The Federal Reserve and Market Confidence

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The views expressed here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System.
The Federal Reserve and Asset Prices

What is the effect of the Fed’s communication on asset prices?

- Standard monetary policy: set interest rate
- Other aspects: policy approach, assessment of the economy
The Federal Reserve and Asset Prices

What is the effect of the Fed’s communication on asset prices?

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- Other aspects: policy approach, assessment of the economy

→ This paper:
  - Empirical design allowing for a broad view of communication
  - “Other” matters a lot, distinct pattern: market confidence
What We Do

Take a **broad** view of the yield curve to characterize policy shocks

- All maturities
- Leave markets time to process the communication

Use response in other markets to shed light on the nature of the shocks
What We Find

Take a broad view of the yield curve to characterize policy shocks

1. Yield curve more volatile around FOMC announcements than usual
2. Two policy shocks:
   ▶ 1/3 regular monetary policy shock
   ▶ 2/3 market confidence shock: flat shift across all longer maturities

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3. A decrease in market confidence is related to:
   - Increase in long term real rates, not inflation
   - Low stock returns
   - Increase in uncertainty
   - Credit markets: negative quantity and price effects
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Communication has a large impact on financial markets, but not through changes in short rate
Related Literature

- **Using asset prices to identify monetary policy shocks**

- **Measuring the impact of monetary policy on asset prices**
  - Bernanke and Kuttner 2005, Piazzesi 2005, Gertler and Keradi 2015, Hanson and Stein 2015, Gilchrist et al. 2015, Ozdagli et al. 2016, ...

- **Federal Reserve communication beyond conventional monetary policy**
  - Barro 1986, Romer and Romer 2000, Morris and Shin 2002, Ang et al. 2011, ...
Identification Strategy

- Fed communication happens at discrete points in time: after FOMC meetings
  - Main sample: 1994-2007, 113 FOMC announcements
  - 2-day returns, to allow information to percolate

- Does the yield curve move differently around announcements?
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- Does the yield curve move differently around announcements?

  \[
  \Delta y_t^{(n)} = \nu_t^{(n)} + \varepsilon_t^{(n)}
  \]

  - **Blackout:**
  - **Announcement:**

  - \(\Delta y_t^{(n)}\) change in yield
    - \(\nu_t^{(n)}\) regular
    - \(\varepsilon_t^{(n)}\) policy

  - **Assumption 1:** No policy shocks on “blackout” days
  - **Assumption 2:** Same variance of regular shocks on announcement and non-announcement days
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  - **Assumption 1**: No policy shocks on “blackout” days
  - **Assumption 2**: Same variance of regular shocks on announcement and non-announcement days

  - Cannot observe individual realizations of policy shocks \(\varepsilon_t^{(n)}\)
Excess Variance in the Yield Curve

Instantaneous rate: construct Fed Fund surprises (Kuttner 2001)
Recovering Policy Shocks

- Excess variation due to policy
  \[ \varepsilon_t^{(FF)}, \varepsilon_t^{(3m)}, ... \varepsilon_t^{(10y)} \] likely due to a few underlying policy shocks
- PCA of variance-covariance matrix \( \Sigma_\varepsilon \)
Recovering Policy Shocks

- Excess variation due to policy shocks $\varepsilon_{t}^{(FF)}, \varepsilon_{t}^{(3m)}, \ldots \varepsilon_{t}^{(10y)}$ likely due to a few underlying policy shocks
- PCA of variance-covariance matrix $\Sigma_\varepsilon$
- Two factors explain 93% of the variance
Recovering Policy Shocks

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- PCA of variance-covariance matrix $\Sigma_\varepsilon$
- Two factors explain 93% of the variance

- Factor realizations $f_{j,t} = \sum_n \omega_{j,n} \varepsilon_{t}^{(n)}$ cannot be observed, only contaminated $\tilde{f}_{i,t} = \sum_n \omega_{j,n} \Delta y_{t}^{(n)}$
The Two Policy Shocks

- **Market confidence** $f_1$ (59%)

- **Standard monetary policy** $f_2$ (34%)
Confidence vs Path Shock

- Gurkaynak et al. (2005): multifactor policy surprise, Fed Funds shock and a longer-maturity “path” shock
  - Path shock reflects market expectations for the stance of policy factor over the next year
- Confidence and path shocks positively correlated but...
  - $R$-squared between the two factors only about 20%
  - Many instances with significant deviations between the two, with different signs
- E.g.: April 12, 2003
  - Negative path shock, positive (and twice as large) confidence shock
  - FOMC added language about interest rates remaining low for “considerable period of time”
  - News commentary: bond sell-off due to growing uncertainty about economy and Fed policy
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- E.g.: September 25, 1996
  - No change in path shock, significant decline in confidence shock
  - Reporting after close revealed the Chairman appeared to have greater control over future rates despite dissent by hawks
  - Reduced expectations of future rate increases and resolved some policy uncertainty
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- Confidence and path shocks positively correlated but...
  - $R$-squared between the two factors only about 20%
  - Many instances with significant deviations between the two, with different signs
- Generally, variation day after the announcement related to
  - Additional information
  - Analysis related to monetary policy announcement
  ⇒ Market needs time to process non-rate information
ROBUSTNESS

