Self-Insurance in Turbulent Labor Markets

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Online Appendix

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A Proofs and Derivations

A.1 Solution to the firm problem

We derive the wage–tightness menus offered in each skill–tier submarket. We first express the value of a filled job as a function of wage, then combine it with free entry.

Values of filled jobs. Free entry implies that posting a vacancy has zero value in every active submarket. Using (2), the corresponding free-entry condition is

$$J_{ik}(w) = \frac{\kappa_k}{\beta q_k(\theta)}, \qquad i \in \{l, h\}, \quad k \in \{A, B\}. \tag{A.1}$$

Thus, differences in productivity across active submarkets are offset by differences in wages and vacancy-filling rates.

For a high-skilled worker, substituting $V_{hk} = 0$ into (3) gives

$$J_{hk}(w) = \frac{f_{hk} - w}{1 - \beta(1 - \lambda_{hk})}. \tag{A.2}$$

For a low-skilled worker, substituting $V_{lk} = 0$ into (4) and using the upgrading rule $w' = w + f_{hk} - f_{lk}$, so that $f_{hk} - w' = f_{lk} - w$, gives

$$J_{lk}(w) = \frac{(1 + \widehat{\gamma}^u_k)(f_{lk} - w)}{1 - \beta(1 - \lambda_{lk})(1 - \gamma^u)}, \qquad \widehat{\gamma}^u_k \equiv \frac{\beta(1 - \lambda_{lk})\gamma^u}{1 - \beta(1 - \lambda_{hk})}. \tag{A.3}$$

The term $\widehat{\gamma}^u_k$ summarizes how the possibility of future skill upgrading affects the value of a low-skilled match.

Wage–tightness menus. Combining (A.1) with (A.2) gives the wage–tightness menu for high-skilled workers,

$$w_{hk}(\theta) = f_{hk} - \frac{\widetilde{\kappa}_{hk}}{q_k(\theta)}, \qquad \widetilde{\kappa}_{hk} \equiv \frac{\kappa_k[1 - \beta(1 - \lambda_{hk})]}{\beta}. \tag{A.4}$$

Similarly, combining (A.1) with (A.3) gives the menu for low-skilled workers,

$$w_{lk}(\theta) = f_{lk} - \frac{\widetilde{\kappa}_{lk}}{(1 + \widehat{\gamma}^u_k) q_k(\theta)}, \qquad \widetilde{\kappa}_{lk} \equiv \frac{\kappa_k[1 - \beta(1 - \lambda_{lk})(1 - \gamma^u)]}{\beta}. \tag{A.5}$$

The menus capture the trade-off between wages and job-finding probabilities. A worker who selects a tighter submarket finds a job more quickly but accepts a lower wage. From the firm's perspective, the associated vacancy takes longer to fill but generates a larger flow surplus.

A.2 Workers' optimality conditions

Assets. Let $\xi^s_{ik} \geq 0$ denote the multiplier on the borrowing constraint for a worker with employment status $s \in \{u, e\}$. The envelope conditions for the inner unemployment and employment values are $U_{ik,a}(a) = Ru_c(c^u_{ik})$ and $E_{ik,a}(a, w) = Ru_c(c^e_{ik})$. Differentiating the outer unemployment value yields

$$\mathcal{U}_{ik,a}(a) \;=\; R \sum_{k' \in \{A,B\}} \mu_{ikk'}(a) u_c(c^u_{ik'}(a - \mathcal{M}_{kk'})) \,. \tag{A.6}$$

The Euler equation for an unemployed worker searching in tier k is

$$u_c(c^u_{ik}) \;=\; \beta R \left[p_k(\theta) u_c(c^e_{ik}{}') + (1 - p_k(\theta)) \sum_{k' \in \{A,B\}} \mu_{ikk'}(a') u_c(c^u_{ik'}{}') \right] + \xi^u_{ik}. \tag{A.7}$$

For a low-skilled employed worker,

$$u_c(c^e_{lk}) \;=\; \beta R \left\{ (1 - \lambda_{lk}) \left[(1 - \gamma^u) u_c(c^e_{lk}{}') + \gamma^u u_c(c^e_{hk}{}') \right] + \lambda_{lk} \sum_{k' \in \{A,B\}} \mu_{lkk'}(a') u_c(c^u_{lk'}{}') \right\} + \xi^e_{lk}. \tag{A.8}$$

For a high-skilled employed worker,

$$u_c(c^e_{hk}) \;=\; \beta R \left\{ (1 - \lambda_{hk}) u_c(c^e_{hk}{}') + \lambda_{hk}(1 - \gamma^d_k) \sum_{k' \in \{A,B\}} \mu_{hkk'}(a') u_c(c^u_{hk'}{}') + \lambda_{hk} \gamma^d_k \sum_{k' \in \{A,B\}} \mu_{lkk'}(a') u_c(c^u_{lk'}{}') \right\}. \tag{A.9}$$

In each case, complementary slackness requires $\xi^s_{ik}(a' - \underline{a}) = 0$. Primes denote next-period consumption in the relevant labor-market state.

Submarket choice. Conditional on searching in tier k, an unemployed worker chooses a point on the wage–tightness menu. The first-order condition is

$$p_k'(\theta)\left[E_{ik}(a', w_{ik}(\theta)) - \mathcal{U}_{ik}(a')\right] + p_k(\theta) E_{ik,w}(a', w_{ik}(\theta))\, w_{ik}'(\theta) \;=\; 0. \tag{A.10}$$

The first term captures the gain from a higher job-finding probability, while the second captures the utility cost of the lower wage associated with a tighter submarket.

A.3 Unemployed value function $\mathcal{U}$: derivation

Let $\epsilon_{k'}$ be i.i.d. mean-zero type-I extreme-value shocks. Equivalently, their cdf is $F(\epsilon) = \exp\{-\exp[-(\epsilon + \gamma_{\text{EM}})]\}$, where $\gamma_{\text{EM}} \simeq 0.57721$ is the Euler–Mascheroni constant.

For an unemployed worker with skill i, reference tier k, and assets a, let $W_{k'} \equiv U_{ik'}(a - \mathcal{M}_{kk'})$. The random outer value is

$$Z \;\equiv\; \max_{k' \in \{A,B\}} \{W_{k'} + \nu \epsilon_{k'}\}. \tag{A.11}$$

The maximum is itself a type-I extreme value, with mean $\nu \log \sum_{k'} \exp(W_{k'}/\nu)$. Therefore,

$$\mathcal{U}_{ik}(a) \;=\; \nu \log \left[\sum_{k' \in \{A,B\}} \exp\left(\frac{U_{ik'}(a - \mathcal{M}_{kk'})}{\nu} \right) \right]. \tag{A.12}$$

Without the mean-zero normalization, the expression would contain the additive constant $\nu \gamma_{\text{EM}}$. This constant does not affect tier choices or choice probabilities because it is common across alternatives. We nevertheless remove it to keep value-function levels normalized consistently. Infeasible alternatives are omitted from the sum.

