The Cyclicality of the Wage Offer Distribution

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Introduction

- Well documented that the number of vacancies $v$ is pro-cyclical, e.g. Shimer (2005)
- Much less is known about the cyclicality of the wage offer distribution $F$: CDF of wages across vacancies
  - Is the creation of high-wage vacancies more or less cyclical than the creation of low-wage vacancies?
- This paper
  - provides new evidence suggesting that the creation of high-wage vacancies is more cyclical
  - quantifies a new theory that accounts for the evidence by allowing unemployed workers to receive multiple offers simultaneously
An increase in productivity $y_t$ is associated with an increase in the share of vacancies posted by high-wage industries $v_j,t/v_t$

$$\Delta \log \left( \frac{v_j,t}{v_t} \right) = \eta_j \Delta \log y_t + \varphi_j + Q_t \beta_j + \zeta_{j,t}$$

The slope of the fitted line is 0.053 with a standard error of 0.023
An increase in productivity $y_t$ has a larger impact on the upper end of the wage distribution of new hires from unemployment $w_{q,t}$

$$\Delta \log w_{q,t} = \eta_q \Delta \log y_t + \varphi_q + Q_t \beta_q + \epsilon_{q,t}$$

The slope of the fitted line is 0.013 with a standard error of 0.003.
Model: Overview

- DMP meet Burdett and Judd (1983)
- DMP: Discrete time; homogeneous workers and homogeneous firms; random meetings between unemployed workers and vacancies; no on-the-job search; exogenous job destruction
- Deviation: Each period, a worker can meet *multiple* vacancies, and vice versa.
  - Vacancies are created at the beginning of a period with a *posted* wage
  - The total number of meetings across all workers and vacancies is deterministic
    \[ m(u, v) \]
  - The number of meetings at the individual level is random; Poisson with mean
    \[ \lambda_j = \frac{m(u, v)}{j}, j \in \{u, v\} \]
  - At the end of a period, a vacancy makes an offer to *one* of the workers it meets, if any
  - A worker with one or more offers accept the one with the highest wage if it’s better than unemployment
- BJ: Multiple offers imply wage dispersion even with homogeneous agents on both sides
  - \( F \) is endogenous and non-degenerate
Comparative Statics

\[
\frac{\partial P_M}{\partial y} > 0 \quad \text{and} \quad \frac{\partial P_M}{\partial u} < 0 \quad \text{with} \quad P_M \quad \text{being the fraction of workers with multiple offers among those with at least one offer}
\]

- Consistent with Guo (2020)

- Let \( w^q_F \) be \( q \)th percentile of the wage offer distribution \( F \). We have, for any \( 0 \leq q_1 < q_2 \leq 100 \)

\[
\frac{\partial w^{q_2}_F}{\partial y} > \frac{\partial w^{q_1}_F}{\partial y} > 0
\]

Intuition: an increase in productivity \( y \) raises the market tightness \( \theta \) and the offer arrival rate

- Unemployed workers are more likely to receive multiple offers
- Low-wage offers are more likely to be rejected
- In response, firms post a larger share of high-wage vacancies

Same for \( G \), the wage distribution of new hires from unemployment.
Calibration: Steady State

- Calibrated in the spirit of Hagedorn and Manovskii (2008)

\[
\frac{\partial \log w_j^q}{\partial \log y} \quad \text{for } j \in \{F, G\}
\]
Simulation: Dynamics

- Same qualitative predictions for the cyclicity of $F$ and $G$
- Fit for other non-wage labor market moments (volatility, auto and cross correlations for $u$, $v$ and $y$): no worse than standard DMP

<table>
<thead>
<tr>
<th></th>
<th>$u$</th>
<th>$v$</th>
<th>$\theta$</th>
<th>$y$</th>
<th></th>
<th>$u$</th>
<th>$v$</th>
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<th>$y$</th>
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<tbody>
<tr>
<td><strong>Panel A: Data</strong></td>
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<td><strong>Panel B: Standard DMP Model</strong></td>
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<tr>
<td>Standard deviation</td>
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<td>0.233</td>
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<td>0.257</td>
<td>0.174</td>
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<td>0.586</td>
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<td>-0.567</td>
<td>-0.662</td>
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<td>$v$</td>
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Panel C: Model in This Paper

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