The Long-Term Decline of the U.S. Job Ladder

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40 Years of Stagnant Real Wages

- Over the past four decades, real wages for the average American worker have barely grown
- A vast literature highlights several important drivers
  - Technological change (e.g. Acemoglu & Restrepo, 2020)
  - Globalization (e.g. Autor, Dorn & Hanson, 2013)
  - Institutional changes (e.g. Autor, Manning & Smith, 2016)
- The role of changes to the structure of the labor market have received less attention
  - Mismatch
  - Concentration
  - Frictions and search behavior

  Influence worker mobility and through that wage growth

The Structure of the U.S. Labor Market & Wage Stagnation

Findings from an estimated structural job ladder model:

1. **Upward job mobility has fallen by 40%** between the 1980s and 2010s

2. Primarily accounted for by changes in three structural factors:

   (a) **Greater mismatch** between open jobs and searching workers
   (b) **Greater employer concentration** that has limited the scope for job shopping
   (c) **Less search by employed workers**

3. Combined effect: **4 p.p. lower real wages** ($\approx$ 40% of fall in aggregate labor share)

The Stylized Job Ladder Model

A Partial Equilibrium Job Ladder Model

- A unit mass of ex-ante identical workers move in and out of employment & across jobs
- Unemployed workers receive job offers at rate λ drawn from the **offer distribution F(w)**
  - We assume that parameters are such that the unemployed accept all offers
- Employed workers earn a fixed wage w for as long as they are employed
  - **Outside offers** at rate $\phi\lambda$ with a wage from $F(w)$ that workers may accept
  - **Reallocation shocks** at rate $\delta\lambda^f$ with a wage from $F(w)$ that workers must accept
  - **Job loss shocks** at rate $\delta(1-\lambda^f)$ that leave the worker unemployed

Inferring Net Upward Mobility

- The steady-state **wage distribution G(w)** is given by

$$G(w) = \frac{F(w)}{1 + \kappa\Big(1 - F(w)\Big)}, \qquad \underbrace{\kappa}_{\text{net upward mobility rate}} \equiv \frac{\phi\lambda}{\delta}$$

  - Net upward mobility rate, κ = Average # of outside offers between two separation events
  - Greater upward mobility $\Rightarrow$ faster wage growth $\Rightarrow$ larger gap btw offer & wage distributions

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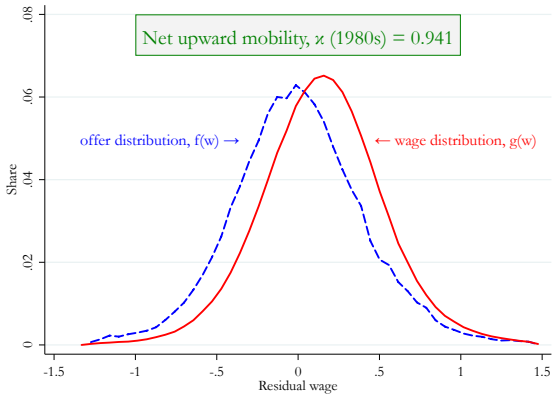
- Strategy: Non-parametrically estimate $G(w)$ and $F(w)$ using cross-sectional data
  - **Wage distribution G(w)**: wages cond. on demographics & occupation separately by year
  - **Offer distribution F(w)**: residual wages of those who were non-employed in the previous month

- Infer net upward mobility κ decade-by-decade (or year-by-year)

The Offer Distribution, the Wage Distribution & Net Upward Mobility



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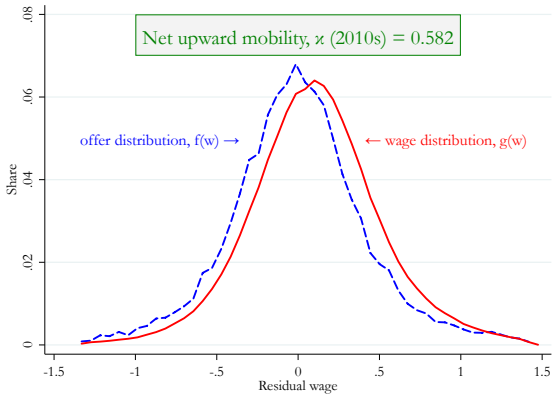
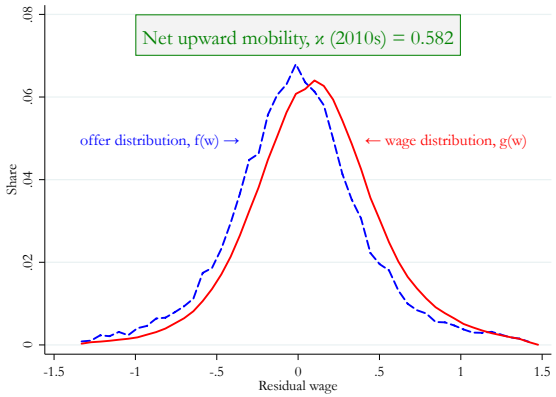
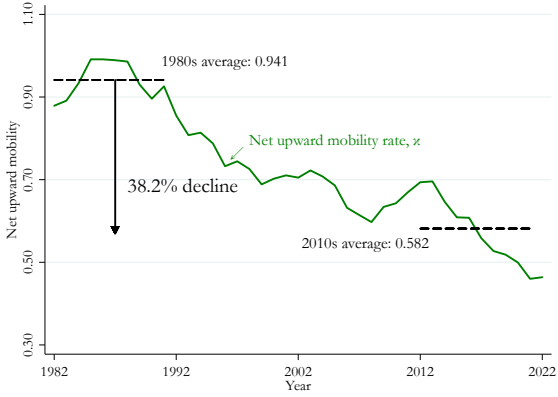


The Offer Distribution, the Wage Distribution & Net Upward Mobility

≈ 40% decline in net upward mobility between the 1980s and 2010s





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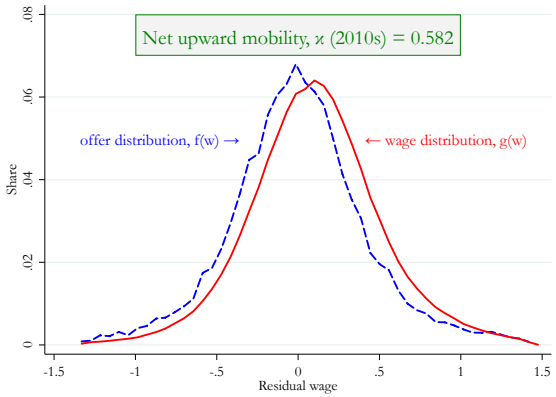

The Full Job Ladder Model

Three Main Goals of the Full Model

1. **Robustness to other factors behind the offer-wage gap**

2. **Identify the structural factors**

3. **Quantify their consequences for aggregate wage growth**

Three Main Goals of the Full Model

1. **Robustness to other factors behind the offer-wage gap**
   - **On-the-job wage dynamics**: log wages evolve according to an AR1 in continuous time
     Joint distribution over wages at t and $t + 12$ of stayers
   - **Unobserved heterogeneity**: Types differ in non-employment incidence and earnings ability
     Joint distribution over wages at t and $t + 12$ of job losers

