Self-Insurance in Turbulent Labor Markets

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Motivation

- Job loss has **long-lasting negative effects on wages ("scarring")**
  Jacobson, LaLonde, and Sullivan (93), Davis and von Wachter (11), Jarosch (21)
  - Especially for workers that **switch occupation**
    Kamburov Manovskii (02, 08, 09), Fujita (18), Huckfeldt (22), Postel-Vinay and Sepahsalari (23)
  - **Persistent skill loss ("turbulence")**
    Ljungqvist and Sargent (98, 07, 08), Jung and Kuhn (2019), Baley, Figueiredo, Ulbricht (22)

- How do workers **insure against turbulence risk**?
  - **Micro** — **role of savings** for cost of job loss
  - **Macro** — link between turbulence and **wealth inequality**
  - **Policy** — effects of **technological/climate change**

What do we do

1. **New evidence on consequences of job loss**
   - Unemployment duration and reemployment wages
   - Joint role of **liquid wealth** and **occupational tenure**
   - Scarring effects driven by **poor occupational switchers**

2. **Macro-labor framework disciplined with micro-data**
   - (I) **Risk averse workers** that smooth consumption
   - (II) **Idiosyncratic risks:** unemployment (transitory) + turbulence (persistent)
   - (III) **Frictions** in financial and labor markets
   - (IV) **Heterogeneous occupations** differ in returns $\times$ risks

What do we do (cont...)

3. **Micro implications:**
   - A novel self-insurance mechanism:

$$\underbrace{\text{precautionary savings}}_{\text{Bewley–Huggett–Aiyagari}} + \underbrace{\text{precautionary job search}}_{\text{Eeckhout and Sepahsalari (22)}} + \underbrace{\text{precautionary occ. mobility}}_{\text{This paper}}$$

4. **Macro implications:**
   - Aggregate effects of turbulence risk depend on its **incidence** (e.g., robots vs. Chat GPT)
   - Key role for **occupational reallocation**

Empirical Evidence

Data and Definitions

- NLSY79, monthly panel 1979-2012
  - labor market history (wages, occupation) + assets + worker characteristics
- Identify EUE' transitions
  - Unemployment duration
  - Wage growth $\Delta w = log(w'/w)$
  - Occupational switch
- Key heterogeneity dimensions:
  - **net liquid assets** (percentiles) Rendón (06), Lise (12), Herkenhoff, Phillips and Cohen-Cole (16)
  - **occupational attachment (3-digit)** Fujita (18)

    untenured: occup. tenure $<$ 2 years
    tranquil: occup. tenure $>$ 2 years $\times$ occ. stayer
    turbulent: occup. tenure $>$ 2 years $\times$ occ. switcher

wealth definition | turbulence shock | turbulence & wealth

Statistics from EUE' transitions

Tenured workers

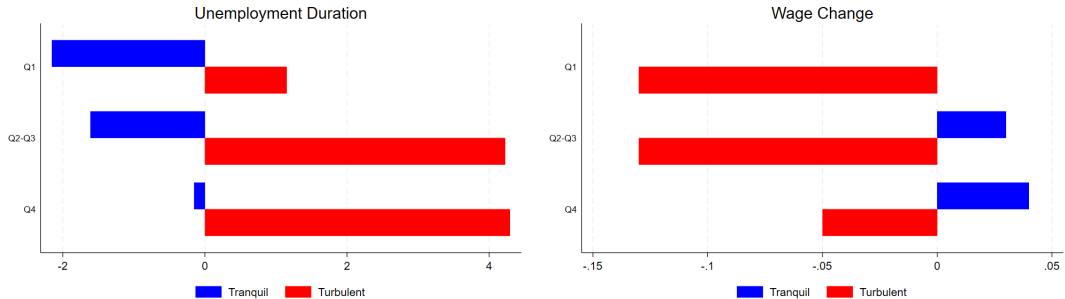
	Tranquil	Turbulent
Transitions		
Observations	7,102	4,212
% of total	62%	38%
Worker characteristics at separation		
Female (%)	57.2	57.7
White (%)	84.7	80.1
College Degree (%)	22.0	19.7
Age (years)	36.6	36.0
Occupational tenure (years)	7.2	5.8
Outcomes at reemployment		
Wage growth	0%	-12%
Unemployment duration	4 months	12 months

Source: NLSY79.

all transitions

Unemployment Duration & Wage Growth

- **Occupational detachment:** longer duration and negative wage growth
- **Wealth:** amplifies duration and wage growth



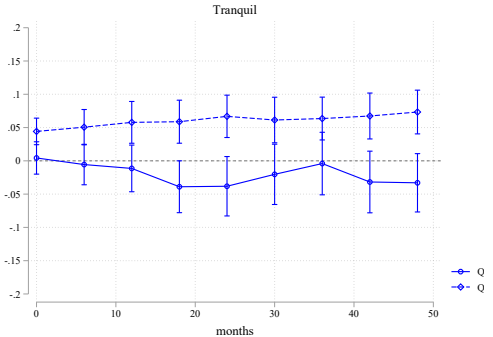
(controls = past wage, age, age^2, gender, race, education, ability, industry, year and month FE)

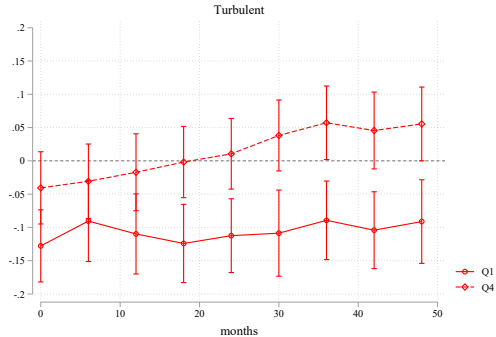
Wage dynamics after reemployment

- Long-term wage scarring concentrated among **turbulent** $\times$ **poor**

$\star$ 4 years after displacement:

  - Wages still 10% below for poor
  - Recovered for the rich





The Model

Demography, Preferences and Technology

- Continuum of ex-ante identical risk-averse workers
  - value consumption $u(c)$, supply labor inelastically
  - fixed interest rate R
  - borrowing constraint $a' \geq \underline{a}$
- Ex-post heterogenous
  - status $s \in \{\text{employed } e, \text{unemployed } u\}$
  - skill/experience $x \in \{\text{low } x_l, \text{high } x_h\}$
  - assets a
- Risk-neutral one-worker firms, produce output $y \cdot x$
- Worker-firm pairs located in two "tiers" $k \in \{A, B\}$
  - *Tier A*: productive jobs y_A, hard to get
  - *Tier B*: unproductive jobs y_B, easy to get

Labor markets and skill dynamics

- Labor markets
  - firms **post vacancies** at cost κ, free entry, zero profits
  - unemployed **direct their search** to tier-skill submarket (k, x)
  - within submarket, **random matching** $p(\theta)$, with $\theta = u/v$
  - **exogenous separations** w/prob λ
- Exogenous skill dynamics
  - **skill gain** $(x_l \uparrow x_h)$ on the job w/prob γ^u
  - **skill loss** $(x_h \downarrow x_l)$ after exogenous separation w/prob γ^d (turbulence)
- Endogenous tier mobility (through unemployment)
  - switching costs $\mathcal{M}_{kk'}$
  - preference shocks $\epsilon_{k'} \sim \textit{Gumbel}$
  - productivity change $(y_A \longleftrightarrow y_B)$

