Pulling and Pushing Distressed Firms With a String: The Asymmetric Effects of Monetary Policy

Ander Perez-Orive ¹ Yannick Timmer¹

¹Federal Reserve Board

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The views expressed in these slides are those of the authors and do not necessarily reflect the views of the Federal Reserve Board or the Federal Reserve System.
Motivation (I): MP Tightening and Firms in Distress

- Stance of U.S. monetary policy has tightened significantly since March 2022
- High share of firms in financial distress compared to previous tightening episodes
Motivation (II): Asymmetric Effects of MP

- Macro-econometric literature: tightening monetary policy shocks have larger effects on economic activity than loosening shocks
  - Angrist et al. (2018); Barnichon et al. (2017, 2022); Debortoli et al. (2020); Jordà et al. (2020); Tenreyro and Thwaites (2016)
  - Based on macro data

- Some papers discuss potential channels informally (downward nominal wage rigidity, financial factors,....) but no empirical evidence
Research Questions

▶ Asymmetry in strength of effects of tightening and easing shocks on investment and employment?
  ▶ Yes: tightening transmits more strongly into investment and employment than easing

▶ Heterogeneous response of distressed vs healthy firms to contractionary and expansionary shocks?
  ▶ Yes, firm distress strengthens the transmission of monetary policy, but only for contractionary shocks

▶ Evidence of a financial mechanism to explain this asymmetry?
  ▶ Yes: credit constraints and external financing worsen following contractionary policy when firms are in distress, but barely respond for healthy firms or after easing shocks
  ⇒ Significant response only for distressed firms during contractionary shocks
Firm financial heterogeneity in the transmission of monetary policy
- Cloyne et al. (2023); Gertler and Gilchrist (1994); Ottonello and Winberry (2020)
- Financial factors matter significantly for transmission
  - Disagreement about the sign of effects
- Empirical models are linear: no asymmetry in transmission

Macro literature on the asymmetric transmission of monetary policy
- Angrist et al. (2018); Barnichon et al. (2017, 2022); Debortoli et al. (2020); Jordà et al. (2020); Tenreyro and Thwaites (2016)
- Monetary tightening has strong effects on economic activity
  - Monetary accommodation generates substantially less pronounced responses
- Literature does not address financial channels behind asymmetry

We combine the two literatures and reconcile some conflicting evidence
Data

- Micro data allows us to shed light on channels
- Firm-level balance sheet
  - Compustat sample, U.S. nonfinancial firms, quarterly between 1995 and 2019
- Firm-level distress
  - CRSP
  - Distance to Default (D2D): Merton distance to default model, which takes as inputs the firm's equity valuations and leverage.
  - Distress: 25th percentile of D2D distribution; otherwise healthy
- Monetary policy
  - Monetary policy shocks from Miranda-Agrippino and Ricco (2021)
  - High-frequency market surprises around monetary policy announcements
  - Abstract from new information from the Federal Reserve regarding the economy
  - Separate the shocks series into accommodative and contractionary shocks
Investment drops following tightening shocks but is unresponsive to easing shocks.
Aggregate Asymmetry—Employment

- Employment drops following tightening shocks but is unresponsive to easing shocks
Channels

▶ Downward Nominal Wage Rigidity (Debortoli et al., 2020)
  ▶ Expansionary monetary shock stimulates aggregate demand putting upward pressure on nominal wages → small effect on output
  ▶ Contractionary shock reduces aggregate demand and makes the downward wage rigidity binding → larger reduction in output

▶ Financial Channel
  ▶ Tightening → access to external financing deteriorates more for firms in distress
  ▶ Easing → external financing conditions do not change appreciably enough for the two groups of firms
  ▶ Test by exploiting heterogeneity across firms in terms of their ex-ante level of distress
Empirical Specification

\[ \Delta_h \log Y_{i,t+h} = \left( \rho^h + \lambda^h \Delta r_t^+ + \lambda^h \Delta r_t^- \right) \left( \text{Distressed}_{i,t-1} + \text{Healthy}_{i,t-1} \right) \\
+ \alpha^h \text{controls}_{i,t-1} + \eta_i + \epsilon_{i,t+h}, \]  

(1)

- $\Delta_h \log Y_{i,t+h}$ is the change in the log of the real stock of capital/employment between the end of quarter $t - 1$ and the end of quarter $t + h$ and $\Delta r_t$
- $\Delta r_t$ is the monetary surprise in quarter $t$
  - We decompose $\Delta r_t$ into tightening and easing shocks ($\Delta r_t^+$ and $\Delta r_t^-$)
  - Standardized with zero mean and standard deviation of one ($\approx 8$ bp)
- We classify firms into financially distressed firms and healthy firms
Investment Results – Tightening

