LABOR SEARCH MODELS: PARTIAL-EQUILIBRIUM DYNAMICS

NOVEMBER 15, 2011

DSGE Labor Search Model

LABOR-MARKET EQUILIBRIUM

☐ Aggregate law of motion of employment

$$N_{t+1} = (1 - \rho^x)N_t + m(u_t, v_t)$$

☐ Flow equilibrium conditions (an accounting identity...)

$$m(u_t, v_t) = u_t k^h(\theta_t) = v_t k^f(\theta_t)$$

□ Vacancy-posting (aka job-creation) condition

Does a good job explaining long-run (steady-state)

$$\gamma = k^f(\theta_t) E_t \left\{ \Xi_{t+1|t} \left(z_{t+1} - w_{t+1} + \frac{(1 - \rho^x)\gamma}{k^f(\theta_{t+1})} \right) \right\}$$

□ Wage determination

$$w_{t} = \eta \left[z_{t} + \gamma \theta_{t} \right] + (1 - \eta)b$$

- ☐ Shimer (2005) and Hall (2005): analyze the stochastic dynamics of the labor market equilibrium
 - Not general equilibrium dynamics

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2

Shimer (2005)

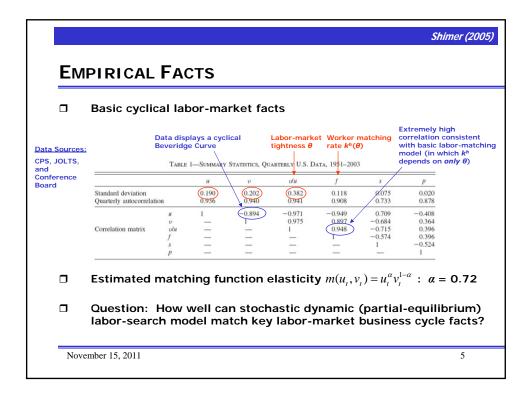
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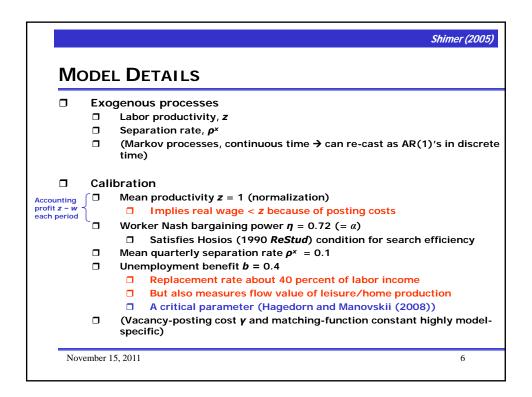
BASIC ISSUES AND RESULTS

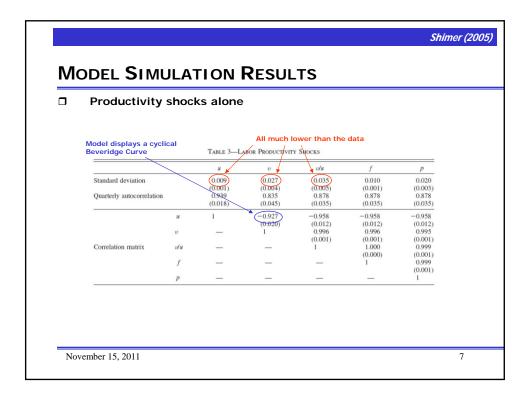
- □ Shouldn't a model that does well at explaining long-run phenomena also be expected to do reasonably well at explaining cyclical phenomena? (should it?....)
- □ Labor search model's key endogenous variables
 - Unemployment u_t (equivalently, $N_t = 1 u_t$)
 - \Box Vacancies v_t
 - \square Labor-market tightness θ_t
- Main Conclusion: model's predicted volatility in (u_t, v_t, θ_t) far lower than empirically-observed volatility
- Main Model Shortcoming: the wage-setting process (i.e., assumption of Nash bargaining)
 - Exogenous rise in productivity is nearly-fully absorbed by a rise in the wage → virtually no change in firms' incentives to post vacancies
 - □ Vacancy-posting the key economic margin of basic labor search model

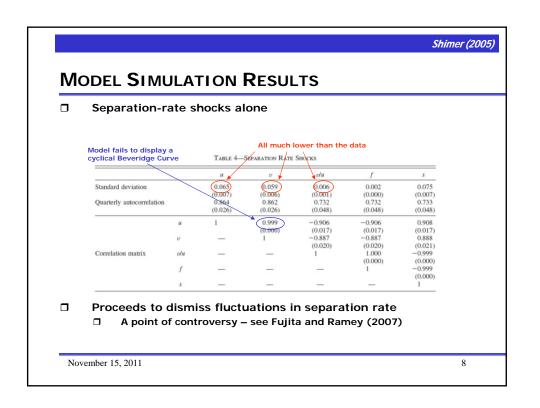
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Shimer (2005) **EMPIRICAL FACTS** Basic cyclical labor-market facts Extremely high correlation consistent with basic labor-matching model (in which k^h Data displays a cyclical Beveridge Curve Labor-market Worker matching tightness θ rate $k^h(\theta)$ Data Sources: CPS, JOLTS, depends on only 0) Table 1—Summary Statistics, Quarterly U.S. Data, 1951-2003 and Conference **Board** 0.202 0.075 0.733 Standard deviation 0.190 0.382 0.020 0.118 Quarterly autocorrelation 0.908 0.878 -0.894 -0.949 0.709 -0.408 0.897 0.948 0.975 -0.6840.364 Correlation matrix -0.7150.396 -0.574November 15, 2011









Shimer (2005)

MODEL MECHANISM(?)