Value functions and dynamics

Discipline with micro data

Tier Definition

- Using O^*Net, we map occupations into underlying **skill factors**
  Guvenen, et.al, (2020); Lise and Postel-Vinay (2020), Baley, Figueiredo, and Ulbricht (2022)
  - Four skills: Math, verbal, technical, and social
- **Occupations** defined by a vector of skill requirements:

$$r = (r_m, r_v, r_t, r_s), \quad \text{with norm} \quad \ell = ||r||$$

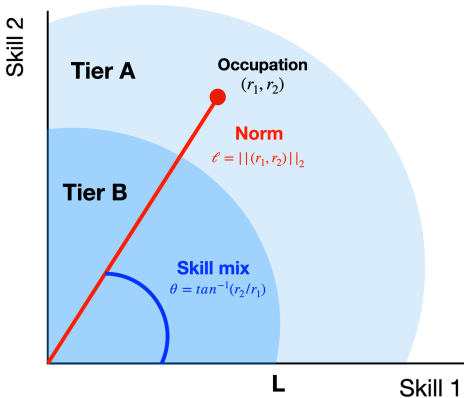
- **Tiers** defined above and below median of norm ℓ distribution

Tier	**Population** (%)	**Avg. Wage** (logs)	**Liquid Wealth** (Real USD, 2000)	**Occup. Tenure** (years)	**Tenured** (%)
A	49.8	7.5	$53,000	7.5	72.5%
B	50.2	7	$25,000	5.8	59.6%

example

Returns and Risks

By tier and tenure



- **Tenure and tier premia** x_l, x_h, y_A, y_B

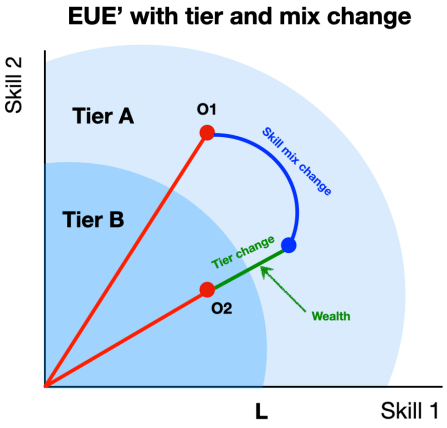
Average wage (residual)	Tier A	Tier B
Untenured	1.13	1.00
Tenured	1.26	1.08
A/B	1.17	

- **Unemployment risk** $\lambda_{Al}, \lambda_{Ah}, \lambda_{Bl}, \lambda_{Bh}$

Separation rate (logit)	Tier A	Tier B
Untenured	0.025	0.037
Tenured	0.007	0.001

Skill-mix changes

For *EUE′* transitions of tenured workers



- **Skill upgrades** γ^u
  - tenure = 2 years in occupation
- **Skill-mix change unrelated to wealth**

$\Pr(\lvert\theta\rvert) > \bar{\theta}$		
$\bar{\theta}$	Rich	Poor
5°	0.17	0.15
10.5° (median)	0.14	0.13
14°	0.11	0.11
20°	0.07	0.08

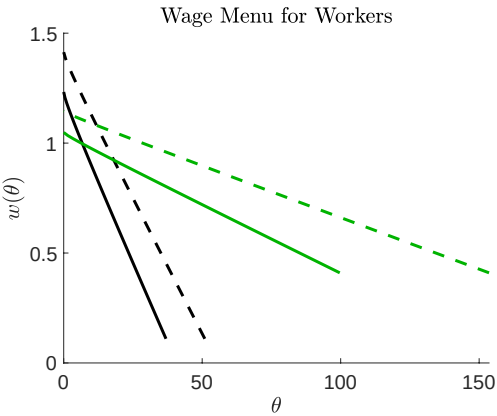
- **Turbulence risk** γ_A^d, γ_B^d
  - turb = $\Pr(\lvert\theta\rvert) > 14°$

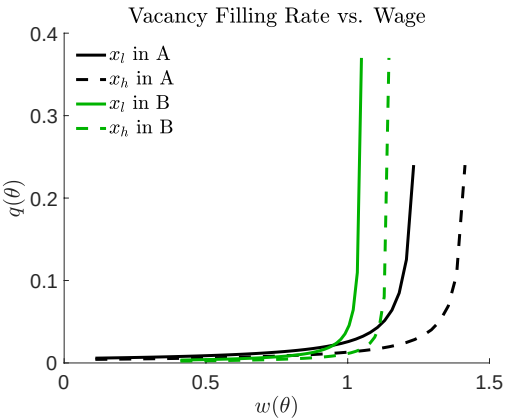
	Tier A	Tier B
Turb/Tenured *EUE′*	0.18	0.28

The model in action

Firms' Wage-Tightness Menu

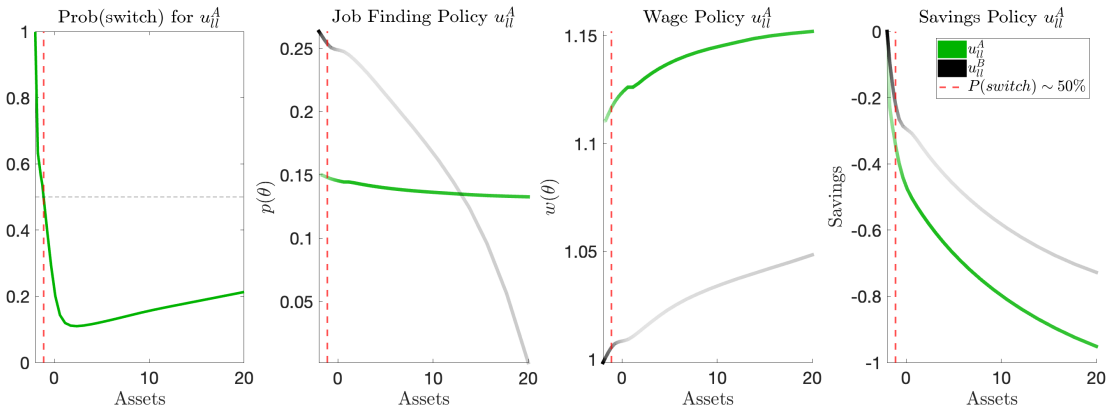
- **Negative relationship** between wages w and tightness θ





