Labor Market Recoveries Across the Wealth Distribution

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EEA

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The views expressed are my own and do not necessarily reflect those of the OFR or the Department of Treasury.

Motivation

1. Different workers experience different labor market outcomes over the cycle
   * well-documented for *standard* controls such as race, sex, education, age, industry

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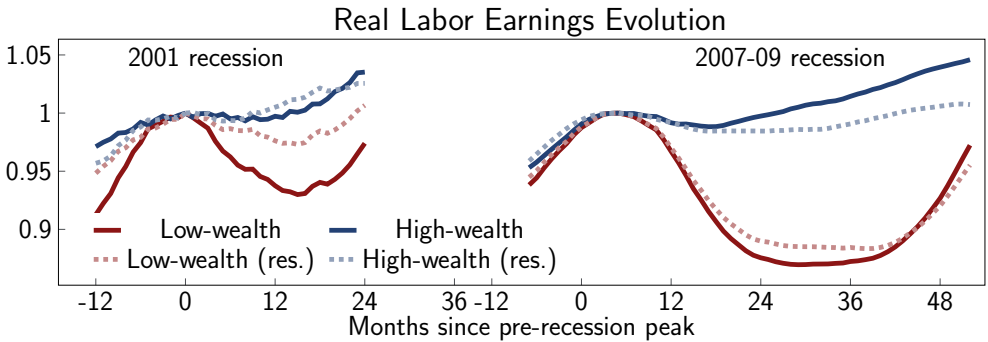
2. Even accounting for these, there persist large differences by wealth
   - Fact 1: Low-wealth workers' earnings fall more and recover more slowly



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1. Different workers experience different labor market outcomes over the cycle
   * well-documented for *standard* controls such as race, sex, education, age, industry
2. Even accounting for these, there persist large differences by wealth
   * Facts 2 & 3: EE and EU rates more volatile for low-wealth workers

EE falls and EU rises by more in recession for low-wealth

	Standard Deviation of cyclical component		
	all workers	low wealth	high wealth
UE (job-finding)	5.54	5.04	6.06
EE (job-switching)	0.99	1.20	0.81
EU (job-losing)	1.49	1.81	1.21

► Full table ► Residualized

This Paper

- Build a model to account for these facts by integrating three key ingredients

  (1) risk aversion (2) incomplete markets (3) risky job-switches

  * job-loss prob. decreasing in tenure $\Rightarrow$ switching jobs implies higher job-loss prob.

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- Two forces rationalize worse labor market outcomes for low-wealth workers

  * Precautionary Job-Keeping Motive (causal)

    $\rightarrow$ low-wealth workers don't switch jobs to avoid extra risk of job loss

  * Tenure-Wealth Correlation (selection)

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- Model results (today)

  * accounts for Great Recession earnings gap dynamics by wealth

  * explains atypical strong recovery in job-switching post-Pandemic due to fiscal stim.

Model (in a nutshell)

Model Overview

- Model combines
  - search and matching framework with on-the-job search
  - incomplete markets

  $\rightarrow$ develop *generalized* AOB protocol to accommodate these ingredients
- Risk-averse heterogeneous households: employed or unemployed
  - if employed have tenure j
  - can switch from lower to higher productivity firms
  - switching jobs is risky because probability of job-loss, $\sigma(j)$, declines with tenure j

Employed Worker: Job-Switching Decision

- Worker who receives offer from firm with productivity n' faces

$$\max \left\{ E\left(a, z, w^e_{\text{stay}}\left(a, z, n, n', j\right), n, j+1\right), E\left(a, z, w^e_{\text{switch}}\left(a, z, n, n', j\right), n', 0\right) \right\}$$

  - wages w^e_{stay} and w^e_{switch} are negotiated via generalized AOB (see paper)

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- Key trade-off when moving to higher productivity firm $n' > n$
  - higher wages: $w^e_{\text{switch}}(\cdot) > w^e_{\text{stay}}(\cdot)$
  - lower tenure and lost job stability: $j+1 > 0 \Rightarrow \sigma(j+1) < \sigma(0)$
  - depends on willingness to take on risk which depends on wealth

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  - lower tenure and lost job stability: $j+1 > 0 \Rightarrow \sigma(j+1) < \sigma(0)$
  - decision depends on sensitivity to risk and so wealth plays a key role

- Asset cutoff $a^*(z, n, n', j)$ above switch, below stay

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- Event study determines *incremental* job-loss prob. relative to non-switchers

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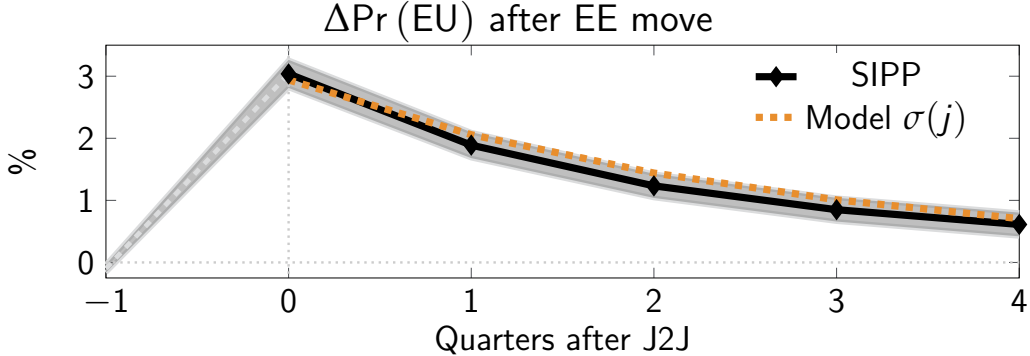
$$\mathbb{1}\left(\mathrm{EU}_{i,t\to t+1}\right) = \sum_{n=-1}^{14} \theta_j D^j_{i,t} + \underbrace{\alpha_i}_{i\text{-FE}} + \underbrace{\beta_t}_{t\text{-FE}} + \Gamma X_{i,t} + \epsilon_{i,t}$$

where $D^j_{i,t} := \begin{cases} 1 & \text{if at } t-j\text{, worker } i \text{ switched jobs} \\ 0 & \text{otherwise} \end{cases}$

Job-Switching Risk

- Job-loss probability increases in the months following a J2J move



- Cumulative $\sim$ 7 p.p. increase in the avg. prob. of job-loss (18% to 25%)

► All Changes ► Low Wealth ► Low Wealth × Wage Growth

Precautionary Job-Keeping at Work

Low-Wealth Workers' *Lower* Job-Switching Rates

Precautionary job-keeping explains lower job-switching for low-wealth workers

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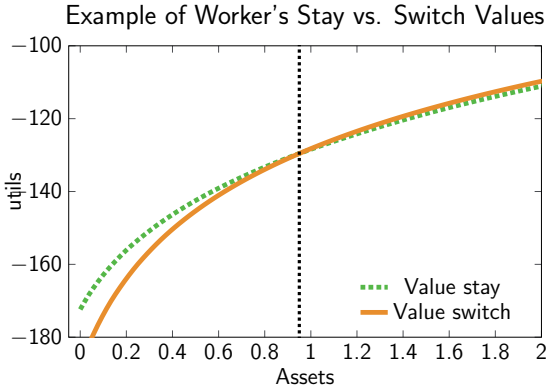
Precautionary job-keeping explains lower job-switching for low-wealth workers

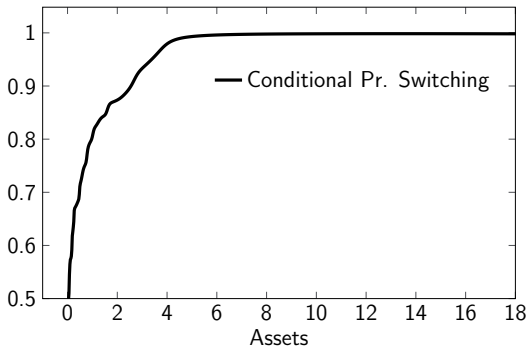
- It implies asset cutoff for switching job keeping states and amenities fixed