A.4 Switching probability

Let $W_{k'} \equiv U_{ik'}(a - \mathcal{M}_{kk'})$. Under i.i.d. type-I extreme-value shocks, the probability that a worker with skill i and reference tier k chooses destination tier k' is

$$\mu_{ikk'}(a) \;=\; \Pr\left(W_{k'} + \nu\epsilon_{k'} \geq W_r + \nu\epsilon_r,\ \forall r \in \{A, B\}\right) \;=\; \frac{\exp(W_{k'}/\nu)}{\sum_{r \in \{A,B\}} \exp(W_r/\nu)}. \tag{A.13}$$

Substituting for $W_{k'}$ gives

$$\mu_{ikk'}(a) \;=\; \frac{\exp\left(U_{ik'}(a-\mathcal{M}_{kk'})/\nu\right)}{\sum_{r\in\{A,B\}}\exp\left(U_{ir}(a-\mathcal{M}_{kr})/\nu\right)}, \tag{A.14}$$

which is equation (8). Infeasible alternatives receive probability zero, and the probabilities are renormalized over the feasible set.

A.5 Profits

Firms receive operating profits from filled jobs and incur costs when posting vacancies. Let $\Gamma^E_{ik}(a,w)$ denote the stationary mass distribution of employed workers in skill–tier cell (i,k). Aggregate operating profits are

$$\Pi^{\text{op}} \;=\; \sum_{i\in\{l,h\}}\sum_{k\in\{A,B\}}\int_a\int_w (f_{ik}-w)\,d\Gamma^E_{ik}(a,w). \tag{A.15}$$

Let $\Gamma^U_{ik}(a)$ denote the stationary mass distribution of unemployed workers who search in tier k. Since tightness is the vacancy–searcher ratio, vacancies in skill–tier submarket (i,k) are $v_{ik}=\int_a \theta^*_{ik}(a)\,d\Gamma^U_{ik}(a)$. Aggregate vacancy-posting expenditures are therefore

$$\Pi^{\text{vac}} \;=\; \sum_{i\in\{l,h\}}\sum_{k\in\{A,B\}}\kappa_k v_{ik}. \tag{A.16}$$

Profits distributed to households are

$$\pi \;=\; \Pi^{\text{op}}-\Pi^{\text{vac}}. \tag{A.17}$$

Because the population is normalized to one, π is also per-capita dividend income.

The free-entry condition (A.1) implies that the expected value of posting an additional vacancy is zero in every active submarket. It does not imply that current operating profits net of current vacancy expenditures are zero in each skill–tier cell: filled jobs generate profit flows over their entire duration, whereas vacancy costs are paid when vacancies are posted.

Under the Tier-A vacancy subsidy, firms pay $(1-\omega)\kappa_A$ per vacancy and the government finances the remaining share $\omega\kappa_A$. The underlying resource cost remains κ_A, so the subsidy changes the financing of vacancy creation but not its real resource cost.

A.6 Welfare measure

We compare the benchmark steady state, denoted by 0, with a counterfactual policy steady state, denoted by P. Welfare is evaluated using the benchmark distribution of initial worker states.

Individual welfare. For a worker with skill i, labor-market status $s \in \{E, U\}$, tier k, and initial state z, define expected discounted consumption utility under policy P (either UI through ϕ or JC through ω) as

$$\mathcal{W}_{ik}^{s,P}(z) \;\equiv\; \mathbb{E}_P\left[\sum_{t=0}^{\infty} \beta^t \frac{(c_t^P)^{1-\sigma}}{1-\sigma} \,\middle|\, s, i, k, z\right]. \tag{A.18}$$

The consumption-equivalent variation $\lambda_{ik}^s(z|P)$ is the permanent proportional change in benchmark consumption that makes the worker indifferent between the benchmark and the policy:

$$\mathbb{E}_0\left[\sum_{t=0}^{\infty} \beta^t u\big((1+\lambda_{ik}^s(z|P))c_t^0\big) \,\middle|\, s, i, k, z\right] \;=\; \mathcal{W}_{ik}^{s,P}(z). \tag{A.19}$$

Under CRRA utility,

$$\lambda_{ik}^s(z|P) \;=\; \left(\frac{\mathcal{W}_{ik}^{s,P}(z)}{\mathcal{W}_{ik}^{s,0}(z)}\right)^{\frac{1}{1-\sigma}} - 1. \tag{A.20}$$

A positive value indicates that the worker prefers the policy economy. The objects $\mathcal{W}_{ik}^{s,P}$ incorporate the consumption consequences of endogenous employment, savings, skill, and tier transitions but exclude the additive tier-preference shocks themselves.

Aggregate welfare. Aggregate welfare among unemployed and employed workers is

$$\Lambda^U(P) \;=\; \sum_{i\in\{l,h\}} \sum_{k\in\{A,B\}} \int_a \lambda_{ik}^U(a|P)\, d\Gamma_{ik}^{U,0}(a), \tag{A.21}$$

$$\Lambda^E(P) \;=\; \sum_{i\in\{l,h\}} \sum_{k\in\{A,B\}} \int_a \int_w \lambda_{ik}^E(a,w|P)\, d\Gamma_{ik}^{E,0}(a,w). \tag{A.22}$$

Because the benchmark mass distributions jointly integrate to one, economy-wide welfare is

$$\Lambda(P) \;=\; \Lambda^U(P) + \Lambda^E(P). \tag{A.23}$$

This measure averages individual consumption-equivalent variations using the benchmark distribution and therefore compares policies from the perspective of the same initial population.

B Computational Appendix

This appendix describes the numerical solution and estimation of the model. Block recursivity allows us to solve the wage–tightness menus and worker policy functions before computing the stationary distribution. The algorithm therefore proceeds in three steps. First, free entry determines a wage–tightness menu for each skill–tier submarket. Second, a nested fixed-point algorithm solves workers' consumption, saving, submarket, and tier-choice policies. Third, we iterate the induced law of motion to obtain the stationary distribution and simulate worker histories.

For policy counterfactuals, we embed these steps in an outer tax loop. For each value of the unemployment insurance transfer ϕ or vacancy subsidy ω, we update the proportional labor-income tax until the government budget constraint is satisfied.

B.1 Solution algorithm

Step 1: Wage–tightness menus. For each skill $i \in \{l, h\}$ and tier $k \in \{A, B\}$, free entry and the firm problem yield the analytical wage–tightness menus derived in Appendix A.1:

$$w_{hk}(\theta) = f_{hk} - \frac{\widetilde{\kappa}_{hk}}{q_k(\theta)}, \qquad w_{lk}(\theta) = f_{lk} - \frac{\widetilde{\kappa}_{lk}}{(1+\widehat{\gamma}_k^u)q_k(\theta)}. \tag{B.1}$$

We evaluate these menus on a grid for market tightness and retain feasible points with positive wages and probabilities in $[0, 1]$. The associated job-finding probability is $p_k(\theta) = \theta q_k(\theta)$. Because the menus depend only on primitives, not on the cross-sectional distribution, we compute them once for each parameter vector.

Under the Tier-A vacancy subsidy, the firm-paid cost entering the Tier-A menu is $(1 - \omega)\kappa_A$. The Tier-B menu is unchanged.

Step 2: Worker policies. We discretize assets on $[\underline{a}, \overline{a}]$ and wages on the set generated by the wage–tightness menus. Employed value functions are defined over assets and wages, $E_{ik}(a, w)$, whereas the inner and outer unemployment values, $U_{ik}(a)$ and $\mathcal{U}_{ik}(a)$, depend on assets, skill, and the worker's reference tier but not on a current wage.

We solve the worker problem using a nested fixed point. The inner loop applies the Endogenous Grid Method to update consumption and saving policies conditional on the current search policies. For employed workers, the continuation values incorporate separation, skill upgrading, and displacement-induced skill loss. For unemployed workers, they incorporate

the probability of finding a job in the chosen submarket and the option to reconsider the search tier after an unsuccessful search.

