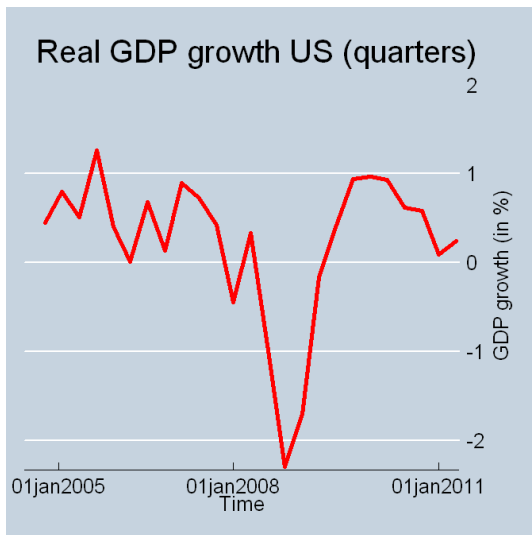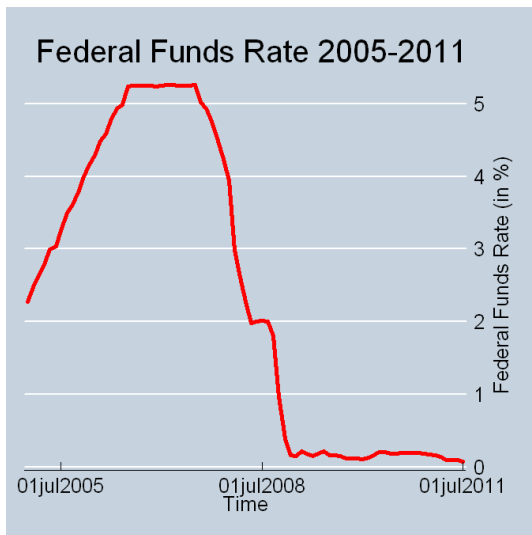# Can the Fed talk the hinds legs off the stock market?

Sylvester Eijffinger

Real GDP growth US (quarters)

# Motivation: Monetary policy to the rescue?



Federal Funds Rate 2005-2011

# Motivation: Other options?

Inside the mind of the current chairman of the Federal Reserve:
[Bernanke and Reinhart, AER 2004]

1. Expanding the Size of the Central Bank's Balance Sheet
   $\rightarrow$ we have seen this (a lot!)

2. Altering the Composition of the Central Bank's Balance Sheet
   $\rightarrow$ we saw this in September (operation twist).

3. Shaping Interest-Rate Expectations
   $\rightarrow$ our focus

# Focus of the talk: Communication

Literature: [Eggertsson and Woodford, BPEA 2003]
[Blinder et alia, JEL 2008]

Contribution:
link communication - stock prices
$\rightarrow$ <u>heterogenous responses</u> (across time and stocks)
$\longleftrightarrow$
literature

Other contribution: institutional innovation and instability of shocks, outliers, . . .

# Methodology: Event study approach

Idea: On FOMC days, changes in interest rates due to central banks.

$\rightarrow$ central bank talk or central bank action

Regress changes long term interest rates on central bank action, residuals should capture central bank communication.

$\rightarrow$ gauge effect of central bank talk

# Methodology: Two factors

Decompose:

$$\Delta\text{Eurodollar future 1Y}_t = \alpha + \beta\text{Surprise Action}_t + \epsilon_t$$

*Surprise Action = Target factor*
and
$\epsilon$ = *Path factor*

FOMC meetings above/beyond target surprises.
$\rightarrow$ Two factors explain bulk of asset movements on FOMC days.

# Methodology: Surprises

Control variable
is a market-based surprise measure of monetary policy: commonly used trick.

Federal funds future: value $= 100$ - average of effective rate over 30 days before payout
$\rightarrow$ gauge market expectations.

Change in small window around FOMC meeting: surprise measure.

# Methodology: Surprises: Algebra

$\text{ff}_t^0$ implied rate future contract expiring this month at time t,
$D_0$ is number of days this month contains,
$d_0$ is number of days of the month elapsed,
$r_{-1}$ interest rate prevailing up until FOMC meeting,
$r_0$ interest rate prevailing up after FOMC meeting

$$\text{ff}_{t-\Delta t}^0 = \frac{d_0}{D_0} r_{-1} + \frac{D_0 - d_0}{D_0} \mathbb{E}_{t-\Delta t}(r_0) + \mu_{t-\Delta t}^0.$$

$$\text{ff}_t^0 = \frac{d_0}{D_0} r_{-1} + \frac{D_0 - d_0}{D_0} r_0 + \mu_t^0.$$

# Methodology: Surprises: Algebra

$\rightarrow$ construct surprise

$$\text{Surprise}_t \equiv r_0 - \mathbb{E}_{t-\Delta t}(r_0)$$
$$= \dots$$
$$= \left[\text{ff}_t^0 - \text{ff}_{t-\Delta t}^0\right] \frac{D_0}{D_0 - d_0}.$$

# Methodology: Event study approach

$$\text{Return}_{it} = \alpha + \beta_1 \text{Target}_t + \beta_2 \text{Path}_t + \epsilon_{it}$$

Our interest is in the effect of the *Path* factor

Path factor = communication

Everything what the central bank did, except its actions (things which move fed funds futures), that moved Eurodollar futures $\rightarrow$ communication of outlook, policy inclination,...