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2. **Identify the structural factors**
   - **Mismatch** between labor demand & supply across segmented labor markets
     Dispersion in labor market tightness across occupations
   - **Employer concentration**: Finite # of firms; workers cannot accept jobs at their current employer
     Covariation between job mobility and firm size in panel of U.S. states

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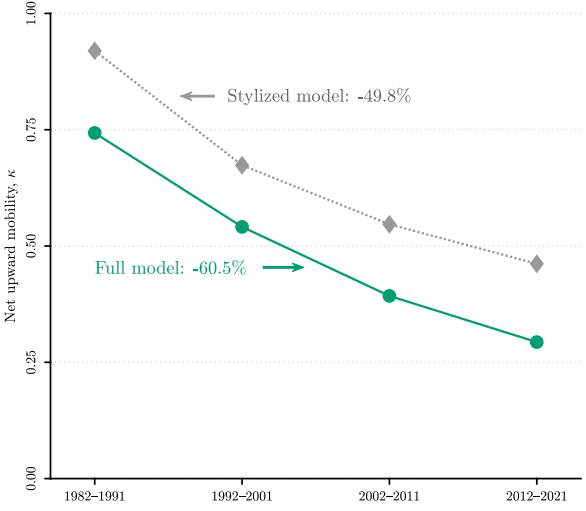
3. **Quantify their consequences for aggregate wage growth**
   - We estimate the model decade-by-decade
   - Counterfactual wage growth with forces turned on or off

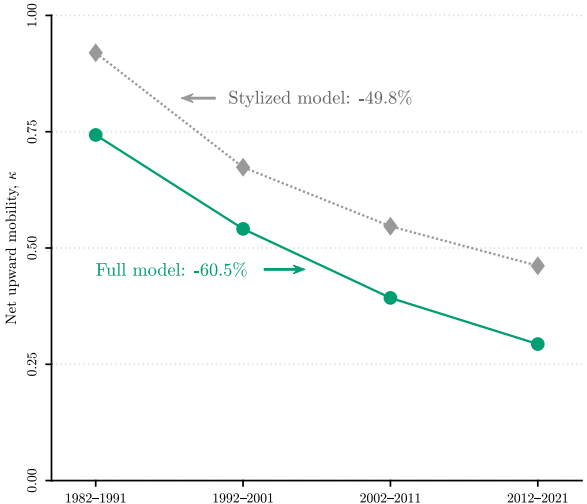
The Long-Term Decline of the Job Ladder: Stylized & Full Model

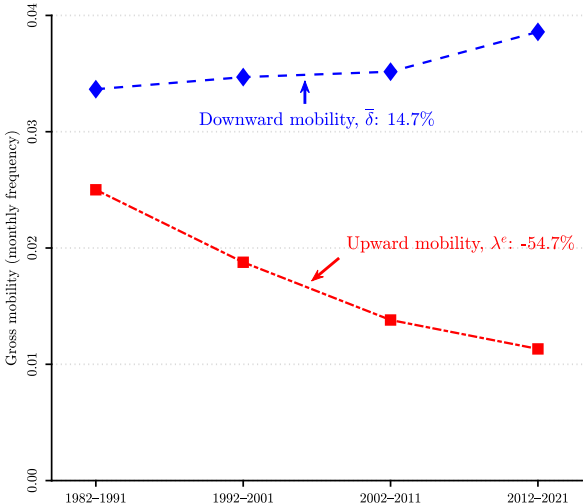
The richer model finds an even larger decline of the U.S. job ladder...



The Long-Term Decline of the Job Ladder: Stylized & Full Model

...mostly as a result of less gross upward mobility





The Factors Behind the Long-Term Decline of the U.S. Job Ladder

$$\underbrace{\lambda^e}_{\text{Upward mobility}} \approx \underbrace{\chi}_{\text{matching efficiency}} * \underbrace{\left(\frac{V}{S}\right)^{\alpha}}_{\text{aggregate tightness}} * \underbrace{(1-\tau)}_{\text{mismatch}} * \underbrace{\frac{m-1}{m}}_{\text{employer concentration}} * \underbrace{\phi}_{\text{rel. search intensity}}$$

- **Mismatch** between labor demand & supply across occupations
  - Reduction in job finding rate relative to frictionless relocation across occupations
- **Employer concentration**: Workers cannot accept a job from their current employer
  - Finite number *m* of suitable employers for a worker

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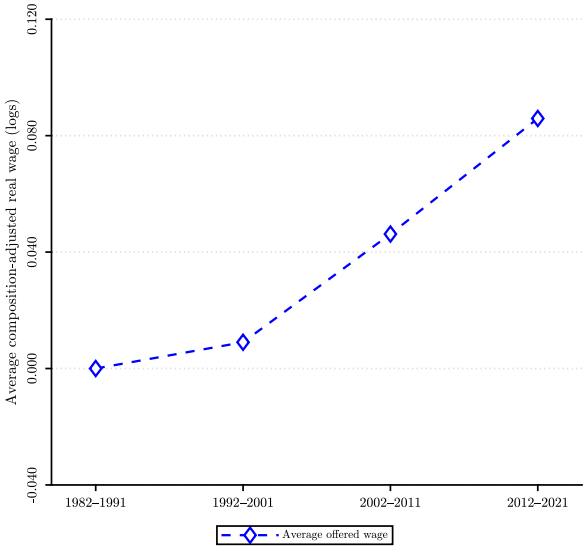
Total	Matching efficiency	Aggregate tightness	Mismatch	Employer concentration	Relative search intensity
-55	-19	25	**-17**	**-13**	**-38**

The Consequences of the Long-Term Decline of the U.S. Job Ladder

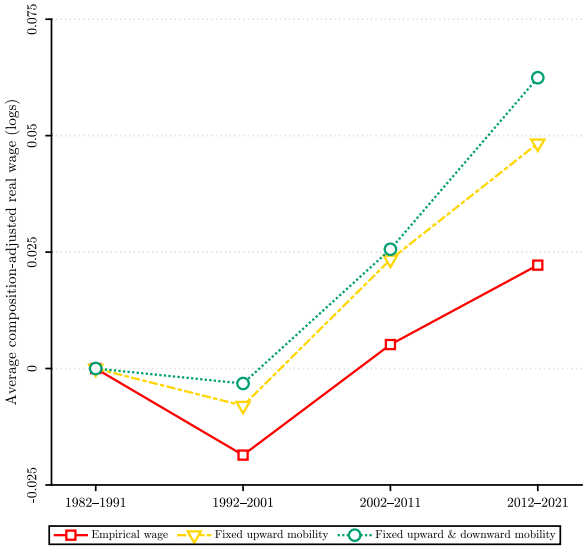


We consider the following accounting exercise

- Let offered wages ($F_t(w)$) grow as in data
- Hold **one/a few parameters** fixed in 1980s
- Quantify the impact on the gap and hence

overall wages $=$ offered wages $+$ gap

The Consequences of the Long-Term Decline of the U.S. Job Ladder



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Combined effect: -4.0p.p. real wages

($\approx$ 40% of labor share decline)

Conclusion

The Structure of the U.S. Labor Market & Wage Stagnation

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In the paper: supporting evidence from individual wage & employment dynamics in the NLSY

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Back-up

1. Demographic differences:

   Gender | Race | Education | Age | Occupation | Industries | Occupation wage percentiles

2. Heterogeneity in net upward mobility:

   Non compete occupations | Over identification test

3. Alternative Explanations:

   Greater Between-Occupation Mobility? | Are Workers Better Matched Out of Unemployment?