The outer loop updates labor-market choices. Conditional on destination tier k', an unemployed worker chooses market tightness along $w_{ik'}(\theta)$. Given the resulting inner values, tier-choice probabilities are updated using

$$\mu_{ikk'}(a) \;=\; \frac{\exp\left(U_{ik'}(a-\mathcal{M}_{kk'})/\nu\right)}{\sum_{r\in\{A,B\}}\exp\left(U_{ir}(a-\mathcal{M}_{kr})/\nu\right)}. \tag{B.2}$$

Alternatives that violate the borrowing constraint after paying the mobility cost are assigned probability zero, and probabilities are renormalized over the feasible alternatives.

We alternate between the inner and outer loops until the value and policy functions converge. We use Howard improvement between full policy updates to accelerate convergence. The solution produces consumption and saving policies for employed and unemployed workers, optimal market tightness and wages within each destination tier, and tier-choice probabilities for every unemployment state.

Step 3: Stationary distribution and simulation. Given the policy functions, we construct the transition operator over employment status, skill, reference tier, assets, and, for employed workers, wages. We iterate this operator until the distribution converges. We then use the stationary distribution to compute aggregate and tier-specific moments.

For outcomes that depend on complete worker histories, including unemployment duration, tier transitions, and post-displacement wage dynamics, we simulate a panel from the stationary equilibrium. The simulation uses the same transition probabilities and policy functions as the stationary-distribution calculation.

Government-budget loop. In the benchmark without policy interventions, $\tau = 0$. For a counterfactual policy, begin from an initial tax rate $\tau^{(0)}$. At iteration n, solve Steps 1–3 at $\tau^{(n)}$, compute the stationary tax base and policy expenditure, and update the tax rate implied by the relevant balanced-budget condition:

$$\tau^{\mathrm{UI}}\overline{w}e \;=\; \phi u, \qquad \tau^{\mathrm{JC}}\overline{w}e \;=\; \omega\kappa_A v_A. \tag{B.3}$$

The loop stops when the difference between the updated and previous tax rates is below the tolerance used in the computation. To improve numerical stability, the tax update can

be damped according to $\tau^{(n+1)} = (1-\zeta)\tau^{(n)} + \zeta\tau^{\text{new}}$, where $\zeta \in (0,1]$ is the relaxation parameter.

B.2 Stationary distribution

The individual state records employment status $s \in \{E, U\}$, skill $i \in \{l, h\}$, tier $k \in \{A, B\}$, and assets a. Employed workers are additionally characterized by their wage w. For unemployed workers, k denotes the reference tier that determines the cost of redirecting search.

Let $\Gamma^E_{ik}(a, w)$ and $\Gamma^U_{ik}(a)$ denote unnormalized stationary mass distributions. Their integrals equal the corresponding population masses and satisfy

$$\sum_{i\in\{l,h\}} \sum_{k\in\{A,B\}} \left[\int_a \int_w d\Gamma^E_{ik}(a,w) + \int_a d\Gamma^U_{ik}(a) \right] = 1. \tag{B.4}$$

Employed-worker transitions. A low-skilled worker employed in tier k remains low-skilled with probability $(1-\lambda_{lk})(1-\gamma^u)$, upgrades with probability $(1-\lambda_{lk})\gamma^u$, and separates with probability λ_{lk}. A high-skilled worker remains employed and high-skilled with probability $1-\lambda_{hk}$. Upon separation, the worker retains high skill with probability $\lambda_{hk}(1-\gamma^d_k)$ and loses skill with probability $\lambda_{hk}\gamma^d_k$.

Conditional on remaining employed, next-period assets follow the relevant employed saving policy. If a low-skilled worker upgrades, the wage changes according to the upgrading rule in the main text. Upon separation, the worker becomes unemployed with reference tier equal to the tier of the displaced job.

Unemployed-worker transitions. An unemployed worker with skill i, reference tier k, and assets a chooses destination tier k' with probability $\mu_{ikk'}(a)$. Conditional on that choice, the worker selects tightness $\theta^*_{ik'}(a-\mathcal{M}_{kk'})$ and finds a job with probability $p_{k'}(\theta^*_{ik'}(a-\mathcal{M}_{kk'}))$.

A successful search generates employment in tier k' at the wage associated with the chosen submarket. Following an unsuccessful search, the worker remains unemployed, carries next-period assets determined by the unemployment saving policy, and enters the next period with k' as the reference tier. Thus, tier choice and job finding must be applied jointly; tier-choice probabilities alone do not describe the law of motion of unemployment.

Retirement and entry. With probability ρ_r, a worker retires and is replaced by a low-skilled unemployed entrant. Entrants are assigned the initial asset position and reference-tier distribution used in the computation. Assets left by retirees are redistributed according to

the inheritance rule specified in the main text. The subjective discount factor used in the value functions is adjusted for retirement through $\beta = \widehat{\beta}(1 - \rho_r)$.

Transition operator. Let s index a point in the discretized state space and let $P(s'|s)$ denote the transition probability implied by the saving, search, tier-choice, skill, separation, and retirement rules. Asset policies generally fall between grid points; we allocate probability to adjacent points using linear interpolation. We treat wage transitions analogously when necessary.

Stacking the employed and unemployed mass distributions in the vector Γ, the law of motion is

$$\Gamma' \;=\; P(\Psi)\Gamma, \tag{B.5}$$

where Ψ collects the converged policy functions. The stationary distribution solves

$$\Gamma^* \;=\; P(\Psi)\Gamma^*, \qquad \mathbf{1}'\Gamma^* \;=\; 1. \tag{B.6}$$

We obtain Γ^* by iterating (B.5) from an initial distribution until the maximum absolute change in cell masses is below the distributional tolerance.

The distributions $\Gamma^E_{ik}(a, w)$ and $\Gamma^U_{ik}(a)$ used elsewhere in the paper are the corresponding marginals of Γ^*.

B.3 Simulation

We initialize simulated workers by drawing from the stationary distribution and then apply the model's transition probabilities and policy functions period by period. For each worker, we record assets, employment status, skill, reference and employment tiers, wages, unemployment duration, and realized tier transitions. To reduce the influence of initial conditions, we discard the first T_{burn} periods and compute simulated moments from the remaining observations.

The baseline results use $N_{\text{sim}} = 6{,}000$ simulated workers over $T_{\text{sim}} = 500$ retained periods, following a burn-in of $T_{\text{burn}} = 500$ periods. We use common random numbers across parameter vectors and policy experiments so that changes in simulated moments primarily reflect changes in parameters rather than simulation noise.

B.4 SMM calibration details

Let Θ denote the vector of eleven internally calibrated parameters and let g^d and $g^m(\Theta)$ denote the vectors of empirical and model moments reported in Table 2. We choose Θ to minimize

$$\widehat{\Theta} \;=\; \arg\min_{\Theta\in\mathcal{P}} \left[g^m(\Theta) - g^d\right]' \mathcal{W} \left[g^m(\Theta) - g^d\right], \tag{B.7}$$

where $\mathcal{P}$ is the parameter space and $\mathcal{W}$ is the weighting matrix.

The eleven targeted moments are unemployment duration, the Tier-A employment share, the elasticity of unemployment-to-employment flows with respect to tightness, the average outside-option ratio, the asset–wage correlation, the share of workers with negative assets, the skill premium in each tier, the ratio of experienced workers across tiers, and the two directional tier-switching shares. All parameters are determined jointly; the parameter–moment discussion in the main text describes which moments primarily discipline each parameter rather than one-to-one identification.

