Wealth, Wages, and Employment

Still Preliminary

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  - Workers are risk averse, so only use self-insurance.
  - Workers sometimes lose their jobs or quit or switch.
  - The economy aggregates into a modern economy (total wealth, labor shares, consumption/investment ratios)

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- Especially Eeckhout and Sepahsalari (2024), Chaumont and Shi (2022), Griffy (2021).

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3. Need to add two-sided noise (EVS) to generate useful wage dispersion and turnover.

Build the Theory Sequentially

1. Exogenous Job Destruction and Worker Quits. Built on top of Growth Model.

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4. Add Manager Posting Shocks. Gives full Support to Wages even in Business Cycles (again EVS).

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- General equilibrium: Workers own firms.

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5. Job Matching : $M(V, U)$: Some vacancies meet some unemployed job searchers. A match becomes operational the following period. Job finding and job filling rates $\psi^h(\theta) = \frac{M(V,U)}{U}$, $\psi^f(\theta) = \frac{M(V,U)}{V}$.

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- Problem of the unemployed: Choose which wage to look for

$$V^u(a) = \max_{c,a',w} u(c) + \beta \left\{\psi^h[\theta(w)]\ V^e(a',w) + [1-\psi^h[\theta(w)]]\ V^u(a')\right\}$$
$$\text{s.t.} \quad c + a' = a(1+r) + b, \quad a \geq 0$$

$\theta(w)$ is an equilibrium object

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- Up to a certain level of wealth, richer households apply to higher wages. After that, it seems not. Consistent with theory

Firms Post vacancies at different wages & filling probabilities

- Value of a job with wage w: uses constant $\overline{k}$ capital that depreciates

$$\Omega(w) = z - \overline{k}\delta_k - w + \frac{1-\delta}{1+r}\Omega(w)$$

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Block Recursivity Applies (firms can be ignorant of Eq)

- Value of creating a firm includes posting a vacancy: $\psi^f[\theta(w)]\ \ \Omega(w)$

- Free entry condition requires that for all offered wages

$$\bar{c} + \overline{k} = \psi^f[\theta(w)]\ \ \frac{\Omega(w)}{1+r} + [1 - \psi^f[\theta(w)]]\ \ \frac{\overline{k}(1-\delta_k)}{1+r},$$