4. Estimation:

   Overview | Step I | Step II | Estimates from Step I-II | μ, ρ & σ | δ^i & ω | Step III | Validation

5. NLSY validation:

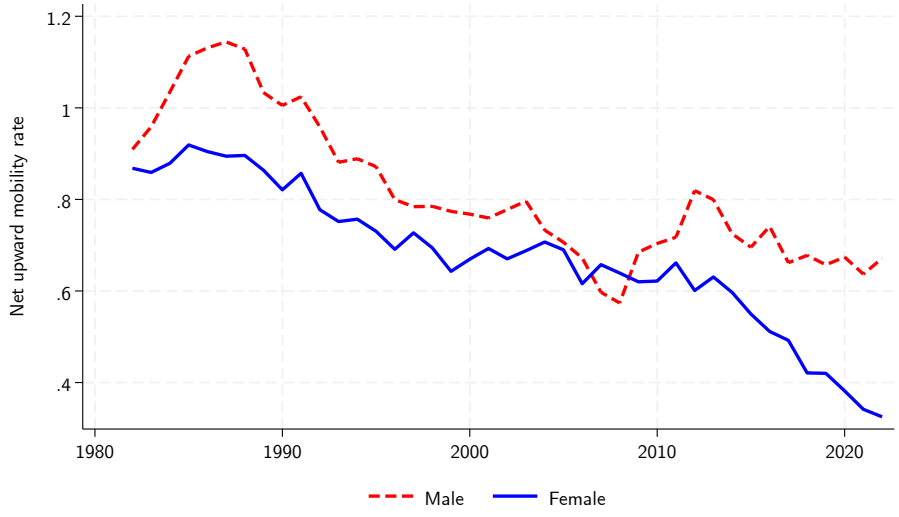
   NLSY validation vs. CPS | NLSY wage distribution w/in individuals | NLSY wage growth | NLSY wage growth across occupations

   NLSY wage growth and JJ mobility | NLSY extensive/intensive JJ mobility | NLSY and initial matches | NLSY Counterfactual

Appendix

Declines similar across genders

back

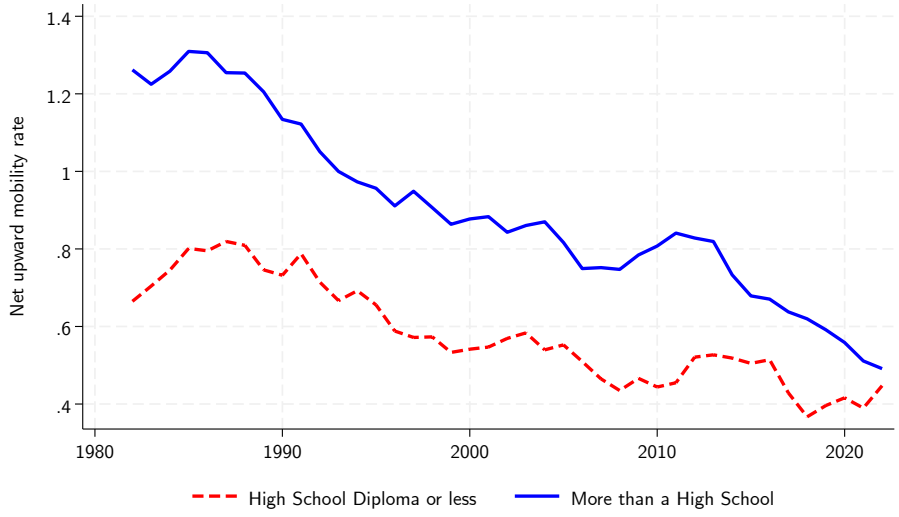


Declines similar across race groups

back

Decline larger for more educated workers

back



Decline larger for younger workers

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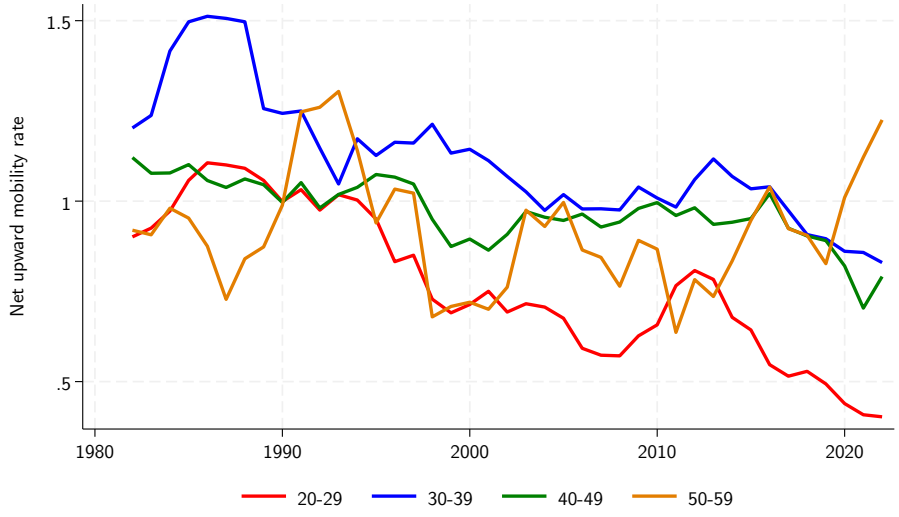

Decline visible within broad occupation groups

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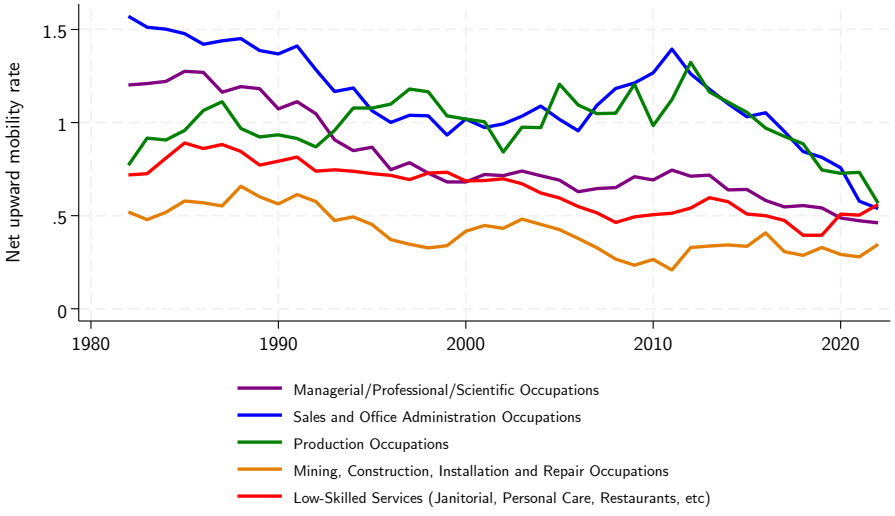