- Policy news beyond announcements: all non-announcement days
- Different regular news on announcements: scheduled FOMC meetings only, no other macro news
Policy news beyond announcements: all non-announcement days

Different regular news on announcements: scheduled FOMC meetings only, no other macro news

Standard monetary policy shock not specific to Fed Funds rate: also present in OIS rates, longer maturity Fed Funds futures, ...
Post-Crisis: 2010-2016

- Zero lower bound: no standard monetary policy shock
- Larger market confidence shock than pre-crisis
About twice a year, the Fed Chair testifies in front of Congress.
Importance of the Broad View

- Study entire yield curve simultaneously
  - Impact on long-term rates
  - Multiplicity of shocks: not everything must flow through short rate

- Allow two days to measure impact of the announcement
  - Time to react to announcement: learning (individual and social), and decision-making
  - Immediate jump satisfies perfectly exclusion restriction but:
    - Does not rule out that there could be a longer reaction (e.g. earnings announcements)
    - Does not constitute a valid instrument* if multiple components to the announcement respond at different frequencies
How Quickly Does the Market Interpret?

Example: Aug 12, 2003 FOMC meeting

- No change in target
- No FF surprise
- On Aug 13: yield on 2-years declined 6/32 to 1.825%; yield on 5-years declined 21/32 to 3.43%; yield on 30 years declined 1 18/32 to 5.465%

BOND REPORT

Treasury's take a plunge

By Julie Rannazzisi
Published: Aug 13, 2003 4:37 pm ET
Excess Variation Over Each Day

The graph shows the absolute change (in basis points) over maturity days post an announcement. The data points are categorized into two groups: blue circles for the announcement day and red diamonds for the day after the announcement.
High-Frequency Variation for 10-Year Yield

![Graph showing high-frequency variation for 10-year yield with time periods and events marked on the x-axis. The graph compares actual and null hypothesis scenarios with blue and dashed lines, respectively. The y-axis represents the yield values.]
Excess Variation Over Each Testimony Date

![Graph showing excess variation over each testimony date. The x-axis represents maturity with values ranging from 0 to 10, and the y-axis represents absolute change (bps) ranging from -1 to 3.5. The graph includes two sets of data points: blue circles for testimony day and orange diamonds for day after testimony.]
HIGH-FREQUENCY VARIATION FOR 10-YEAR YIELD
Interpreting The Two Policy Shocks

- Two orthogonal dimensions of communication:
  - *Market confidence* $f_1$: Shift in risk premia that mean reverts over a couple of years
  - *Standard monetary policy* $f_2$: Shift in the short rate that mean reverts over a couple of years
Interpreting The Two Policy Shocks

- **Two orthogonal dimensions of communication:**
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- **Use other asset classes:**
  - Inflation, real rate or term premium
  - Equity market
  - Uncertainty measures
  - Credit markets
Impact of Policy Shocks on Other Assets

Do other assets also respond to policy shocks?

Blackout:

\[ R_{i,t} = \xi_{i,t} \]

Announcement:

\[ R_{i,t} = \xi_{i,t} + \beta_{1,i} f_{1,t} + \beta_{2,i} f_{2,t} \]

Identification: do we observe different covariance of asset returns with the contaminated factors around announcements?

Operationalize as a regression

\[ R_{i,t} = \alpha_{0,i} + \alpha_{1,i} A_t + \gamma_{1,i} f_{1,t}^* + \gamma_{2,i} f_{2,t}^* + \beta_{1,i} (f_{1,t}^* \times A_t) + \beta_{2,i} (f_{2,t}^* \times A_t) + \varepsilon_{i,t} \]
Real rate, inflation, and risk premium

- Accounting identity:

\[ n \times y_t^{(n)} = E_t \left[ \sum_{j=0}^{n-1} r_{t+j} \right] + E_t \left[ \sum_{j=0}^{n-1} \pi_{t+j} \right] + E_t \left[ \sum_{j=0}^{n-1} rX_{t+j}^{(n-j)} \right] \]

- Standard monetary policy shock: increase in short rate that mean reverts: large impact on the short end on the yield curve that decays quickly

- Market confidence shock could be:
  - long-lasting impact on future real rate
  - long-lasting impact on future inflation
  - long or short-lasting impact on risk premium
Real rate, inflation, and risk premium

- Accounting identity:
  
  $$n \times y_t^{(n)} = \mathbb{E}_t \left[ \sum_{j=0}^{n-1} r_{t+j} \right] + \mathbb{E}_t \left[ \sum_{j=0}^{n-1} \pi_{t+j} \right] + \mathbb{E}_t \left[ \sum_{j=0}^{n-1} r_x(n-j)_{t+j} \right]$$

  - n-year rate
  - expected real rate
  - expected inflation
  - expected excess return

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REAL RATE, INFLATION, AND RISK PREMIUM

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  - **n-year rate** = expected real rate + expected inflation + expected excess return

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  - long-lasting impact on future real rate
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**Real vs Nominal Rates**

\[ \text{cov}(f_i, \Delta y_i) \]

- \( f_1 \): Nominal
- \( f_1 \): TIPS
- \( f_2 \): Nominal
- \( f_2 \): TIPS
**Real rate, inflation, and risk premium**

- Accounting identity:

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- **Standard monetary policy shock**: increase in short rate that mean reverts: large impact on the short end on the yield curve that decays quickly.

