Financial Markets and Unemployment

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Macro-Finance Linkages Workshop
October 28, 2011
The question, the model, the answers

“Study the importance of financial markets for unemployment fluctuations”
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The question, the model, the answers

“Study the importance of financial markets for unemployment fluctuations”

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<th>H-P filtered standard deviations relative to output</th>
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<th>Standard labor search</th>
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Some proposed solutions:


2 - Small labor surplus: Hagerdorn and Manovskii (2008)
The question, the model, the answers

This paper: Standard Pissarides model augmented with financial friction

- Financial constraint: borrowing limited by equity value of the firm as collateral
- Wage determination: excess borrowing motive to drive down wages
The question, the model, the answers

This paper: Standard Pissarides model augmented with financial friction

- **Financial constraint**: borrowing limited by equity value of the firm as collateral
- **Wage determination**: excess borrowing motive to drive down wages

Interaction of both financial and labor frictions:

- **Credit shock**: firms cut hiring as borrowing (hence ability to drive down wage) is limited
The question, the model, the answers

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Interaction of both financial and labor frictions:

- Credit shock: firms cut hiring as borrowing (hence ability to drive down wage) is limited

- Large and endogenously persistent response to financial shocks

- “Quantitative confidence” from estimation and VAR
Understanding the Mechanism: basic framework

Labor market fluctuations driven by market tightness $\theta = \frac{v}{u}$

- Constant job destruction rate; drives job creation

\[ \kappa > 0: \text{cost of a vacancy per unit of time} \]
\[ q(\theta_t): \text{probability of filling vacancy in a unit of time} \]

Key: what drives $Q_t$ over the business cycle?

Since $\frac{\partial q(\theta_t)}{\partial \theta} < 0 \Rightarrow \frac{\partial \theta}{\partial Q_t} > 0$
Understanding the Mechanism: basic framework

Labor market fluctuations driven by market tightness \( \theta = \frac{v}{u} \)

- Constant job destruction rate; drives job creation

\( \theta \) determined by a firm entry condition:

\[
\frac{\kappa}{q(\theta_t)} = Q_t
\]

- \( Q_t \): value of a vacancy filled with a worker
- \( \kappa > 0 \): cost of a vacancy per unit of time
- \( q(\theta_t) \): probability of filling vacancy in a unit of time

Key: what drives \( Q_t \) over the business cycle?

Since \( \frac{\partial q(\theta)}{\partial \theta} < 0 \Rightarrow \frac{\partial \theta}{\partial Q_t} > 0 \)
What drives $Q_t$ over the business cycle? $\frac{\partial \theta}{\partial Q_t} > 0$

In general $Q_t$ is the value of profit flows from employing labor over the lifetime of the job:

$$Q_t = \mathbb{E}_t [z_{t+1} - w(z_{t+1}) + (1 - \lambda)\beta Q_{t+1}]$$

$$= \mathbb{E}_t \sum_{i=0}^{\infty} (1 - \lambda)^i \beta^i [z_{t+1+i} - w(z_{t+1+i})]$$

- $z_t$: labor productivity; persistent process
- $w(z_t)$: wage rate

Solutions to increases elasticity to productivity shocks, $\frac{\partial Q_t}{\partial \epsilon z_t}$:

1. Wage rigidity
2. Small labor surplus: small gap between $z$ and $w$
What drives $Q_t$ over the business cycle? $\frac{\partial \theta}{\partial Q_t} > 0$

With financial frictions $Q_t$ in MQT 2011, the value now depends on debt $b$:

$$Q_t = \mathbb{E}_t \left[ z_{t+1} - w(z_{t+1}, b_{t+1}) + (1 - \lambda)\beta Q_{t+1} \right]$$

- By increasing debt, firm can lower the wage negotiated with workers.

Why?
- the surplus split between worker and firm is decreasing in debt.
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Why?
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Consequence:
- without restriction on borrowing, firms can push workers down to their reservation wage - a constant value $a$
- a relaxation of borrowing limits increases $Q_t$ and hence hiring
Understanding the Mechanism: Summarizing

$$\frac{\kappa}{q(\theta_t)} = E_t Q(z_{t+1}, b_{t+1})$$

- Original credit market channel:
  - shocks to credit market affect future profit margin on labor
  - distinct from a credit channel that would impact cost of hiring
Understanding the Mechanism: Summarizing

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**Decomposition of Employment Growth**
Understanding Labor market Fluctuations

Extended model with three shocks estimated by Bayesian methods

- add a shock to the efficiency of the matching function (to $q(\theta_t)$)

Variance Decomposition

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| H-P filtered standard deviations relative to output |
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An Original Channel

Loose credit markets drive down wages

- Hiring done by new, entering firms
- Not a concern for large employers over the cycle with access to credit markets

How does this square with the data?

1. Wages: 2008:Q3 to 2009:Q2, 1% increase in real wage
2. U.S. vs German labor markets:
   - German firms rely more heavily on debt finance
   - Little to no decline in employment during the crisis
3. Job flows:
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3. Job flows:
Labor markets during the Great Recession

Private sector gross job gains and losses - BED

- Gross job gains
- Gross job losses
Labor markets during the Great Recession
An Original Channel

Petrosky-Nadeau (2009):

- Borrowing to finance part of working capital
- Agency problem between borrowers and lenders

Modified entry condition:

\[
\frac{\phi_t \kappa}{q(\theta_t)} = \mathbb{E}_t Q(z_{t+1}, \phi_{t+1})
\]

- \(\phi_t\): shadow cost of external vs. internal funds - increases in recessions
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- \( \phi_t \): shadow cost of external vs. internal funds - increases in recessions
- By the LHS: traditional credit channel affecting costs
- By the RHS: \( \phi_t \) enters wage bargaining
  - positive credit shock improves position of firms and lowers wage
  - similar effect on the incentive to hire workers
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- \(\phi_t\): shadow cost of external vs. internal funds - increases in recessions
- Partially indistinguishable from model’s matching shocks
An Original Channel: prices and quantities

Risk neutral lenders and borrows: return on loan pinned by arbitrage condition:

\[ R(1 - \lambda) = 1 + r \]

- \( r \): risk free rate
- \( R \): return on debt
- \( \lambda \): job destruction / default rate

Creates a tension:
- Default rates are small → reasonable spread \( R - (1 + r) \)
- Job destruction rates are not \( \lambda = 0 \). 0.05 per quarter in model, closer to 0.1 in the data ⇒ Implied model \( R > 25\% \) per year
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  \[ \lambda = 0.05 \text{ per quarter in model, closer to 0.1 in the data} \]

\[ \Rightarrow \text{Implied model } R > 25\% \text{ per year} \]
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  \[ \Rightarrow \] adds an amplifying price rigidity
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Sluggish employment recovery requires highly persistent credit shock
- Does it show up anywhere else that the labor market?......
Financial Markets and Unemployment

Burgeoning literature studying the interaction of labor and credit markets

This paper zeros in on the strategic use of debt in wage negotiations

- New channel for credit market to affect real aggregate quantities
- Finds shocks to credit market play an important part in explaining the dynamics of the labor market