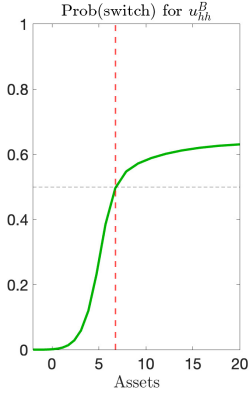
Unemployed Search and Saving Policy

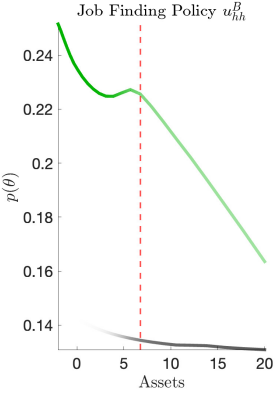
- Tier **downgrades** ($A \searrow B$) most likely by **poor**

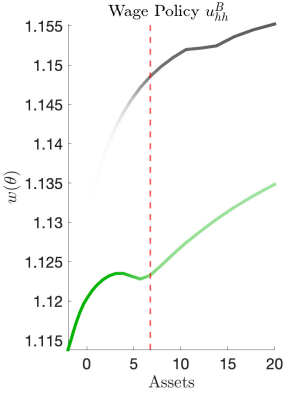


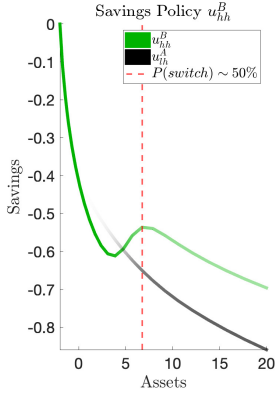
Unemployed Search and Saving Policy

- Tier **upgrades** ($B \nearrow A$) mostly likely by the **rich**

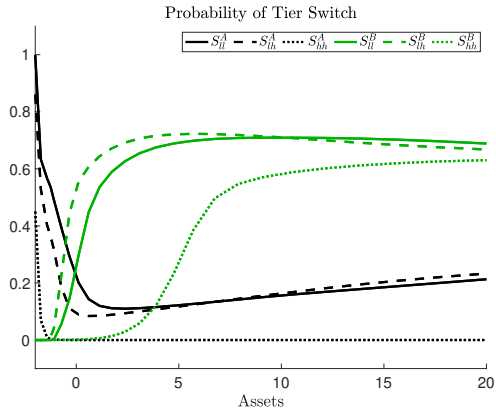








Tier Choice and Wealth



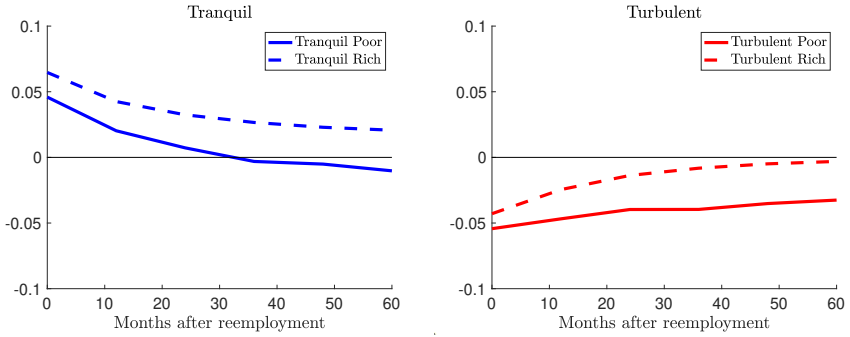
- **Tier change and wealth in data**

	Down $A \downarrow B$		**Up** $B \uparrow A$	
	Rich	Poor	Rich	Poor
untenured	0.05	0.06	0.16	0.14
tenured	0.08	0.09	0.11	0.09

Micro-effects of turbulence risk

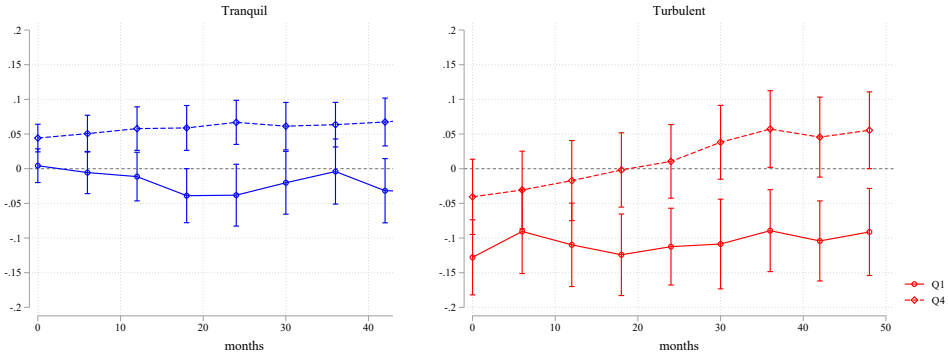
Wage Scars in Model

- Wealth-dependent long-term effects of job loss
  - Tranquil transitions entail wage increases only for rich
  - Turbulent transitions entail wage losses, very persistent for poor



turb switchers | turb stayers | turb tranquil

Wage Scars in Data



Macro-effects of turbulence risk

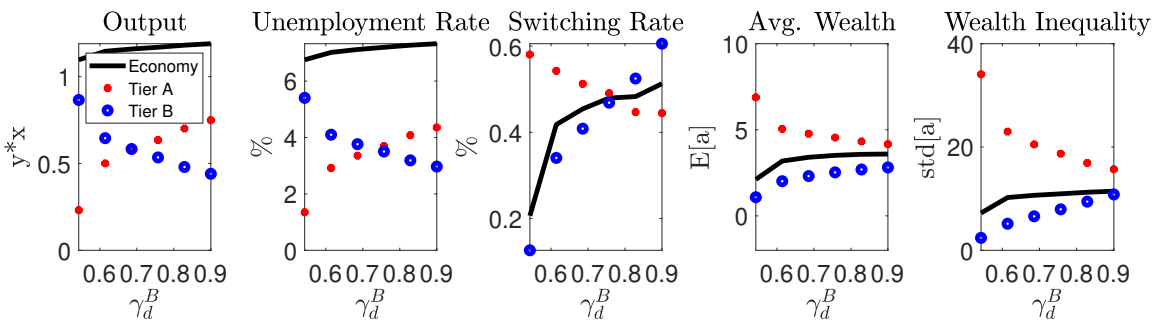
Increase in turbulence risk

One component of technological change

- Higher turbulence risk in **tier** B, $\gamma_B^d \uparrow$
  - Skilled-biased technical change (e.g., automation)
  - Climate change at bottom (e.g., agriculture)
- Higher turbulence risk in **tier** A, $\gamma_A^d \uparrow$
  - AI-biased technical change (e.g., translators)
  - Climate change at the top (e.g., oil engineers)
- Focus on steady-state analysis (productivity fixed)