☐ Consider a single firm's vacancy-posting decision

$$\gamma = k^{f}(\theta_{t})E_{t}\left\{\Xi_{t+1|t}\left(z_{t+1} - w_{t+1} + \frac{(1 - \rho^{x})\gamma}{k^{f}(\theta_{t+1})}\right)\right\}$$

- □ Interpretation of Shimer (2005) result
 - Wages absorb too much of any change in productivity
 - □ → not much change in firms' vacancy posting incentives
 - \Box \rightarrow (in equilibrium) not much change in θ
 - \rightarrow (in equilibrium) not much change in u (because $k^h(\theta)$ governs transitions into/out of jobs)
- **☐** The Shimer Puzzle
 - ☐ How to address the model shortcoming?
 - Not a criticism of the labor search structure per se a criticism of the wage-setting mechanism (Nash) used in the model

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9

Responses to Shimer (2005)

BEYOND THE BASIC MODEL

- ☐ Hall (2005): a "social norm" under which w doesn't change in response to cyclical fluctuations
 - Permissible as an equilibrium DUE TO the "bargaining interval" between
 z and b
 - □ NOT something rationalizable in a standard Walrasian view of labor
 - \square Larger fraction of z shock passed on to change in $pr \rightarrow$ model does better at accounting for volatility in v, u, θ
- ☐ Full DSGE macro models that take on the Shimer Puzzle
 - ☐ Krause and Lubik (2005): job-to-job transitions
 - ☐ Gertler and Trigari (2009): "staggered (Calvo) Nash bargaining"
 - □ Rotemberg (2006): monopolistic competition and markup shocks
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 - ☐ Weinke and Sveen (2007): New Keynesian sticky-price model
 - ☐ Chugh (2009): financial accelerator

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0

Pissarides (2009)

BEYOND THE BASIC MODEL

- ☐ Pissarides (2009 *Econometrica*)
 - Wage stickiness NOT the answer
 - ☐ Empirically
 - □ Wages in new hires are very volatile over the business cycle
 - ☐ Wages in ongoing jobs much less volatile (i.e., "sticky")...
 - ...but irrelevant for the dynamics of the job-creation condition of a search model!
- Proposes model of decreasing marginal costs of posting vacancies
 - □ Rather than typical constant marginal cost of posting vacancies
 - ☐ i.e., increasing returns recruiting/posting technology
 - □ A type of amplification mechanism

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Hagedorn and Manovskii (2008)

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□ Wage determination

$$w_{t} = \eta \left[\mathbf{z}_{t} + \gamma \theta_{t} \right] + (1 - \eta) \mathbf{b}$$

- ☐ HM's key insight: in basic RBC model, "gap" between social value of market work (z) and value of non-market activity (b) equals ZERO
 - □ So this ought to be the heart of the issue in a search model, too...not the wage-determination mechanism *per se*

November 15, 2011 12

MODEL MECHANISM

- ☐ To gain intuition, solve analytically for steady state of labor market (i.e., Pissarides Chapter 1)
- Can show (HM 2008, p. 1695) steady state elasticity of labor market tightness to labor productivity is

$$\varepsilon_{\theta,z} = \frac{z}{z-b} \frac{\eta k^h(\theta) + (1-\beta(1-\rho^x))/\beta}{\eta k^h(\theta) + (1-\xi)(1-\beta(1-\rho^x))/\beta}$$

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Hagedorn and Manovskii (2008)

MODEL MECHANISM

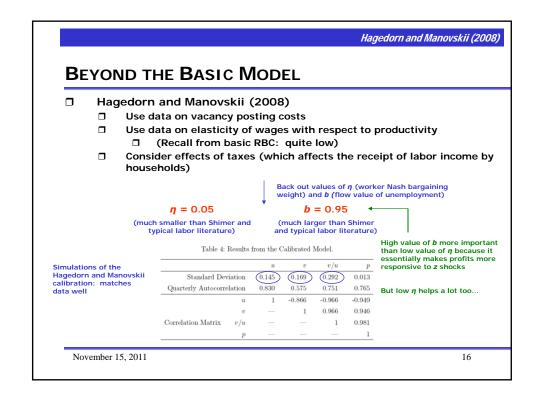
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- ☐ Depends on many things....
- ...in particular, depends on the gap between social value of market work (z) and value of non-market activity (b)
- □ Shimer calibration of **b** = 0.4 (unemployment "benefit" 40% of the value of labor income) inconsistent with G.E. business cycle models in which indifference conditions are satisfied in equilibrium
- ☐ Steady-state intuition maybe a guide to dynamics? Cyclical fluctuations typically "pretty linear"

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Hagedorn and Manovskii (2008) **BEYOND THE BASIC MODEL** Hagedorn and Manovskii (2008) Use data on vacancy posting costs Use data on elasticity of wages with respect to productivity (Recall from basic RBC: quite low) Consider effects of taxes (which affects the receipt of labor income by households) Back out values of η (worker Nash bargaining weight) and b (flow value of unemployment) $\eta = 0.05$ b = 0.95(much smaller than Shimer and typical labor literature) (much larger than Shimer and typical labor literature) November 15, 2011 15



Embed in General Equilibrium

FULL MACRO MODELS

- ☐ Full DSGE macro models that take on the Shimer Puzzle
 - ☐ Krause and Lubik (2005): job-to-job transitions
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 - ☐ Chugh (2009): financial accelerator
- Pre-Shimer: the effects of labor matching frictions on basic RBC model dynamics?
 - □ Andolfatto (1996 AER)
 - ☐ Merz (1995 *JME*)
 - □ den Haan, Ramey, Watson (2000 AER)

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