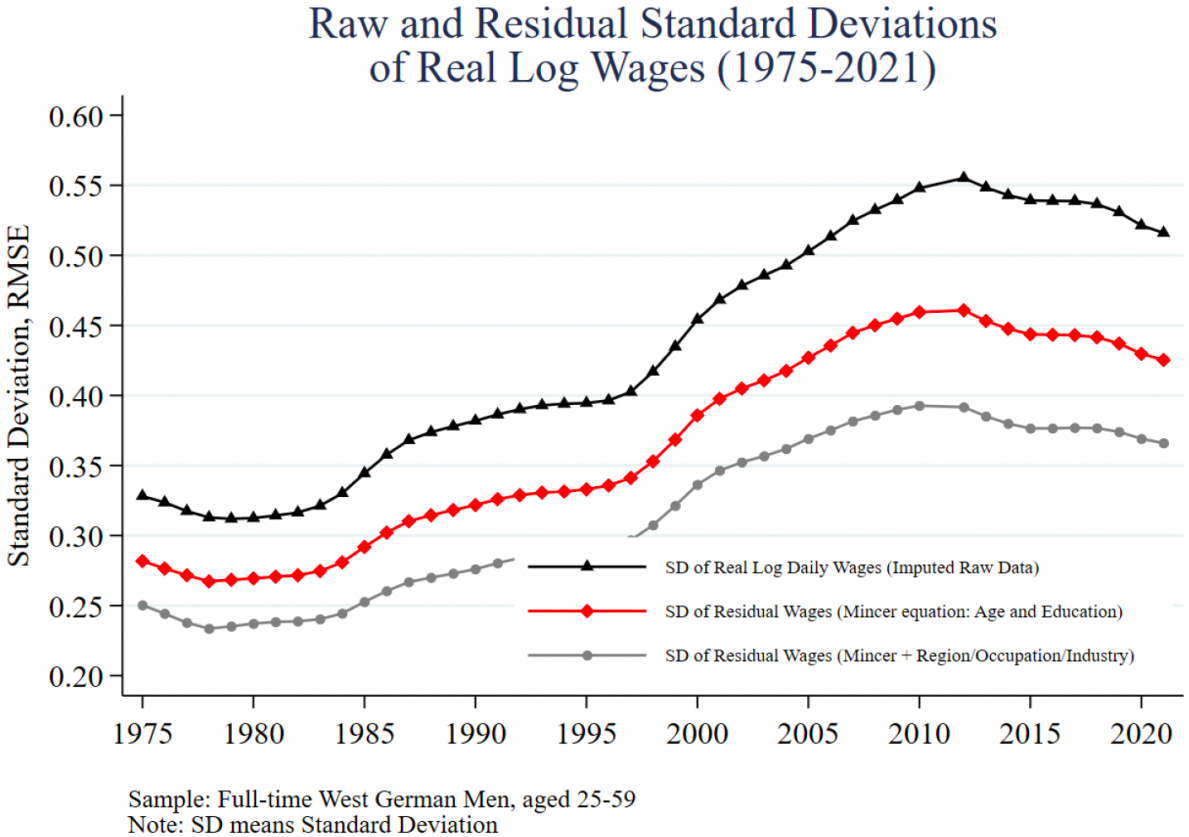


Figure from last lecture, now consider the full time series:

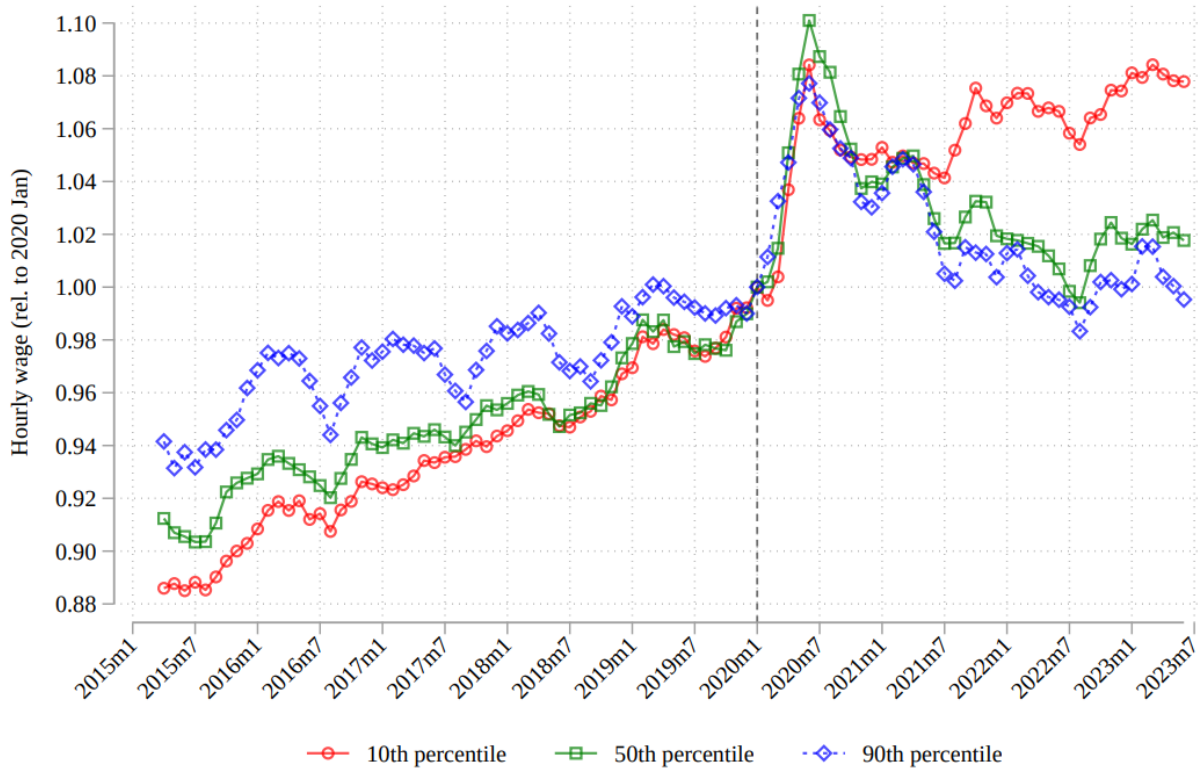
- Inequality declines after 2010/12.

