The Labor Wedge as a Matching Friction

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Motivation

- There are large cyclical variations in the ratio of the MP and MRS of labor

- This "labor wedge" accounts for a significant part of business cycle fluctuations (Chari, Kehoe, McGrattan (2007))

- It has been attributed to time-varying imperfections in the labor market

- Search frictions haven’t been considered as a potential explanation
Objective

- Provide a theory of the labor wedge in the spirit of the Mortensen-Pissarides search model
- Understand how the labor wedge is affected by job creation and job destruction shocks
- Assess their importance for business cycles
Strategy

- Take a BC model with search and matching in the labor market
- Add wedges in the spirit of CKM (2007)
- Decompose the labor wedge into:
  - Separation shocks (job destruction)
  - Matching and bargaining shocks (job creation)
- Measure their contributions to unemployment and output
Model Economy
Based on Farmer and Hollenhorst (2006)

- A continuum of families operates a backyard technology
- Members cannot work in their own backyard
- There are two market activities:
  - Head-hunting - competitive
  - Productive - wage-setting rule
- Exogenous shocks: total factor productivity \( (A_t) \), separation \( (\delta_{Lt}) \), matching \( (B_t) \) and bargaining \( (\phi_t) \)
Family’s problem:

\[ E_t \sum_{t=0}^\infty \beta^t \left[ \log C_t - \chi \frac{\left(L_t^s + V_t^s + U_t\right)^{1+\gamma}}{1+\gamma} \right] \rightarrow \max\{C_t, L_t^s, L_t^d, V_t^s, V_t^d, U_t, K_{t+1}\} \]

subject to:

\[ C_t + K_{t+1} - (1 - \delta_K) K_t = A_t K_t^\alpha \left(L_t^d\right)^{1-\alpha} + w_t (L_t^s - L_t^d) + q_t (V_t^s - V_t^d) \]

as a household she faces a labor accumulation constraint:

\[ L_t^s = (1 - \delta_L) L_{t-1}^s + U_t \frac{M_t}{U_t} \]

as a firm she faces a labor accumulation constraint:

\[ L_t^d = (1 - \delta_L) L_{t-1}^d + V_t \frac{M_t}{V_t} \]

matching function:

\[ M_t = B_t U_t^\theta V_t^{1-\theta} \]
Calibration and Estimation

- We calibrate:

\[ \alpha = 0.34, \quad \delta_K = 0.025, \quad \beta = 0.99, \quad \theta = 0.7 \]

- Data: real output, investment and consumption per capita, index of hours per capita, unemployment rate, index of vacancies, quarterly seasonally adjusted for 1964:I-2007:III

- We estimate:

\[ \delta_{Lss} = 0.038, \quad \frac{M_{ss}}{U_{ss}} = 0.65, \quad \phi_{ss} = 0.58, \quad \gamma = 3.54 \]

autoregressive processes for the shocks
Impact of Separation, Bargaining and Matching Shocks

- Positive shocks to the separation rate decrease hours and increase unemployment:
  - Decreases in hours lower the marginal rate of substitution (outside option of workers)

- Increases in the bargaining power keep wages fairly constant, increase unemployment and decrease vacancies

- Decreases in the matching efficiency decrease the number of new matches
Interpretation of the Labor Wedge

- The labor wedge is the instantaneous welfare gain of a match
- It narrows in good times and widens in recessions
Decomposition of the Labor Wedge

- Matching shocks account for most of the changes in the labor wedge
Decomposition of Output

- Matching shocks explain the slow recoveries from recessions
Decomposition of Output

- Separation shocks are important at early stages
Decomposition of Unemployment

- Job destruction shocks start recessions
Decomposition of Unemployment

- Shocks to job creation cause jobless recoveries
The finding that job destruction starts recessions and job creation deepens them is robust across recessions.
Potential Solution to Shimer’s Puzzle
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The bargaining power of the workers increases because of changes in the MRS. The volatility of wages produced by the model is close to that in the data.
Potential Solution to Shimer’s Puzzle

- Volatility of wages produced by the model is close to that in the data
- The bargaining power of the workers increases because of changes in the MRS
Why are the MRS and the Shocks So Volatile?

- FOC for job search implies volatile MRS and $\rho \left( MRS, \frac{M}{U} \right) > 0$:

  $$MRS_t = PV \left( W_t - MRS_t \right) \frac{M_t}{U_t}$$

  Data: $\frac{M_t}{U_t}$ volatile, $W_t$ fairly constant
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- FOC for vacancies implies volatile matching shocks and $\rho \left( MRS, B \right) > 0$:
  \[ MRS_t = PV \left( MP_t - W_t \right) \left( \frac{U_t}{V_t} \right)^\theta B_t \]
  Data: $MP_t$ and $W_t$ fairly constant
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\]

Data: \( MP_t \) and \( W_t \) fairly constant

- The two FOCs imply volatile bargaining power and \( \rho \left( \frac{U}{V}, \phi \right) > 0 \):

\[
\frac{\phi_t}{1 - \phi_t} = \frac{U_t}{V_t}
\]

Data: \( \frac{U_t}{V_t} \) volatile, \( \rho (V_t, U_t) < 0 \)
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  Data: $\frac{U_t}{V_t}$ volatile, $\rho \left( V_t, U_t \right) < 0$

- Labor accumulation pins down separation probability
The labor wedge is mainly driven by matching shocks

Implications for current views on the relative importance of job creation and job destruction:

- Both job creation (Shimer (2005)) and job destruction shocks (Fujita and Ramey (2006)) are important
- Job destruction starts recessions and negative job creation shocks deepen them

Allowing for changes in the reservation value of workers can solve Shimer’s puzzle:

- Generate volatile unemployment and vacancies
- Match volatility of wages