Federal Reserve Policies and Financial Market Conditions During the Crisis

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Bank Structure and Competition
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The views expressed here are those of the authors and do not necessarily represent the views of the Federal Reserve System.
Main Question

Did the Fed policies implemented during the crisis have a significant impact on broad financial conditions?
## Federal Reserve Liquidity & Credit Facilities

<table>
<thead>
<tr>
<th>Traditional Counterparties</th>
<th>Other Investors and Borrowers</th>
<th>Other</th>
<th>Portfolio Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depository Institutions</td>
<td>Other Central Banks</td>
<td>Primary Dealers</td>
<td>MMMF and Commercial Paper Markets</td>
</tr>
</tbody>
</table>

*authorized under Section 13(3) of the Federal Reserve Act – “unusual and exigent circumstances.”

The dates in parentheses reference the introduction and the end (when applicable) of each program.
Previous Studies

• TAF & Swap lines
  McAndrews et al. (2008); Taylor and Williams (2009); Christensen et al. (2009);

• LSAPs
  Gagnon et al. (2010); Hancock and Passmore (2011); Krishnamurthy and Vissing-Jorgensen (2011);

• TALF – Campbell et al. (2011)

• AMLF – Duygan-Bump et al. (2010)

• CPFF – Adrian et. al. (2010)

• TARP – Veronosi and Zingales (2010); Ng et. al. (2010)
Brave and Genay

- **Event Study**: Broad set of policy actions
  - All announcements
  - Initiation/expansion only

- **Broad measure of financial conditions**
  - Higher threshold for finding significant effects from policy actions

- **Account for endogeneity of policy actions**
  - Estimate a two-equation system with a “policy response” function
Main Results

• The response function of policymakers matter
  • The Fed was more likely to take action when financial market and economic conditions were worse than normal
  • Failing to take into account the Fed’s policy response has significant effects on measured effects of policies

• Collectively, the Fed actions improved broad financial market conditions significantly

• The results are robust to alternative definitions of events and model specifications
Definition of Policy Events

Baseline Model: January 2007 – August 2010

• monetary policy actions (FFR, LSAP #1)
• credit and liquidity facilities; assistance to specific inst.
• excludes U.S. policy actions not coordinated with the Fed (e.g. actions by the Treasury, FDIC, etc.).
• initiations, expansions, extensions, reductions, and ends
Measuring Financial Market Conditions

FRB Chicago National Financial Conditions Index (NFCI) Available at www.chicagofed.org/nfci

• Broad coverage of financial markets
  • A weighted average of 100 financial indicators
    • Money Markets (28/100)
    • Debt/Equity Markets (27/100)
    • Banking System (45/100)

• Weekly frequency: Jan. 1973 – Aug. 2010
  • Uses an unbalanced panel of weekly, monthly, and quarterly data
  • Captures a single common factor among the indicators
Measuring Financial Market Conditions

• Express financial conditions relative to economic conditions
  • First regress each financial indicator on current and lagged business cycle and inflation indicator
  • Use the standardized residuals to estimate the ANFCI

• Degree measured in standard deviations from mean
  • Positive value = “Tighter” than suggested by economic conditions
  • Negative value = “Looser” than suggested by economic conditions
Policy and Financial & Economic Conditions

![Graph showing the probability of policy events over years 2007 to 2010. The x-axis represents years, and the y-axis represents the probability of policy events. Two lines are plotted: ADSBCI in blue and ANFCI in red. The graph also shows the standard deviation units on the right y-axis.](image-url)
Methodology

Estimate a two-equation system by Maximum Likelihood

\[ I_t = g(AFCI_{t-1}, ADSBCI_{t-1}, AFCI_{t-1} \times ADSBCI_{t-1}, I_{t-1}, \varepsilon_t) \]

\[ \Delta AFCI_t = f(I_t, \Delta AFCI_{t-k}, \Delta ADSBCI_{t-k+1}, \eta_t) \]

\[ \text{Cov}(\varepsilon_t, \eta_t) = \lambda \]
Actual vs Predicted Probability of All Policy Actions
Actual vs Predicted Probability of All Policy Actions

![Graph showing actual vs predicted probability of all policy actions from 2007 to 2010. The x-axis represents years from 2007 to 2010, and the y-axis represents probability ranging from 0 to 1. The graph depicts fluctuations in probability over time.]
Probability of Policy Action

The Fed was more likely to take policy action when financial conditions were tight and business conditions were weak.

Assume normal business conditions, 1 std. dev. increase in ANFCI

- Probability (Action) increases by 10%.

Assume business conditions 1 std. dev. below average, 1 std. dev. increase in ANFCI

- Probability (Action) increases by 14%.
Average Policy Effects – All Events

Exogenous Policy

Endogenous Policy

![Graph showing average policy effects over time for exogenous and endogenous policies.](image)
## Estimated Effects on Individual Measures

<table>
<thead>
<tr>
<th>Financial Indicator</th>
<th>Average Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>TED spread</td>
<td>-16 bps</td>
</tr>
<tr>
<td>3-month LIBOR-OIS spread</td>
<td>-14 bps</td>
</tr>
<tr>
<td>10 yr. – 3m Treasury spread</td>
<td>8 bps</td>
</tr>
<tr>
<td>1-month Nonfinancial A2P2/AA spread</td>
<td>-14 bps</td>
</tr>
<tr>
<td>Moody’s Baa/10-yr Treasury spread</td>
<td>-4 bps</td>
</tr>
<tr>
<td>Citigroup ABS/5-yr Treasury spread</td>
<td>-12 bps</td>
</tr>
<tr>
<td>MOVE</td>
<td>-3%</td>
</tr>
<tr>
<td>VIX</td>
<td>-1%</td>
</tr>
</tbody>
</table>
Model Simulations – All Events

Probability of a Policy Action

Weeks

Response of Financial Conditions

Weeks

Probability

Std. Dev. Units
Summary

• During the crisis, the Fed was more likely to take policy action when financial and economic conditions deteriorated.

• In estimating the effects of policies, it is important to take the policy response function into account.

• The policy actions were associated with significant improvements in financial markets.
  • Dynamics of financial and business conditions during this period suggest that the improvements lasted beyond the announcement week.
Average Policy Effects – Initiations

Exogenous Policy

Endogenous Policy

Mean(Policy) Mean(Non-Policy)
Average Policy Effects – Fed Only (All Events)

Exogenous Policy

Endogenous Policy
APPENDIX
Financial Conditions Indexes: ANFCI

![Graph of Financial Conditions Indexes: ANFCI](image-url)
Definition of Policy Events

Alternative Models

• initiations, expansions, and extensions
  • January 2007 – June 2009

• Fed only
  • excludes Fed actions during weeks with actions by multiple agencies
Predicted Probability of Fed Policy Actions Only
Predicted Probability of Program Introductions
## Average Treatment Effects

<table>
<thead>
<tr>
<th>Maximum Likelihood Estimates</th>
<th>All Policy Actions</th>
<th>FR-only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Events</strong></td>
<td>-0.35**</td>
<td>-0.24**</td>
</tr>
<tr>
<td><strong>Number of Events</strong></td>
<td>56</td>
<td>35</td>
</tr>
<tr>
<td><strong>Expansions/Extensions</strong></td>
<td>-0.39**</td>
<td>-0.33**</td>
</tr>
<tr>
<td><strong>Number of Events</strong></td>
<td>44</td>
<td>24</td>
</tr>
</tbody>
</table>

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Model Simulations – All Events

Response of Financial Conditions

Response of Business Conditions