Decline uneven across industries

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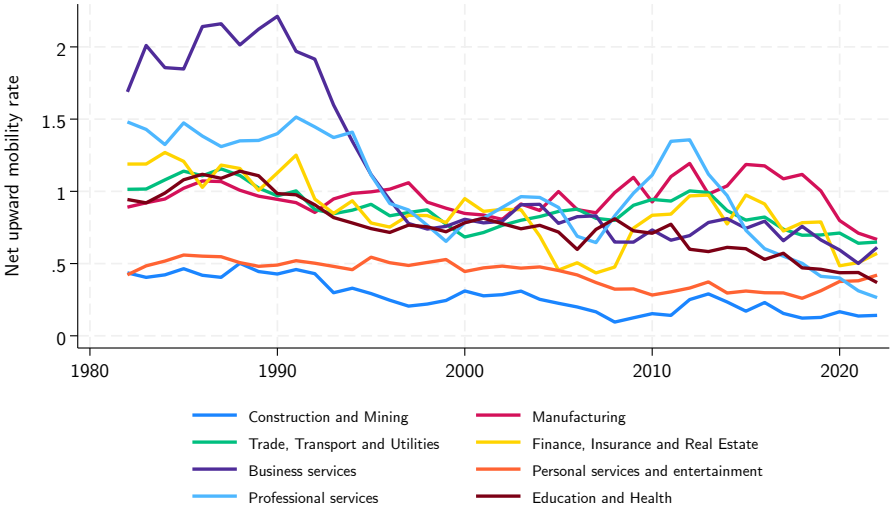
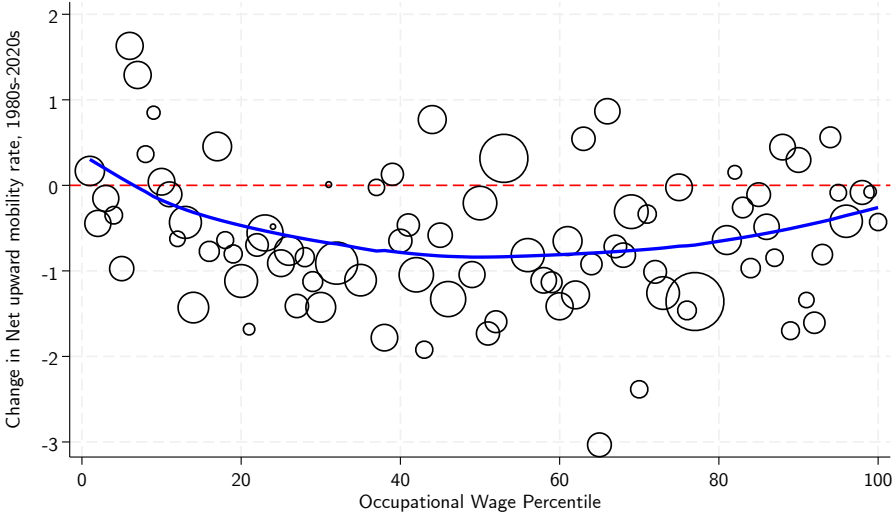


Decline larger for occupations in the middle of the wage distribution

back

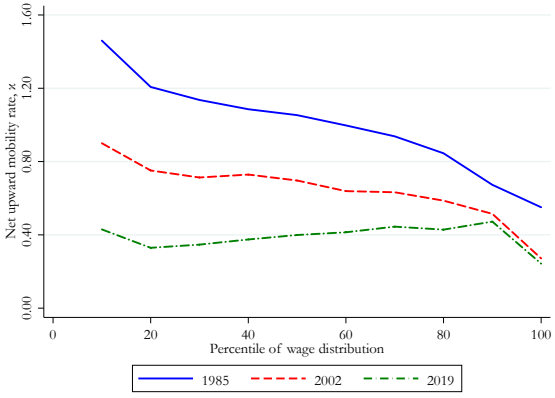


Decline larger in occupations with more non-competes

back

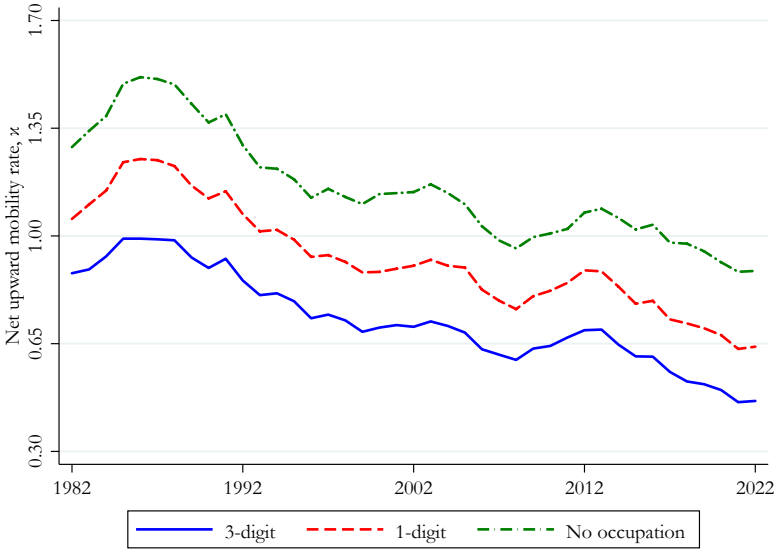
κ estimated at different percentiles

back



Greater Between-Occupation Mobility?

back

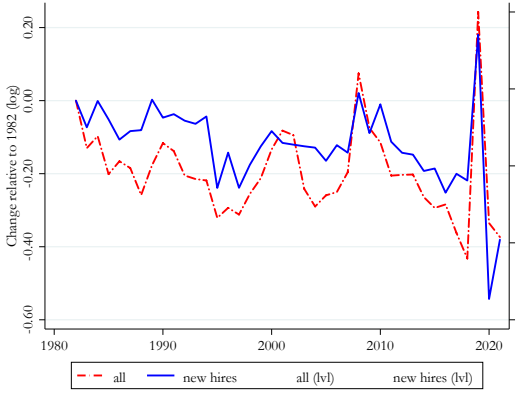


Are Workers Better Matched Out of Unemployment?

back

Consider a Jovanovic (1979) learning model

- Better screening implies bad matches are increasingly weeded out prior to formation
- Convergence of offer & wage distributions and fall in mobility, but this is benign
- Would expect a decline in EN mobility, especially among new matches



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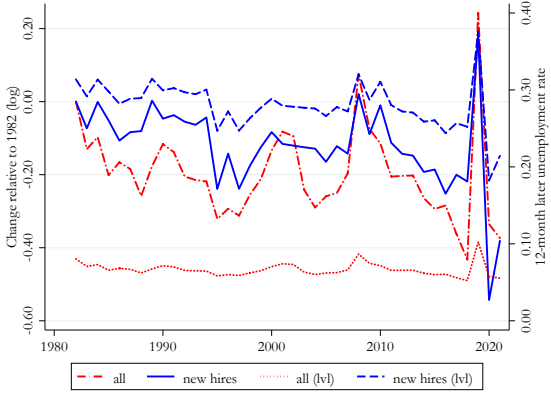