Weighting matrix. The calibration uses an identity matrix.

Global and local search. We conduct a global search over $\mathcal{P}$ using a Sobol sequence with $N_{\text{Sobol}} = 50{,}000$ parameter vectors. For each vector, we solve the model, compute the stationary distribution and simulated moments, and evaluate (B.7). Starting from the best Sobol candidate, we then use the Nelder–Mead simplex algorithm to refine the solution. The optimization stops when both the parameter tolerance and the objective-function tolerance are below 10^{-4}.

C Data Appendix

C.1 Data Description

For the empirical analysis, we use data from the NLSY79, a nationally representative longitudinal survey of 12,696 individuals who were between 14 and 22 years old when they were first interviewed in 1979. We use a cross-sectional sample comprising 6,111 respondents, designed to represent the non-institutionalized civilian population living in the United States in 1979, with ages ranging from 14 to 22 as of December 31, 1978. From the core sample, we exclude individuals who served in the military for more than two years because their military experience does not represent the standard civilian labor-market experience. We further exclude respondents who are weakly attached to the labor market, defined as those who have been out of a job for more than 10 years.

Workers' employment histories The NLSY79 interviewed individuals annually from 1979 to 1993 and biennially from 1994 to 2016. The NLSY79 recorded labor force status weekly throughout the sample period, even in the later period when interviews were conducted biennially. Following Baley, Figueiredo and Ulbricht (2022), we use the NLSY79's Work History Data file to construct a monthly panel. This file records each respondent's work history week by week, including weekly labor status and hours worked. While an individual may hold more than one job, we focus on the primary job in a given month, defined as the one for which the individual worked the most hours. Using a mapping that links jobs across consecutive interviews, we construct a monthly panel of primary-job employment spells and nonemployment spells.

For each primary job, we retain information on the hourly wage, occupation, and industry codes. Before merging occupation and industry information with the employment panel, we clean occupational and industry titles using the approach outlined in Guvenen, Kuruscu, Tanaka and Wiczer (2020). For each job, we assign the occupation and industry codes most often observed during the employment spell. In the NLSY79, occupation titles are described by the 3-digit Census occupation code. Because this classification system changed over time[29], before cleaning, we converted all the occupational codes across the years into the *occ1990dd* occupation system developed by Dorn (2009), which has the advantage of being time-consistent.[30]

[29]Until 2000, NLSY79 reports occupation codes in the Census 1970 3-digit occupation code. After this year, occupation codes are reported in the Census 2000 3-digit occupation code.

[30]The crosswalk files between the Census classification codes and the *occ1990dd* occupation aggregates

Following Kambourov and Manovskii (2008), we mitigate measurement error by assigning each job the modal occupation code for its spell and classifying a switch as genuine only when it coincides with an employer change. Using this definition, we find that about 52% of EUE transitions involve an occupation switch, in line with the 45–67% range reported by Huckfeldt (2022) for the CPS Displaced Worker Supplement. Among EUE transitions without an occupational switch, around 35% are recalls to a previous employer, close to the 40% share reported by Fujita and Moscarini (2017) using the SIPP. These results confirm that even under a more traditional coding-based approach, our measurement strategy delivers credible benchmarks and a consistent mapping to the model's distinction between turbulent transitions (involving low ex post skill transferability) and tranquil ones.

Assets The NLSY79 contains detailed questions on household asset holdings and liabilities from 1985 onwards. The wealth information is not observed at the same frequency as the labor market data; asset data are collected at interview dates, yielding at most one observation per year. The NLSY79 defines all assets as the amount the respondent would reasonably expect someone to pay if the asset were sold in its current condition. Respondents report the market value of their assets at the time of the interview; we assign this information to that calendar month and leave all others blank. We use the CPI reported by the BLS to convert each asset's market value to 2000 dollars. From the detailed information reported in the NLSY, we create five categories of net assets—residential property, financial assets, business assets, vehicles, and others—as follows:

- Residential Property = "Market value of residential property r/spouse own" - "Amount of mortgages and back taxes r/spouse owe on residential property"
- Financial assets = "Total market value of stocks/bonds/mutual funds" + "Total amount of money assets like savings accounts of r/spouse"+ "Total amount of money in assets like IRAs or Keogh of r/spouse"+"Total amount of money in assets like CDs, loans or mortgages of r/spouse"
- Business assets = "Total market value of farm/business/other property r/spouse own"- "Total amount of debts on farm/business/other property r/spouse owe"
- Vehicles = "Total market value of vehicles including automobiles r/spouse own"- "Total amount of money r/spouse owe on vehicles including automobiles"

created by Autor and Dorn (2013) can be found at http://www.ddorn.net/data.

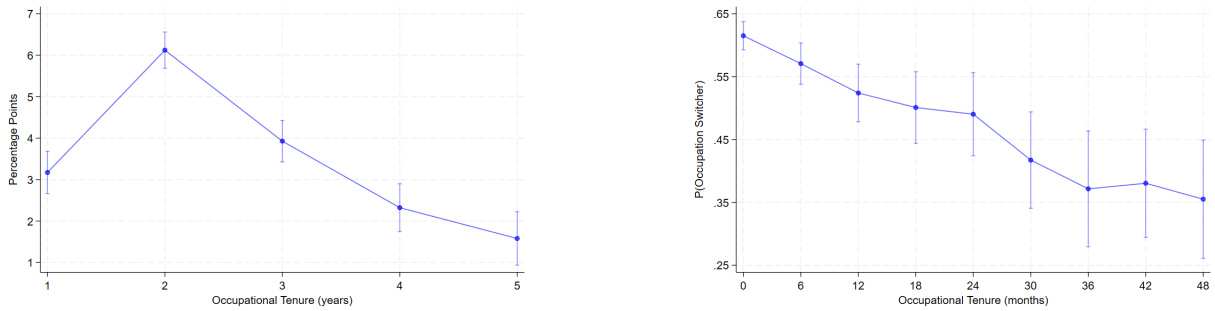
- Others = "Total market value of all other assets each worth more than $500"-"Total amount of other debts over $500 r/spouse owe"

We then define *Liquid Wealth* as the sum of business assets, financial assets, vehicles, and other assets, all net of debts. Following Lise (2013), we trim the top and bottom one-half of one percent of the distribution of the assets to reduce the influence of outliers.

C.2 Turbulence Risk

Figure C.1 supports our tenure classification. Wage returns to occupational tenure are concentrated in the first two years, while occupational switching declines sharply during the first 30 months and then stabilizes. We therefore classify workers with less than two years of tenure as untenured and later switches with low skill transferability as potentially turbulent.

Figure C.1: Occupational Tenure and Mobility



(a) Returns to Occupational Tenure (b) Occupational Mobility

Note: Panel (a) plots the wage return to working an additional year in an occupation during the first five years of employment in that occupation. Estimates control for individual characteristics (age and its square, labor market experience, gender, race, educational attainment, and ability), year, and month fixed effects. Panel (b) plots the probability of switching occupations from a logit regression that includes the same controls. Both panels use EUE transitions observed from 1979 to 2016 in the NLSY79.

C.3 Summary Statistics

The following table provides summaries of EUE transitions and worker characteristics at separation:

C.4 Wage differences

Table C.2 shows that our occupation-based definition of job tiers captures economically meaningful wage differences. Column 1 reports a substantial unconditional wage gap between tiers: workers in Tier A have log hourly wages about 0.48 log points higher than workers in Tier B. Column 2 shows that this difference remains sizable at 0.19 log points after controlling for age and its square, labor-market experience, gender, race, education, ability, industry, and year and month fixed effects.