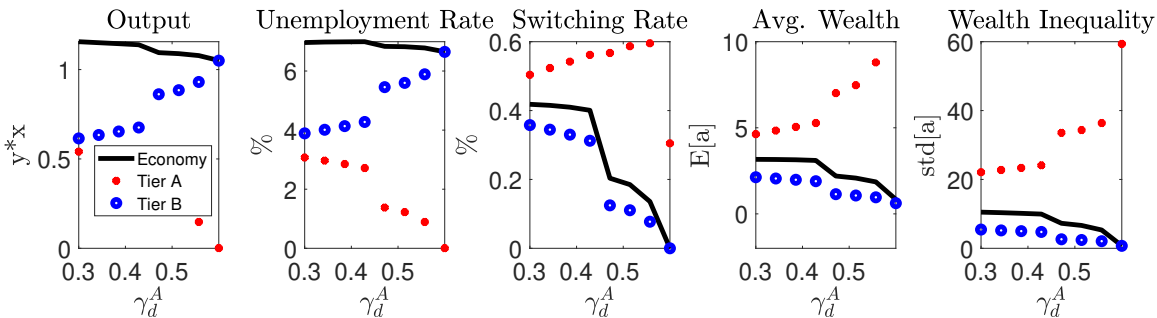
Higher turbulence risk in B ($\gamma_B^d \uparrow$)

- **Rich unemployed in B upgrade to A**
- Economy is wealthier and more unequal



Higher turbulence risk in A ($\gamma_A^d \uparrow$)

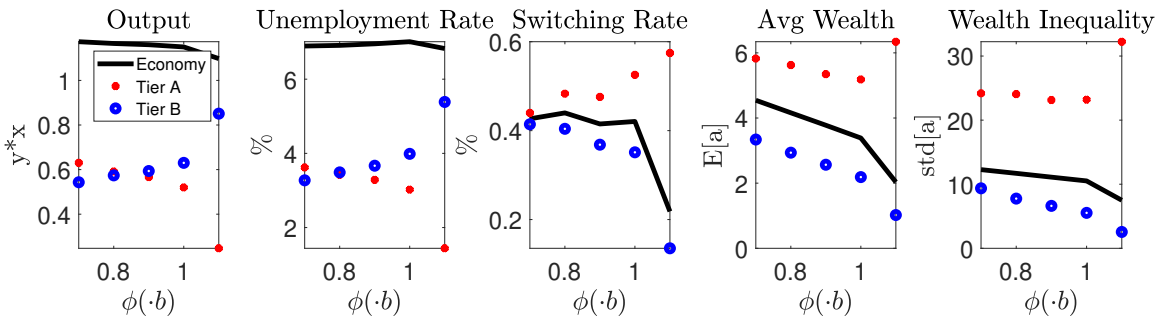
- **Poor unemployed in A downgrade to B**
- Economy is poorer and more equal



Policy Implications

Unemployment insurance

- **Unemployment benefits b uniformly change by factor ϕ**
- Benefits-induced reallocation across tiers



Conclusion

- Wage scars concentrated among **poor occupational switchers**
- New self-insurance mechanism: **Occupational mobility**
- Macro effects depend on turbulence's incidence
- Next steps:
  - Welfare
  - Unemployment insurance vs. retraining schemes

Gràcies!

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Backup

Contributions

- **Skill obsolescence and unemployment**

  Ljungqvist and Sargent (98, 04, 07, 08); Hornstein, Krusell, and Violante (05); Beraja and Zorzi (22); Helm, Kügler and Schönberg (22); Carter Braxton and Taska (22); Baley, Ljungqvist and Sargent (22, 23).

  ○ Role of precautionary savings, search and reallocation

- **Cost of job loss and occupational mobility**

  Jacobson, LaLonde and Sullivan (93); Kambourov and Manovskii (08); Davis and Von Wachter (11); Krolikowski (17); Fujita (18); Helm, Gathmann and Schönberg (20); Carillo-Tudela and Visshers (21); Jarosch (21); Burdett, Carillo-Tudela and Coles (20); Huckfeldt (22); Baley, Figueiredo and Ulbricht (22); Postel-Vinay and Sepahsalari (23); Carillo-Tudela, Visshers, and Wiczer (23)

  ○ New evidence on wealth-dependent scarring effects

- **Wealth and labor markets**

  Hopenhayn and Nicolini (97); Acemoğlu and Shimer (97); Rendón (06); Krusell, Mukoyama and Sahin (10); Lise (12); Herkenhoff, Phillips, and Cohen-Cole (16); Hawkins and Mustre-del-Rio (17); Bartal (20); Krusell, Luo, Rios-Rull (21); Faia, Kudlyak, and Shabalina (21); Chaumont and Shi (22); Eeckhout and Sepahsalari (22); Huang and Qiu (22), Carter Braxton and Taska (23); Caratelli (23)

  ○ Wealth-driven occupational mobility and inequality

Wealth definition

Appendix

- *Liquid Wealth* Lise (2012)
  - sum of financial assets (saving accounts, stocks, bonds, and mutual funds), farm and business assets, vehicles
  - minus debts
- Respondents report **expected market value of their assets** at interview date
- At most, **one observation on assets per year**
- We consider **closest observation** as a proxy of the wealth level upon unemployment

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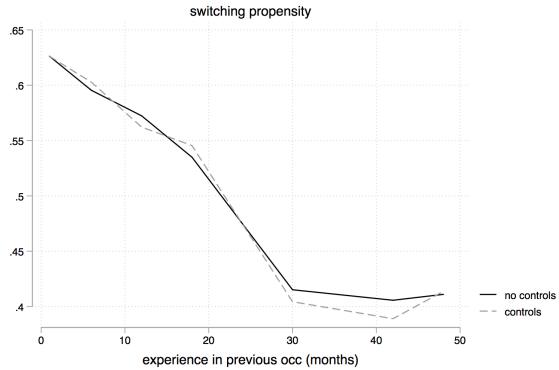
Turbulence Shock

Definition

- Switching propensity decreases during the first 2.5 years, then flat



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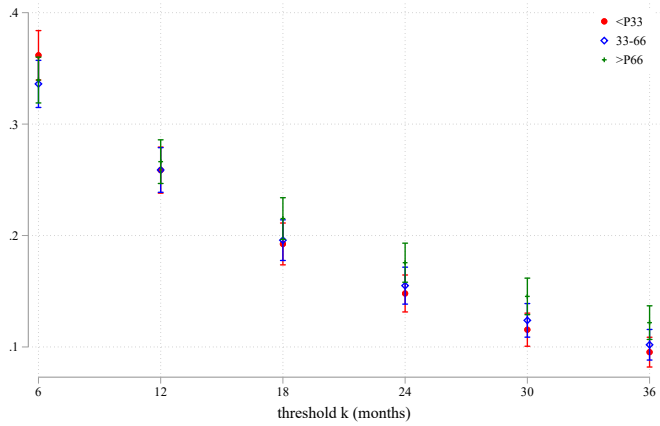
Turbulence Shock

- Probability of being hit by a turbulence shock not correlated with wealth



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Summary statistics

All EUE' transitions

Transitions	All	Untenured	Tranquil	Turbulent
Observations	37,324	25,910	7,102	4,212
% of total transitions	100	69.4	19.0	11.6
Worker characteristics at separation				
Age	29.7	26.8	36.6	36.0
Job tenure	1.4	0.5	3.0	3.6
Occupational tenure	2.5	0.7	7.2	5.8
Total experience	8.3	5.7	14.8	13.5
Liquid wealth (000's, 2000 dollars)	28.9	20.1	43.0	35.2
Outcomes at reemployment				
Wage growth (%, 1st job)	1%	4%	0%	-12%
Unemployment duration (months)	7.7	8	4	12

Source: NLSY79.