Low-Wealth Workers' *Lower* Job-Switching Rates

Precautionary job-keeping explains lower job-switching for low-wealth workers

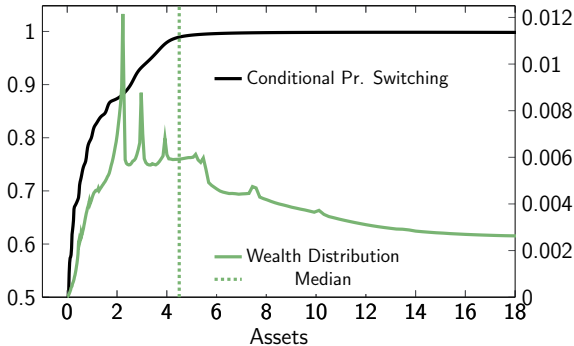
- Aggregating over workers leads to a prob. of switching jobs increasing in assets



Low-Wealth Workers' *Lower* Job-Switching Rates

Precautionary job-keeping explains lower job-switching for low-wealth workers

- In SS, low-wealth workers face steeper probability of job-switching



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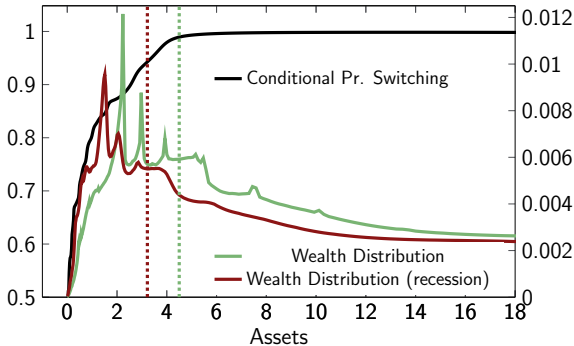


- In recessions wealth falls and job-switching falls more for low-wealth workers

Precautionary Job-Keeping: Model vs. Data

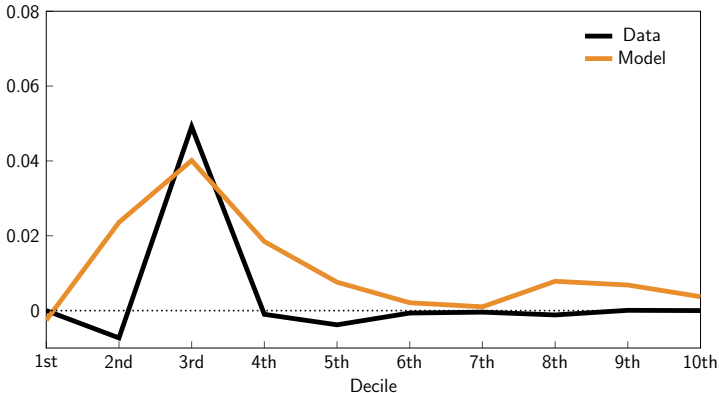
- Use SIPP and model to run (X: age, tenure, industry, educ., race, married, num. kids)

Precautionary Job-Keeping: Model vs. Data

- Use SIPP and model to run (X: age, tenure, industry, educ., race, married, num. kids)

$$\mathbb{1}\left(\text{EE}_{i,t}\right) = \beta_0 + \boldsymbol{\beta_1}\frac{\text{Wealth}_{i,t}}{\text{Income}_{i,t}} + \vec{\gamma}X_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t}$$

Sensitivity of job-switching to wealth/income ratio (β_1)



Precautionary Job-Keeping: Model vs. Data

- Condition on incumbent/poacher, β-het. $\rightarrow$ filters out selection effects

  (1) down-ward sloping (2) extra year-worth of income $\uparrow$ prob. of switching by 7p.p.

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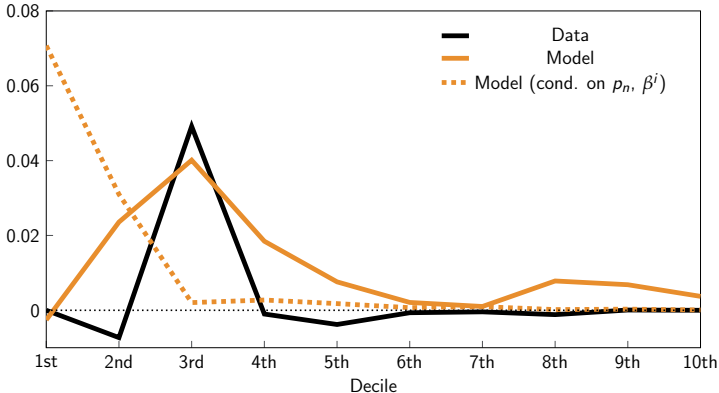

Results

Quantitative Results

Fit to Untargeted Moments

- Great Recession ▶ Unequal Great Recession
  - account for 40% of earnings gap between low- and high-wealth workers

Counterfactual Exercise

- Pandemic Recession ▶ Great Reallocation
  - rationalize strong job-switching rate post-Pandemic

Unequal Recovery from the Great Recession

- Low-wealth workers suffered larger earnings losses than high-wealth workers

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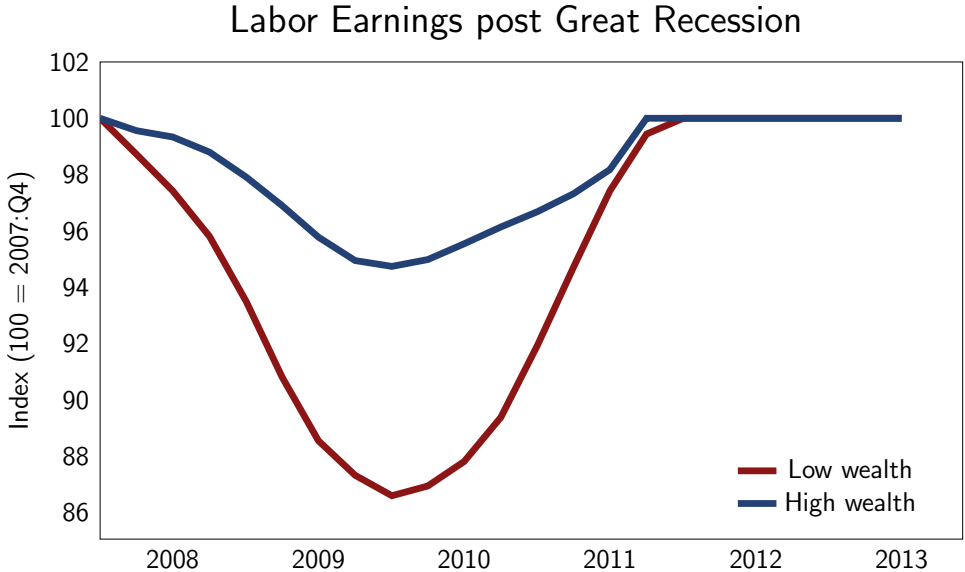
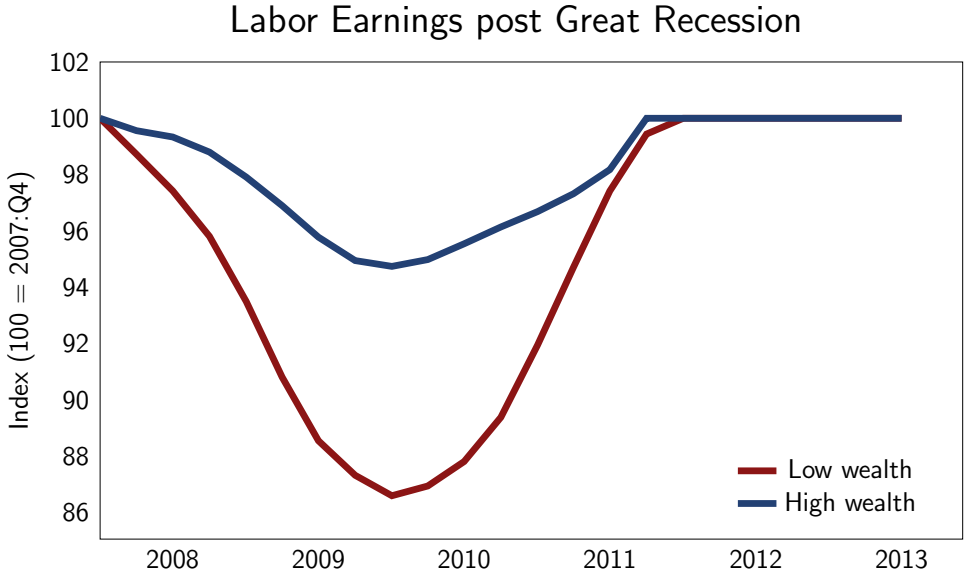