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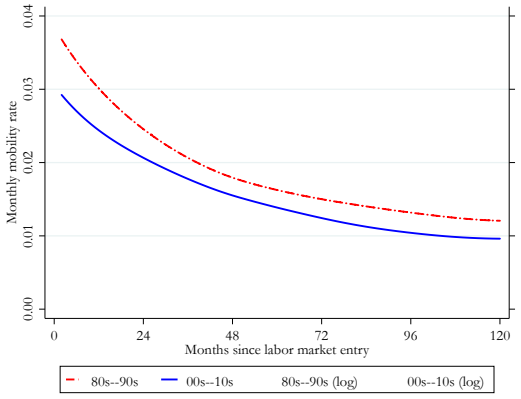

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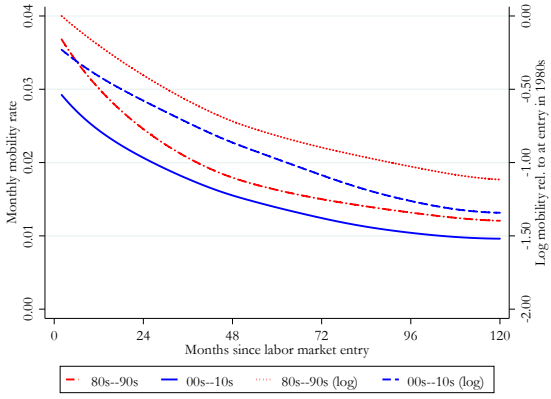


Overview of Estimation

back

- **Step I**: λ, V and τ directly from the data step I
- **Step II**: Estimate 8 parameters jointly step II

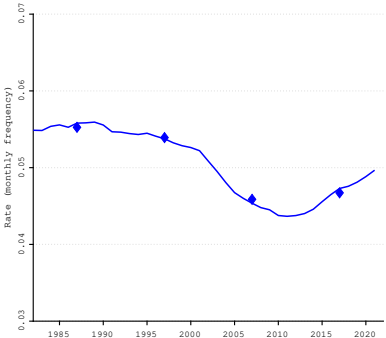
$$\left\{ \lambda^e \ , \ \lambda^f \ , \ \mu \ , \ \rho \ , \ \sigma \ , \ \delta^1 \ , \ \delta^2 \ , \ \omega \right\}$$

  - Key source of identification: joint distributions over wages

- **Step III**: m from $Cov\left(\frac{\lambda^e}{\lambda}, \text{fsize}\right)$ in panel of U.S. states step III

Step I: λ, V & τ Directly from the Data

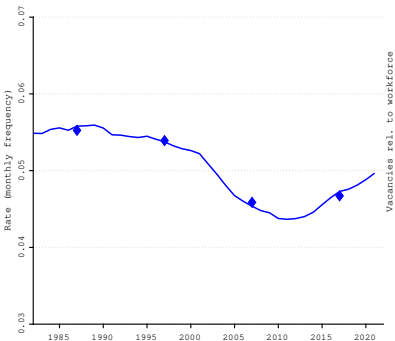
back



(a) Job finding rate (λ)

Step I: λ, V & τ Directly from the Data

back



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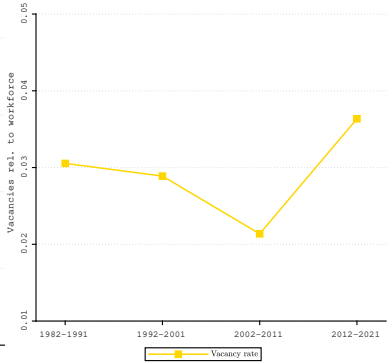
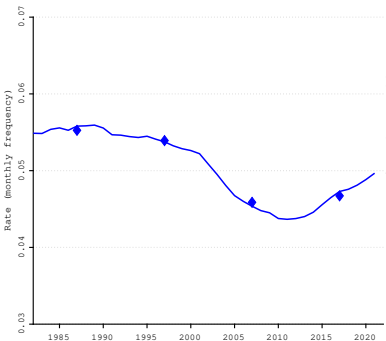


(b) Vacancy rate (V)

Step I: λ, V & τ Directly from the Data

back

Wedge (τ) from st.d. of JFR across 3-digit occupations: $\tau_y \approx \frac{\alpha(1-\alpha)}{2} \sum_i \left(\frac{\lambda_{iy}^{\frac{1}{\alpha}} - \sum_j \lambda_{jy}^{\frac{1}{\alpha}} \omega_{jy}}{\sum_j \lambda_{jy}^{\frac{1}{\alpha}} \omega_{jy}} \right)^2 \omega_{iy}$



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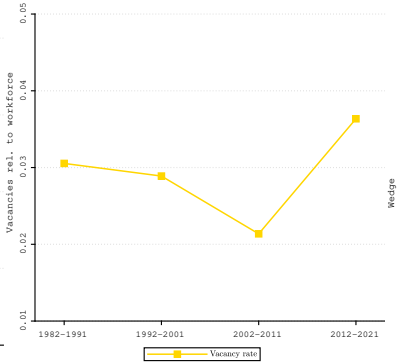

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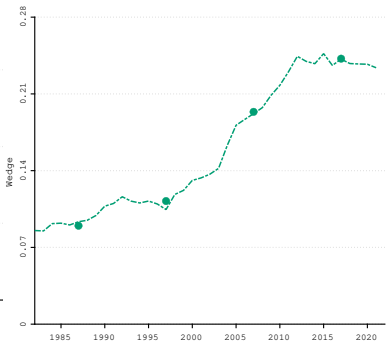

(c) Matching wedge (τ)

Step II: 8 Parameters Internally via SMM

back

$$\left\{ \lambda^e \ , \ \lambda^f \ , \ \mu \ , \ \rho \ , \ \sigma \ , \ \delta^1 \ , \ \delta^2 \ , \ \omega \right\}$$

1. Gap between the wage & wage offer distributions

Step II: 8 Parameters Internally via SMM

back

$$\left\{ \lambda^e \ , \ \lambda^f \ , \ \mu \ , \ \rho \ , \ \sigma \ , \ \delta^1 \ , \ \delta^2 \ , \ \omega \right\}$$

1. Gap between the wage & wage offer distributions

2. Share of stayers

Step II: 8 Parameters Internally via SMM

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1. Gap between the wage & wage offer distributions
2. Share of stayers
3. Joint distribution among stayers details

Step II: 8 Parameters Internally via SMM

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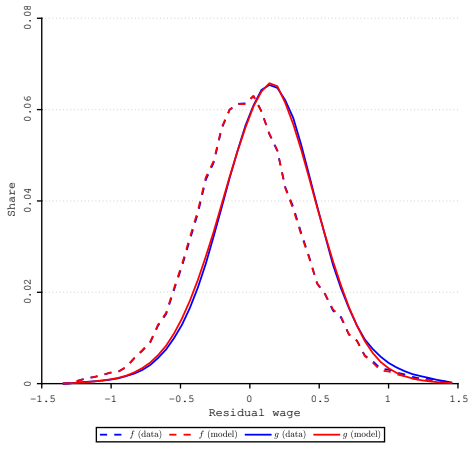
$$\left\{ \lambda^e \ , \ \lambda^f \ , \ \mu \ , \ \rho \ , \ \sigma \ , \ \delta^1 \ , \ \delta^2 \ , \ \omega \right\}$$