Table C.1: Summary Statistics

	All	**Untenured**	**Tranquil**	**Turbulent**
EUE transitions	37,131	25,782	8,450	2,899
% of total	100	69.4	22.8	7.8
Worker characteristics at separation				
Age (years)	29.7	26.8	36.7	35.3
Job tenure (years)	1.4	0.5	3.2	3.5
Occupational tenure (years)	2.5	0.7	7.0	5.6
Labor market experience (years)	8.3	5.7	14.8	12.8
Hourly wage (2000 dollars)	11.5	9.5	17.2	11.9
Liquid wealth (thousands, 2000 dollars)	28.9	20.1	43.5	29.1
Wage growth at reemployment Δw (in %)	1%	4%	−2%	−13%

Notes: Average characteristics of EUE transitions observed from 1979 to 2016 in NLSY79.

Table C.2: Wage Differences Across Tiers

	(1) No controls	(2) Controls
Tier A	0.477***	0.189***
	(0.013)	(0.012)
Observations	1,059,962	1,059,962

Notes: The table presents OLS estimates of wage differences between workers employed in Tier A and Tier B jobs. The dependent variable is log hourly wages. Tier A is an indicator equal to one for workers employed in Tier A and zero for workers employed in Tier B. Column 1 reports the specification without controls. Column 2 controls for age and its square, cumulative labor-market experience, gender, race, industry, education, ability, and year and month fixed effects. Standard errors, clustered at the individual level, are reported in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

C.5 Robustness Checks

In this section, we show that the empirical findings are robust to:

(i) unemployment benefits and spousal income as controls (Figure C.2),

(ii) different thresholds for occupational tenure τ (Figure C.3),

(iii) excluding short unemployment spells (Figure C.4),

(iv) restricting the sample to EUE transitions of workers with high job tenure in the previous job (at least two years) to better isolate involuntary separations from quits and selective firings (Figure C.5),

(v) a more traditional definition of turbulence-based occupational mobility across 3-digit occupation codes, in contrast to our baseline turbulence measure based on angular distances in the space of occupational skills requirements (Figure C.6), and

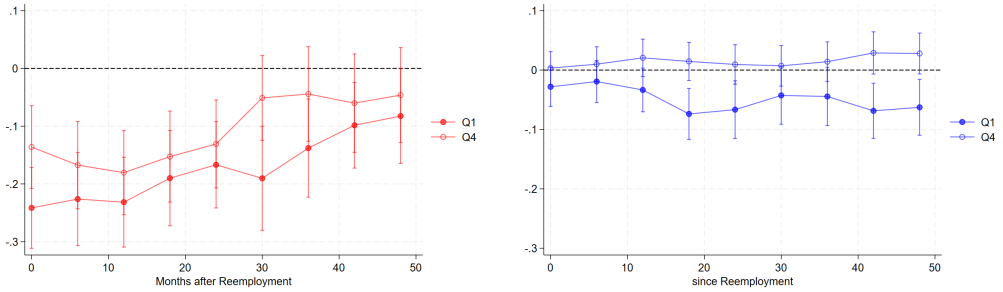
(vi) different definitions of liquid wealth (Figure C.7).

In all figures, we plot average residual wage growth at reemployment and every six months thereafter. The left plot shows turbulent transitions, defined as workers who switch to a new occupation with low skill transferability, i.e., those classified as experiencing a turbulent transition following an unemployment spell. The right plot shows tranquil transitions, defined as workers who, after unemployment, either return to their previous occupation or move to one with high skill transferability. Q1 and Q4 denote the first and fourth quartiles of the household liquid wealth distribution at the start of the unemployment spell. The sample covers EUE transitions observed from 1979 to 2016 in NLSY79.

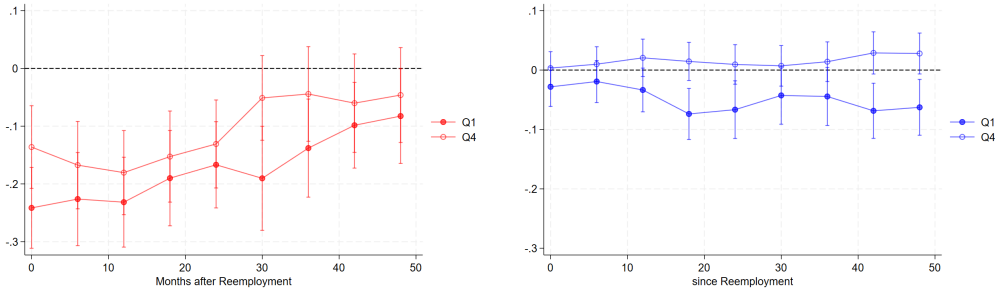
Across these alternative specifications, the wealth gradient is concentrated among turbulent transitions. Low-wealth workers experiencing low-transferability occupational moves suffer persistent wage losses, whereas high-wealth workers recover much of the initial decline. These exercises establish the robustness of the conditional pattern, but they do not eliminate the possibility that realized occupational choice contributes to the turbulence classification.

We also decompose the baseline wage paths according to whether reemployment occurs within the worker's pre-displacement tier or in a different tier. Figure C.8 reports this decomposition separately for turbulent and tranquil transitions.

Figure C.2: Robustness Check: Additional Controls

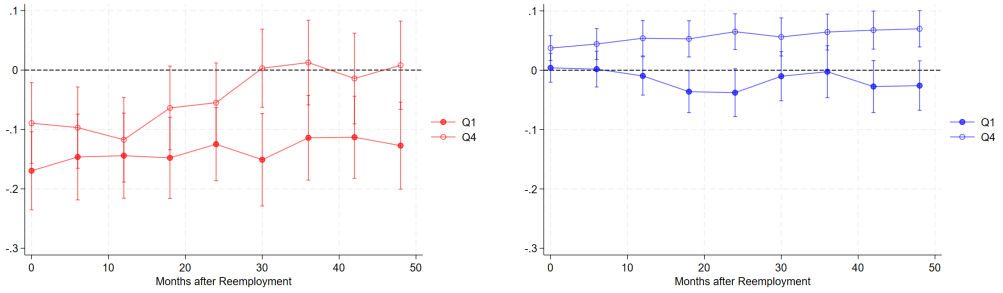


(a) Spousal Income

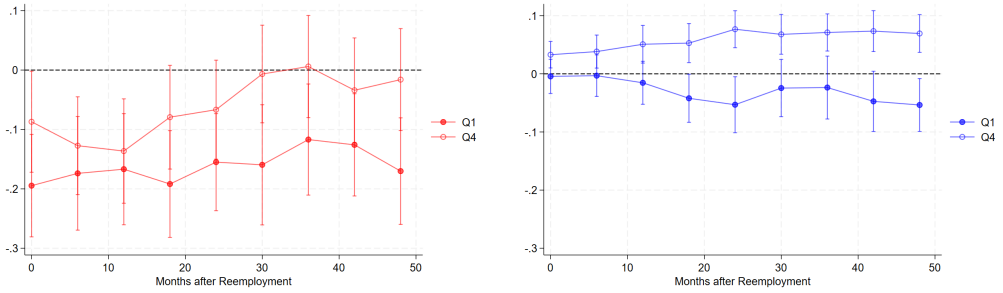


(b) Unemployment Benefits

Figure C.3: Robustness Check: Alternative Occupational Tenure Threshold (τ)