# Methodology: Issues

Endogeneity, simultaneity? Sufficiently small window.

Literature: Daily window ok, larger window not.

Changes in risk premium? Only relevant at lower frequency

sample: FOMC meetings

Well established approach in the literature, most technical objections are documented and resolved.

# Analysis: Goal

Literature finds no significant effect for stock indices of the path factor:

$$\text{Return Index}_{it} = \alpha + \beta_1 \text{Target}_t + \beta_2 \text{Path}_t + \epsilon_{it}$$

In this paper:
[1] individual stocks
[2] heterogeneity across time: recession vs. no recession
[3] heterogeneity in the cross section: industries (demand channel), firms (credit channel).

# Analysis: Main specification:

$$\text{Return}_{it} = \alpha + \beta_1 \text{Target}_t + \beta_2 \text{Target}_t * \text{Rec}_t + \beta_3 \text{Path}_t + \beta_4 \text{Path}_t * \text{Rec}_t + \epsilon_{it}$$

$\text{Rec}_t$: NBER recession indicator.

# Data, Errors, Outliers

Stock data: CRSP
Financial account variables: COMPUSTAT
Sample: S&P 500 (adjusted as composition changes)
Futures data: obtained from CME group

Results with heteroskedasticity robust errors and firm fixed effects
$\rightarrow$ other error specifications yield similar results

Results with outlier dates dropped: robust results (but good idea?)

# Results: Aggregate results

Table: Baseline event study (excluding outliers)

|  | (1) Late b/t | (2) Late b/t |
| --- | --- | --- |
| Target | -14.133*** | -13.281*** |
|  | (-20.11) | (-23.88) |
| Target*Rec |  | -6.549** |
|  |  | (-3.21) |
| Path | 3.847*** | -2.950*** |
|  | (16.75) | (-16.10) |
| Path*Rec |  | 20.517*** |
|  |  | (39.34) |
| N | 27016 | 27016 |
| r2 | 0.05 | 0.15 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

# Quick reminder: credit channel, demand channel

Credit Channel:
[1] Highly bank-dependent borrowers are affected more as banks reduce overall supply of credit.
Kashyap, Stein, Wilcox, AER 1993

[2] Rising interest rates push down present value of collateral, weakening balance sheets. $\rightarrow$ constraint on supply of goods.
Bernanke, Gertler, JEP 1993

Demand Channel:
Firms which produce goods which are interest-sensitive should see expected future earnings more affected. $\rightarrow$ on industry level.
Ehrmann, Fratzscher, JMCB 2005

# Results: Industry effects and cyclicality

Table: Industry effects: Manufacturing

| Major Group | Target | Target*Rec | Path | Path*Rec |
|---|---|---|---|---|
| Primary metal | -29.06*** | -24.68 | -1.397 | 30.60*** |
| Fabricated metal | -22.89*** | -0.614 | -3.179*** | 20.03*** |
| Rubber | -21.19** | 5.463 | -4.114 | 20.25*** |
| Petroleum | -18.17*** | 3.438 | 0.583 | 14.30*** |
| Paper | -14.33*** | 34.10 | -2.511* | 16.60*** |
| Printing and Publishing | -13.69* | 1.973 | -0.397 | 14.10*** |
| Apparel, finished products | -13.35* | -24.58 | -0.850 | 20.04*** |
| Industrial/commercial machinery | -11.81*** | -8.183 | -4.077*** | 20.75*** |
| Chemicals | -11.78*** | 2.718 | -0.610 | 8.275*** |
| Transportation equipment | -11.38*** | -39.76*** | -0.752 | 21.62*** |
| Electronic equipment | -7.513*** | -4.518 | -5.150*** | 20.60*** |
| Food and Kindred products | -7.424*** | 1.715 | -1.483* | 9.501*** |
| Tobacco Products | -6.505 | 31.03* | -3.648 | 7.721* |
| Photo/Medical/Optical Goods, Clocks | -5.843** | -9.568 | -3.006*** | 12.22*** |

$^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

# Results: Why?

Cyclical companies should respond more,
[Ehrmann and Fratzscher, JMCB 2004].

Test by constructing *industrial growth beta's*. Old idea by
[Boudoukh, Richardson, Whitelaw, JF 1994].