Recent Research on Wage Inequality

Tightness–reallocation hypothesis and US trends
Autor/Dube/McGrew (2024). *The unexpected compression: Competition at work in the low wage labor market*. r&r QJE

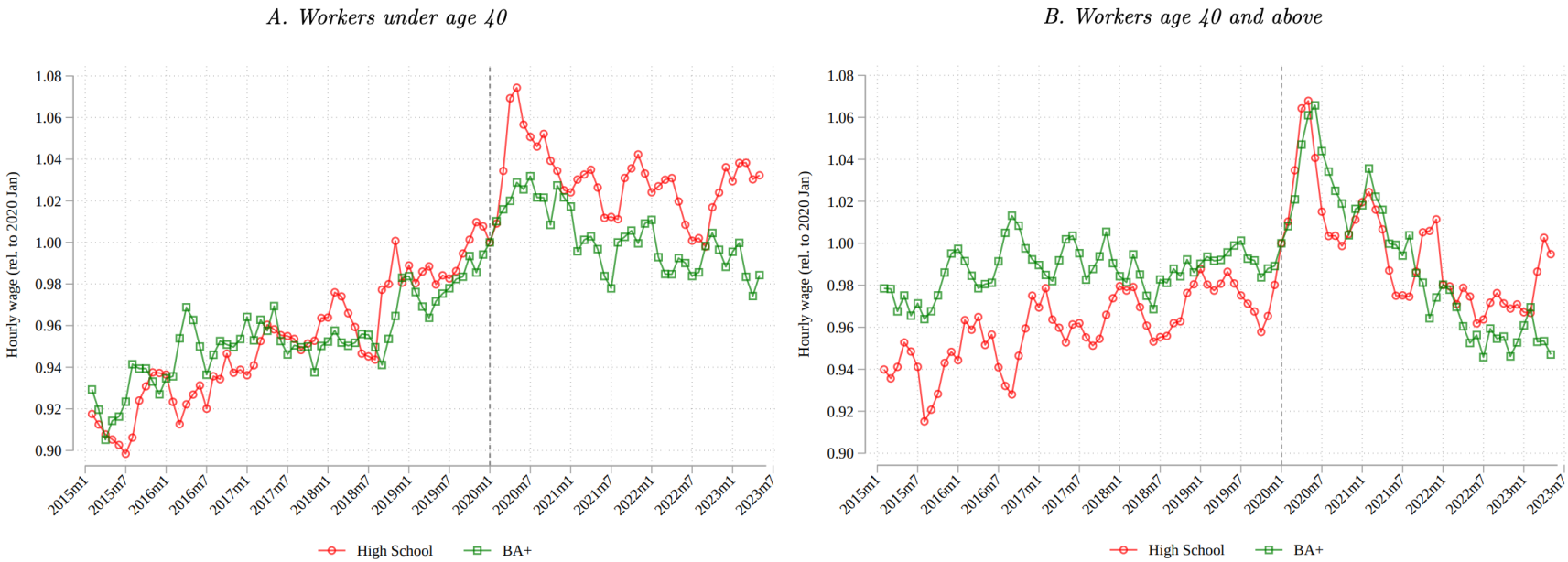
1. Model
2. Evidence
3. Dustmann/Schönberg/Gergs for Germany (r&r QJE)

Inequality declines also in the U.S.



Documented by Autor/Dube/McGrew. Their model discussed in the following focuses on period since beginning of pandemic (although inequality decreased already before).

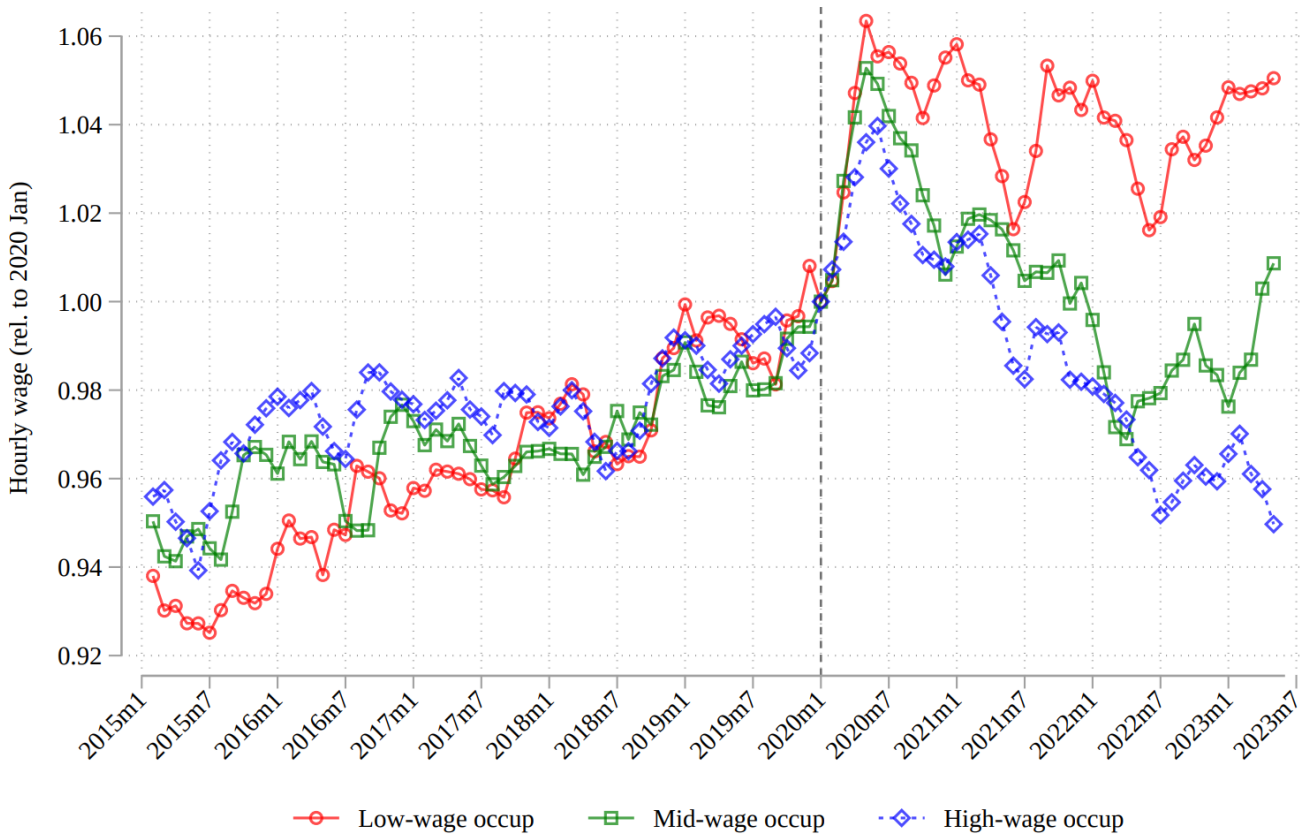
Inequality declines also in the U.S.