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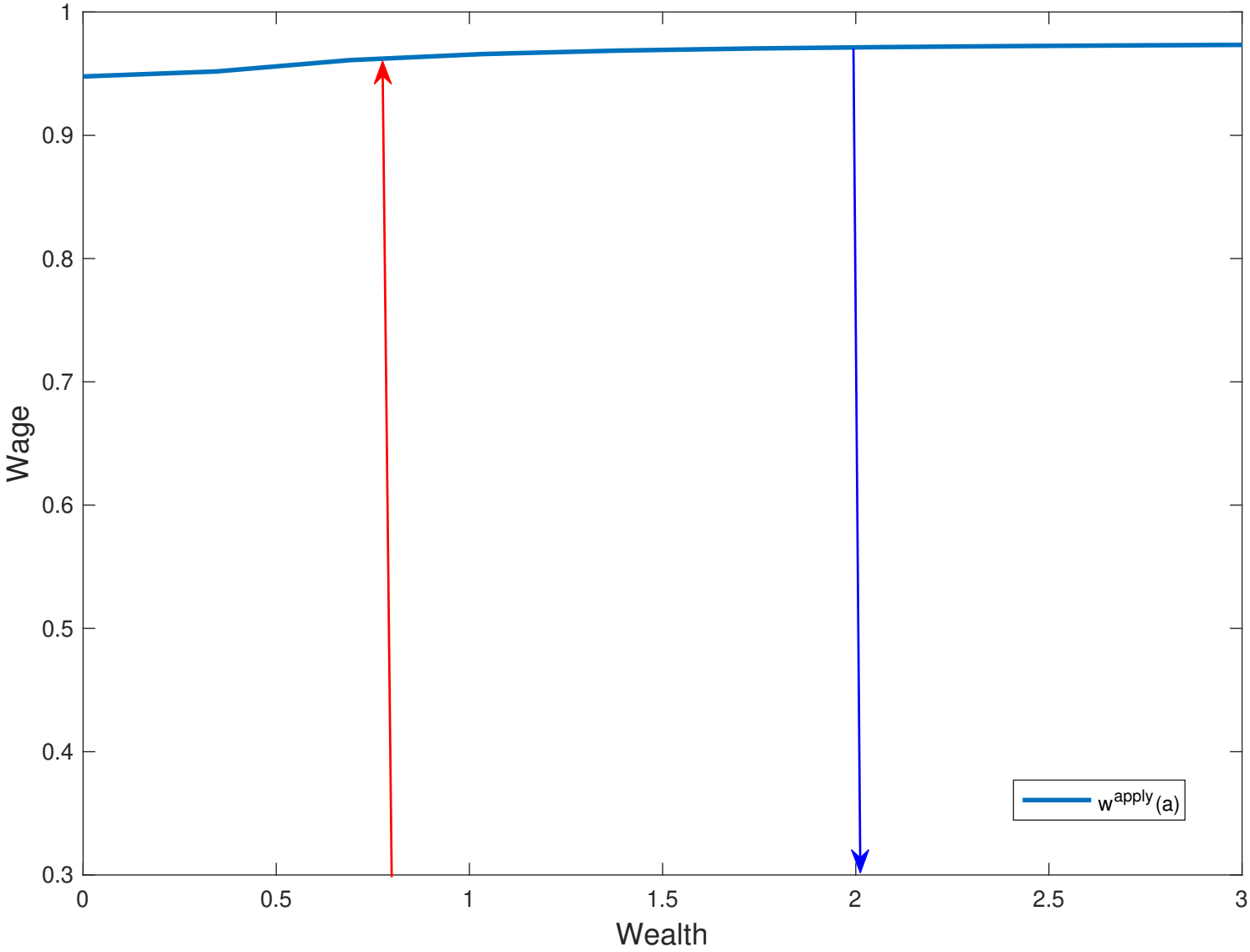
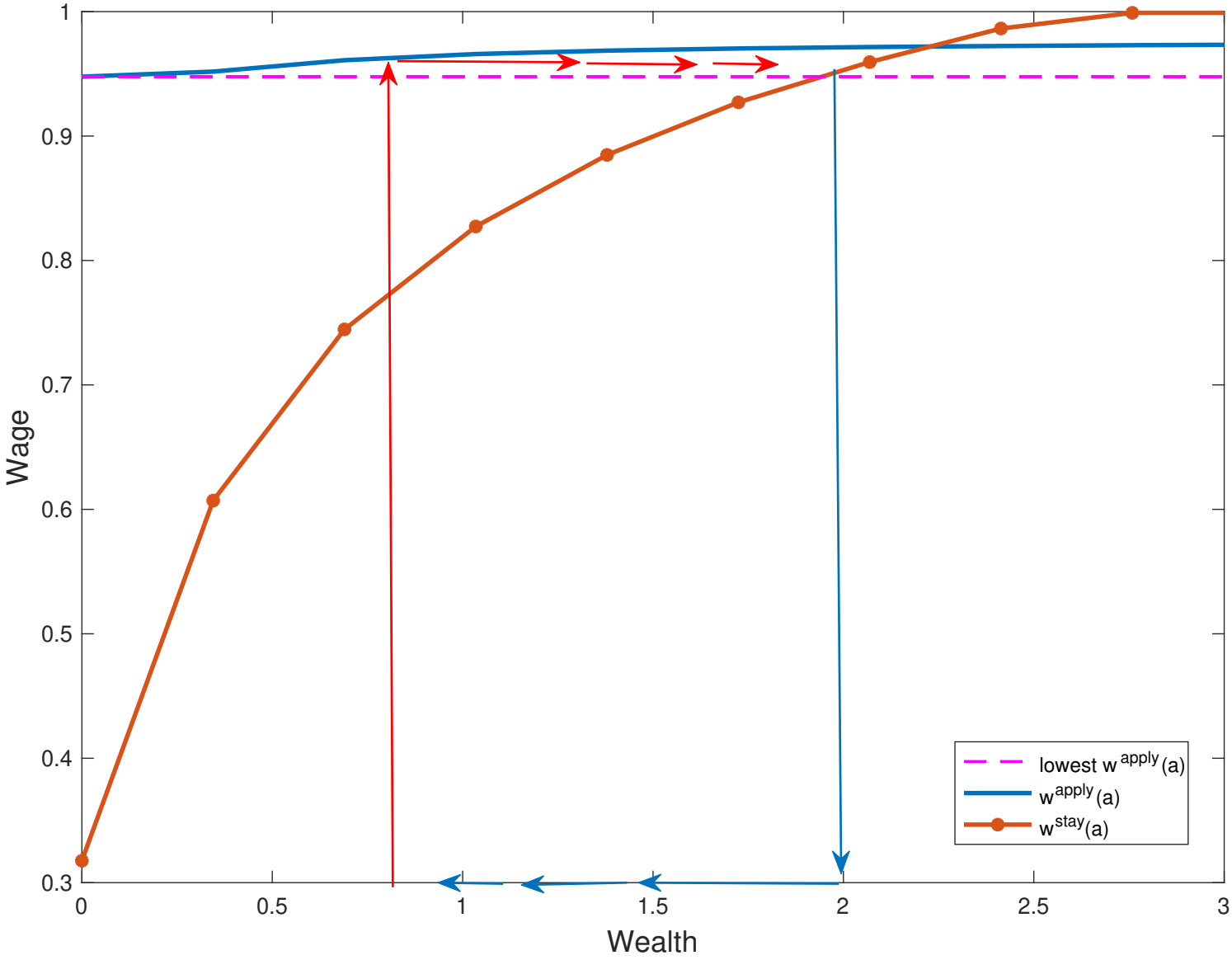
  3. An interest rate r clears the asset market

$$\int a \; dx = \int \Omega(w) \; dx.$$

Worker's wage application decision



Worker's saving decision



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- After saving, the employed choose whether to search, quit or neither

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- Neither is just

$$V^e(a', w)$$

- Employed Households solve

$$V^e(a,w) = \max_{a' \geq 0} u[a(1+r) + w - a'] + \beta \left[\delta V^u(a') + (1-\delta)\widehat{V}^e(a',w)\right]$$