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Wage Scars in Data

Short and Long-Term

- **Short-term impact:** 1st job ($w_1 - w_0$)

	Tranquil	Turbulent		
		↓	↑	→
<P33	0.00	-0.23	-0.08	-0.10
>P66	0.05	-0.16	-0.06	-0.03
	0.02	-0.21	-0.06	-0.07
# transitions	3,113	316	326	534

- **Long-term scarring:** 48 months after reemployment ($w_{48} - w_0$)

	Tranquil	Turbulent		
		↓	↑	→
<P33	-0.06	-0.18	-0.13	-0.05
>P66	0.06	-0.02	0.04	0.03
	0.01	-0.09	-0.03	-0.02
# transitions	2,252	251	261	421

⋆ Scarring concentrates among **turbulent** × **poor** × **downgrades**

Wage dynamics

By wealth, tenure and direction

- **Reemployment:** 1st job ($w_1 - w_0$)

	All workers			Untenured			Turbulent		
	↓	↑	→	↓	↑	→	↓	↑	→
<**P33 Poor**	-0.12	0.03	-0.05	-0.08	0.08	-0.03	-0.22	-0.08	-0.10
>**P66 Rich**	-0.09	0.07	-0.03	-0.03	0.14	-0.02	-0.16	-0.06	-0.03
	-0.12	0.05	-0.03	-0.07	0.10	-0.01	-0.21	-0.06	-0.07
# transitions	937	1,002	1,365	611	686	831	316	326	534

- **Scarring:** 48 months after reemployment ($w_{48} - w_0$)

	All workers			Untenured			Turbulent		
	↓	↑	→	↓	↑	→	↓	↑	→
<**P33 Poor**	-0.11	-0.01	-0.01	-0.08	0.05	0.01	-0.18	-0.13	-0.05
>**P66 Rich**	0.02	0.06	0.10	0.01	0.04	0.10	0.01	0.04	0.03
	-0.06	0.01	0.02	-0.04	0.04	0.05	-0.09	-0.03	-0.02
# transitions	719	837	1,085	468	576	664	251	261	421

⋆ Scarring concentrates among poor turbulent with downward switches

Switching Propensities

By wealth, tenure and direction

- Switching Propensities

	All workers			Untenured			Tenured		
	$\downarrow$	$\uparrow$	$\rightarrow$	$\downarrow$	$\uparrow$	$\rightarrow$	$\downarrow$	$\uparrow$	$\rightarrow$
$<$**P33 Poor**	0.14	0.15	0.20	0.16	0.19	0.23	0.11	0.10	0.17
$>$**P66 Rich**	0.11	0.10	0.17	0.15	0.14	0.20	0.09	0.07	0.15

⋆ Split lateral moves between groups (lateral in A are rich, lateral in B are poor).

⋆ Switching is higher for poor untenured workers

⋆ Up and down switching almost symmetric

Occupational moves

- We follow Jaimovic and Siu (2012), Huckfeldt (2022)
- 6 major groups by declining average wage:
  1. managers, professionals, technicians, finance, and public safety;
  2. production and craft;
  3. transportation, construction, mechanics, mining, and farm;
  4. machine operators and assemblers;
  5. clerical and retail sales;
  6. service occupations.
- Upgrades, downgrades, lateral moves.

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Occupation Switching

tenured workers

	Occupation Category					
	1	**2**	**3**	**4**	**5**	**6**
1	82.7% (20%)	5.6%	3.9%	3.8%	12.1%	7%
2	0.5%	63.3% (2%)	1.1%	2.0%	0.6%	0.6%
3	2.6%	11.0%	83.8% (18%)	8.9%	3.1%	5.7%
4	0.8%	7.3%	3.9%	72.2% (9%)	1%	1.9%
5	8.9%	6.4%	3.4%	7.5%	76.4% (27%)	9.3%
6	4.5%	5.9%	3.9%	5.7%	6.8%	75.5% (14%)

- Diagonal cells include **3-digit** occupation switchers in parenthesis

Two major islands

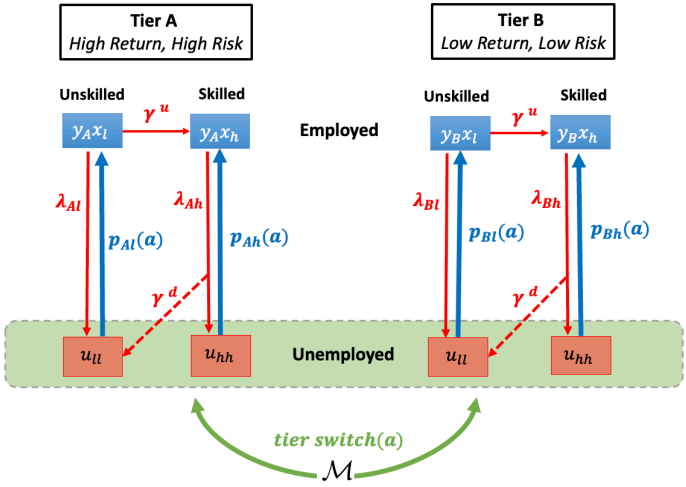
Return × Risk

- **Island A: High return, high risk $\iff$ cognitive skills**
  managers, professionals, technicians, finance, public safety, production, and craft

- **Island B: Low return, low risk $\iff$ routine/manual skills**
  services, clerical and retail sales, transportation, construction, mechanics, machine operators, assemblers, mining, and farm

Island	**Population** (%)	**Wage** (USD/hour)	**Liquid Wealth** (USD thousands)	**Corr(w,a)**	**Occup. Tenure** (years)	**Tenured** (%)
A	40%	\$18	\$56.7	0.26	7.6	73%
B	60%	\$11	\$27.1	0.20	6	60%

Labor Market Dynamics



Firms Employed Unemployed Return

Firms

Within each tier $k \in \{A, B\}$:

- **Value of a vacancy**

$$V_k \;=\; -\kappa_k \;+\; \max_w \; \beta \left\{ q_k(\theta) J_k(w(\theta), x) \;+\; (1 - q_k(\theta)) V_k \right\} \qquad \forall x$$

- **Value of a filled job**

$$\begin{aligned} J_k(w, x_h) &= f(y_k, x_h) \;-\; w \;+\; \beta \left[\lambda_{kh} V_k \;+\; (1 - \lambda_{kh}) J(w, x_h) \right] \\ J_k(w, x_l) &= f(y_k, x_l) \;-\; w \;+\; \beta \left[\lambda_{kl} V_k \;+\; (1 - \lambda_{kl}) (\gamma_k^u J(w', x_h) + (1 - \gamma_k^u) J(w, x_l) \right] \end{aligned}$$

where $w' = w + \psi_k (x_h - x_l)$

  - productivity (y_k) and vacancy cost (κ_k) by tier
  - job ladder (γ_k^u, ψ_k) by tier
  - separation risk (λ_{kx}) by tier x skill