Less educated workers' relative wages rise:

- Among older workers pre-pandemic (right panel)
- Among younger workers post-pandemic (left panel, focus in the following)

Inequality declines also in the U.S.



Low-wage occupations' relative wages rise, too.

Static labour supply model I

As in our heterogeneity lecture: Monopsonistically competitive setting with one type of (low-skill) labour

- Large number of firms J
- Workers have idiosyncratic preference shocks over jobs: ν_j that are Type I Extreme Value distributed
- Worker utility defined by: $U_j = \varepsilon^L ln(w_j) + \nu_j$ (where ε^L is labor supply elasticity)

$$ln(w_j) = \frac{ln(\Phi) - ln(L)}{\varepsilon^L} + \frac{1}{\varepsilon^L} ln(l_j)$$

- Inverse labor supply function of each firm: where L is total number of workers in the market, and $ln(\Phi)$ is the elasticity-weighted sum of wages set by all other firms.

Static labour supply model II

Suppose firm output (in \$) $Y_j = p_j \ln(l_j) \rightarrow MRPL_j = \frac{p_j}{l_j}$, where p_j is a firm-specific productivity factor..

From labour demand, wage at firm j is

$$w_j = \frac{\varepsilon^L}{1+\varepsilon^L} \cdot \frac{p_j}{l_j} = markdown \cdot MRPL_j$$

From inverse supply,

$$w_j = const \cdot l_j^{1/\varepsilon^L}$$

Static labour supply model II

First, equate supply with demand and differentiate w.r.t. productivity:

- Firm employment rises with firm productivity

$$\frac{\mathrm{d}\ln(l_j)}{\mathrm{d}\ln(p_j)} = \frac{\varepsilon^L}{1+\varepsilon^L}$$

- Rising ε^L strengthens this relationship, i.e. reallocation of employment from low-productivity to high-productivity. firms.

Static labour supply model III

Second, from labour demand (repeated for convenience):

$$w_j = \frac{\varepsilon^L}{1+\varepsilon^L} \cdot \frac{p_j}{l_j} = markdown \cdot MRPL_j$$

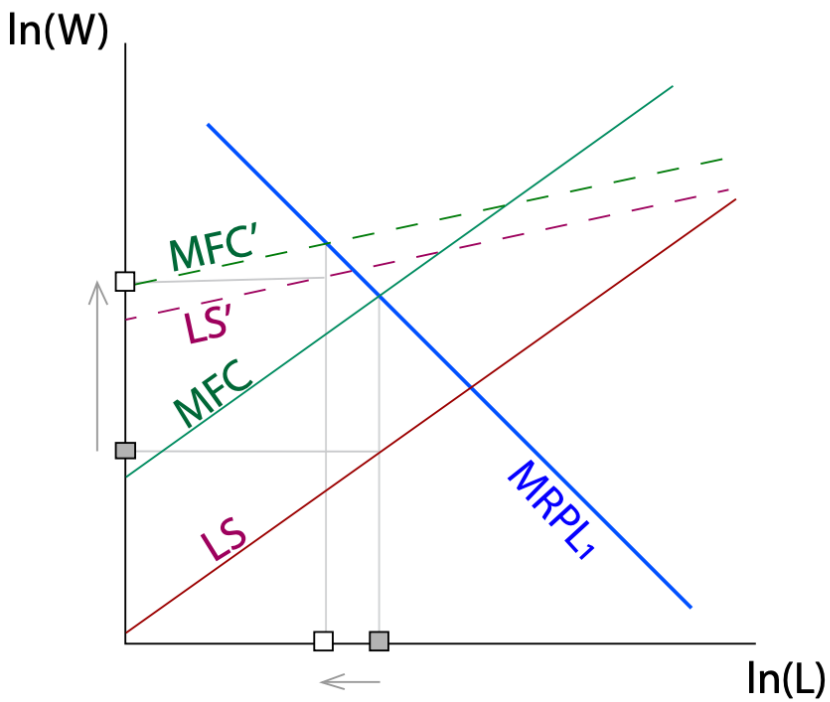
- Increasing elasticity ε^L reduces wage markdown in all firms.
- $MRPL_j = \frac{p_j}{l_j}$ declines in l_j such that low-productivity firms' relative wages rise as they shrink.

Both effects compress the aggregate wage distribution.

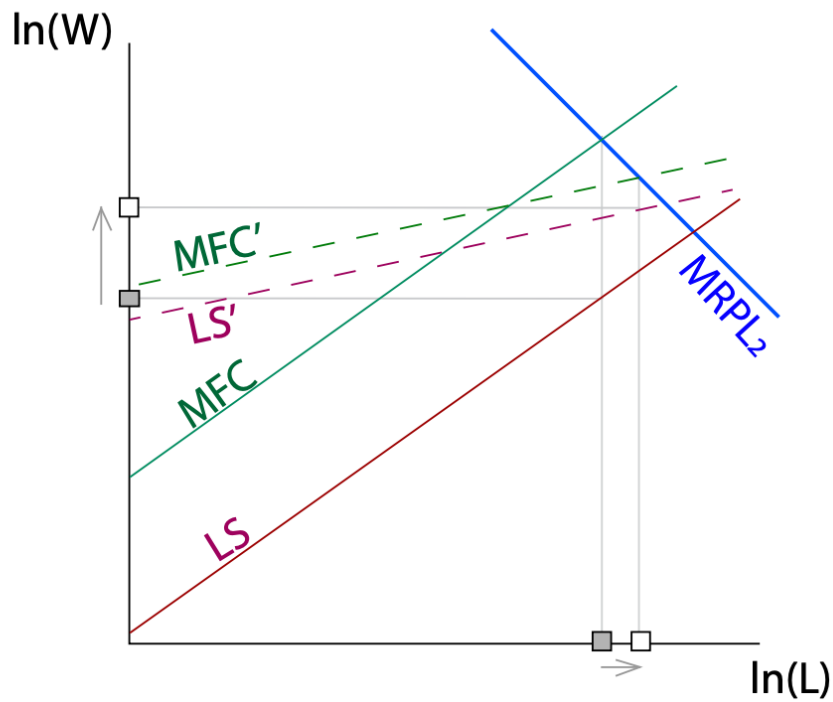
Static labour supply model (graphically)

Figure 4: Effect of Rotation of Labor Supply Curve in a Monopsonistic Labor Market

A. Low-productivity monopsonistic firm



B. High-productivity monopsonistic firm



Increase in Labor Supply Elasticity

In search model with on-the-job search:

- Firm-specific labor supply curves become more elastic as the labor market tightens.
- Will focus on employment-to-employment separation elasticity (i.e., of quitting the firm as a function of its wage).