Unequal Recovery from the Great Recession

- Low-wealth workers suffered larger earnings losses than high-wealth workers

- What does the model imply for earnings dynamics?
  - shock Z_t and σ_t to match output and unemployment in GR ▸ Targets ▸ Wealth
  - compute (untargeted) earnings response for low- and high-wealth workers

Unequal Recovery from the Great Recession



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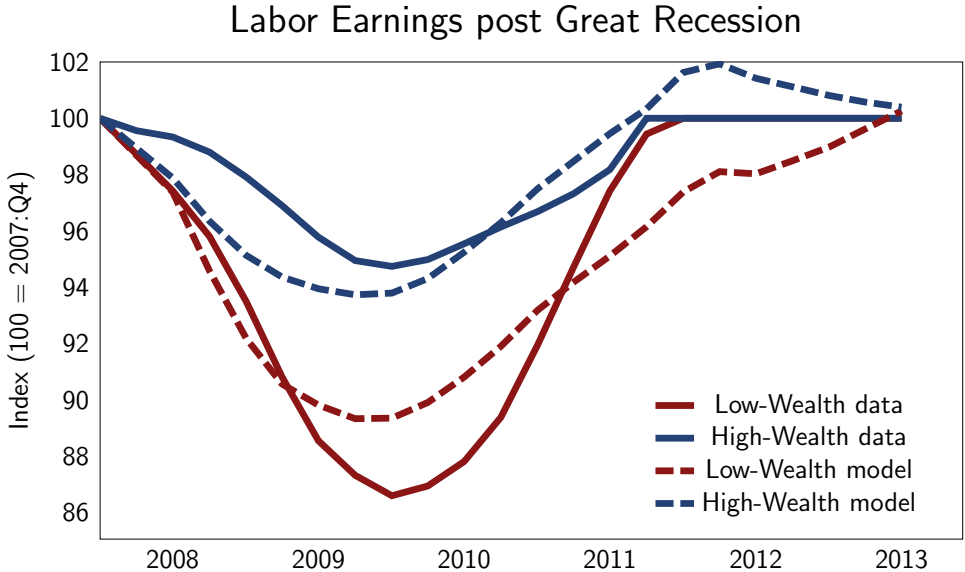

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- How much of earnings gap can the model explain?

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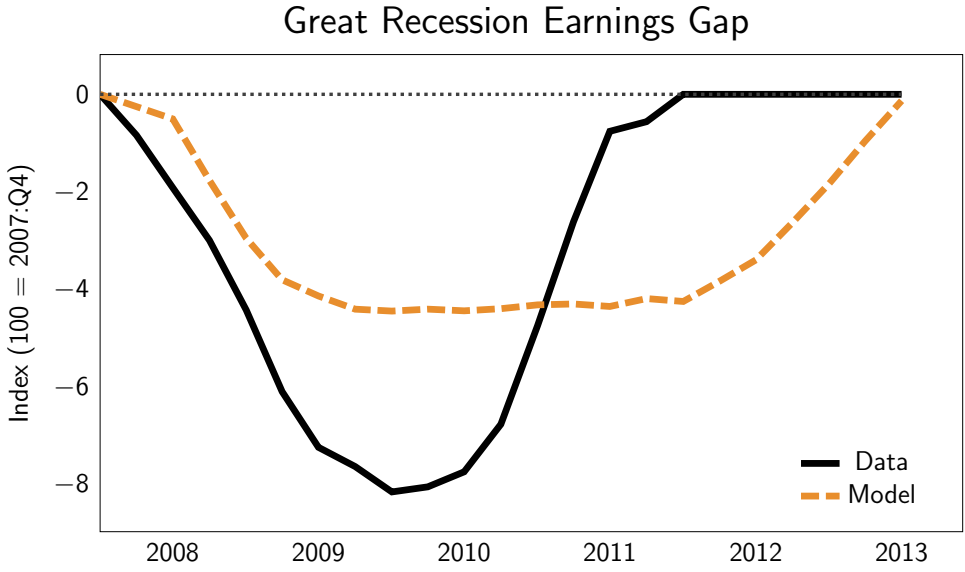

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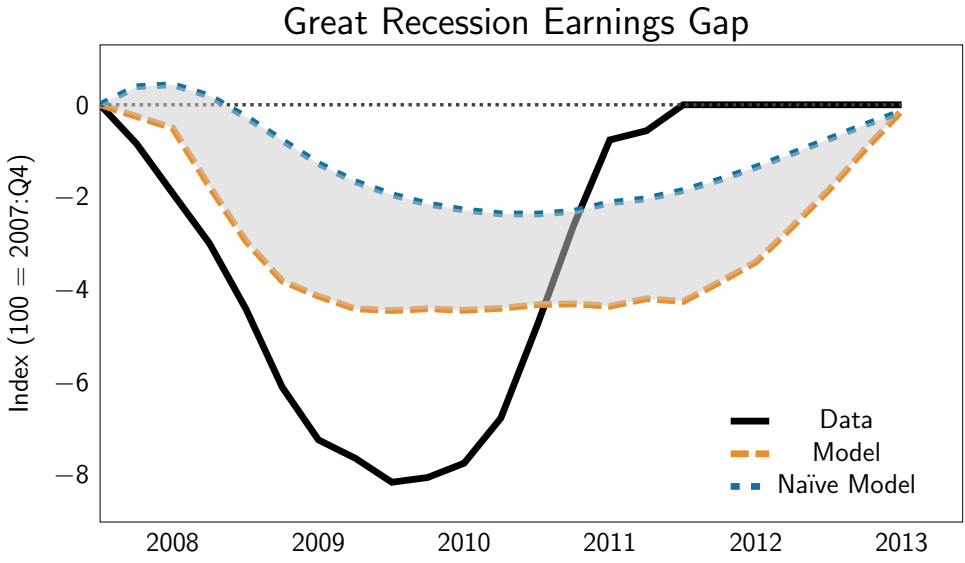
- What does the model imply?
  - shock Z_t and σ_t to match output and unemployment in GR
  - compute earnings response for low- and high-wealth workers
- How much of earnings gap can my model explain?
  - compare to naïve model with constant job-loss prob. to match unemp. level
  - next: benchmark model explains extra 40% of earnings gap relative to naïve