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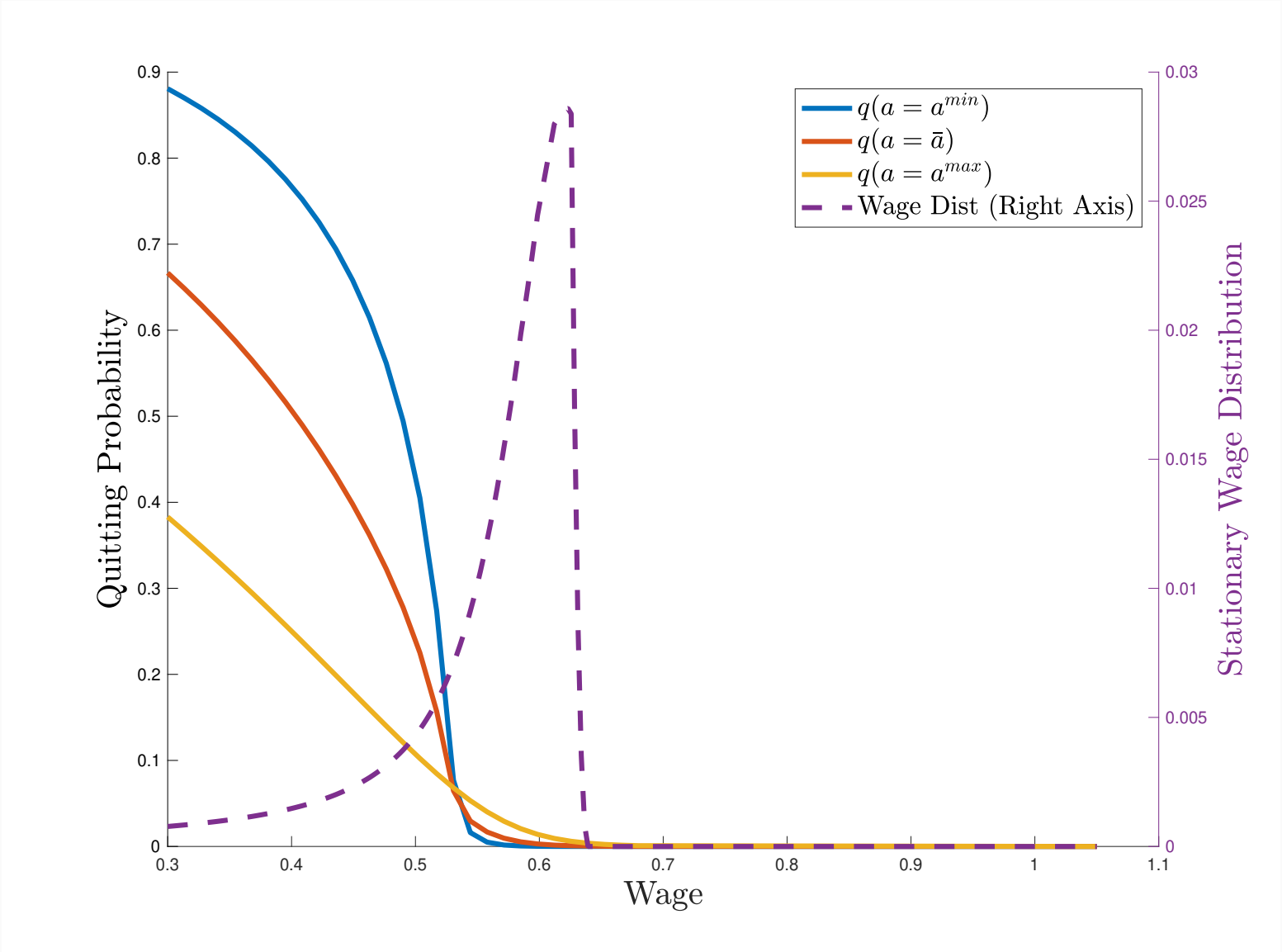
- The solution involves probabilities of quitting and of searching

$$q(a',w) = \frac{1}{1 + \exp(\alpha[V^e(a',w) - V^u(a')]) + \exp(\alpha[V^s(a',w) - V^u(a') + \mu^s])},$$
$$s(a',w) = \frac{1}{1 + \exp(\alpha[V^u(a') - V^s(a',w)]) + \exp(\alpha[V^e(a',w) - V^s(a',w) - \mu^s])}.$$

$\mu^s < 0$ is the mode of the shock ϵ^s which reflects the search cost.

OJS Quitting Probabilities, Various wealths & Wage Density



- The rich pursue often other activities (leisure?)

- The value of the firm is

$$\Omega^{\mathbf{0}}(w) \quad = \quad (z - w - \delta^k k)\; Q^{\mathbf{1}}(w) + (1 - \delta - \delta_k)k\; Q^{\mathbf{0}}(w),$$

$$Q^{\mathbf{1}}(w) = 1 + \sum_{\tau=\mathbf{0}}^{\infty} \left[\left(\frac{1-\delta}{1+r} \right)^{\mathbf{1}+\tau} \prod_{i=\mathbf{0}}^{\tau} \ell^i(w) \right],$$

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$$\ell^j(w) = 1 - \int h(w;a)\; q[g^{e,j}(a,w), w]\, dx^u(a) -$$

$$\int h(w;a)\; s[w; g^{e,j}(a,w)] \left[\int \hat{h}[\widetilde{w}; g^{e,j}(a,w), w] \xi \phi^h(\widetilde{w})\; d(\widetilde{w}) \right] dx^u(a)$$

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- Without knowing the wealth of the worker it is Not block recursive but Q^0 and Q^1 are sufficient. (No need to index contracts by wealth (as in Chaumont and Shi (2022).)

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- So we want to reduce the correlation on wages and wealth when hired.

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- Still agents will mostly the "right" wages (controlling the variance).

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- The rest is the same.