1. Gap between the wage & wage offer distributions
2. Share of stayers
3. Joint distribution among stayers details
4. Joint distribution among job losers details

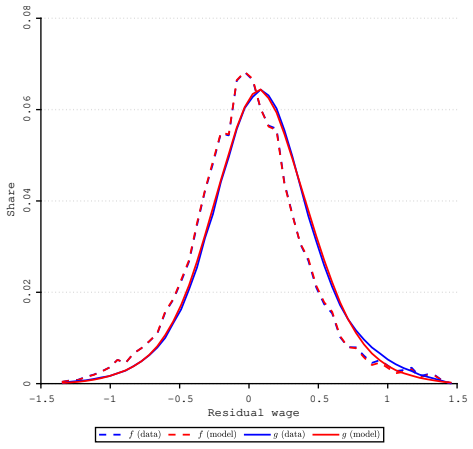
Step II: λ^e Informed by Wage Relative to Offer Distributions

back

Taking $F(w)$ from data, the model matches empirical $G(w)$ very well



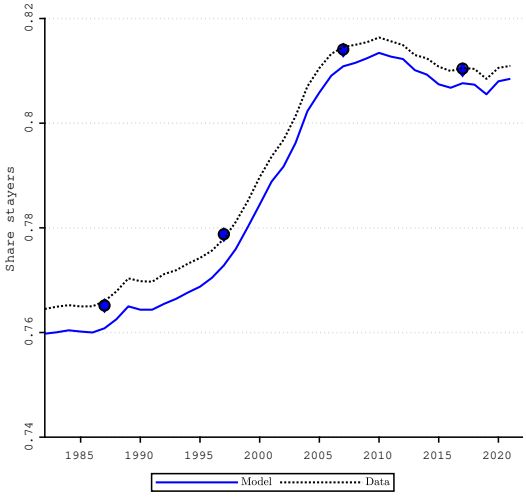
(a) 1982–1991



(b) 2012–2021

Step II: λ^f Informed by Share of Stayers

back



- The EN rate informs the EN rate $\delta(1-\lambda^f)$
- λ^e gives voluntary job-to-job flows
- Use the share that remain in job to get λ^f

Steps I-II: Parameter Estimates

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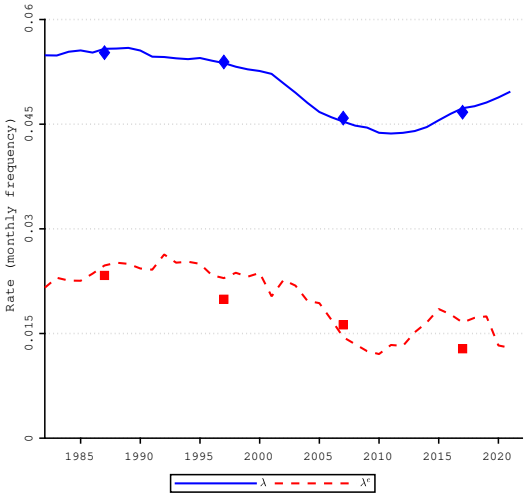
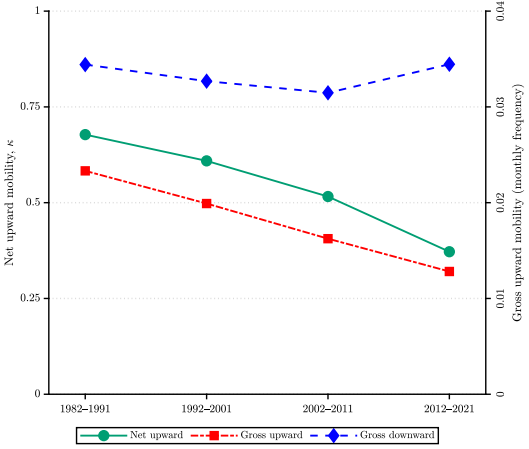


- $\lambda^e = \lambda\phi\frac{m-1}{m}$ declined by relatively more than λ

Steps I-II: Parameter Estimates

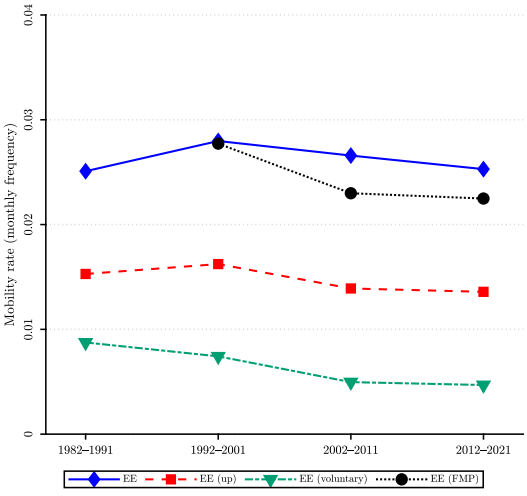
back



- $\lambda^e = \lambda\phi\frac{m-1}{m}$ declined by relatively more than λ
- Modest increase in reallocation shocks $\delta^i\lambda^f$

Steps I-II: Parameter Estimates

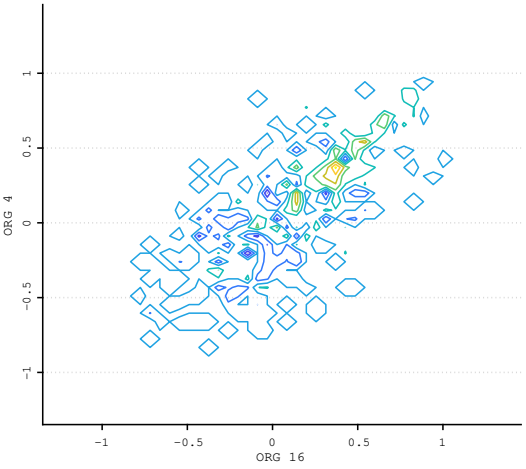
back



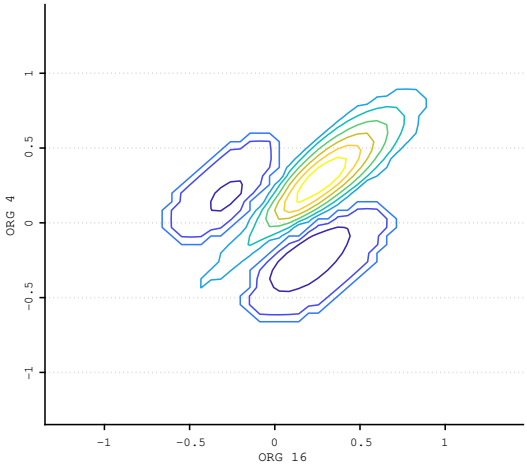
- $\lambda^e = \lambda\phi\frac{m-1}{m}$ declined by relatively more than λ
- Modest increase in reallocation shocks $\delta^i\lambda^f$
- Less pronounced decline in realized EE mobility
  1. Voluntary mobility is less than half of total EE
  2. Workers are more likely to accept offer as λ^e falls

