

Discussion of
“Labor-Market Matching with Precautionary Savings (and Aggregate Fluctuations)”

by Per Krusell, Toshihiko Mukoyama and Aysegül Sahin

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University of Pennsylvania, CEPR, and NBER

NY/Philadelphia Workshop on Quantitative Macroeconomics
May 11, 2007

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**“Mortensen-Pissarides Meets Bewley-Huggett-Aiyagari (and
Krusell-Smith)”**

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Purpose of the Paper

- Methodological: Show how to compute Mortensen-Pissarides equilibrium unemployment model with risk-averse households that can save.
- Substantive 1: Provide a (quantitative) theory of cross-sectional wage dispersion.
- Substantive 2: Provide a quantitative theory of (un-)employment fluctuations over the cycle.

The Model without Shocks: Households

- State variables: assets a , employment status $\in \{u, e\}$
- Take as given:
 - endogenous wage function $\omega(a)$,
 - endogenous interest rate $r - \delta$.
 - Exogenous probability of becoming unemployed, σ and endogenous probability to find a job λ_w
- Only meaningful decision is standard consumption-savings decision.

The Model without Shocks: Households

- Dynamic programming problem of employed, yielding $a' = \psi_e(a)$

$$W(a) = \max_{c, a' \geq 0} \left\{ u(c) + \beta \left[\sigma U(a') + (1 - \sigma)W(a') \right] \right\}$$

$$c + \frac{a'}{1 + r - \delta} = a + \omega(a)$$

- Dynamic programming problem of unemployed, yielding $a' = \psi_u(a)$

$$U(a) = \max_{c, a' \geq 0} \left\{ u(c) + \beta \left[(1 - \lambda_w)U(a') + \lambda_w W(a') \right] \right\}$$

$$c + \frac{a'}{1 + r - \delta} = a + h$$

The Model without Shocks: Firms

- Post vacancies at cost ξ per period
- Match formed with endogenous probability λ_f . Production of a match given by $zF(k)$
- Match destroyed with exogenous probability σ .
- Since wages depend on workers' asset level a , this becomes a state variable for the firm (match).

The Model without Shocks: Firms

- Bellman equation for a filled vacancy

$$J(a) = \max_k \{zF(k) - rk\} - \omega(a) + \frac{1 - \sigma}{1 + r - \delta} J(\psi_e(a))$$

- Value of posting a vacancy

$$V = -\xi + \frac{1}{1 + r - \delta} \left[(1 - \lambda_f)V + \lambda_f \int J(\psi_u(a))\mu_u(a)da \right] = 0$$

The Model without Shocks: Wage Determination

- Nash bargaining

$$\omega(a) = \arg \max_w \left(\tilde{W}(w, a) - U(a) \right)^\gamma (J(a) - V)^{1-\gamma}$$

where

$$\tilde{W}(\omega(a), a) = W(a)$$

- Key: U and $\tilde{W}(w, a)$ depend on a , independently from dependence via $\omega(a)$. Bargaining position of worker depends on asset position.

The Model without Shocks: Matching

- Number of filled vacancies given by matching function $\chi u^\eta v^{1-\eta}$
- Define $\theta = v/u$. Then

$$\begin{aligned}\lambda_f &= \chi \theta^{-\eta} \\ \lambda_w &= \chi \theta^{1-\eta}\end{aligned}$$

- Law of motion for unemployment rate

$$u' = \sigma(1 - u) + (1 - \lambda_w)u$$

The Model without Shocks: Key Stationary Equilibrium Conditions

- Key equilibrium objects: $u, v, r, \omega(a), \mu(s, a)$
- Equilibrium wage function determined by Nash bargaining
- Invariant distribution induced by endogenous decisions $\psi_u(a), \psi_e(a)$ and probabilities governing transitions between employment status $(\sigma, \lambda_w(\theta))$.

Cross-Sectional Implications of the Model: Dependence of Wages on Wealth

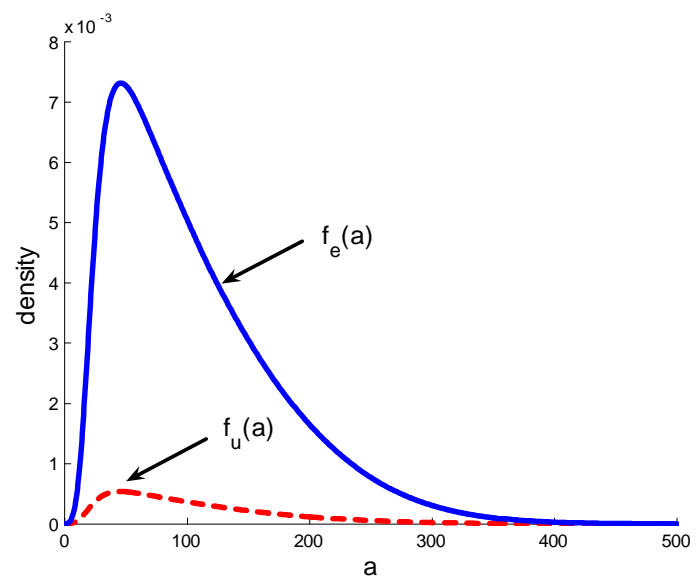
- In model (weak) dependence of wages on wealth
- Empirical evidence? Alexopolous and Gladden (2006) find significant effect of wealth on reservation wages in SIPP.
- Paper says evidence is inconclusive but cites none.