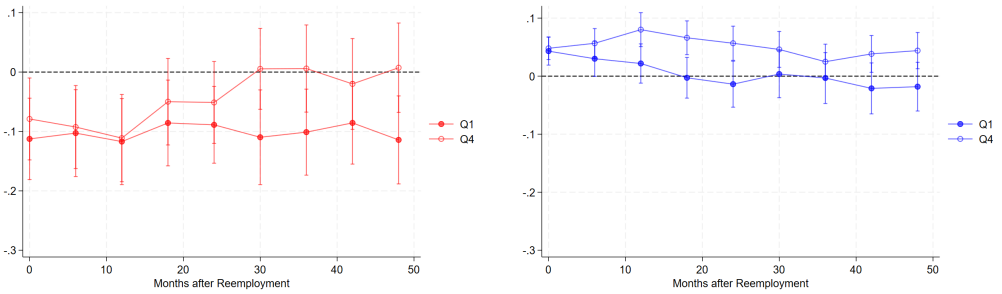


(a) Tenure Threshold Set at One Year

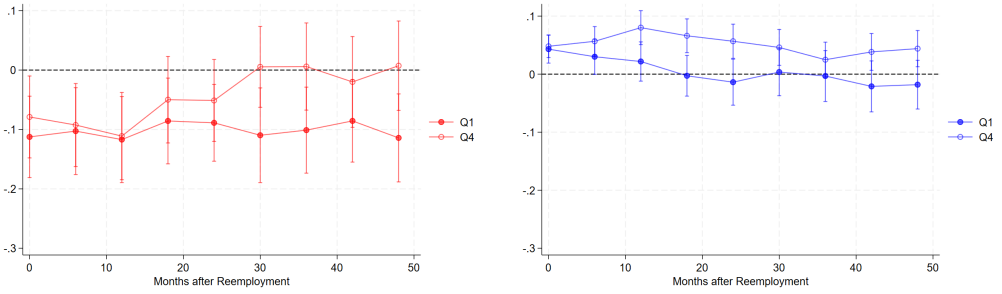


(b) Tenure Threshold Set at Three Years

Figure C.4: Robustness Check: Excluding Short Unemployment Spells



(a) Excluding Spells Lasting 1 Month



(b) Excluding Spells Lasting Less Than 2 Months

Figure C.5: Robustness Check: Restrict to Workers with High Job Tenure

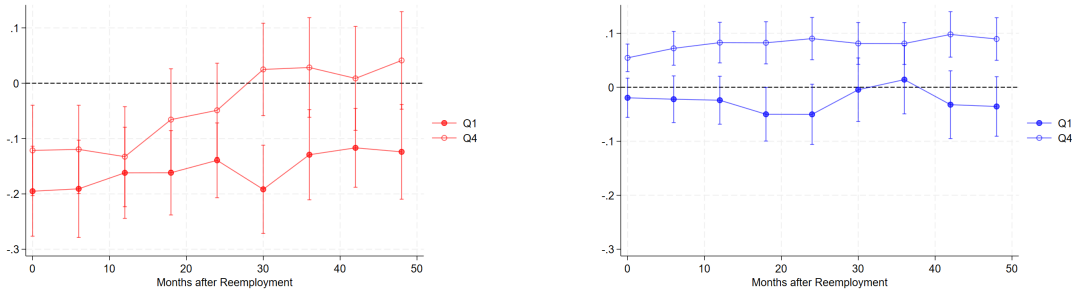


Figure C.6: Robustness Check: Switching Across 3-digit Occupations

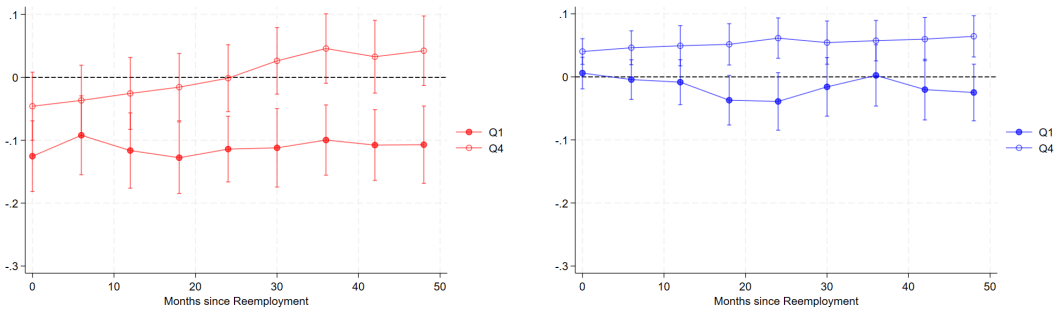
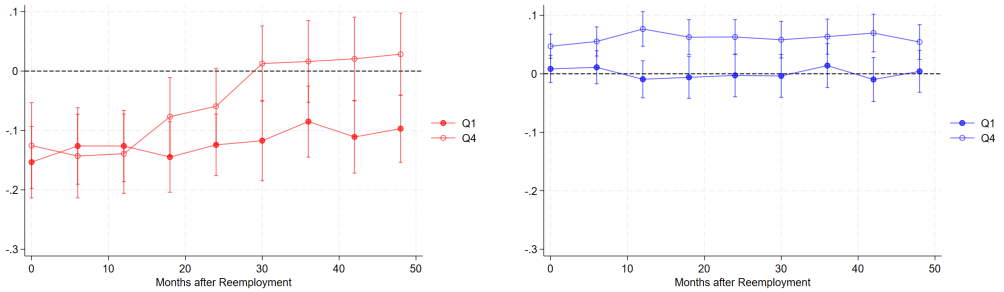
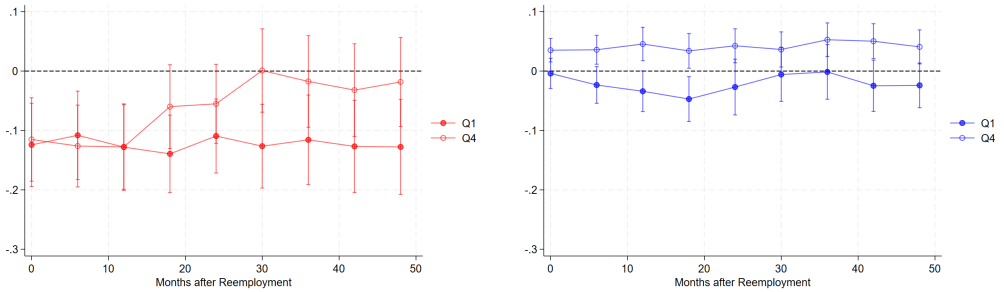


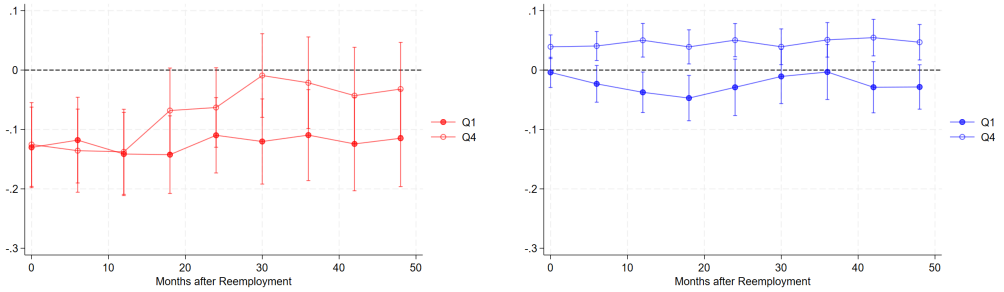
Figure C.7: Robustness Check: Different Definitions of Liquid Wealth