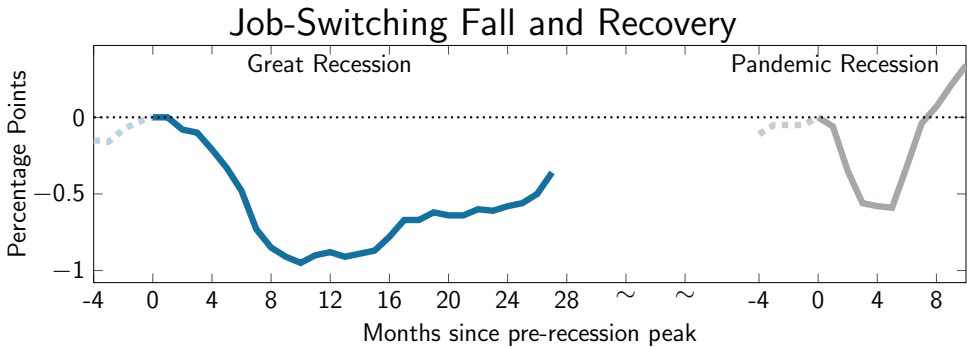
Unequal Recovery from the Great Recession

[Next: Pandemic]



Job-Switching: Great vs. Pandemic Recession

- Model not tailored to Pandemic but helps understand behavior of job-switching
  - Great Recession: deep fall and slow recovery
  - Pandemic Recession: mild fall and quick recovery (Great Reallocation)



Post-Pandemic Great Reallocation

Can fiscal stimulus account for atypical job-switching post-Pandemic?

- I simulate an economy in which I introduce
  - extra UI (2.7% of GDP)
  - govt. checks (3.9% of GDP)
  - job-loss shock to match empirical EE rate

  $\Rightarrow$ workers' wealth increased! ▸ Wealth

- Then contrast its implications to that of an economy without fiscal stimulus

Q: How would have job-switching behaved absent stimulus?

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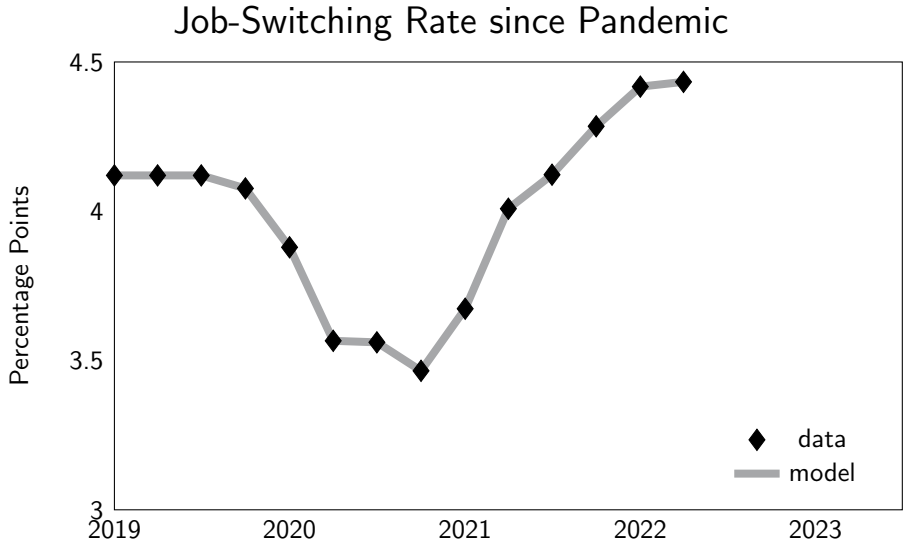

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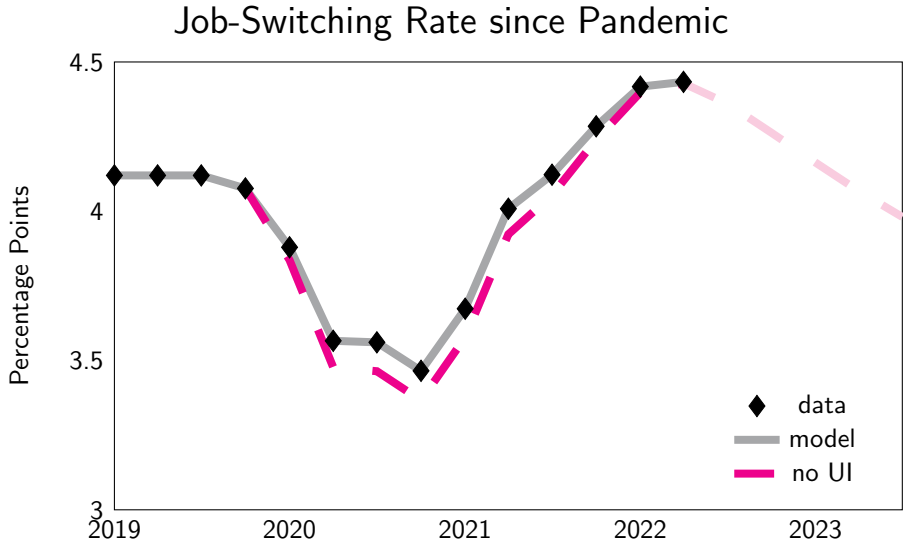

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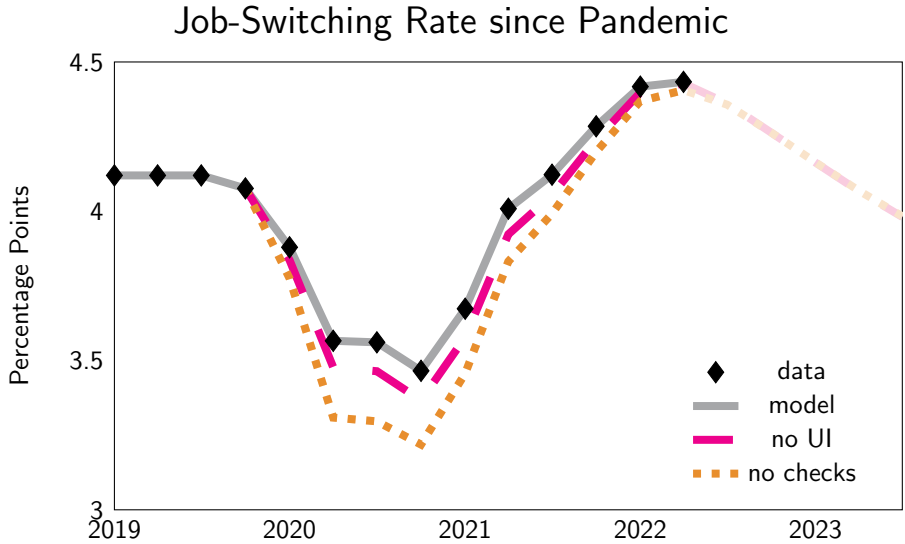

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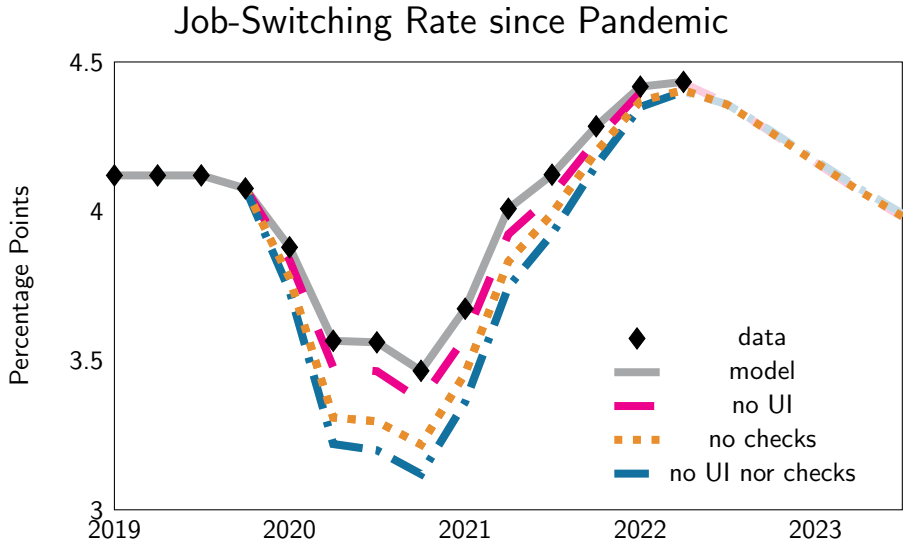

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* Then contrast its implications to that of an economy without fiscal stimulus

Q: How would have job-switching behaved absent stimulus?