Search framework I

- Separations S in a job ladder model: $S(w) = \delta + \rho + \lambda_e(1 - F(w))$
- δ is exogenous outflow rate to non-employment, ρ is exogenous EE rate (can even be to worse jobs)
- $F(w)$ is cumulative distribution of firm wages
- EE separation rate to better-paying jobs: $\lambda_e(1 - F(w))$
- Separation rate depends only on the rank of the firm $r = F(w)$
- EE separation elasticity with respect to own wage rank is:

$$\tilde{\varepsilon}_{EE} = \frac{\partial \ln[\rho+\lambda_e(1-r)]}{\partial \ln(r)} = \frac{-r\lambda_e}{\rho+\lambda_e(1-r)}$$

Search framework II

- Employed relative to unemployed workers' offer arrival rate $0 < \frac{\lambda_e}{\lambda_u} = \phi < 1$ (proportional to job search efforts ϕ and 1).
- Total job search effort in the economy

$$JS = u + (1-u)(1-\delta)\phi = [1-(1-\delta)\phi]\,u + (1-\delta)\phi$$

  - where u share of unemployed workers and $(1-u)(1-\delta)$ share of employed workers searching on the job.
  - rises in u.

Search framework III

Constant returns to scale matching function such that total matches $m(JS, V) = JS \cdot m(1, \theta)$

- where V is number of vacancies posted by employers
- and then $\theta \equiv V/JS$ labor market tightness.

Thus get contact rates that are endogenous and rising in θ (falling in u):

$$\lambda_u = \frac{m(JS, V)}{JS} = m(1, \theta) \quad \text{and} \quad \lambda_e = \phi \cdot m(1, \theta) \tag{1}$$

Search framework IV

Remember

$$-\tilde{\varepsilon}_{EE} = \frac{r\lambda_e}{\rho + \lambda_e(1-r)}$$

which leads to (for absolute values of $\tilde{\varepsilon}_{EE}$):

- EE separation elasticity increasing in tightness θ (falling in u): $\frac{\partial -\tilde{\varepsilon}_{EE}}{\partial \theta} = \frac{\partial -\tilde{\varepsilon}_{EE}}{\partial \lambda_e}\frac{\partial \lambda_e}{\partial \theta} > 0$.
- Higher contact rate makes EE separations more sensitive to wage rank: $\frac{\partial^2 -\tilde{\varepsilon}_{EE}}{\partial \lambda_e \partial r} > 0$.
- Increased tightness, and increased contact rate, raise separations – more at the bottom of the firm wage distribution: $\frac{\partial[\rho+\lambda_e(1-F(w))]}{\partial \lambda_e} = 1 - F(w) = 1 - r$.

...endogenizing $F(w)$ does not alter the main conclusions.

General model takeaways

In the model, tightness may increase due to a positive demand shock, raising V, or a fall in u – perhaps reflecting a contraction in the labor force. Autor et al. argue both factors are plausible candidates for the increase in labor market tightness following the pandemic.

Possible non-model reasons for more "footlooseness":

- Involuntary separations during pandemic – lessened employer attachment
- Higher liquidity leading higher reservation wages.
- Shifting perceptions about availability of higher-wage jobs (Jäger et al., 2022).

Predictions of imperfect competition model

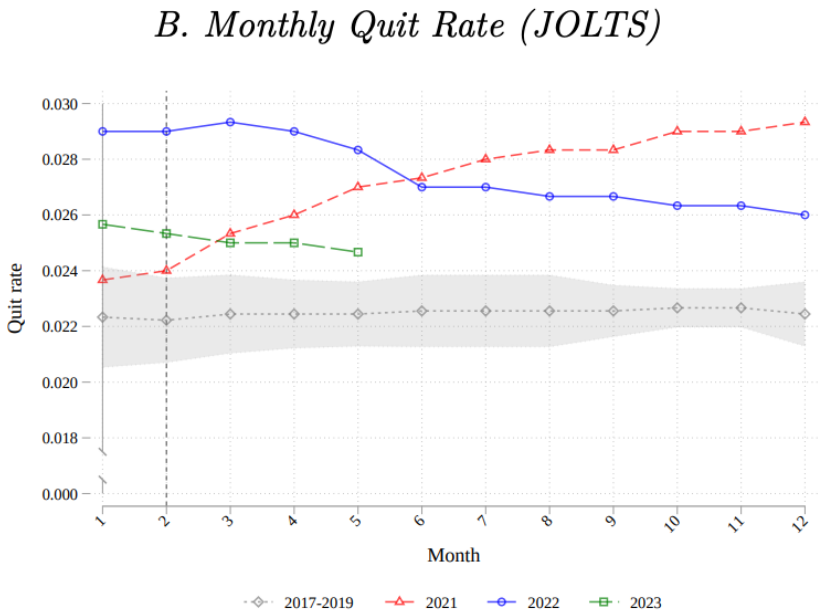
1. Decline of inequality among similar workers
2. Relative increase in wages concentrated in employers at low end of the wage distribution
3. Higher tightness in low-skill labour market
4. Rise in employment-to-employment (EE) transitions among low-wage workers
5. Increase in the elasticity of quits with respect to (low) wages
6. Workers move disproportionately from lower- to higher-ranked firms i.e. reallocation
7. Concentration of wage gains among job-movers versus job-stayers