4: Manager Vacancy Posting Shocks

- The value of a firm with newly hired worker at w is as before

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$$Q^{\mathbf{1}}(w) = 1 + \sum_{\tau=\mathbf{0}}^{\infty} \left[\left(\frac{1-\delta}{1+r} \right)^{\mathbf{1}+\tau} \prod_{i=\mathbf{0}}^{\tau} \ell^i(w) \right],$$

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- This gives the probabilities of where to post
- Prospective entrants understand the incompetence of their managers:

$$\bar{c} + \overline{k} = \frac{\widehat{\Omega}}{1+r}$$

A little Detail on Computation (ensures the zero profit condition holds)

- When we discretize the set of wages, solving the zero profit condition requires solving a system of equations:

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$$o = \sum_j \Pi^j \left\{ \left(1-\psi^f(w_j)\right) \left((1-\delta^f) \left[o + \sum_\ell e^\ell \int_a q(a, w^\ell) dF(a) \right] + x \right) \right\}.$$

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  3. Matching probability j is determined as a function of vacancies and unemployed:

$$\psi^f(w_j)=\frac{\iota^j}{\left\{(\iota^j)^\eta+\left[(o+x)\Pi^j\right]^\eta\right\}^{1/\eta}}j=1,\ldots,J.$$

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$$\psi^f(w_j)=\frac{u^j}{\left\{(u^j)^\eta+\left[(o+x)\Pi^j\right]^\eta\right\}^{1/\eta}}j=1,\ldots,J.$$

  4. Probability of managers posting a vacancy in market j:

$$\Pi^j=\frac{1}{1+\sum_{k\neq j}\exp\left\{\alpha_F\left[\Omega^0(w_k)-\Omega^0(w_j)\right]\right\}}j=1,\ldots,J.$$

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Preliminary Quantitative Findings

Plan II: Study Fluctuation Properties Related to Wage Rigidity

- Outside Steady State Employers commit to a wage schedule

$$w(z) = \phi \; z \; w$$

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- We estimate the value of ϕ off the Business cycle Properties.

Steady State Allocations in Yearly Units: Endog Quits & OJS

Interest rate	3.%
Output	1.000
Avg consumption	.733
Avg wage (also labor share)	.700
Nonmployment	.145
Avg New Wage from Unemployment	.662
Avg New Wage	.668
Avg wealth	3.401
Monthly Quits Prob	.019
Monthly Job Losing Prob	.003
Wage of newly hired unemp	.619
Coeff Var Consumption	.123
Coeff Var Wage	.067
Coeff Var Wealth	1.004
Mean-min consumption	2.024
Mean-min wage	1.250
Monthly U-E transition	.133
Monthly J2J Moves	.002
Vacancies	0.826

Aggregate Fluctuations (untrustworthy as of now)

Introduce Aggregate Shocks (in a small open economy)

- We now pose a standard aggregate shock

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  - If wages were completely rigid there would be massive quits: counterfactual.
  - By aiming at the Job to Job Volatility we can estimate the degree of wage rigidity φ^z
  - We use the Boppart et al. (2018) way of solving aggregates (switching to Auclert et al. (2021))

Baseline: IRF to z shock: Typical Response when wages sufficiently flexible

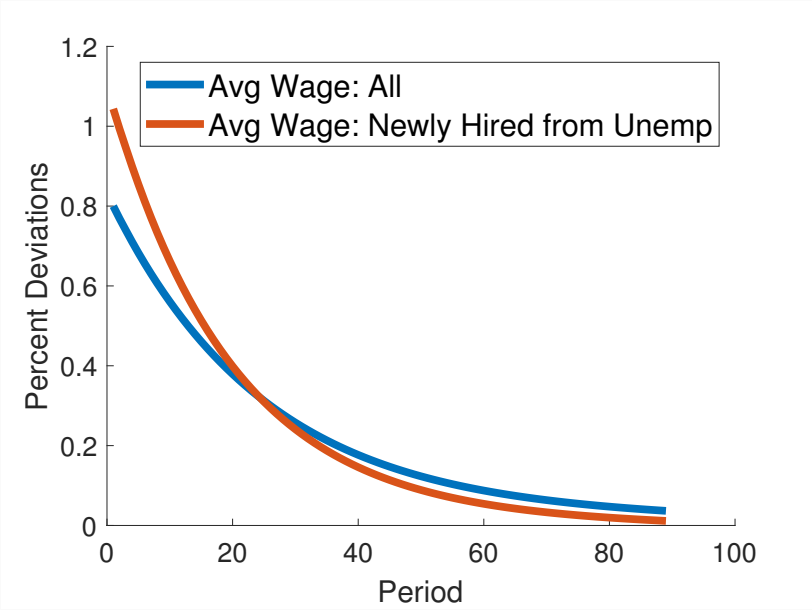

Figure 1: Wages

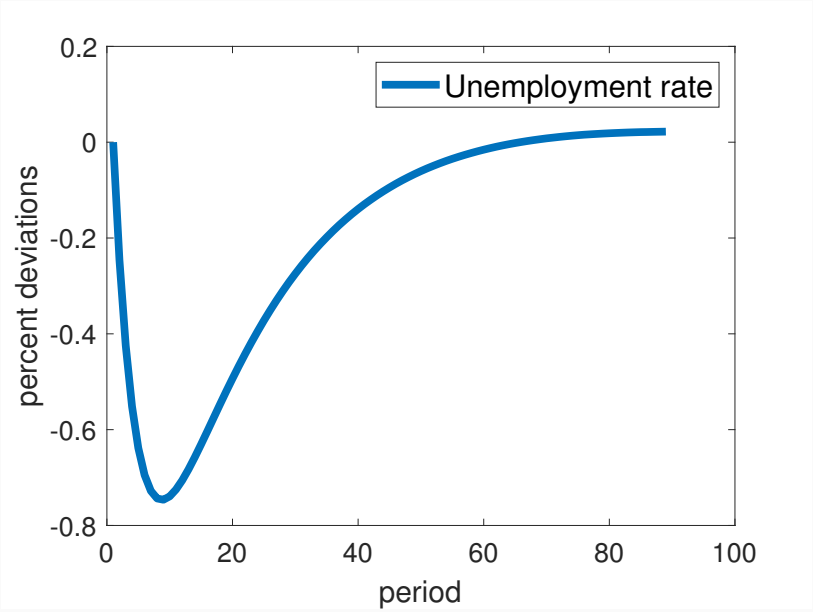

Figure 2: Unemployment Rate

- Obviously New wages move more than average wages
- Some response of unemployment