$\Rightarrow$ Fiscal stimulus alleviated precautionary job-keeping

  * fiscal stimulus supported EE recovery by encouraging job-switching

Conclusion

- Study cyclical labor market outcomes across the wealth distribution
- Build an equilibrium model of the labor market with
  - risk-aversion
  - incomplete markets and asset accumulation
  - job-loss probability is decreasing in tenure
- Give rise to precautionary job-keeping and tenure-wealth correlation which help
  - explain 40% of earnings gap dynamics by wealth following Great Recession
  - account for post-Pandemic Great Reallocation

Appendix

SIPP Dataset

- use SIPP waves from 1996 to 2013
- panel varies from a few to 40 months, median 22
- contains rich labor market information
  - weekly frequency
  - job ID (allows to track job-switches)
- contains detailed information on financial wealth
  - only certain waves of survey collect financial data
  - I use closest reported wealth data
- sample:
  - 15-55 years old (non-dependent)

▶ Back

SIPP Labor Flows

	Mean (%)			Stdv.			Persistence		
	all	low-wealth	high-wealth	all	low-wealth	high-wealth	all	low-wealth	high-wealth
UE	55.68	51.16	61.69	5.54 (0.828)	5.04 (0.764)	6.06 (0.960)	0.9641 (0.041)	0.9637 (0.042)	0.9617 (0.039)
EU	3.64	4.80	2.91	1.49 (0.204)	1.81 (0.188)	1.21 (0.172)	0.8827 (0.073)	0.8790 (0.066)	0.8788 (0.069)
EE	4.12	5.07	3.35	0.99 (0.120)	1.20 (0.171)	0.81 (0.092)	0.9105 (0.089)	0.9128 (0.084)	0.9058 (0.093)
u	5.17	7.21	3.38	1.57 (0.352)	2.45 (0.572)	1.03 (0.186)	0.9468 (0.086)	0.9424 (0.083)	0.9499 (0.075)

▶ Back

Moments Detail

- bootstrap SE Politis and Romano '94
- residualized by age, sex, race, education, work class, industry
- differences hold for EU and EE

	Standard Deviation of cyclical component		
	all	low wealth	high wealth
UE	5.11	4.70	5.71
	(0.807)	(0.791)	(0.916)
EU	1.23	1.41	1.09
	(0.094)	(0.162)	(0.077)
EE	0.46	0.78	0.34
	(0.081)	(0.19)	(0.0.041)

▶ Back

Job-Loss Decreasing in Tenure: Microfoundation

- Job-loss probability $\sigma(j)$ decreases with tenure j
- Firm and worker learn about idiosyncratic match quality (Jovanovic 1979)
  - high quality (H) with prob. π^H, low quality (L) with prob. $1-\pi^H$
- Tenure $j < J$: firm learns worker potential
  - firm receives a signal of worker potential
    - with prob. α^L low-potential type is revealed $\rightarrow$ worker laid off
    - with prob. $1-\alpha^L$ signal is uninformative $\rightarrow$ job-loss prob. is σ
  - lay-off probability is $\sigma(j) = \left(1-\pi^H\right)\left(1-\alpha^L\right)^j \alpha^L + \sigma$
- Tenure $j \geq J$: true quality is revealed and job-loss probability is σ

▶ Back

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▶ Back

Firms: Active

- Value of active firms matched to worker $x \equiv (a, z, w, j)$ is

$$J(x;n) = \underbrace{y_n - r^K k - w}_{\text{flow profits } \pi} + \frac{1}{1+r}\mathbb{E}\Bigg[(1-\sigma(j))\, s \sum_{n'} g(n'|n)\lambda_{n'} \underbrace{J^{ee}(x';n,n')}_{\text{outside offer}}$$
$$+ (1-\sigma(j)) \left(1 - s\sum_{n'} g(n'|n)\lambda_{n'}\right) \underbrace{J(x';n)}_{\text{no outside offer}} + \sigma(j) \underbrace{V(n)}_{\text{match ends}} \Bigg]$$

where firms rent capital at r^K, $k = p_n \cdot z$, and $V(n)$ is the value of a vacancy

- $J^{ee}(\cdot)$ firm value when worker receives outsider offered from firm n'

$$J^{ee}(\cdot) = \begin{cases} V(n), & \text{if worker switches} \\ J\left(a', z', w^e_{\text{stay}}(x';n,n'), n, j+1\right), & \text{if worker stays} \end{cases}$$

► Back

Firms: Vacant

- Posts one vacancy today at cost $\kappa \cdot p_n$, fills it tomorrow with prob. q_n

$$V(n) = -\kappa p_n + \frac{1}{1+r}\left[(1-q_n)\,V(n) + q_n J_0(n)\right]$$

- $J_0(n)$ is the expected value when meeting a worker

$$\begin{aligned} J_0(n) &= \int_{x^u} g(n|0)\, J^0\left(x^u, w^u\left(x^u; n\right)\right) d\Psi^u\left(x^u\right) \\ &+ \int_{x^e} \sum_{n'>0} g(n|n') \Big[\underbrace{\varphi\left(x^e, n'\right)}_{\text{pr. of poaching}} J^0\left(x^e, w^e_{\text{switch}}\left(x^e, n'\right)\right) + \left(1-\varphi\left(x^e, n'\right)\right) V(n) \Big] d\Psi^e\left(x^e\right) \end{aligned}$$

where $x^u \equiv (a, z)$, $x^e \equiv (a, z, n, j)$ and $\Psi^u\left(x^u\right), \Psi^e\left(x^e\right)$ are distributions over x^u, x^e

- $J^0(\cdot)$ same as $J(\cdot)$ but without immediate possibility of switching

▶ Back

Rest of Model: Detail

- Dividends aggregated across firms net of vacancy costs

$$\Pi = \sum_{n=1}^{N} \int_{x^e} \left[p_n z(x^e) \left(y_n - r^K k\left(x^e\right) \right) - w(x^e) \right] d\Psi\left(x^e\right) - \kappa \sum_{n=1}^{N} v_n p_n$$

- Risk-neutral Capitalists rent capital and maximize firm equity s.t. adj. costs

$$p\left(K'\right) = \max_{K} \Pi + r^K K - \left[K' - (1-\delta) K + \frac{1}{2\delta\epsilon_I} \left(\frac{K'-K}{K} \right)^2 K \right] + \frac{1}{1+r} p\left(K\right)$$

where $\delta \equiv$ depreciation rate, $\epsilon_I \equiv$ elasticity of investment to Tobin's q

- Government transfers resources across agents and balanced budget

$$\tau \int_{x^e} w(x^e)\, d\Psi\left(x^e\right) = b \int_{x^u} d\Psi\left(x^u\right) + T$$

$x^u \equiv (a, z)$ and $x^e \equiv (a, z, n, j)$, conditional on unemp. and employment