Return

Employed Workers

Within each tier $k \in \{A, B\}$:

- **Value of unskilled employment**

$$\begin{aligned} E_k(a, x_{ll}, w) &= \max_{a'} \; u(c) \; + \; \beta \lambda_{kl} \mathcal{U}_k(a', x_{ll}) \\ &+ \; \beta(1 - \lambda_{kl}) \; [(1 - \gamma_k^u) E_k(a', x_{ll}, w) \; + \; \underbrace{\gamma_k^u E_k(a', x_{hl}, w')}_{\text{exog. skill upgrade}}] \end{aligned}$$

- **Value of skilled employment**

$$\begin{aligned} E_k(a, x_{hh}, w) &= \max_{a'} \; u(c) \; + \; \beta(1 - \lambda_{kh}) E_k(a', x_{hh}, w) \\ &+ \; \beta \lambda_{kh} \; [(1 - \gamma_k^d) \mathcal{U}_k(a', x_{hh}) \; + \; \underbrace{\gamma_k^d \mathcal{U}_k(a', x_{lh})}_{\text{exog. skill downgrade}} \;] \end{aligned}$$

- **Budget constraint**

$$c + a' \;=\; Ra + w \quad \text{and} \quad a' \geq \underline{a}$$

Return

Unemployed Workers

- **Value of unemployment (tier choice)**

$$\begin{aligned}\mathcal{U}_k(a,x) &= \mathbb{E}\left[\max_{k'} U_{k'}(a' - \mathcal{M}_{kk'}, x) + \nu\epsilon_{k'}\right] \\ &= \nu \log \sum_{k'} \exp\left(\frac{1}{\nu} \cdot U_{k'}(a' - \mathcal{M}_{kk'}, x)\right).\end{aligned}$$

- **Value of unemployment (within tier k)**

$$U_k(a,x) = \max_{a',\theta} u(c) + \beta\left[p_k(\theta)E(a',x,w(\theta)) + (1 - p_k(\theta))\,\mathcal{U}_k(a',x)\right]$$

- **Budget constraint**

$$c + a' = Ra + b(x) \quad \text{and} \quad a' \geq \underline{a}$$

Return

Dissecting Returns and Risks

- **Wage premia** $(w_{kx}/w_{k'x'})$ $\Longrightarrow$ x_l, x_h, y_A, y_B
  - residual real wage

Average wage	Island A	Island B
Untenured	1.14	1.00
Tenured	1.28	1.07
Tenured/Untenured	1.14	1.07

- **Unemployment risk** $\Longrightarrow$ λ_{kx}
  - logit evaluated at mean covariates

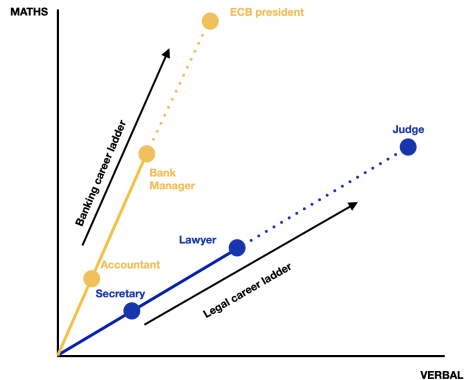
Separation rate	Island A	Island B
Untenured	2.4%	3.50%
Tenured	0.6%	0.94%
All workers	1.0%	1.54%

  - decreases with occupational tenure
    Jovanovic (1984), Nagypál (2007), Papageorgiou (2014), Baley, Figueiredo, and Ulbricht (2022)
  - higher in island B

Illustrative examples

- **Occupation** is a vector of skill requirements $r = (r_v, r_m)$
- **Careers** defined by angle θ
- **Tiers** defined by norm ℓ

	Verbal r_v	Math r_m	Angle	Norm
Legal career:	80%	20%	θ	ℓ
Judge	96	24	14^o	98.9
Lawyer	80	20	14^o	82.5
Secretary	40	10	14^o	41.2
Banking career:	30%	70%		
ECB president	42	98	67^o	106.6
Bank manager	30	70	67^o	76.2
Accountant	15	35	67^o	38.1



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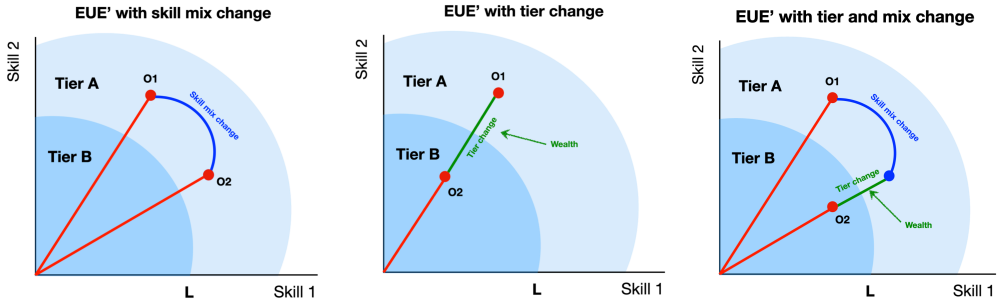
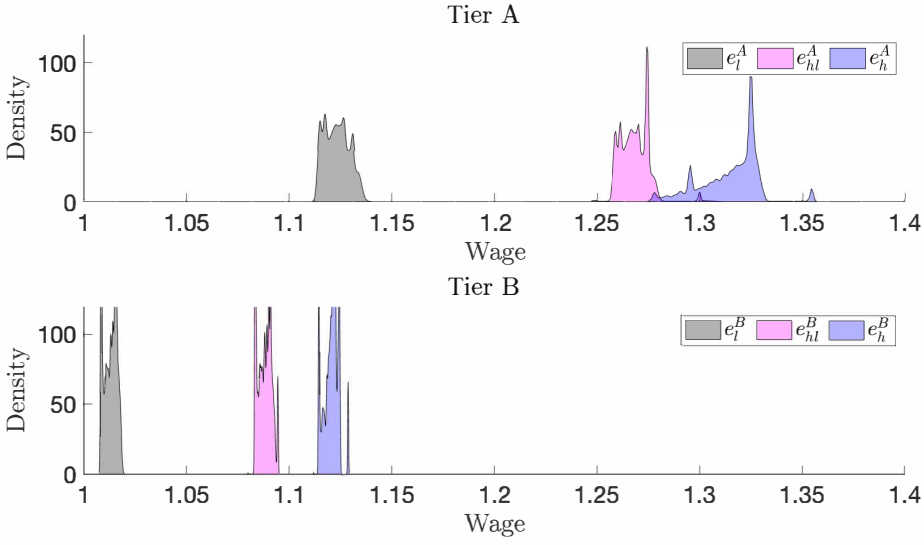
Occupational mobility: both within and across tiers