Baseline: IRF to z shock

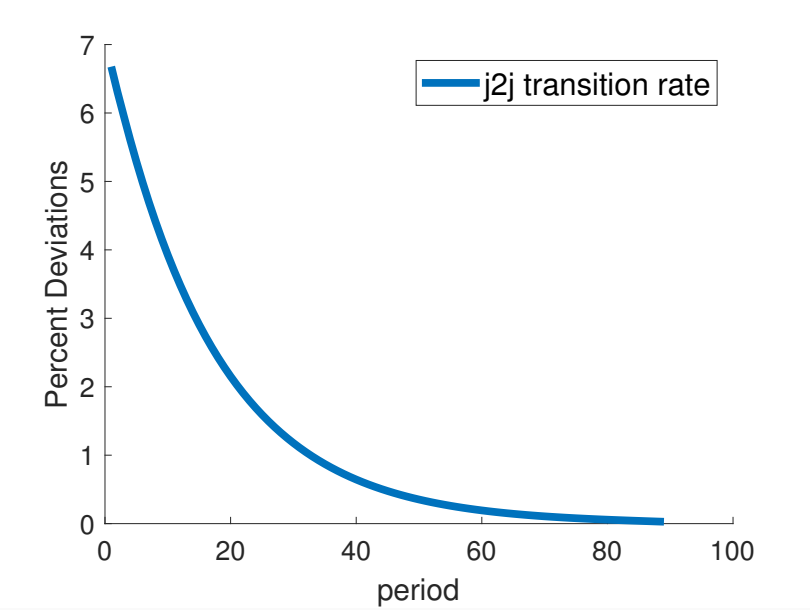

Figure 3: J2J transitions

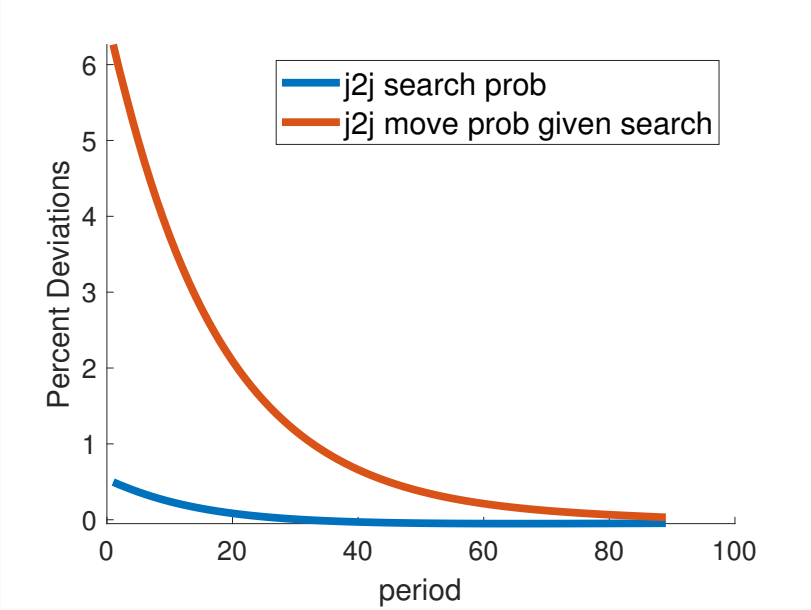

Figure 4: J2J search & JFP

- Too much responsive j2j transitions
- Due to improved job finding probabilities, not more searchers

Assessing Performance in terms of standard HP-filtered 2nd moments

- 1st order data moments are from standard database: CPS, JOLTS, LEHD and NIPA.

- 2nd order data moments are from Haefke et al. (2013), Campolmi and Gnocchi (2016), Brown et al. (2017) and Fujita and Nakajima (2016).

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- Obvious Extension is to consider variations on the quality of the match which is what may trigger workers to switch jobs which may make it more procyclical
- Helps to stay out of the bargaining undisciplined obsession.