Cross-Sectional Implications of the Model: Wage Dispersion

- Fact: large variance of log wages (for males) even after controlling for observables. Katz and Autor (HLE 1999): variance ≈ 0.4 , within-group about $2/3$ of that.
- Model: cross-sectional variance of log-wages close to 0.
- The mechanism in the paper does not contribute to our understanding of within-group wage dispersion. Other mechanisms (e.g. idiosyncratic shocks to labor productivity) needed. Note: authors fully acknowledge this.

Cross-Sectional Implications of the Model: Wealth Dispersion

- Calibration implies average a/w ratio is about 30 (note: model period is 6 weeks).
- Wealth distribution not very dispersed. Gini ≈ 0.35 . Not a satisfactory model of wealth inequality.
- Unemployment spells 9 weeks on average \Rightarrow typical households gets into unemployment with wealth >15 times the wage losses during unemployment spell \Rightarrow Makes nonlinearities that you worked so hard in creating unimportant.



2.9.1 Different preferences

Table 1 presents the summary statistics for different utility functions. One is log utility, and the other is $u(c) = c^{1-\zeta}/(1-\zeta)$ with $\zeta = 5$ (we kept the other parameters constant). Larger ζ is associated with higher precautionary savings and thus with higher \bar{k} . Higher \bar{k} leads to larger profitability of each vacancy: v increases, θ increases, and u decreases. Naturally, p and d increase.

	ξ	θ	u	v	\bar{k}	p	d	w
log utility	0.7368	1.00	6.90%	0.069	104.74	1.02	0.0051	3.44
$\zeta = 5$	0.7447	1.00	6.90%	0.069	104.94	1.04	0.0052	3.45

Table 1: Summary statistics for the model without aggregate shocks. w is the average wage in the economy.

Figure 1 shows the wage as a function of asset holdings.

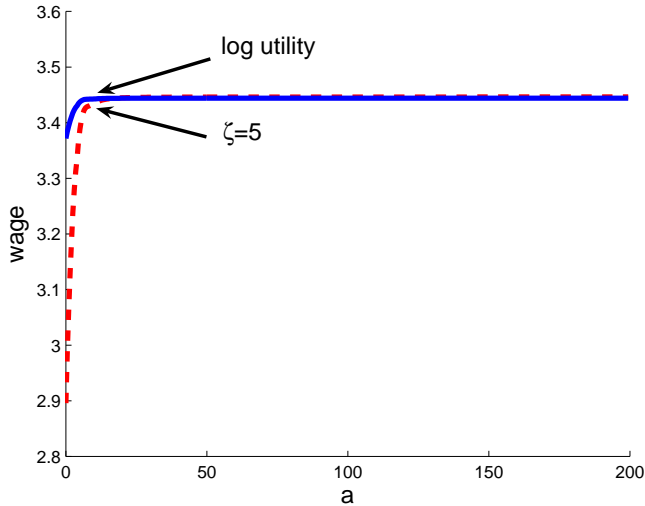


Figure 1: Wages for log utility and $u(c) = c^{1-\zeta}/(1-\zeta)$ with $\zeta = 5$.

The observed concavity of $\omega(a)$ follows, intuitively, from two features: (i) the function being increasing, which is due to the outside option being worse for consumers with a low stock of assets

Cross-Sectional Implications of the Model: Dependence of Unemployment Duration on Wealth

- Fact: Both unemployment duration and job quits rise with holdings of (liquid) assets (Algan et al., RED 2003), Alexopoulos and Gladden (2006).
- By construction absent in the model since probability of losing and finding a job cannot depend on a (or do workers ever reject offers?).
- Would need model with meaningful household choice on the labor market (i.e. endogenous job separation or endogenous search intensity, as in e.g. Gomes et al., JME 2001, Bilts et al., 2007).

Cross-Sectional Implications of the Model: Unemployment Spells and Long-Term Wage Losses _____

- Fact: long after unemployment spell wages significantly lower than for similar workers without layoff (Jacobson et al., AER 1993).
- Model: has nice mechanism to generate this. Unemployed dip into wealth, and this weakens their bargaining position forever after.
- Could you explore this prediction quantitatively?

The Model with Aggregate Shocks

- Aggregate productivity stochastic: z follows first order Markov chain.
- Markets for aggregate risk are complete \Rightarrow no disagreement about how profits of firms should be discounted.
- Equilibrium is computed using a variant of Krusell-Smith (1997) algorithm. Note: entire wage schedule now moves stochastically.

The Model with Aggregate Shocks: Main Results

- Again “approximate aggregation”
- Business cycle properties of u/v depend crucially on calibration of h .
 - For $h \approx 40\%$ of \bar{w} they find v/u about 1/12 as volatile as in data.
 - For $h \approx 98\%$ of \bar{w} they find v/u about 60% as volatile as in the data.
- Rough conclusion: Risk aversion and ability to save do not change the conclusion from the Shimer vs. HM debate.

The Model with Aggregate Shocks: Comments

- Is this result surprising? At first sight no? Hagedorn-Manovski (2007)

$$\epsilon_{\theta,z} = \frac{y}{y-h}\psi$$

Small for small h , but very large for h close to y . [But: not clear to me why concave utility does not add anything]

- Nakajima (2007): with risk averse agents that can save, labor-leisure trade-off: fluctuations in v/u as in data for $h = 0.4\bar{w}$.
- With concave u saving is useful. Acts like an increase in h *on top of* the increase coming from leisure. Can you do labor-leisure choice?

Conclusions

- This paper does what I thought should have been done long time ago (but nobody dared?)
- Potential mechanism for making unemployment a persistently bad event.
- But: this version of the paper makes this mechanism not matter much.