► Back

Equilibrium

Set of values $\left\{U, E, E^u, E^e, V, J, J^{ee}, J^0\right\}$, policies $\left\{c^U, c^E, a^U, a^E, \varphi\right\}$, prices $\left\{r, r^K, w^u\left(\cdot\right), w^e\left(\cdot\right)\right\}$, and labor market tightnesses $\left\{\theta_n\right\}$ such that

- Agents, firms, capitalist maximize objectives + govt. balances budget
- Asset market clears $\int_{x^u} a^U\left(x^u\right) d\Psi^u + \int_{x^e} a^E\left(x^e\right) d\Psi^e = p(K)$
- Labor market clears $\sum_{n=1}^{N} \int z \cdot p_n \, di_k^E = L$
- Free entry holds at each rung $V\left(n\right) = 0 \iff q\left(\theta_n\right) = \left(1 + r\right)\frac{\kappa p_n}{J_0(n)}$

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Bargaining with the Unemployed

Players: worker and firm of type n

Procedure: alternating offer bargaining over $m \in \{1, \ldots M\}$ sub-periods (M odd)

- offers and decisions are made simultaneously
- firms make offers at odd m (start and finish), worker at even m

Contract: signed at m consist of wage w_m^n

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Contract: signed at m consist of wage w_m^n

Logic: if worker and firm sign contract at m

- firm and worker earn profits and wages only from subperiod m on
- if $M = 3$ months, contract signed in month 2 firm only gets 2 months of output
- firm impatient because loses output by postponing signing of contract (pie shrinks)

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Job-Switching Risk: Low-Wealth Only

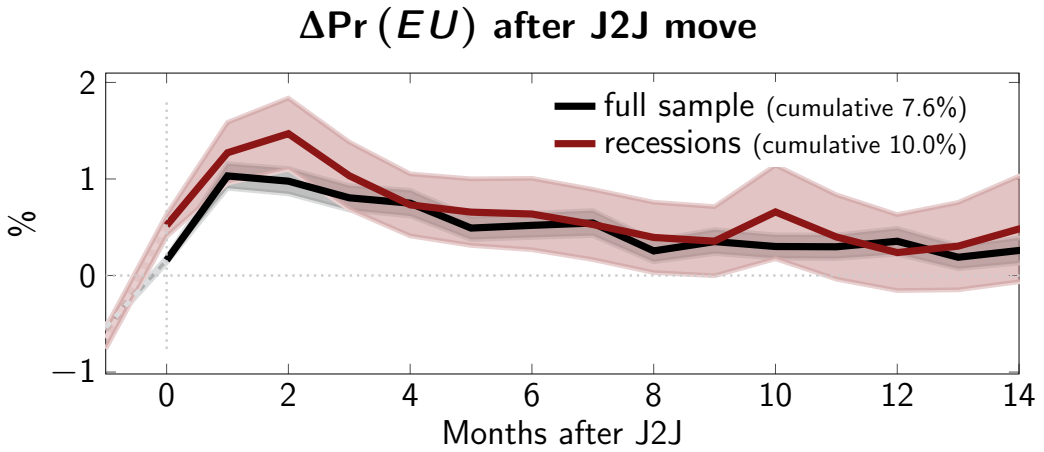

Figure: Change in probability of separation into unemployment after a J2J transitions for workers with low net worth (bottom half of US distribution). Estimated using SIPP, following Davis and von Wachter (2011).

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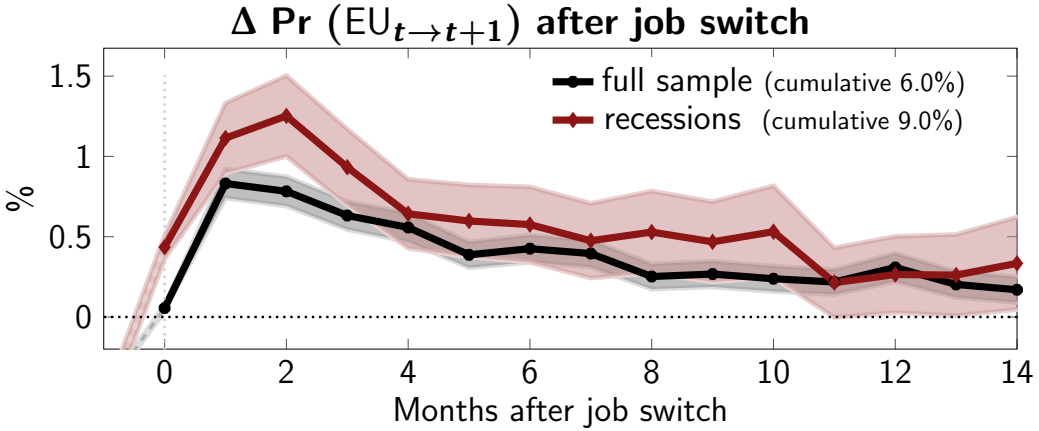
Job-Switching Risk: All Wage Changes



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Job-Switching Risk: Low-Wealth Only × Wage Increases

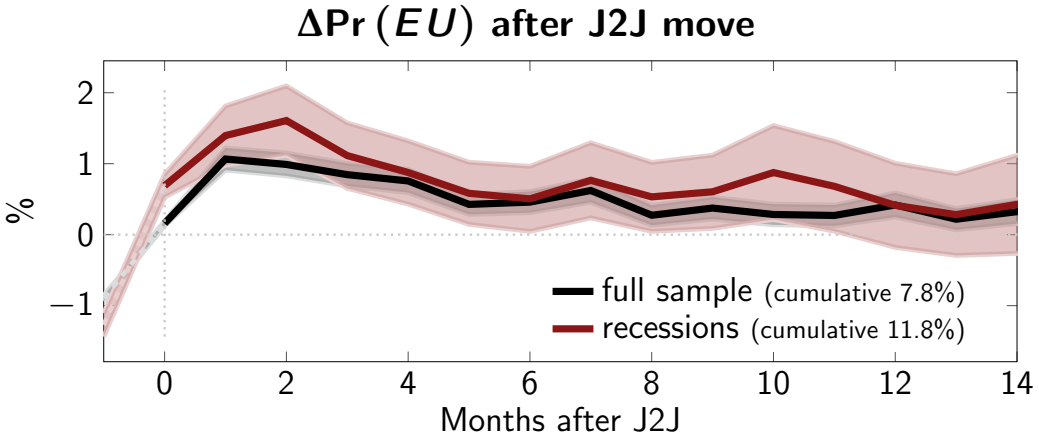

Figure: Change in probability of separation into unemployment after a J2J transitions. Estimated using SIPP, following Davis and von Wachter (2011).