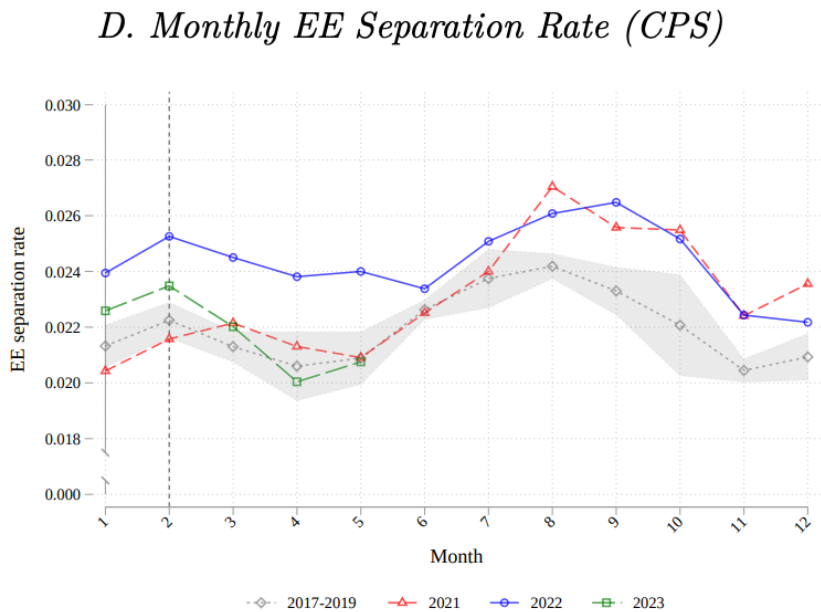
Evidence using US CPS data

Autor et al. present evidence limited in precision, but nevertheless observe interesting trends in the data

- Analysis of changes in transition rates using Current Population Survey data.
- Check whether they rise more among low-wage young workers (high school under-40 group)
- Study reallocation using industry wage premia.
- Study relation between tightness and wage growth.

EE Separation and (voluntary) quit rates

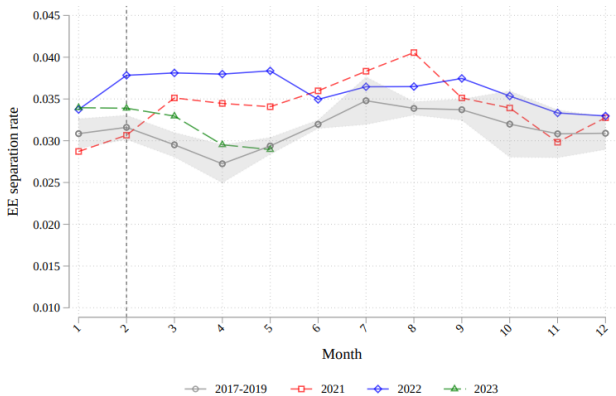




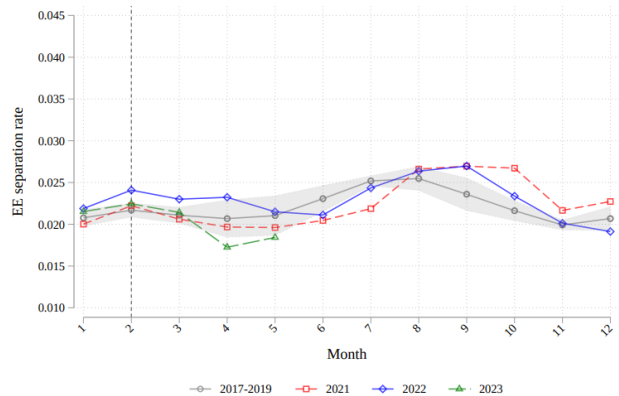
- Compare years 2021 and 2022 to a pre-pandemic baseline average of 2017–2019.
- Transitions rose in 2021 second half, and remained elevated until decline in 2023.

