The Search and Matching Model
Shimer’s Puzzle and Possible Solutions

March 2015
Unemployment - trend and deviations

Trend

Deviations

Year
Unemployment and vacancies

Deviaions

Year

unemployment
vacancies
SHIMER’S PUZZLE

- Can the model explain business cycles \((v, u, \theta)\)?
- The exercise goes as follows:
  - Given shocks to the model and parameters...
  - What’s the volatility of \(u\) and \(v\) in the model?
  - How does this volatility compares with the data?
- Shocks to:
  - labor productivity (BLS)
  - Separations (CPS, time aggregation)
- Value of leisure \(= 0.4\)
- Matches elasticity \(= 0.72\)
- Bargaining power \(= \) Matches elasticity (Hosios)
# Shimer’s Puzzle: Results

## Quarterly Summary Statistics from U.S. Data, 1951:1 to 2003:4

<table>
<thead>
<tr>
<th></th>
<th>$u$</th>
<th>$v$</th>
<th>$v/u$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std Dev</td>
<td>0.190</td>
<td>0.202</td>
<td>0.382</td>
<td>0.020</td>
</tr>
<tr>
<td>Quarterly Autocorrelation</td>
<td>0.936</td>
<td>0.940</td>
<td>0.941</td>
<td>0.878</td>
</tr>
<tr>
<td>Correlation $u$</td>
<td>1</td>
<td>-0.894</td>
<td>-0.971</td>
<td>-0.408</td>
</tr>
<tr>
<td>Correlation $v$</td>
<td>-</td>
<td>1</td>
<td>0.975</td>
<td>0.364</td>
</tr>
<tr>
<td>Correlation $\frac{v}{u}$</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0.396</td>
</tr>
<tr>
<td>Correlation $r$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
# Shimer’s puzzle

## Results

**Quarterly Summary Statistics from Model Simulations**

<table>
<thead>
<tr>
<th></th>
<th>$u$</th>
<th>$v$</th>
<th>$v/u$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std Dev</td>
<td>0.009</td>
<td>0.027</td>
<td>0.035</td>
<td>0.020</td>
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<tr>
<td>Quarterly Autocorrelation</td>
<td>0.939</td>
<td>0.835</td>
<td>0.878</td>
<td>0.878</td>
</tr>
<tr>
<td>Correlation $u$</td>
<td>1</td>
<td>-0.927</td>
<td>-0.958</td>
<td>-0.958</td>
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<tr>
<td>Correlation $v$</td>
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<td>0.996</td>
<td>0.995</td>
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<tr>
<td>Correlation $\frac{v}{u}$</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0.999</td>
</tr>
<tr>
<td>Correlation $r$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
Unemployment and productivity
Mechanisms

If productivity falls or separations increase then:

- Value of a filled job goes down
- Vacancies go down

BUT!

- Wage goes down
- Unemployment goes up

These feedback effects increase vacancies back
WHAT IF PRODUCTIVITY WAS VERY VOLATILE?
THREE TYPES OF SOLUTIONS

- Robert Hall (2005) - **Fine tune the model**

- Marcus Hagedorn and Iourii Manovskii (2008) - **Change the calibration**

- Zvi Eckstein, Ofer Setty and David Weiss (2014) - **Change the shock**
Three types of solutions

▶ Hall (2005) Introduces *Sticky wages*
  ▶ Strengthens shock b/c firms need to pay the previous wage

▶ Hagedorn and Manovskii (2008) change the *calibration* as follows:
  ▶ a very high leisure value (0.955)
  ▶ a low bargaining power for workers (0.05)
  ▶ Wages do not change very much (i.e., sticky)

▶ Eckstein, Setty and Weiss (2014) use different shocks:
  ▶ Interest rate: cost of capital and cost of vacancy fluctuate
  ▶ Financial spread: implies a high probability of default and separation
  ▶ Model’s volatility of both \( v \) and \( u \) is same magnitude of data
Eckstein-Setty-Weiss

Results

Quarterly Summary Statistics from the Calibrated Model

<table>
<thead>
<tr>
<th></th>
<th>u</th>
<th>v</th>
<th>v/u</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std Dev</td>
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<td>Autocorrelation</td>
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<td>0.80</td>
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<tr>
<td>Correlation with u</td>
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<td>−0.91</td>
<td>0.64</td>
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<tr>
<td>Correlation with v</td>
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<tr>
<td>Correlation with θ</td>
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<td>−</td>
<td>1.00</td>
<td>−0.47</td>
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</tbody>
</table>
Unemployment and interest rate

Year

Deviaions

unemployment
interest rate