Step II: μ, ρ & σ Informed by Distribution of Stayers

back



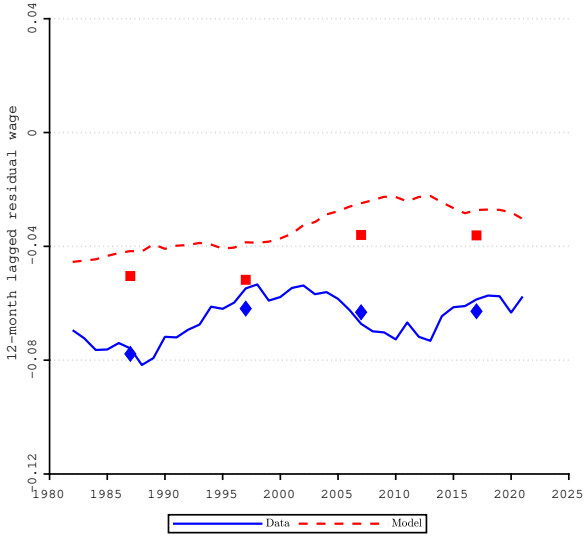
(a) Data



(b) Model

Step II: δ^i & ω Informed by Distribution of Losers

back



Step III: The Number of Recruiting Employers per Market

back

- Assume: # markets B_s in state is prop. to empl. N_{sy}:

$$\beta = \frac{N_{sy}}{B_{sy}}$$

- It follows that the number of firms per market m_{sy} is:

$$m_{sy} = \frac{M_{sy}}{B_{sy}} = \frac{\beta}{fsize_{sy}}$$

- We first run steps I-II at state-year level to get λ_{sy} & λ^e_{sy}.
- We then estimate the parameter β by NLS from:

$$\ln \frac{\lambda^e_{sy}}{\lambda_{sy}} = \ln\left(1 - \frac{fsize_{sy}}{\beta}\right) + \alpha_s + \alpha_y + \varepsilon_{sy}$$

Step III: The Number of Recruiting Employers per Market

back

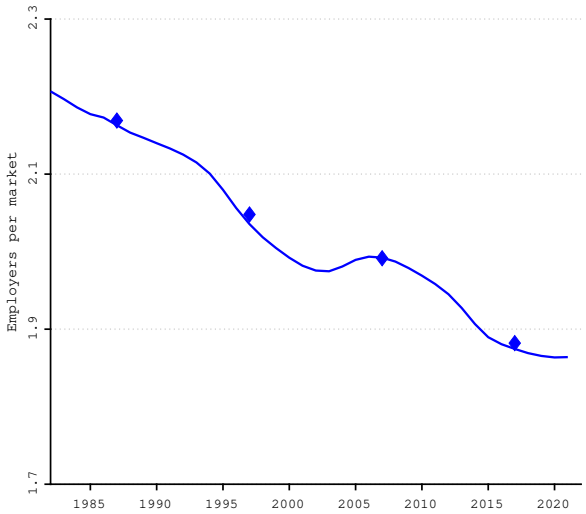
	(1)	(2)	(3)	(4)	(5)	(6)
β	43.454	34.133	63.754	39.185	38.834	39.143
	(5.255)	(2.050)	(17.543)	(7.510)	(9.526)	(7.186)
Trend						-0.000
						(0.000)
$\overline{\delta}$	-1.138	-0.187	-2.016	-2.224		-0.000
	(0.056)	(0.123)	(0.057)	(0.059)		(0.000)
λ	1.750	-8.416	-0.612	-0.227		-2.226
	(0.080)	(0.459)	(0.111)	(0.129)		(0.059)
Year FE	no	no	yes	yes	yes	yes
State FE	no	yes	no	yes	yes	yes
Obs.	2,000	2,000	2,000	2,000	2,000	2,000

Based on β, construct # recruiting employers at national level:

$$m_y = \frac{\beta}{fsize_y}$$

Step III: The Number of Recruiting Employers per Market

back



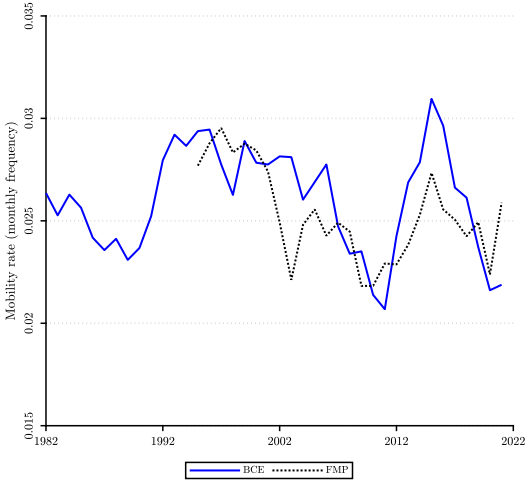
Validation: Our estimates vs. FMP

back

We compare our estimates of job mobility with that of Fujita, Moscarini & Postel-Vinay (FMP).

- Results based on year-by-year model estimation, smoothed using a five-year centered moving average
- Estimates closely align with FMP

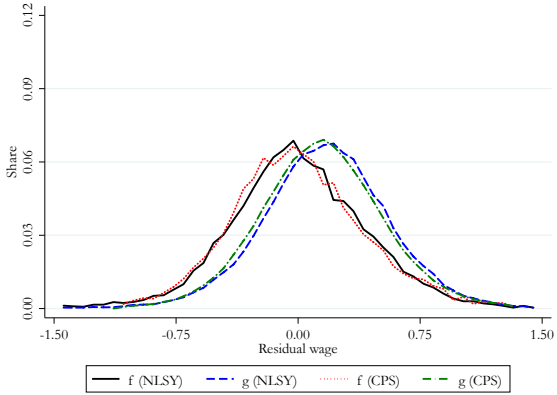
Our estimates of job-to-job mobility and that of FMP



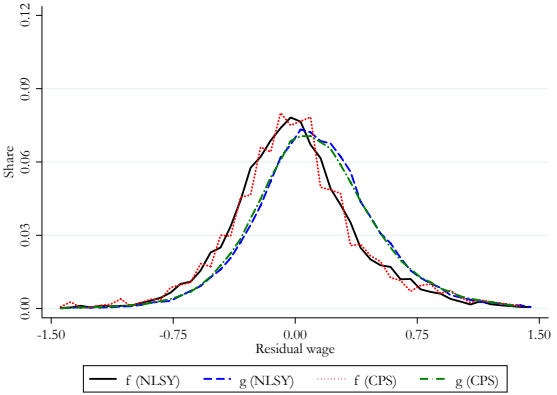
NLSY: Validation of wage distributions vs. CPS

back

Wage and offer distributions for 1980s cohort



Wage and offer distributions for 2000s cohort

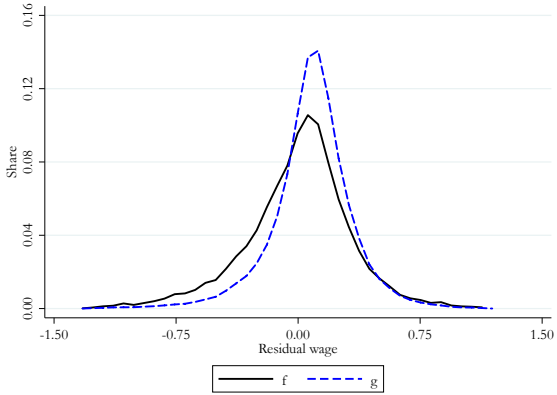


CPS and NLSY wage and offer distributions are close together for both cohorts.