(a) *L1*: "Total market value of stocks/bonds/mutual funds" + "Total amount of money assets like savings accounts of r/spouse"

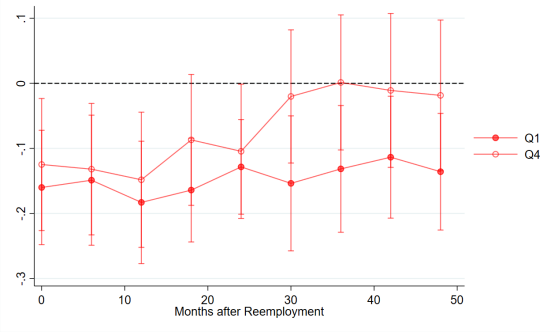


(b) *L2* = *L1* + "Total market value of vehicles inc. autos r/spouse own"- "Total amount of money r/spouse owe on vehicles inc. autos"

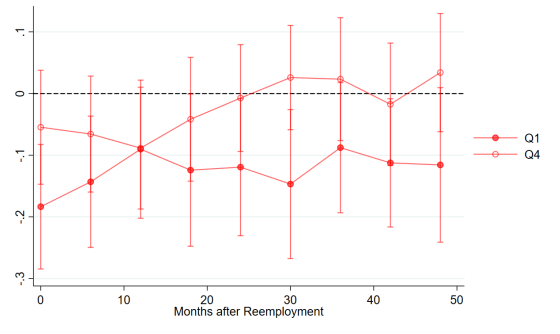


(c) *L3* = *L2* + "Total amount of money in assets like IRAs or Keogh" + "Total amount of money in assets like CDs or loans"

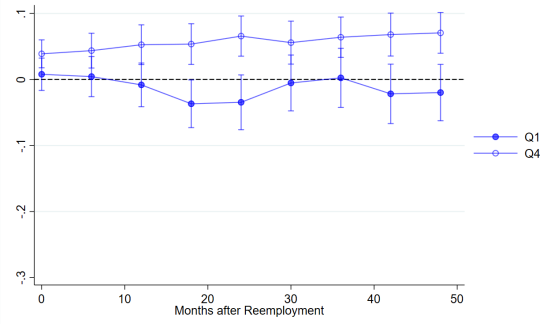
Figure C.8: Wages after Job Loss by Wealth and Tier Mobility



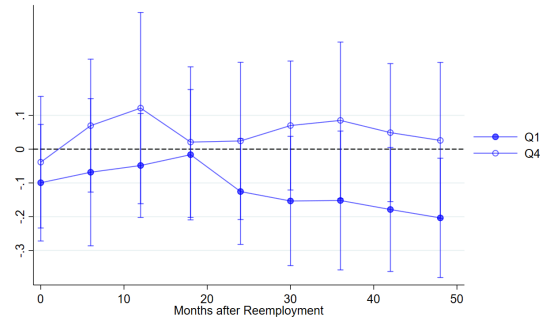
(a) Turbulent: Within Tier



(b) Turbulent: Across Tiers



(c) Tranquil: Within Tier



(d) Tranquil: Across Tiers

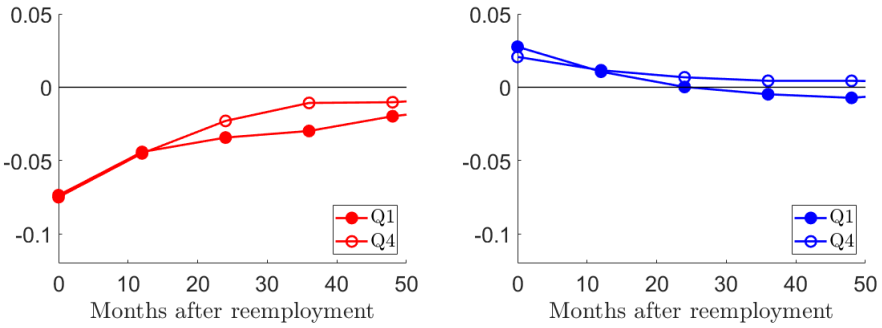
D Additional model outcomes

D.1 Counterfactuals

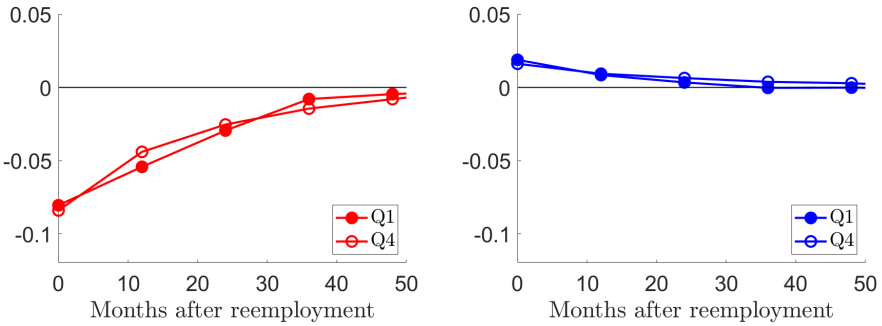
Figure D.1 reports average residual wage growth at reemployment and at 12-month intervals thereafter under alternative calibrations that weaken precautionary tier mobility. In each panel, the left plot shows turbulent transitions and the right plot shows tranquil transitions. Q1 and Q4 denote the first and fourth quartiles of the liquid-wealth distribution at the beginning of the unemployment spell. Panel (a) sets $\nu \to \infty$, making tier choices increasingly insensitive to differences in continuation values across wealth levels.[31] As a result, wealth no longer meaningfully affects the probability of searching across tiers. Panel (b) sets all Tier-B parameters equal to their Tier-A counterparts, eliminating the technological and search differences between tiers. In both exercises, the wealth gradient in post-displacement wage losses becomes substantially weaker. This confirms that the baseline gradient operates through the interaction of liquidity constraints with economically meaningful differences across tiers.

[31] In practice, we set $\nu = 10$, which is roughly 8.3 times its value in the estimated model.

Figure D.1: Effects of Removing Precautionary Tier Mobility



(a) No role for wealth in tier choice ($\nu \to \infty$)



(b) One-tier model

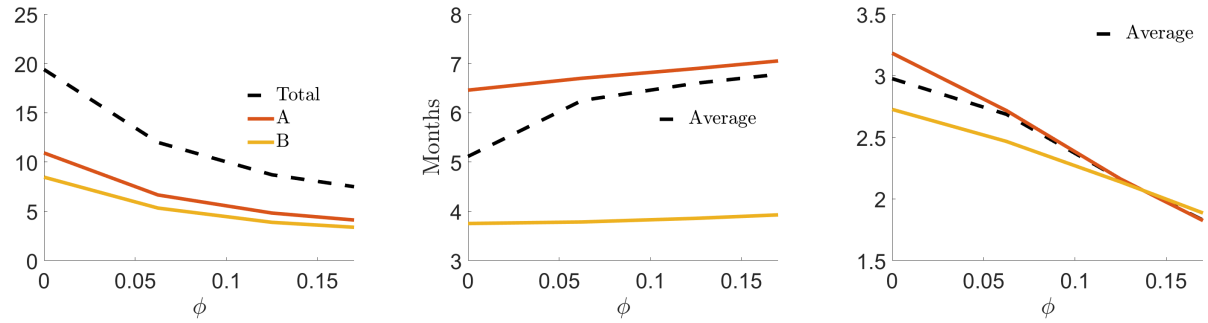
Note: The figure reports average residual wage growth at reemployment and at twelve-month intervals thereafter under alternative calibrations. The left plots show turbulent transitions, and the right plot shows tranquil transitions. Q1 and Q4 denote the first and fourth quartiles of liquid wealth at the beginning of the unemployment spell.