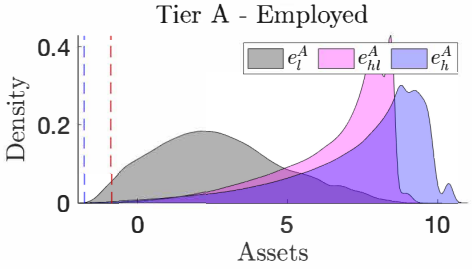
For EUE' transitions of tenured workers

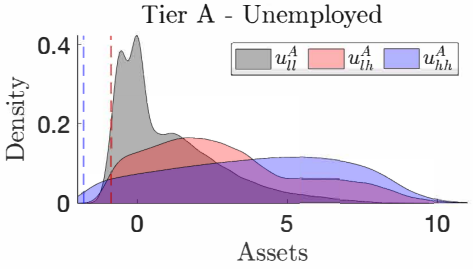


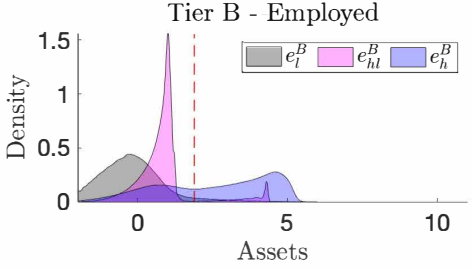
Wage Distributions

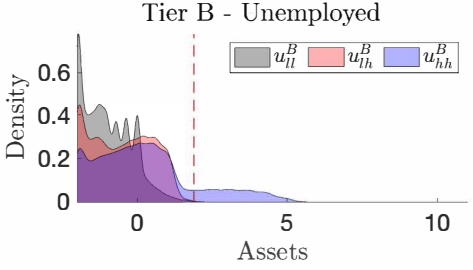


Asset Distributions





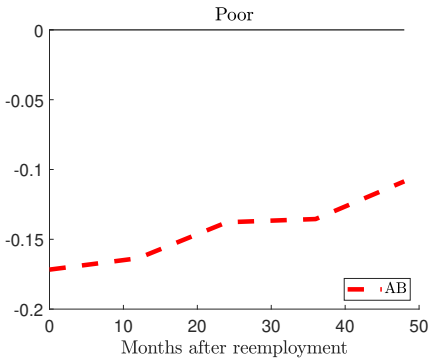


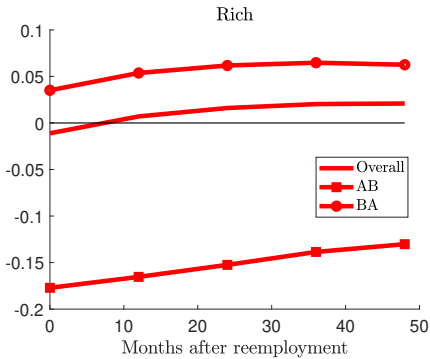


Wage Scar Decomposition

Turbulent + Across-Tier Move

- Poor turbulent workers only downgrade, rich workers upgrade and downgrade





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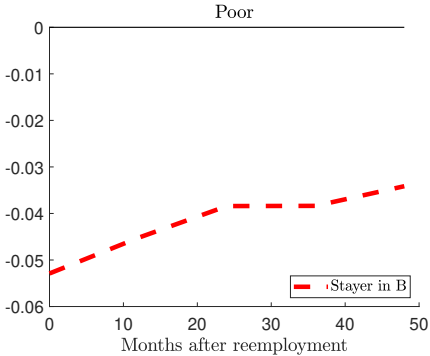
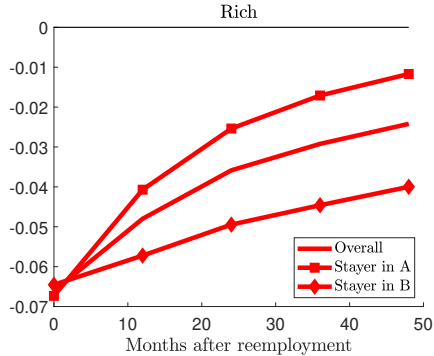
Turbulent + Within-Tier Move





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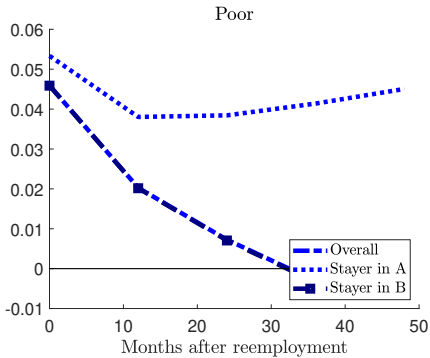
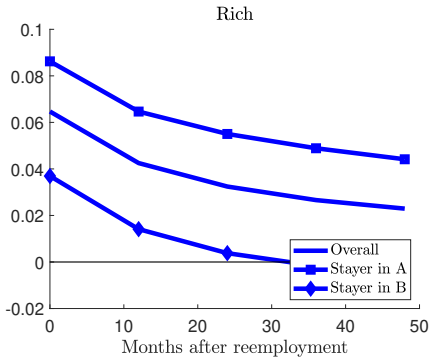
Tranquil





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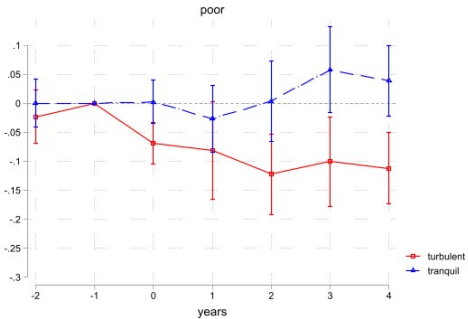
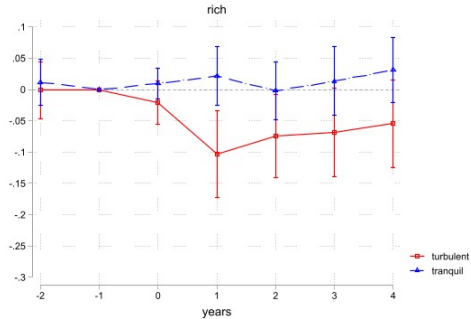
Wage Scars in Data

- ⋆ **New fact:** Scarring effects concentrated among **turbulent** × **poor**
- ⋆ 4 years after displacement:
  - Wages still 11% below for poor
  - Only 5% lower for rich





Calibration

functional forms

- Utility funtion (CRRA)

$$u(c) = \frac{c^{1-\sigma} - 1}{1 - \sigma}$$

- CES Matching function $\rightarrow$ Job finding probability

$$p_k(\theta) = \chi_k \theta (1 + \theta^{\alpha})^{\frac{-1}{\alpha}}$$

- Production function

$$f(x, y) = yx$$

- One period is one month

Parameters

Parameters	Definition	Value
pre-calibrated		
$\hat{\beta}$	discount factor	0.9965
ρ_r	retirement probability	0.0021
σ	CRRA risk aversion	2
$\underline{a}$	borrowing constraint	-2
α	CES matching elasticity	0.7
γ_A^d, γ_B^d	turbulence risk	0.4, 0.6
calibrated		
χ_A, χ_B	matching efficiencies	0.24, 0.36
κ_A, κ_B	vacancy creation cost	0.4, 0.1
b_A, b_B	home production	0.1, 0.4
$\mathcal{M}_{BA}, \mathcal{M}_{AB}$	monetary switching costs	0.75, 0