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Calibration Details

Wealth Share Owned (%)

Quintile	Q1	Q2	Q3	Q4	Q5
Model	1.92	5.06	8.80	18.13	66.09
Data	-1.04	0.68	6.85	18.21	75.30

- Use β's to match wealth Lorenz curve

- Rungs $\{p_n\}_k$ help match income distribution with $K = 8$
- $\log(\epsilon) \in \{-0.64, 0.64\}$ with prob. of persisting in state equal to 0.85
- elasticity I to q $\epsilon_I = 4$ Auclert et al. 2021

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External Validation: Job-Switching and Wealth

- Can model match key untargeted moments related to job-switching and wealth?
- Use SIPP and model to compute β_1: sensitivity of job-switching to wealth

$$\mathbb{1}\left(\text{EE}_{i,t\to t+1}\right) = \beta_0 + \boldsymbol{\beta_1}\frac{\text{Wealth}_{i,t}}{\text{Income}_{i,t}} + \Gamma X_{i,t} + \delta_t + u_{i,t}$$

$X_{i,t}$: controls for age, tenure, work type, education and δ_t : time FE

- Compute β_1 for low- and high-wealth separately
- Higher job-switching sensitivity for low-wealth

	Data	Model
low-wealth	0.900	0.926
high-wealth	0.0006	0.1650

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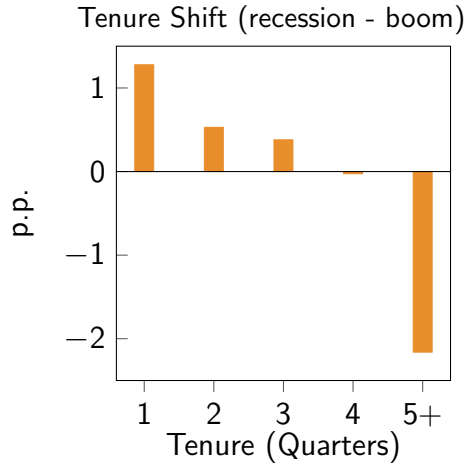
Tenure Reshuffling

- In recessions workers move from high- to low-tenure jobs

- Difference between tenure distribution in recession periods and non-recessions periods

- In recessions there are more low-tenure jobs



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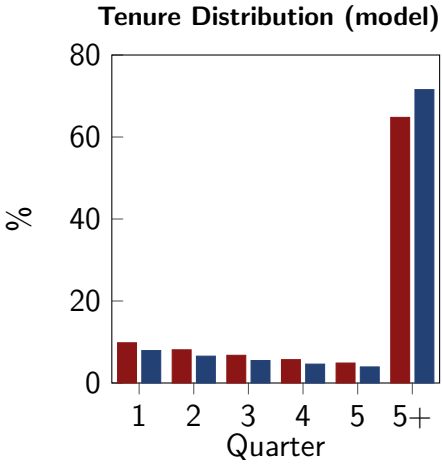
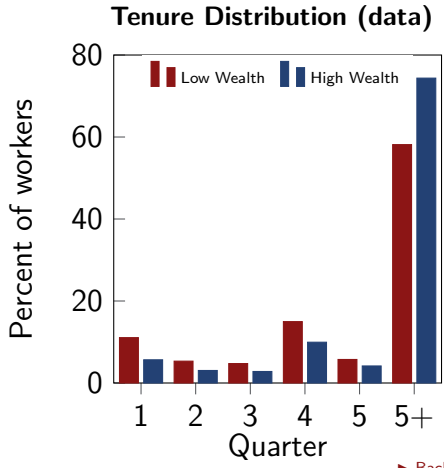
Tenure Distribution in SS

- This implies low wealth workers tend to have low-tenure ($\leftrightarrow$ high separation)





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Cyclical Moments

▶ Back

- Can model account for differences in job-switching and job-losing by wealth?
- Let productivity and common job-loss probability be stochastic

$$\begin{aligned} \sigma_t - \sigma^* &= \rho_\sigma \left[\sigma_{t-1} - \sigma^*\right] + \epsilon_t^\sigma \\ \log(Z_t) - \log(Z^*) &= \rho_Z \left[\log(Z_{t-1}) - \log(Z^*)\right] + \epsilon_t^Z \\ \text{s.t.} \quad & \begin{pmatrix} \epsilon_t^\sigma \\ \epsilon_t^Z \end{pmatrix} \sim \mathcal{N}\left(\vec{0}, \Sigma = \begin{pmatrix} \sigma_\sigma^2 & \sigma_{\sigma,Z} \\ \sigma_{\sigma,Z} & \sigma_Z^2 \end{pmatrix}\right) \end{aligned}$$

Next: can model match?

Cyclical Moments

▶ Back

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$$\begin{aligned} \sigma_t - \sigma^* &= \rho_\sigma \left[\sigma_{t-1} - \sigma^*\right] + \epsilon_t^\sigma \\ \log(Z_t) - \log(Z^*) &= \rho_Z \left[\log(Z_{t-1}) - \log(Z^*)\right] + \epsilon_t^Z \\ \text{s.t.} \quad & \begin{pmatrix} \epsilon_t^\sigma \\ \epsilon_t^Z \end{pmatrix} \sim \mathcal{N}\left(\vec{0}, \Sigma = \begin{pmatrix} \sigma_\sigma^2 & \sigma_{\sigma,Z} \\ \sigma_{\sigma,Z} & \sigma_Z^2 \end{pmatrix}\right) \end{aligned}$$

- Estimate $(\rho_\sigma, \rho_Z, \Sigma)$ targeting headline SD and persistence of u, EE, EU

▶ Detail

Next: can model match?

Cyclical Moments

▶ Back

Standard Deviation (by wealth)

	Data		
	all	low	high
EE	0.99	1.20	0.81
EU	1.49	1.81	1.21
u	1.57	2.45	1.03

- Does model match the higher volatility of EE and EU at low wealth?

Cyclical Moments

▶ Back

Standard Deviation (by wealth)

	Data			Model		
	all	low	high	all	low	high
EE	0.99	1.20	0.81	0.87	1.41	0.55
EU	1.49	1.81	1.21	0.86	1.29	0.57
u	1.57	2.45	1.03	1.13	1.21	1.09

- Does model match the higher volatility of EE and EU at low wealth? Yes

Cyclical Moments

► Back

Standard Deviation (by wealth)

	Data			Model		
	all	low	high	all	low	high
EE	0.99	1.20	0.81	0.87	1.41	0.55
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- Does model match the higher volatility of EE and EU at low wealth? Yes
- Can "standard" models match these moments?
  - ∗ compare to naïve model with constant job-loss prob. to match unemp. level

Cyclical Moments

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Standard Deviation (by wealth)

	Data			Model			Naïve Model		
	all	low	high	all	low	high	all	low	high
EE	0.99	1.20	0.81	0.87	1.41	0.55	0.85	0.88	0.82
EU	1.49	1.81	1.21	0.86	1.29	0.57	1.12	1.12	1.12
u	1.57	2.45	1.03	1.13	1.21	1.09	1.35	1.36	1.35

- Does model match the higher volatility of EE and EU at low wealth? Yes
- Can "standard" models match these moments? No
  - ∗ compare to naïve model with constant job-loss prob. to match unemp. level

Next: Great Recession

SMM Details

- minimize distance between model-implied and empirical SD and persistence of headline EE, EU, and u rates

$$\min_{\rho_Z,\rho_\sigma,\Sigma} \quad \left(\frac{SD_{EE}^{data} - SD_{EE}^{model}}{SD_{EE}^{data}}\right)^2 + \left(\frac{SD_{EU}^{data} - SD_{EU}^{model}}{SD_{EU}^{data}}\right)^2 + \left(\frac{SD_{u}^{data} - SD_{u}^{model}}{SD_{u}^{data}}\right)^2$$
$$\left(\frac{\rho_{EE}^{data} - \rho_{EE}^{model}}{\rho_{EE}^{data}}\right)^2 + \left(\frac{\rho_{EU}^{data} - \rho_{EU}^{model}}{\rho_{EU}^{data}}\right)^2 + \left(\frac{\rho_{u}^{data} - \rho_{u}^{model}}{\rho_{u}^{data}}\right)^2$$

- $\rho_Z = 0.74$, $\rho_\sigma = 0.85$
- $\sigma_Z = 0.01$, $\sigma_\sigma = 0.16$, $\sigma_{\sigma,Z} = -0.26$