D.2 Precautionary Channels Across Tiers

Figures D.2 and D.3 show how the model's main precautionary channels respond to unemployment insurance generosity ϕ and the Tier-A vacancy subsidy ω. In each figure, Panel (a) shows total tier mobility and mobility by destination tier. The line labeled A denotes transitions into Tier A, while the line labeled B denotes transitions into Tier B. Panel (b) reports average unemployment duration, both in the aggregate and by tier. Panel (c) reports average liquid assets.

More generous unemployment insurance reduces precautionary tier mobility by relaxing liquidity constraints, allowing workers to remain selective longer, but it also lengthens unemployment spells and crowds out private savings. The vacancy subsidy instead expands Tier A job opportunities, altering mobility and search duration while affecting savings more heterogeneously.

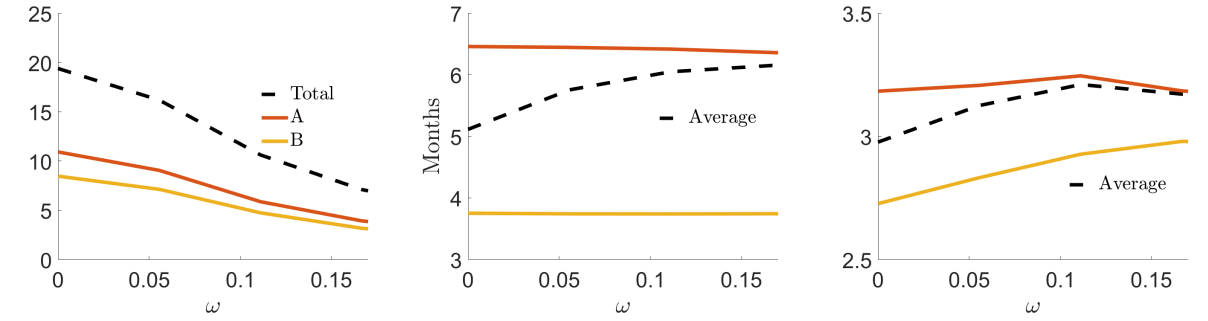
Figure D.2: Precautionary channels for different unemployment benefits ϕ



(a) Tier Mobility Rates (b) Unempl. duration (c) Average assets

Note: Panel (a) shows tier mobility rates (aggregate and by tier; 'A' line denotes switchers to A, and 'B' line shows switchers to B); Panel (b) shows unemployment duration in months, on average, and by tier; and Panel (c) shows assets, on average, and by tier. All outcomes are equilibrium values under varying UI generosity ϕ.

Figure D.3: Precautionary channels by tier for Tier-A vacancy subsidy ω



(a) Tier Mobility Rates (b) Unempl. duration (c) Average assets

Note: Panel (a) shows tier mobility rates (aggregate and by tier; 'A' line denotes switchers to A, and 'B' line shows switchers to B); Panel (b) shows unemployment duration in months, on average and by tier; and Panel (c) shows assets, on average and by tier. All outcomes are equilibrium values under varying job creation subsidy ω.

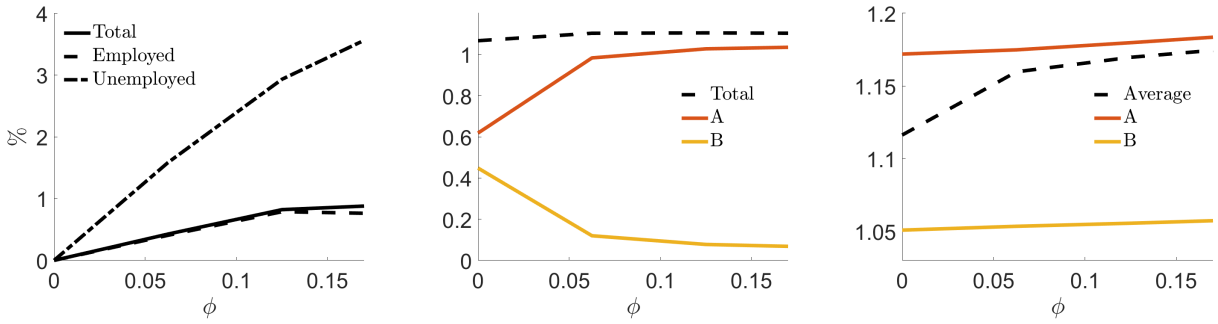
D.3 Macro Outcomes Across Tiers

Figures D.4 and D.5 report the aggregate effects of unemployment insurance and vacancy subsidies. Panel (a) shows welfare, both economy-wide and separately by employment status. Panel (b) reports output in the aggregate and by tier. Panel (c) reports average wages overall and within each tier.

The two policies operate through distinct mechanisms. Unemployment insurance primarily affects workers' liquidity, savings, and search selectivity. The Tier-A vacancy sub-

sidy instead changes firms' vacancy-posting incentives and the composition of employment across tiers. The figures therefore complement the main policy analysis by showing how the welfare and output effects are connected to changes in wages, employment allocation, and self-insurance behavior.

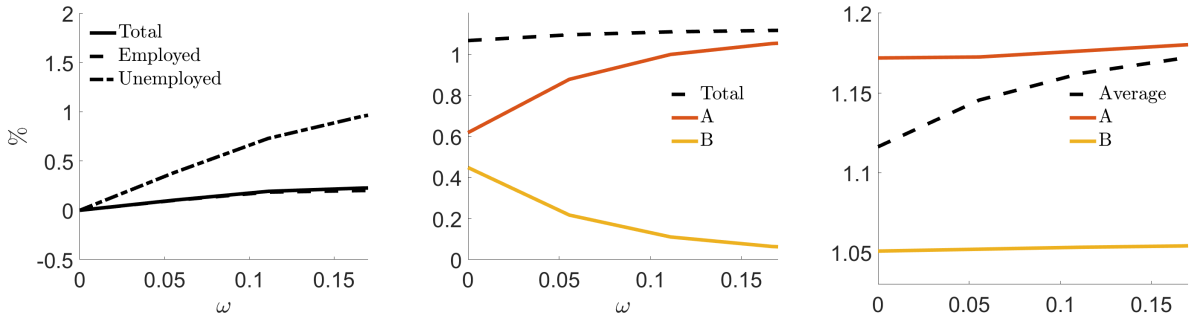
Figure D.4: Macro Outcomes for different unemployment benefits ϕ



(a) Welfare (b) Output (c) Wages

Note: Panel (a) shows welfare, aggregate and by employment status; Panel (b) shows output, total and by tier; and Panel (c) shows wages, average and by tier. All outcomes are equilibrium values under varying UI generosity ϕ.

Figure D.5: Macro outcomes for Tier A vacancy subsidy ω



(a) Welfare (b) Output (c) Wages

Note: Panel (a) shows welfare, aggregate and by employment status; Panel (b) shows output, total and by tier; and Panel (c) shows wages, average and by tier. All outcomes are equilibrium values under varying vacancy subsidy ω.