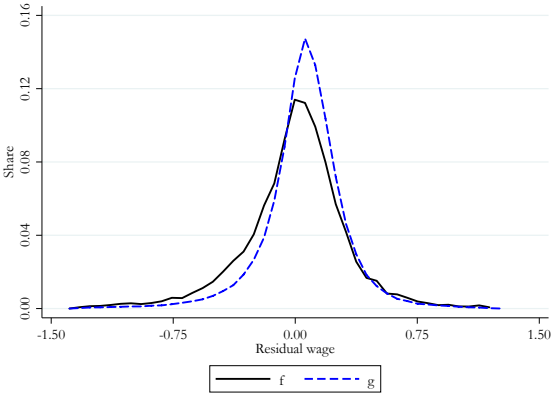
NLSY: Wage and offer distributions within individuals

back

1980s cohort



2000s cohort



Individual FE reduce wage dispersion, consistent w/ unobservable differences in earnings ability.

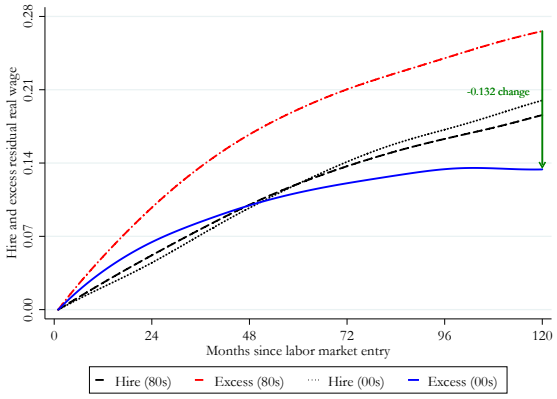
NLSY: Wage growth

back

We compare wage growth in the two NLSY surveys: an 1980s versus a 2000s cohort.

- Wages of hires from non-employment grew similarly across cohorts
- Excess wage growth relative to hires of the same age was 13 log points lower for the 2000s cohort compared to the 1980s cohort

Wages of hires and all workers rel. to hires



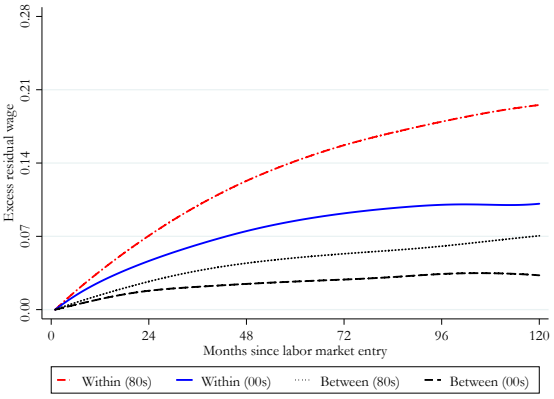
NLSY: Slower wage growth across occupations

back

Wage growth towards higher-paying occupations accounts for the majority of excess wage growth.

- 2000s cohort shows slower wage growth moving toward higher paying occupations than their earlier peers

Between and within occupation relative wage growth



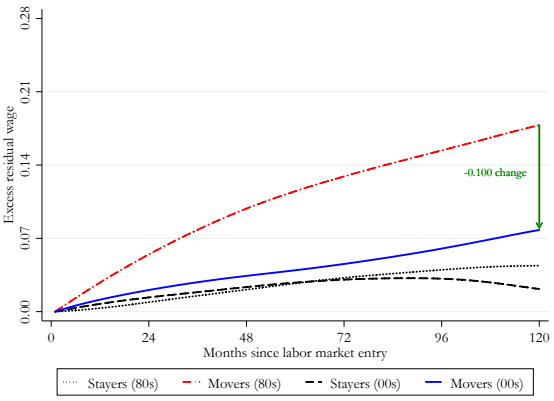
NLSY: Wage growth and job-to-job mobility

back

Decompose excess wage growth within occupation in contributions of stayers and job-to-job movers.

- Most of the change in excess wage growth between the 1980s and 2000s cohort is associated with job-to-job mobility

Decomposition of within-occupation wage growth

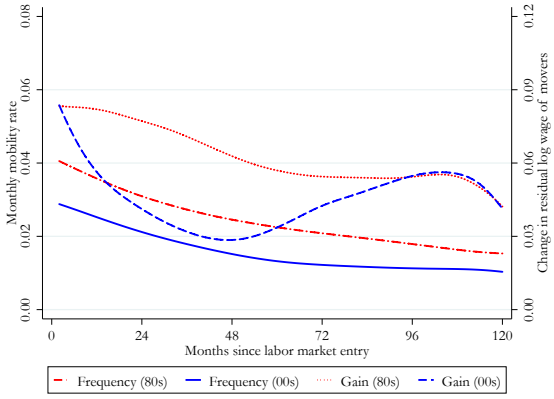


NLSY: Extensive and intensive margin of job-to-job wage growth

back

The frequency of moves and the excess wage gains associated with a move have both declined across the two cohorts.

Decomposition of wage growth of JJ movers



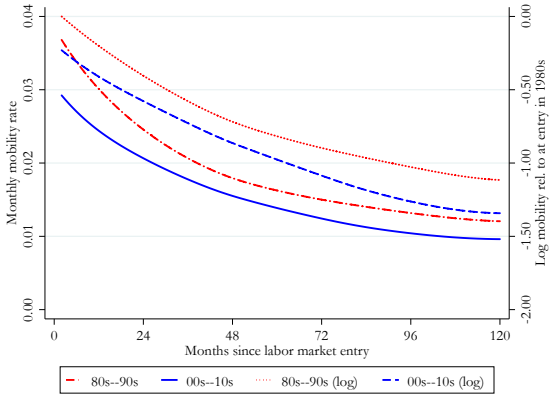
NLSY: Lower mobility not due to better matches

back

Lower job-to-job mobility could be a result of *better initial matches* (cf. Mercan, 2017; Pries and Rogerson, 2022).

- Better initial matches would be reflected in relatively lower EN rates at the start of workers' careers, which we do not find evidence for

The EN transition rate



NLSY: Counterfactual

back

Run accounting exercise to quantify the impact of changes in the (i) frequency in and (ii) wage gain from job-to-job mobility on excess wage growth over first 10 years of career.

- With 1980s job-to-job mobility frequency: + 3 log-points wage growth
- With 1980s wage change upon move: + 3 log-points wage growth
- With both 1980s frequency and wage change upon move: + 10 log-points wage growth

Accounting exercise