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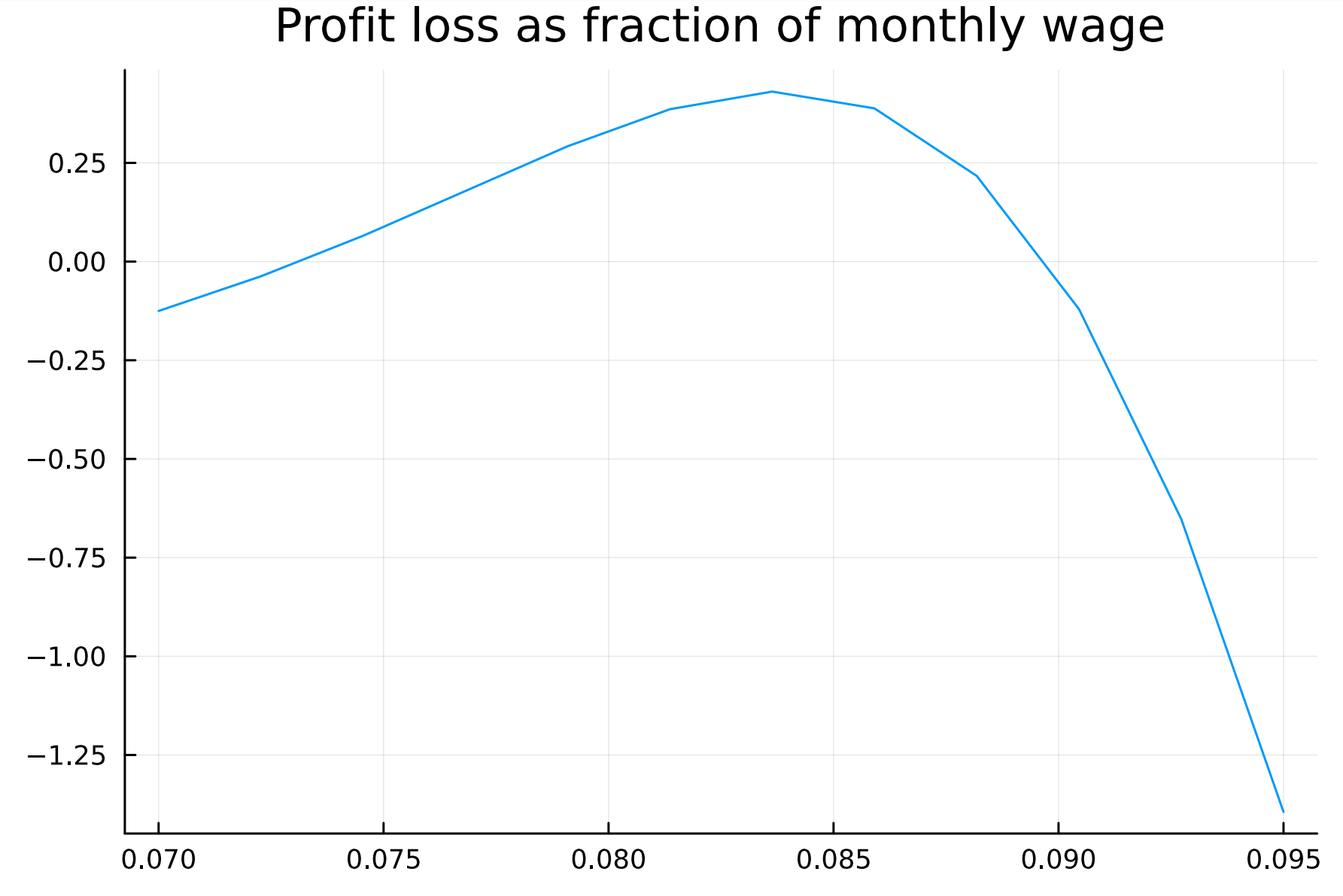
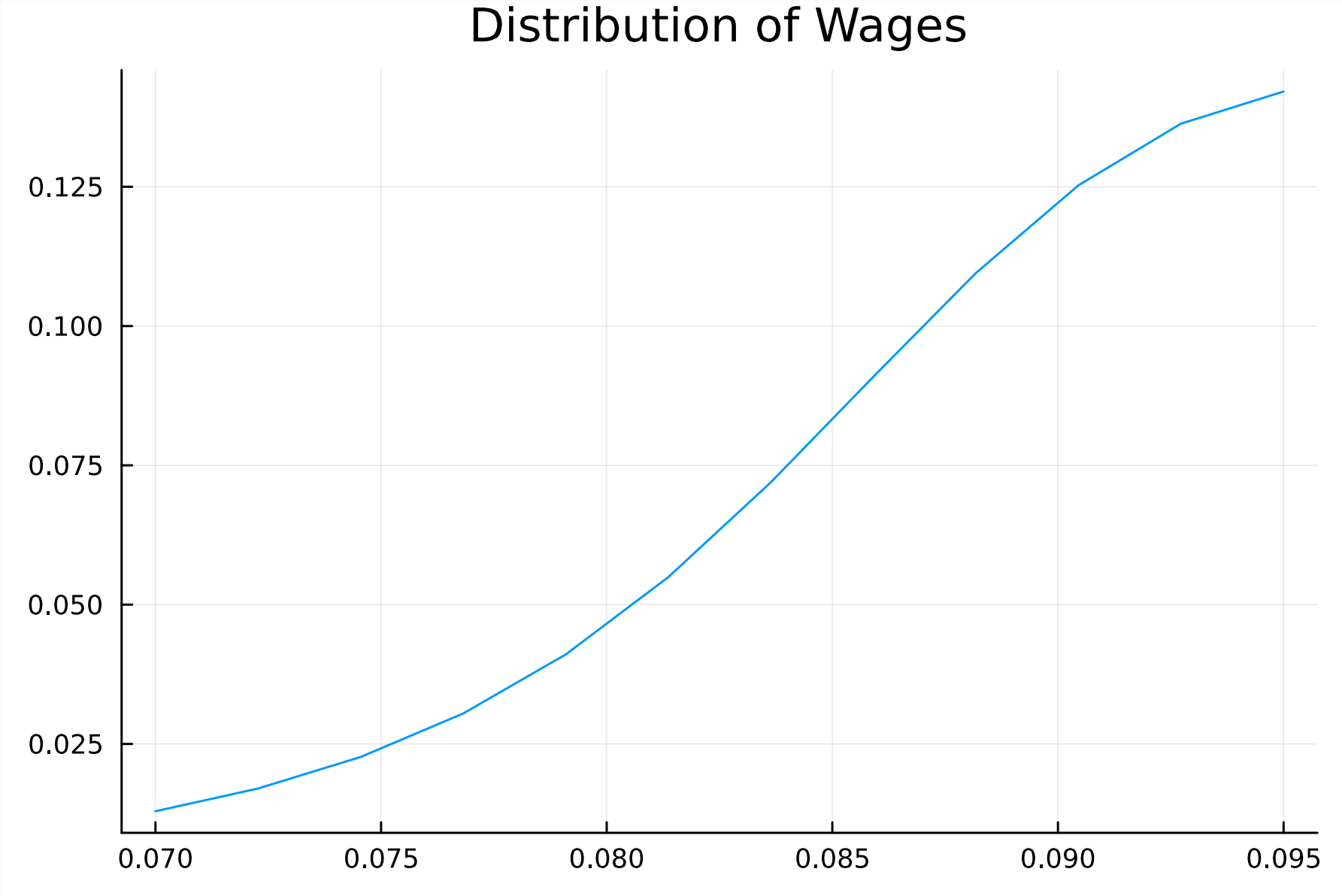
  - Getting the right relative volatility of old and new wages and the amount of job-to-job moves and quits provides a way to measure wage rigidity.
- With partial wage rigidity the model fares reasonably well with the data. A few things still to improve. (Excessive Job-to-JOB transitions)

