The Cyclicality of Income Risk: Empirical Estimates from Monetary Policy Shocks

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Introduction: Micro ↔ Macro

Broad Motivation

- What are the distributional consequences of aggregate shocks?
- How does heterogeneity affect aggregate outcomes?
- What’s the interplay between the two?

What we do:

- Use identified monetary policy shocks to measure response of:
  - Separation rates
  - Job-finding rates
  - Wages
  across the earnings distribution.

- HANK model to quantify the importance of heterogeneity for the response to aggregate shocks (Not today)
Heterogeneity and Monetary Policy

- Theory suggests that heterogeneity has the potential to impact the transmission of MP
- Crucially depends on cyclicality of idiosyncratic income risk
- Scant empirical evidence (so far)

(Quantitative) Theory:


Empirical evidence

- Coibion et al (2017): MP affects inequality of labor earnings, income, consumption and expenditure
Two percent sample of German Labor Market Histories 1974-2014

- 1.7 million individual histories
- Labor market spells split into Episodes (~ 12 months)
- ~ 300 million month-person observations
- Labor market status, compensation, benefits

Peculiarities

- Focus on Euro-sample (2000-2014)
- “Daily Wage” is average earnings during an episode
- Focus on individuals “without special characteristics”
Cutting the data

- Employed vs Non-employed
- Deciles: Current wage or 5-year moving average of historical wages

**Table 1:** Descriptive Statistics by Decile – January 2000

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1) mean</th>
<th>(2) mean</th>
<th>(3) mean</th>
<th>(4) mean</th>
<th>(5) mean</th>
<th>(6) mean</th>
<th>(7) mean</th>
<th>(8) mean</th>
<th>(9) mean</th>
<th>(10) mean</th>
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<tbody>
<tr>
<td>Female</td>
<td>0.77</td>
<td>0.73</td>
<td>0.59</td>
<td>0.50</td>
<td>0.43</td>
<td>0.36</td>
<td>0.32</td>
<td>0.30</td>
<td>0.24</td>
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<tr>
<td>Age</td>
<td>39.32</td>
<td>39.91</td>
<td>38.52</td>
<td>38.26</td>
<td>38.69</td>
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<td>40.81</td>
<td>41.43</td>
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<td>Education</td>
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<td>1.07</td>
<td>1.09</td>
<td>1.10</td>
<td>1.10</td>
<td>1.11</td>
<td>1.15</td>
<td>1.22</td>
<td>1.44</td>
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<td>Skill level</td>
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<td>2.03</td>
<td>2.09</td>
<td>2.10</td>
<td>2.11</td>
<td>2.13</td>
<td>2.19</td>
<td>2.32</td>
<td>2.59</td>
<td>2.99</td>
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<td>Part time</td>
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<td>0.41</td>
<td>0.26</td>
<td>0.16</td>
<td>0.09</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
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<td>Daily wage</td>
<td>19.60</td>
<td>38.79</td>
<td>50.09</td>
<td>60.12</td>
<td>69.04</td>
<td>77.45</td>
<td>86.26</td>
<td>97.98</td>
<td>116.01</td>
<td>141.60</td>
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<td>Empl next period</td>
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<td>0.98</td>
<td>0.99</td>
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<td>0.99</td>
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<td>1.00</td>
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<td>Observations</td>
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<td>47108</td>
<td>46905</td>
<td>48001</td>
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</tbody>
</table>
Strategy

For each decile, estimate a linear probability model:

\[ emp_{j,t+h}^d = \alpha + \beta_h^d \Delta i_t + \varepsilon_{j,h} \quad |emp_{j,t-1}^d = 1 \]

- Probability of unchanging labor market status
- Impulse response by decile at \( t - 1 \)
- Includes dummies for calendar months
- Instrument using high frequency movements in OIS rates
Effect of 100BP monetary contraction – Employed

Change in probability of remaining employed vs non-employed

- $emp_{j,t}^d = 1$ if employed
- $emp_{j,t}^d = 0$ if non-employed

![Graph showing change in probability of remaining employed vs non-employed by decile.](image-url)
Effect of 100BP monetary contraction – Non-Employed

Change in probability of remaining non-employed vs employed

- $emp_{j,t}^d = 1$ if non-employed
- $emp_{j,t}^d = 0$ if employed
- Deciles based on conditional moving average wage

![Graph showing the change in probability of remaining non-employed vs employed by decile. The x-axis represents deciles, ranging from 0 to 10, and the y-axis represents percent, ranging from 0 to 30. The graph shows an increasing trend from decile 0 to decile 10.]
Relatives and Absolutes

Shocks in relation to baseline probabilities

- Lower incomes less likely to stay employed
- Higher incomes **more** likely to stay unemployed
- Effects are large

![Graph showing Probability of Remaining Employed and Probability of remaining Non-Employed](image)
Log-change in wage:

\[ w_{j,t+h}^d - w_{j,t-1}^d = \alpha + \beta_h^d \Delta i_t + \varepsilon_{j,h} \]

- Real wage
- Conditional on staying employed
- Possible to include benefits (unconditional)
Percentage change in real wage over employment episode
Next steps

New-Keynesian Model with labor market that can account for the observations above

Ideas

- Hardwire
- Directed search
- Job-ladder

Feedback much appreciated
Appendix
Effect of 100BP monetary contraction – Employed

Change in probability of remaining employed vs unemployment

- $emp_{j,t}^d = 1$ if employed
- $emp_{j,t}^d = 0$ if unemployed
Effect of 100BP monetary contraction – United States

Change in probability of remaining employed vs non-employment

- $emp_{j,t}^d = 1$ if employed
- $emp_{j,t}^d = 0$ if non-employed

![Graph showing the change in probability of remaining employed vs non-employment across deciles. The graph plots $\beta_{12}$ by Decile with a range from -0.5 to 0.5 on the y-axis and deciles from 0 to 10 on the x-axis. The line shows fluctuations across deciles.]
Probit Regression

Change in probability of remaining employed vs unemployment

- $emp_{j,t}^d = 1$ if employed
- $emp_{j,t}^d = 0$ if non-employed

![Graph showing employment and unemployment trend across deciles.](image-url)
Instrument Details

Instrument for monetary policy surprise:

- EONIA Overnight Indexed Swap rates during short window around ECB announcements

Eonia OIS:

- 3M-3Y contracts swapping EONIA floating rate for fixed rate
- Highly collateralized
- Cash settled
- Rates include expectations