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Real rate, inflation, and risk premium

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- *Standard monetary policy shock*: increase in short rate that mean reverts: large impact on the short end on the yield curve that decays quickly

- *Market confidence shock* could be
  
  - Forward guidance, long-lasting impact on future real rate: horizon is too long
  - long-lasting impact on future inflation \( \times \)
  - long or short-lasting impact on risk premium
Real rate, inflation, and risk premium

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  - long-lasting impact on future inflation \( \times \)
  - short-lasting impact on risk premium \( \checkmark \)

- One standard deviation shock: 10-yr yield increase by 5bps, expected excess return over the next year increase by 50bps
## Equity Returns

<table>
<thead>
<tr>
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<th>$R_M - r_f$</th>
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<tr>
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**Observations**: 3148

**$R$-squared**: 0.01
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- Correlation of long-term yields and stock returns:
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**Uncertainty Measures**

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<td>-15.20*</td>
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<tr>
<td></td>
<td>(0.70)</td>
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<td>(1.10)</td>
<td>(8.96)</td>
</tr>
<tr>
<td>Observations</td>
<td>3141</td>
<td>3137</td>
<td>3103</td>
<td>3154</td>
</tr>
<tr>
<td>$R$-squared</td>
<td>0.01</td>
<td>0.01</td>
<td>0.06</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Decrease in confidence increases uncertainty in stock and bond market.
## Uncertainty Measures

<table>
<thead>
<tr>
<th></th>
<th>$\Delta vix$</th>
<th>$\Delta vxo$</th>
<th>$\Delta smove$</th>
<th>$\Delta epu$</th>
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</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>-3.93***</td>
<td>-2.40***</td>
<td>-1.17**</td>
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<td>(0.80)</td>
<td>(0.82)</td>
<td>(0.52)</td>
<td>(11.55)</td>
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<td>$f_1$</td>
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<td>-0.89**</td>
<td>1.38***</td>
<td>-4.97</td>
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<td></td>
<td>(0.36)</td>
<td>(0.38)</td>
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<td>(3.36)</td>
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<tr>
<td>$f_2$</td>
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<td>(0.11)</td>
<td>(0.12)</td>
<td>(0.11)</td>
<td>(1.29)</td>
</tr>
<tr>
<td>$f_1A$</td>
<td>2.70</td>
<td>2.92*</td>
<td>1.83**</td>
<td>26.86</td>
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<tr>
<td></td>
<td>(1.74)</td>
<td>(1.76)</td>
<td>(0.92)</td>
<td>(19.87)</td>
</tr>
<tr>
<td>$f_2A$</td>
<td>0.52</td>
<td>1.15</td>
<td>0.82</td>
<td>-15.20*</td>
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</tr>
</tbody>
</table>

- Decrease in confidence increases uncertainty in stock and bond market
- In the paper: exchange rate, commodities, energy
Recap

- A one standard deviation decrease in market confidence:
  - Shifts up the real and nominal yield curves by 5bps, even at long maturities
  - Lowers market return by 50bps
  - Increases uncertainty

Suggests shift in:
- Uncertainty about the conduct of policy: reputation (Barro 1986), policy rules (Ang et al. 2011)
- Uncertainty about future economic activity (Romer and Romer 2000)
- Appetite for risk/yield (Drechsler et al. 2014, Hanson and Stein 2015)
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... not coming from a change in rate
Credit Market Conditions

More challenging:

- **Econometrically**
  - less frequent observations
  - slow moving

- **Economically**
  - low confidence → low credit supply,
    - low credit demand
  - ambiguous price prediction
Credit Market Conditions

More challenging:

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- Response to both shocks: cost of mortgages increases, applications drop

<table>
<thead>
<tr>
<th></th>
<th>NFCI</th>
<th>FRM rate</th>
<th>Purchases</th>
<th>Refinance</th>
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<tr>
<td>$t - 1$</td>
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<td>3.42</td>
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<tr>
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<td>(0.39)</td>
<td>(2.47)</td>
<td>(3.70)</td>
<td>(6.67)</td>
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<tr>
<td>$f_2A$</td>
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<td>$t - 1$</td>
<td>0.65**</td>
<td>2.52**</td>
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<tr>
<td>$t - 2$</td>
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<td>(0.16)</td>
<td>(1.23)</td>
<td>(2.75)</td>
<td>(5.96)</td>
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Observations 706 706 706 706

$R$-squared 0.63 0.23 0.19 0.21
Conclusion

- Federal Reserve communication has a pervasive impact on asset prices
- Most of it is distinct from conventional monetary policy actions
- More consistent with direct shifts in market confidence

Another policy tool:
- Purposeful use?
- How to control it?
- Theoretical foundations?