Growth Rate Indus. $\text{Prod.}_t^{SectorX} = \alpha + \beta$Growth Rate Indus. $\text{Prod.}_t^{Aggregate} + \epsilon_t$

Classify industries from cyclical to noncyclical based on $\beta$.

# Results: Why?

Table: Cyclical vs Non-cyclical manufacturing firms

|  | (1) All b/t | (2) Cyclical b/t | (3) Not cyclical b/t |
|---|---|---|---|
| Target | -11.580*** | -19.818*** | -9.998*** |
|  | (-16.45) | (-5.67) | (-8.94) |
| Target*Rec | -6.223* | -12.145 | 5.287 |
|  | (-2.52) | (-0.98) | (1.02) |
| Path | -1.958*** | -1.801 | -1.546*** |
|  | (-7.84) | (-1.53) | (-4.19) |
| Path*Rec | 14.184*** | 25.409*** | 8.308*** |
|  | (25.01) | (10.31) | (9.99) |
| N | 14260 | 1205 | 3152 |
| r2 | 0.11 | 0.12 | 0.08 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

# Results: Firm effects

Table: Firm effects

|  | (1) Leverage High | (2) Leverage Low | (3) Market Value High | (4) Market Value Low |
|---|---|---|---|---|
| Target | -11.730*** | -10.131*** | -10.091*** | -11.777*** |
|  | (-4.54) | (-4.07) | (-5.91) | (-3.70) |
| Target*Rec | -22.814* | 1.756 | 13.207* | -36.134* |
|  | (-1.98) | (0.24) | (2.37) | (-2.45) |
| Path | -2.747* | -1.698 | -2.018*** | -2.393* |
|  | (-2.07) | (-1.48) | (-3.48) | (-2.09) |
| Path*Rec | 23.181*** | 11.931*** | 8.702*** | 29.796*** |
|  | (6.24) | (5.05) | (7.21) | (7.56) |
| N | 910 | 967 | 967 | 910 |
| r2 | 0.17 | 0.11 | 0.12 | 0.21 |

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

# Results: Firm effects

Table: Firm effects

|  | (1) Employees High | (2) Employees Low | (3) Price-earnings High | (4) Price-earnings Low |
|---|---|---|---|---|
| Target | -6.661** | -13.220*** | -4.572 | -11.876*** |
|  | (-2.99) | (-5.28) | (-1.33) | (-4.43) |
| Target*Rec | -5.114 | -26.565* | -9.769 | -14.450 |
|  | (-0.71) | (-2.07) | (-1.09) | (-1.47) |
| Path | -2.961** | 0.068 | -0.671 | -0.989 |
|  | (-2.64) | (0.05) | (-0.60) | (-0.81) |
| Path*Rec | 12.818*** | 21.533*** | 10.216*** | 14.912*** |
|  | (5.32) | (5.93) | (4.51) | (6.58) |
| N | 953 | 897 | 852 | 795 |
| r2 | 0.11 | 0.15 | 0.15 | 0.14 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

# Furthermore:

Controls and robustness checks: asset pricing factors, alternative choice of outliers, ...

What to do?
Asymmetries, recession indicators, financial dependence variable (Rajan/Zingales), ...

Other contributions: Minor, yet imho relevant. Read the paper when interested.

# Conclusion

Take away?

1. Short term impact of Fedspeak. Longer term???

2. Effects can be substantial. Depends on x,y,z.

3. Heterogeneity in effects in line with effects target surprises, [Ehrmann and Fratzscher, JMCB 2004]

4. Is it *really* important?
   $\rightarrow$ answer from the sincere empiricist: Maybe
   $\rightarrow$ pragmatic answer: If Bernanke thinks it is, it is!
   $\rightarrow$ more pragmatic answer: If financial markets think it is, it is!

Questions?

# References

Ben Bernanke and Vincent Reinhart (2004)
Conducting Monetary Policy at Very Low Short-Term Interest Rates.
*American Economic Review* 94(2): 85-90.

Alan S. Blinder and Michael Ehrmann and Marcel Fratzscher and Jakob De Haan and David-Jan Jansen (2008)
Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence
*Journal of Economic Literature*

J. Boudoukh, M. Richardson and R. Whitelaw (1994)
Industry Returns and the Fisher Effect.
*Journal of Finance* 49(5): 1595-1615.

# References

Gauti Eggertsson and Michael Woodford (2003)
The Zero Bound on Interest Rates and Optimal Monetary Policy.
*Brookings Papers on Economic Activity* (1), pp. 139-233.

Michael Ehrmann and Marcel Fratzscher (2004)
Taking Stock: Monetary Policy Transmission to Equity Markets
*Journal of Money, Credit and Banking,* p. 719-738

Refet Gürkaynak, Brian Sack and Eric Swanson (2005)
Do actions speak louder than words? The response of asset prices to monetary policy
actions and statements.
*International Journal of Central Banking*