I. Tightening Shocks = $+\Delta r \ (\Delta r > 0)$

A. Healthy Firms

B. Distressed Firms
II. Easing Shocks = $-\Delta r$ ($\Delta r < 0$)

C. Healthy Firms

D. Distressed Firms

Alternative Measure of Distress
# Investment Results – Triple Interaction

<table>
<thead>
<tr>
<th></th>
<th>Log(Capital)(<em>{t+8}) – Log(Capital)(</em>{t-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Shock</td>
<td>-1.218(***)</td>
</tr>
<tr>
<td>Shock × Stress</td>
<td>0.295(***)</td>
</tr>
<tr>
<td>Shock × Contr.</td>
<td>-0.613*</td>
</tr>
<tr>
<td>Shock × Stress × Contr.</td>
<td>-0.447(***)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.333</td>
</tr>
<tr>
<td>N</td>
<td>172,634</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Y</td>
</tr>
<tr>
<td>Time FE</td>
<td>-</td>
</tr>
<tr>
<td>Industry-Time FE</td>
<td>N</td>
</tr>
<tr>
<td>Industry-Quarter FE</td>
<td>Y</td>
</tr>
<tr>
<td>Agg Controls Int.</td>
<td>N</td>
</tr>
</tbody>
</table>
Employment Results – Tightening

I. Tightening Shocks = +Δ r (Δ r > 0)

A. Healthy Firms

B. Distressed Firms
Employment Results – Easing

II. Easing Shocks = $-\Delta r \ (\Delta r < 0)$

C. Healthy Firms

D. Distressed Firms

Graph showing employment results over quarters for healthy and distressed firms with a focus on easing shocks.
## Employment Results – Triple Interaction

<table>
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<tr>
<th></th>
<th>Log($Emp_{t+8}$) – Log($Emp_{t-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td>-0.970*** (0.103)</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td><strong>Shock × Stress</strong></td>
<td>0.227*** (0.026)</td>
</tr>
<tr>
<td></td>
<td>0.155*** (0.027)</td>
</tr>
<tr>
<td></td>
<td>0.063* (0.032)</td>
</tr>
<tr>
<td><strong>Shock × Contr.</strong></td>
<td>-1.198*** (0.238)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shock × Stress × Contr.</strong></td>
<td>-0.424*** (0.046)</td>
</tr>
<tr>
<td></td>
<td>-0.319*** (0.050)</td>
</tr>
<tr>
<td></td>
<td>-0.138*** (0.052)</td>
</tr>
<tr>
<td><strong>R-squared</strong></td>
<td>0.358</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>171,089</td>
</tr>
<tr>
<td><strong>Firm FE</strong></td>
<td>Y</td>
</tr>
<tr>
<td><strong>Time FE</strong></td>
<td>-</td>
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<td><strong>Industry-Time FE</strong></td>
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Potential Channel

- Policy tightening → access to external financing deteriorates and stress increases

- Distressed firms borrow less
- Healthy firms’ financial stress increases but not enough to hit borrowing constraint

- Policy easing → access to external financing does not improve much
- No appreciable improvement for either group and insignificant effect on borrowing

\[
\begin{array}{c|c|c|c|c|c}
\text{Monetary Policy Shock} & -2 & -1 & 0 & 1 & 2 \\
\text{Δ Stress} & -0.04 & -0.02 & 0 & 0.02 & 0.04 \\
\end{array}
\]
Potential Channel

- Policy tightening → access to external financing deteriorates and stress increases

- Policy easing → access to external financing does not improve much
Potential Channel

- Policy tightening → access to external financing deteriorates and stress increases
  - Distressed firms borrow less
  - Healthy firms’ financial stress increases but not enough to hit borrowing constraint
- Policy easing → access to external financing does not improve much
  - No appreciable improvement for either group and insignificant effect on borrowing
Debt Results – Tightening

I. Tightening Shocks = $+\Delta r (\Delta r > 0)$

A. Healthy Firms

B. Distressed Firms
Debt Results – Loosening

II. Easing Shocks = -Δ r (Δ r < 0)

C. Healthy Firms

D. Distressed Firms
Theoretical Mechanisms

- Models with occasionally binding financial constraints
  - Contractionary policy pushes firms closer to binding constraints

- Theories of credit rationing
  - Supply curve of credit bends backward when rates are high
  - Jaffee and Stiglitz (1990), Freixas and Rochet (2008), Walsh (2010)

- Models with costly debt default and costly equity issuance
  - Contractionary policy pushes firms closer to default
Conclusion

▶ Strong empirical support for hypothesis that financial frictions in nonfinancial firms are important to explain monetary policy asymmetry

▶ Strength of transmission of monetary policy depends on aggregate distribution of firm financial distress.

▶ In current context of high share of distressed firms → potency of recent interest rate increases by Federal Reserve could be high
APPENDIX
Similar average size of easing and tightening shocks

State-independence of shocks
Robustness– Alternative Measure of Distress

Tightening Shocks = $+\Delta r \ (\Delta r > 0 )$

A. High Net Leverage

B. Low Net Leverage
II. Easing Shocks = $-\Delta r \ (\Delta r < 0)$

C. High Net Leverage

D. Low Net Leverage


Cloyne, James, Clodomiro Ferreira, Maren Froemel, and Paolo Surico (2023) “Monetary policy, corporate finance and investment”, *Journal of the European Economic Association*, p. jvad009.

Debortoli, Davide, Mario Forni, Luca Gambetti, and Luca Sala (2020) “Asymmetric effects of monetary policy easing and tightening”.