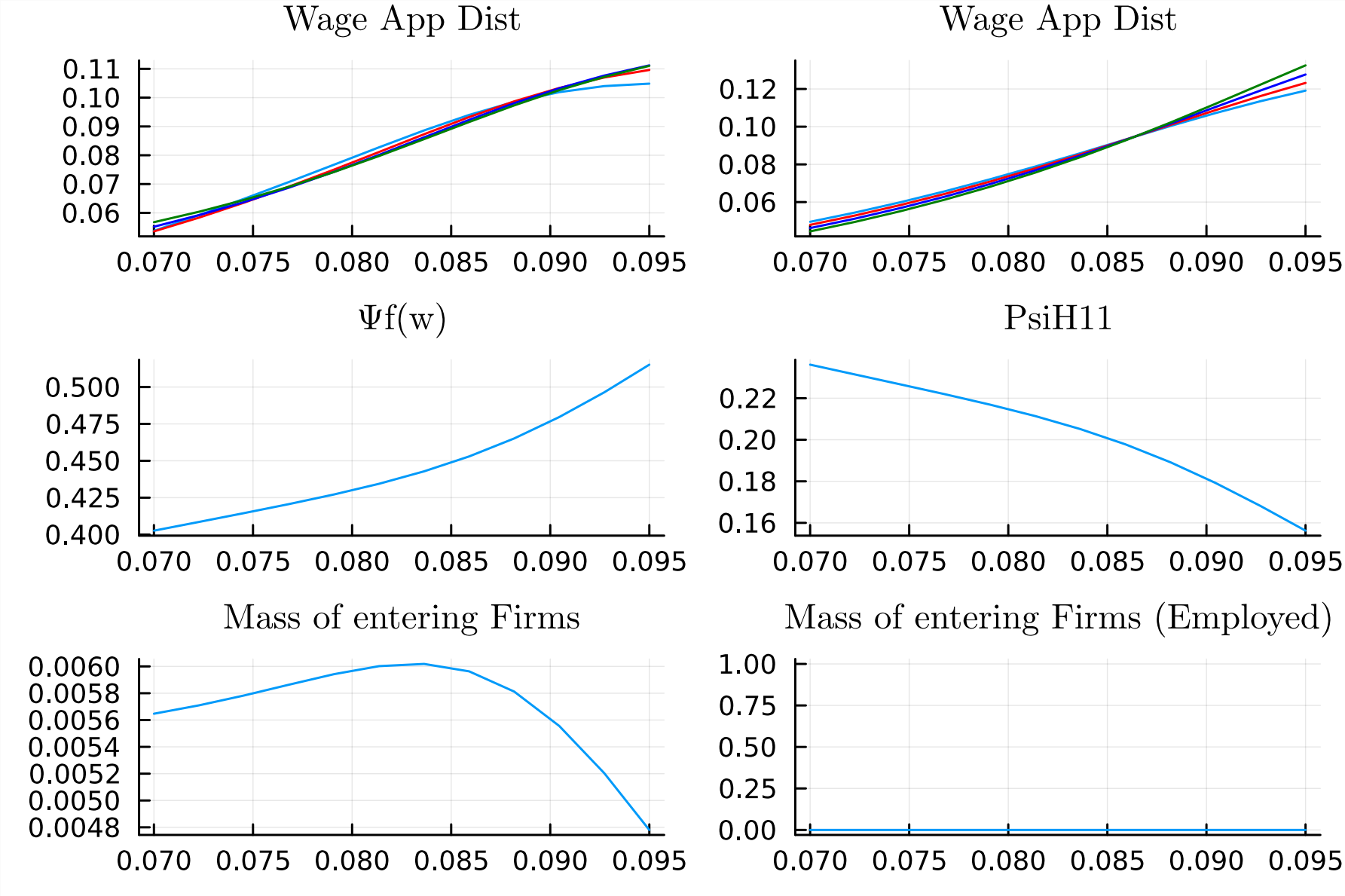
How important are Wage posting Errors?