Target Moment	**Source**	**Data**	**Model**
Assets/Annual Income (Median)	PSID	0.62	0.63
Fraction with negative assets	NLSY	0.16	0.15
Unemployment rate (%)	NLSY	6.5	6.4
Avg. unemployment duration (months)	NLSY	7.7	6.4
Elasticity of job finding to tightness	Shimer (2005)	0.72	0.66
OLS coefficients (assets of job-finding on assets)	Lise (2013)	-0.08	-0.03
Proportion of turbulent EUE' transitions	NLSY	0.12	0.12
Tier wage premium	NLSY	1.15	1.15

Wage Scars

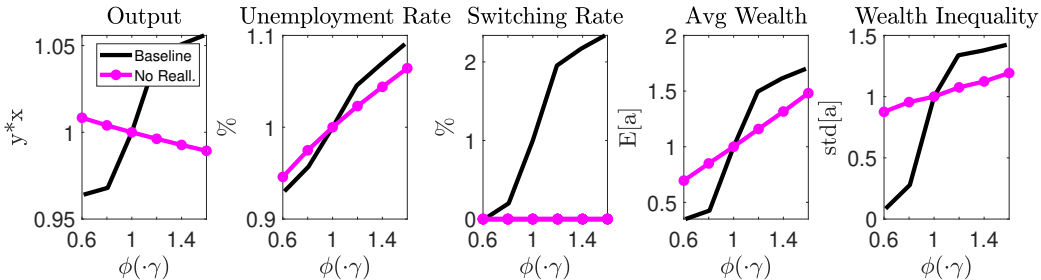
$$\log w_{it} = \sum_{p \in \{<33, >66\}} \sum_{k=-24}^{62} \delta^{k}_{tranq,p} \mathbf{1}^{k}_{tranq,p} + \sum_{p \in \{<33, >66\}} \sum_{k=-24}^{62} \delta^{k}_{turb,p} \mathbf{1}^{k}_{turb,p} + \lambda_t + \beta' X_{it} + \epsilon_{it}$$

- $\mathbf{1}^{k}_{tranq,p} = 1$: tranquil worker at wealth percentile p when separated, k^{th} months after job loss
- $\mathbf{1}^{k}_{turb,p} = 1$: turbulent worker at wealth percentile p when separated, k^{th} months after job loss
- λ_t = year and month fixed effects
- X_{it} = past wage, age, age^2, gender, race, education, ability, industry, occupation
- Keep first transition recorded for each individual in the sample

Role of endogenous reallocation

Counterfactual

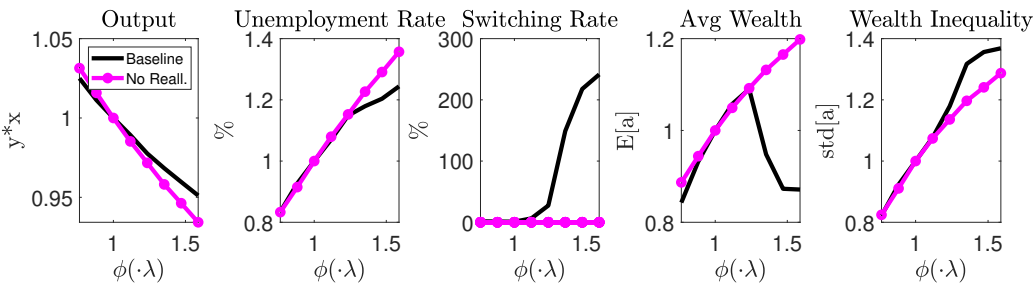
- Turbulence risk γ^d uniformly changes by factor ϕ
- Endogenous reallocation alters the relationship between risk and inequality



vs. **No reallocation** ("average" island)

Implications for Business Cycles

- Separation risk λ uniformly changes by factor ϕ
- Endogenous reallocation dampens output fluctuations
  Speaks to Kaplan and Violante (14), Sterk and Ravn (17), Patterson (23)



vs. **No reallocation** ("average" island)

Welfare Costs of Job Loss

decomposition

- Life-time consumption equivalent $\lambda(a_0)$: compensation for avoiding job loss at $t = 0$

$$\underbrace{\mathbb{E}_0\left[\sum_{t=0}^{\infty}\beta^t\frac{((1+\lambda(a_0))c_t)^{1-\sigma}}{1-\sigma}\right]}_{\text{no separation counterfactual}} = \underbrace{\mathbb{E}_0\left[\sum_{t=0}^{\infty}\beta^t\frac{\tilde{c}_t^{1-\sigma}}{1-\sigma}\right]}_{\text{tranquil/turbulent}}$$

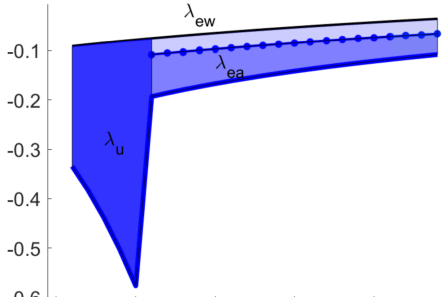
- Decomposition of welfare loss:

$$\underbrace{\lambda}_{\text{Total cost}} = \underbrace{\lambda_u}_{\text{unemployment phase}} + \underbrace{\lambda_e}_{\text{reemployment phase}} = \underbrace{\lambda_u}_{\text{unemployment phase}} + \underbrace{\lambda_{ew}}_{\text{fixed assets}} + \underbrace{\lambda_{ea}}_{\text{fixed wage}}$$

Welfare Costs of Job Loss

counterfactuals

- λ_u: isolating welfare impact of unemp. consumption
- λ_e: isolating welfare impact of re-emp. consumption
  - λ_{ew}: isolating welfare impact of change in wages
  - λ_{ea}: isolating welfare impact of change in assets
- example: tranquil transition



Welfare Mechanisms

appendix

$$(1+\lambda_u(a_0,w_0))^{1-\sigma} = \frac{\sum_{t=0}^{T-1}\beta^t u(\tilde{c}_t)+\beta^T E_{hh}(a_T,w_0)}{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(a_T,w_0)}$$

$$(1+\lambda_e(a_0,w_0))^{1-\sigma} = \frac{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(\tilde{a}_T,\tilde{w}_T)}{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(a_T,w_0)}$$

$$(1+\lambda_{ea}(a_0,w_0))^{1-\sigma} = \frac{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(\tilde{a}_T,w_0)}{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(a_T,w_0)}$$

$$(1+\lambda_{ew}(a_0,w_0))^{1-\sigma} = \frac{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(a_T,\tilde{w}_T)}{\sum_{t=0}^{T-1}\beta^t u(c_t)+\beta^T E_{hh}(a_T,w_0)}$$

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