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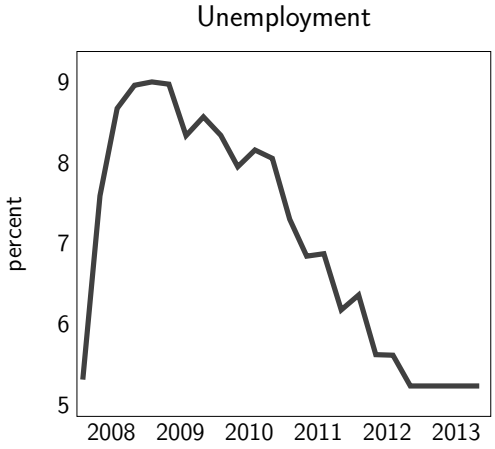
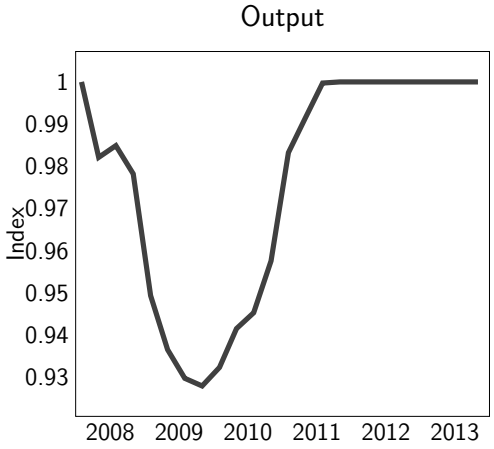
Unequal Recovery from the Great Recession





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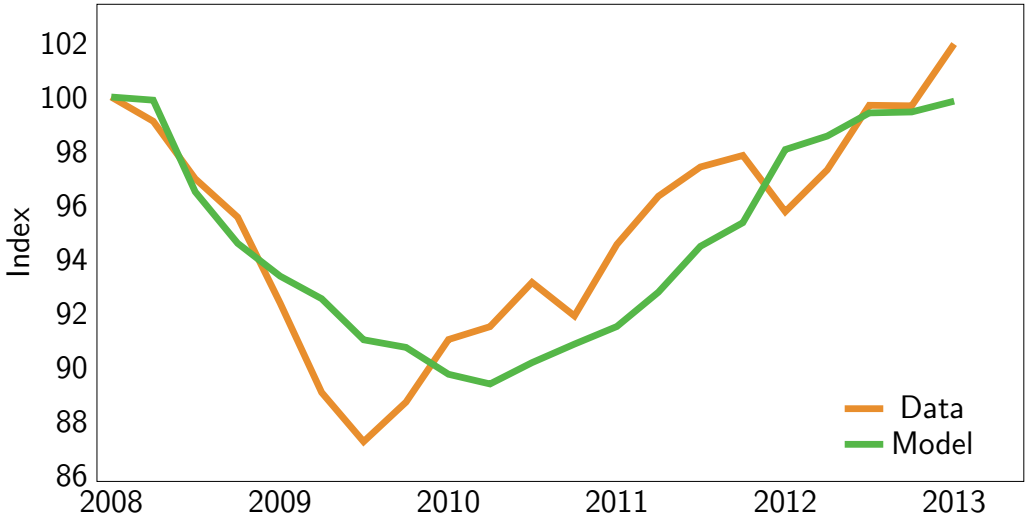
Wealth GR Exercise



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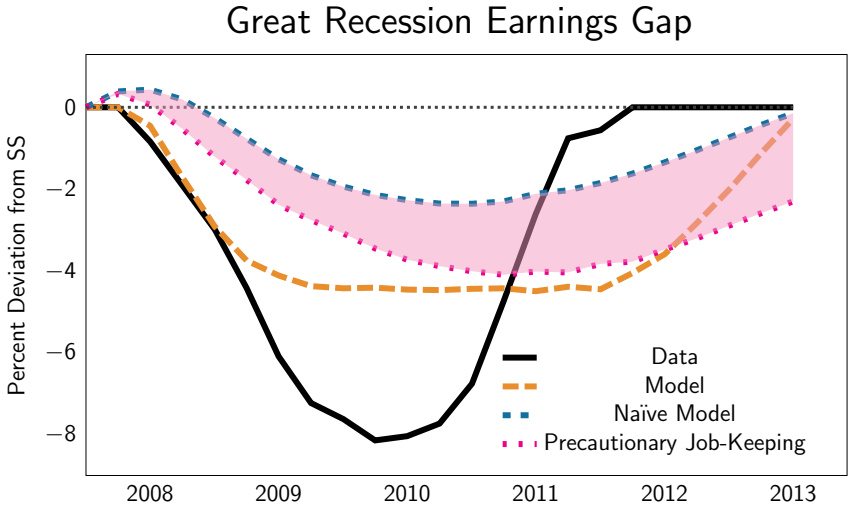
Unequal Recovery: Decomposition



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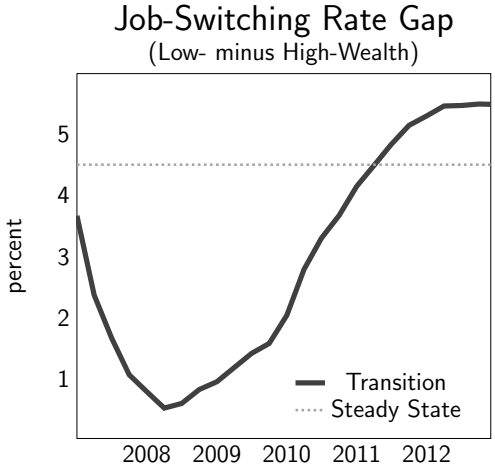
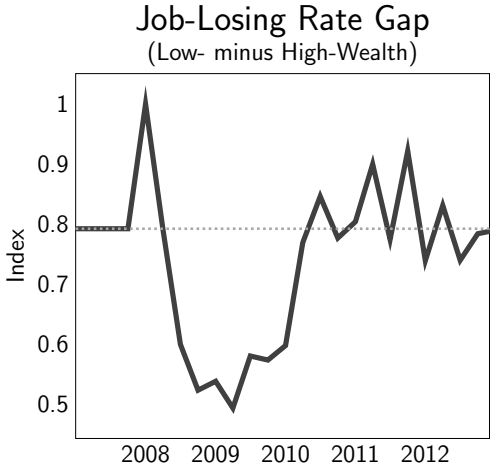
EE and EU Rate in Exercise





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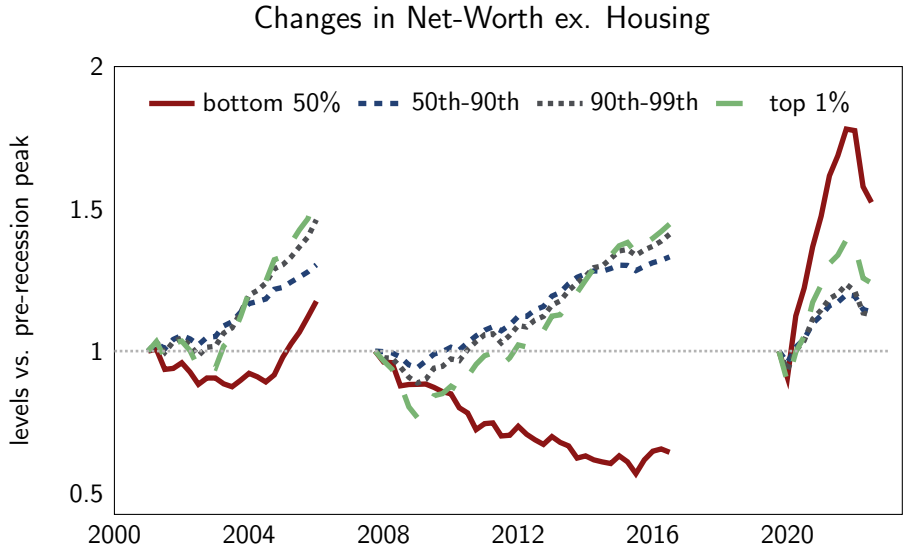
Wealth post-Recessions



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