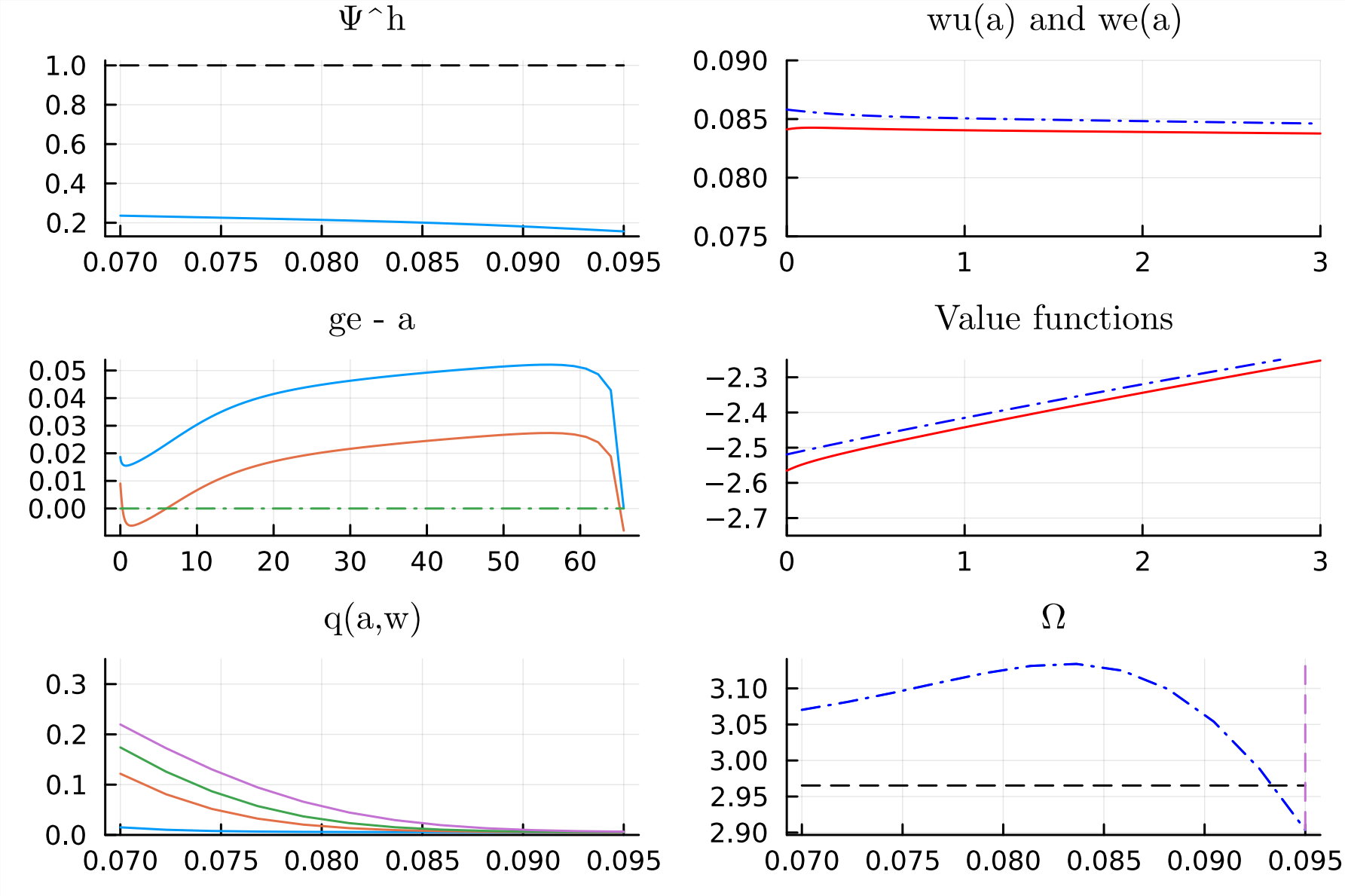
High Wages are Hard to Quit



Various Properties of Labor Market



Various Other Properties



5: Firms Destruction Shocks: Time-line

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1. Workers start period with or without a job: $V^e(a, w)$, $V^u(a)$. Firms start as $\Omega^j(w), \Omega$.
2. Production payment of dividends and wages & Consumption and investment:
3. Firms Get Profitability Shocks that determine their survival.
4. Quitting? Searching? Neither?: Employed draw shocks $(\epsilon^e, \epsilon^u, \epsilon^s)$ and make decision to quit, search, or neither. Those who quit become u', those who search join the u, in case of finding a job become $\{e', w'\}$ but in case of no job finding remain e' with the same wage w and those who neither become e' with w. $\widehat{V}^E(a', w)$, is determined with respect to this stage.
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- Each firm has a firm profitability shock ζ, say normally distributed. To survive, $\Omega^j(w) \geq \zeta$ which happens with probability

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- The measure of firms destroyed add their capital to the amount depreciated.

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8. Match

Outside the Labor Force Model: Time-line

1. Workers enter period with or without a job: V^e, V^u.
2. Production payment of dividends and wages & Consumption :
3. Exogenous Separation
4. Quitting? Searching? Neither?: Only for the Employed
5. In the beginning of the period non Workers get a shock to the utility of either searching or not searching. They then choose whether to sit out and not search or to search. It is an extreme value shock. Workers get a utility injection equal to the expected utility of the maximum of those two shocks to get no bias in the value of working versus not. There may also be a Markov chain for workers that determines the value of b. High b are likely to be outside the labor force for periods on end.
6. Search
7. $\widehat{V}^u(a'), \{\Omega^j(w)\}$ are determined with respect to this stage.
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Matching function	$m = \chi u^\eta v^{1-\eta}$, OJS	$\chi = 0.3$
		$\eta = 0.5$

Productivity Shock Rep Agent "Sort" of Closed Economy ($\rho = 0.95$)

	$\rho^w = 0$	$\rho^w = 0.95$
	Relative Standard Deviation	
GDP	1	1
Average wage	0.047	0.656
New wage	1.045	0.216
Nonemployment	0.883	0.91
Unemployment	0.173	0.162
Quits	0.448	0.76
OJS moves	0.329	0.195
Consumption (per E)	0.177	0.131
Consumption (total)	0.308	0.262
Investment (total)	1.098	2.645
Vacancy (total)	0.904	1.802