EE separation rates: High school vs BA+

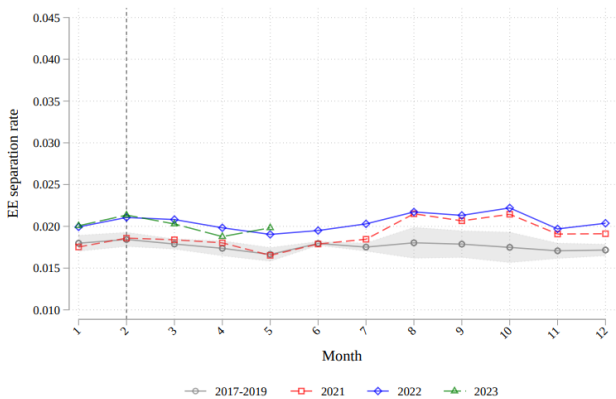
A. High School, under 40



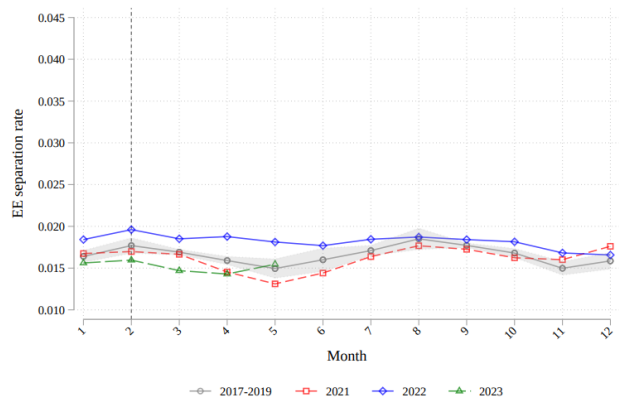
B. BA+, under 40



C. High School, 40+

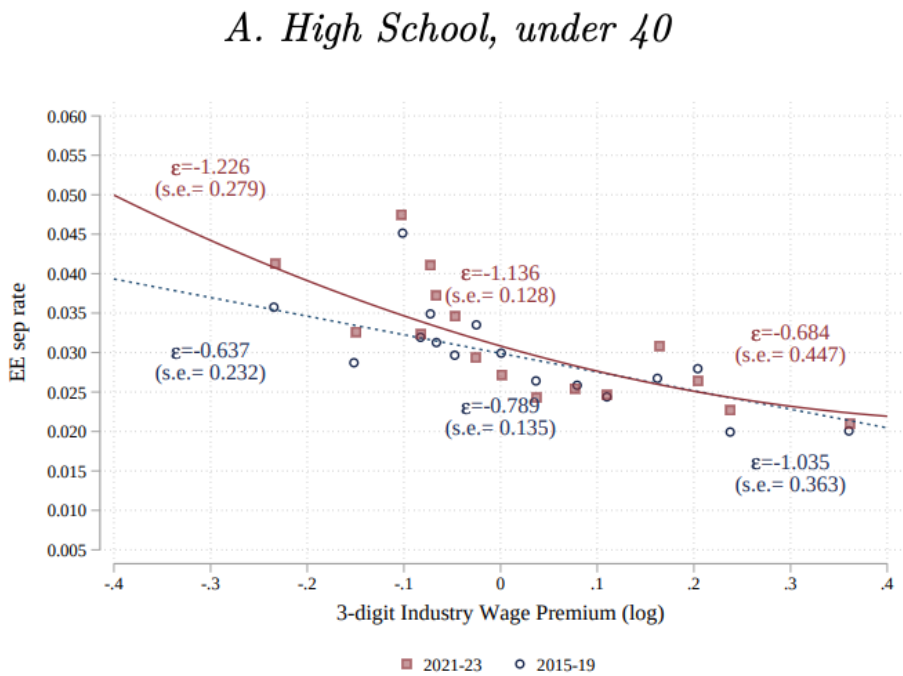


D. BA+, 40+



Separation rates trend driven by high-school, under-40 workers

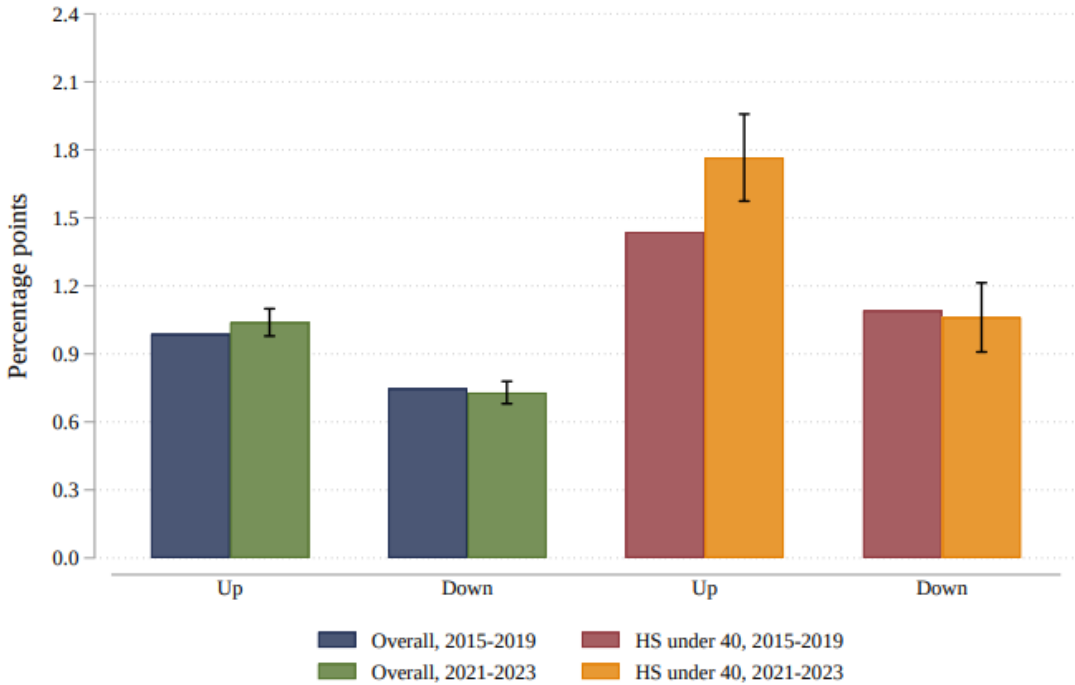
EE separation by industry wage premium



- Employment elasticity steeper post-pandemic: i.e. increased EE separations in industries with high markdowns (or negative wage premia)
- Evidence also consistent with reallocation away from low-wage employers
- Less clear for other skill groups... (see paper)

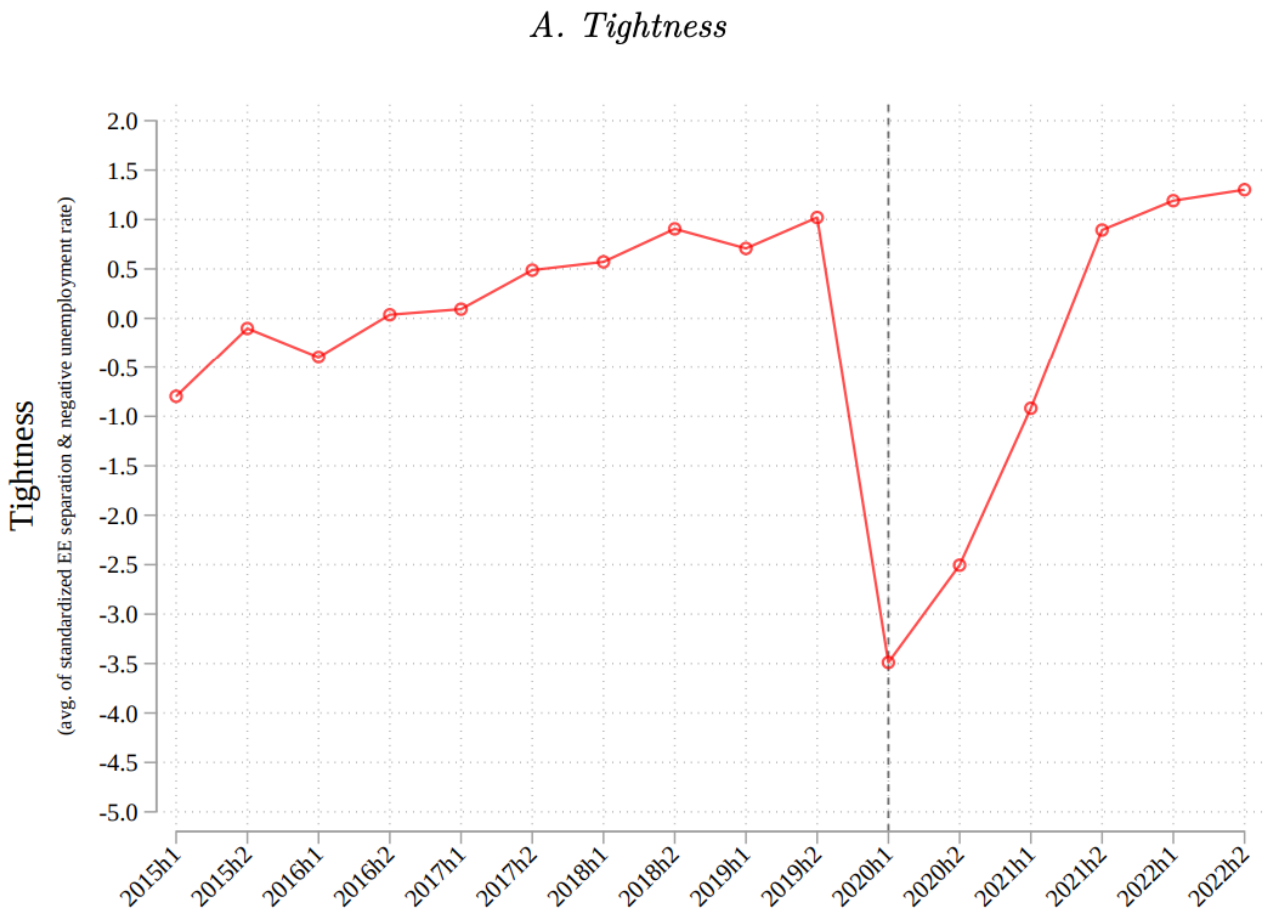
Mobility in and out of bottom-paying employers

B. Bottom Quartile of the 3-Digit Industry Wage Premia



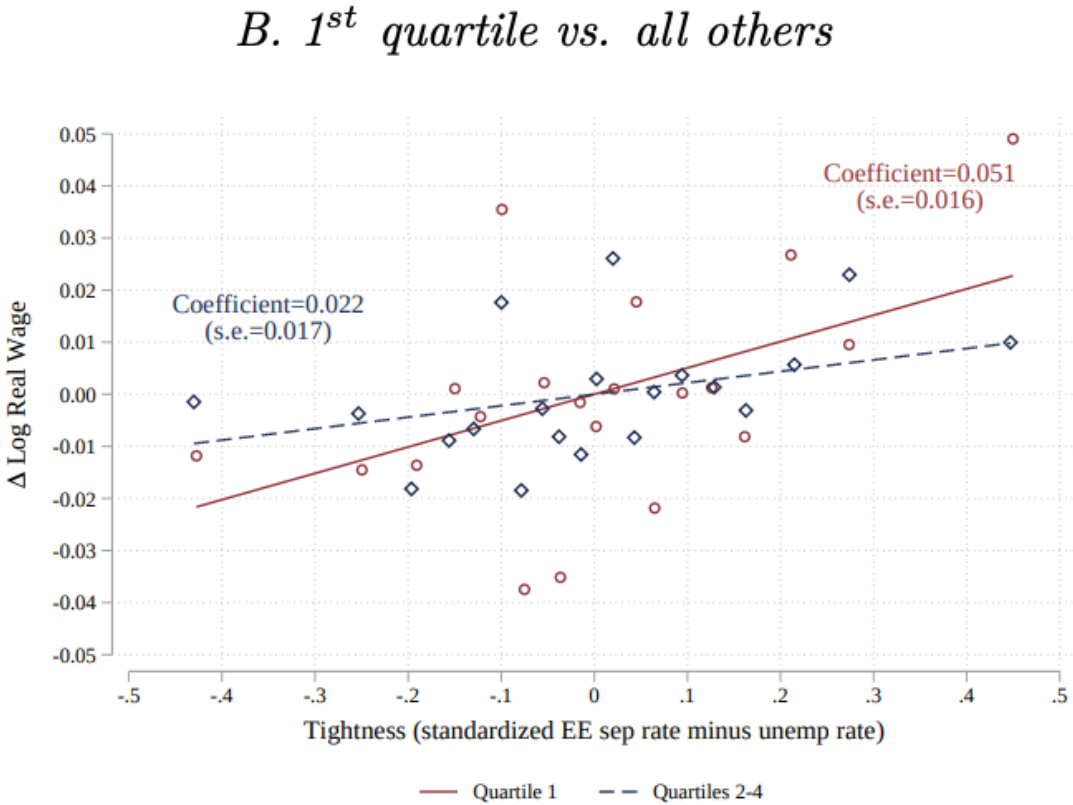
- Reflects a net reallocation of young non-college educated workers away from low-premium (or low rent-sharing) sectors.

Trends in tightness



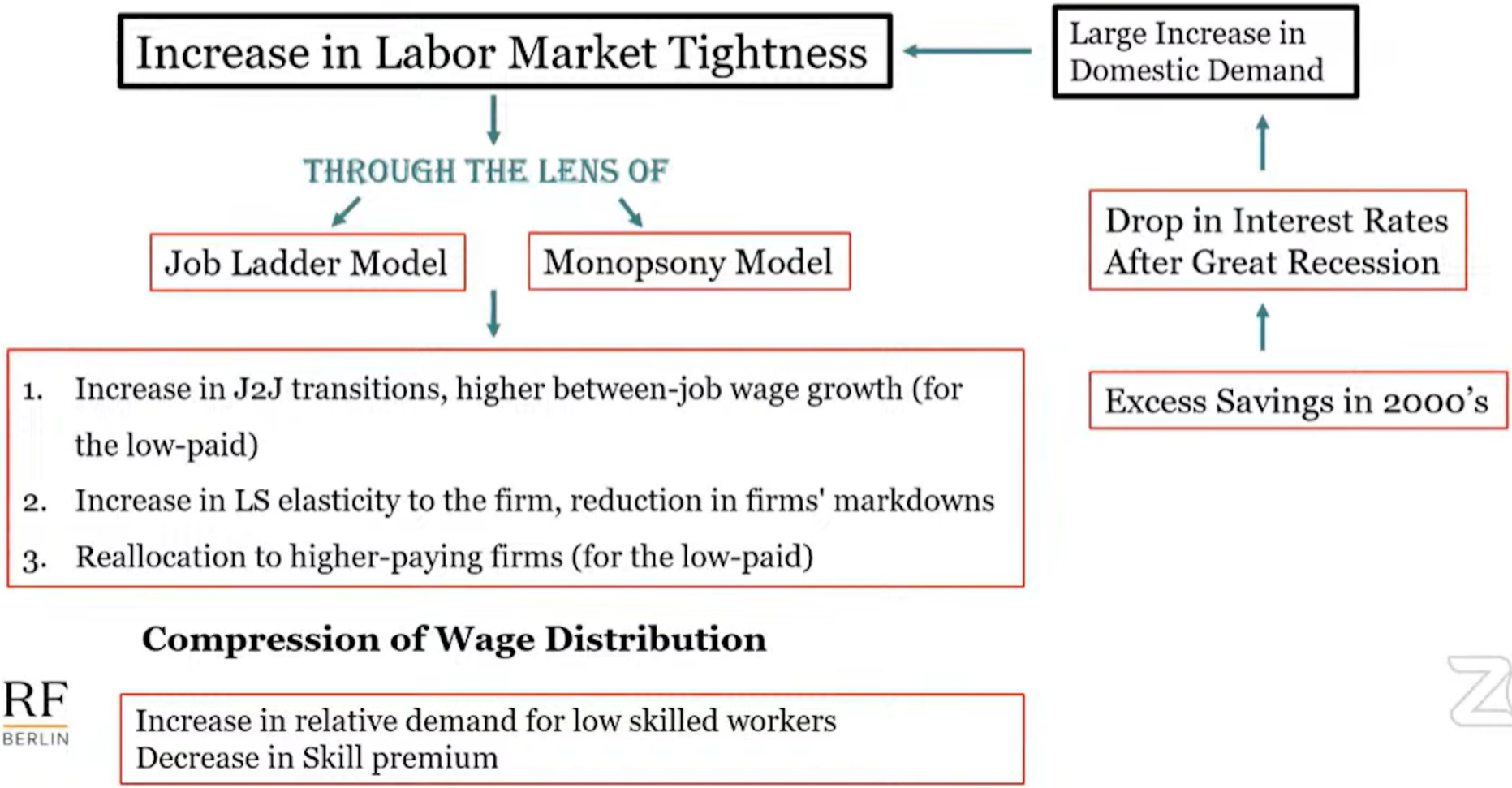
- Rising tightness in the post-pandemic US labor market

Cross-state tightness and wage growth

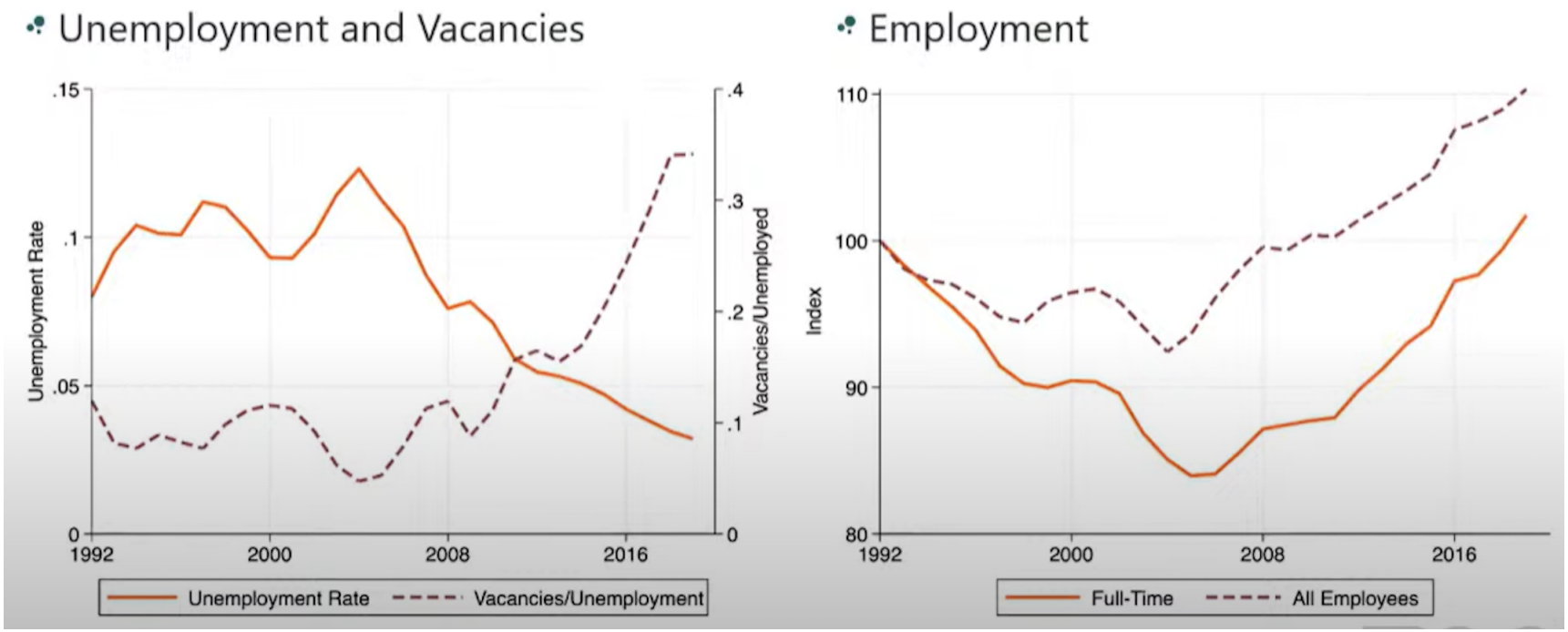


- Phillips-Curve style relationship: higher tightness associated with higher wage growth.
- Stronger for low-wage workers (consistent w/ higher cross-derivative for lower wage rank in theory).

Dustmann et al. (2024) for Germany



Tightness starts rising around 2008



Test impact across local labour markets (LLMs) with different tightness and by low- versus high-earning firms and workers...

Job switching and wage growh by tightness

Table 1: Local Labor Market Tightness, Job Switching and Wage Growth

	Overall	Along the Wage Distribution				By Firm Pay Premium	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Bottom 25%	26-50%	51-75%	Top 25%	Lower 50%	Upper 50%
Panel A: Job Switching							
Local Labor Market Tightness	0.012*	0.118***	0.039***	0.014	-0.005	0.138***	0.016*
	(0.005)	(0.014)	(0.009)	(0.008)	(0.009)	(0.016)	(0.007)
Panel B: Log Wage Growth							
Local Labor Market Tightness	0.005*	0.059***	0.011***	0.011***	0.011***	0.052***	0.012***
	(0.002)	(0.007)	(0.003)	(0.003)	(0.002)	(0.005)	(0.002)
Number of Observations	3914992	1017898	969175	964542	963377	489428	2114028

StDev Tightness: 0.14

Larger impact of tightness for lower-earning workers and firms. (not shown: larger wage growth for low-earners who also switch)

Quantitatively (also not shown here): shutting down job ladder (hold firm FE constant) accounts for 1/3 of declining 90–10 differential (*but only 10% of 50–10, why?*)

Further readings

- Autor/Dube/McGrew (2024). *The unexpected compression: Competition at work in the low wage labor market*. Revise & Resubmit, Quarterly Journal of Economics.
- Dustmann/Gergs/Schönberg (2024). *The Evolution of the German Wage Distribution Before and After the Great Recession*. Revise & Resubmit, Quarterly Journal of Economics.