

THE FEDERAL RESERVE AND MARKET CONFIDENCE

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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



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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*

RELATED LITERATURE

■ Using asset prices to identify monetary policy shocks

- ▶ Rudebusch 1998, Kuttner 2001, Rigobon 2003, Rigobon and Sack 2004, Gurkanyak et al. 2005, Nakamura and Steinsson 2015, Schmeling and Wagner 2016, Leombroni et al. 2016, ...

■ Measuring the impact of monetary policy on asset prices

- ▶ Bernanke and Kuttner 2005, Piazzesi 2005, Gertler and Karadi 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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Blackout:

$$\Delta y_t^{(n)} = \nu_t^{(n)}$$

Announcement:

$$\underbrace{\Delta y_t^{(n)}}_{\text{change in yield}} = \underbrace{\nu_t^{(n)}}_{\text{regular}} + \underbrace{\varepsilon_t^{(n)}}_{\text{policy}}$$

- ▶ *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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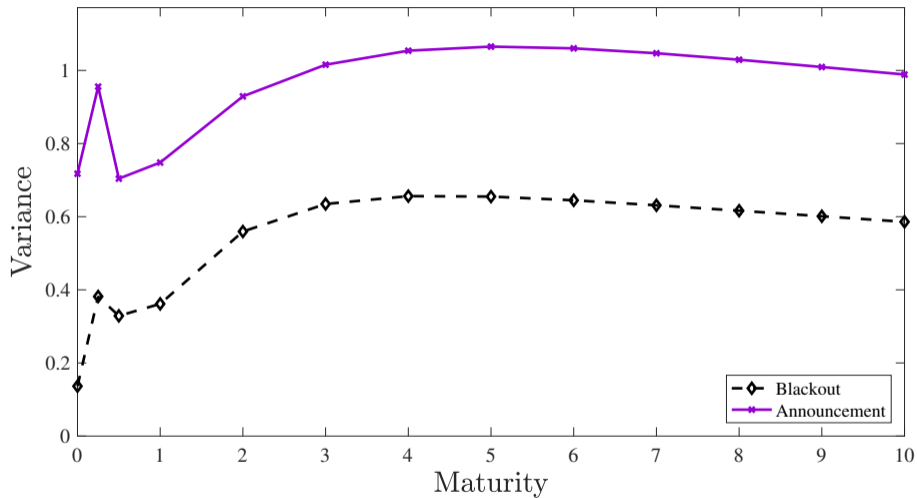
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- ▶ *Assumption 1*: No policy shocks on “blackout” days
- ▶ *Assumption 2*: Same variance of regular shocks on announcement and non-announcement days
- ▶ Cannot observe individual realizations of policy shocks $\varepsilon_t^{(n)}$



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

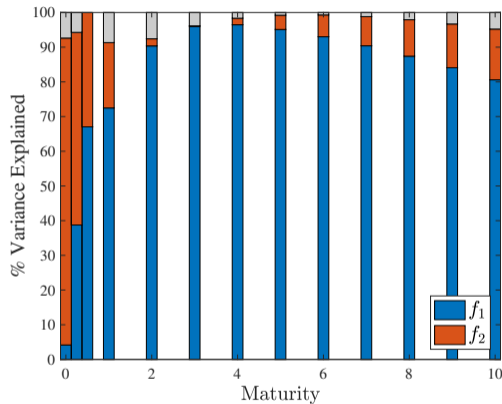
few underlying policy shocks

- PCA of variance-covariance matrix Σ_ε



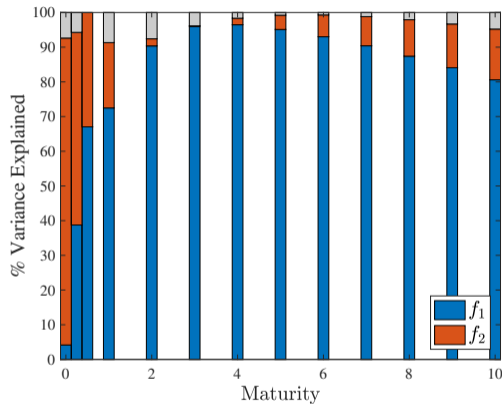
RECOVERING POLICY SHOCKS

- Excess variation due to policy
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- PCA of variance-covariance matrix Σ_ε
- Two factors explain 93% of the variance



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- Excess variation due to policy
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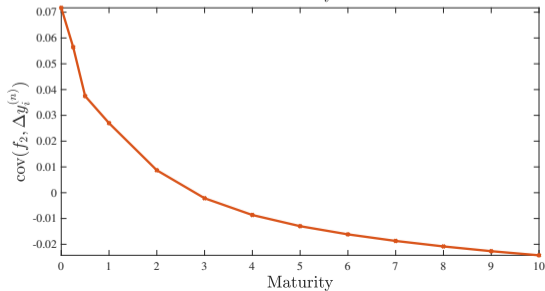
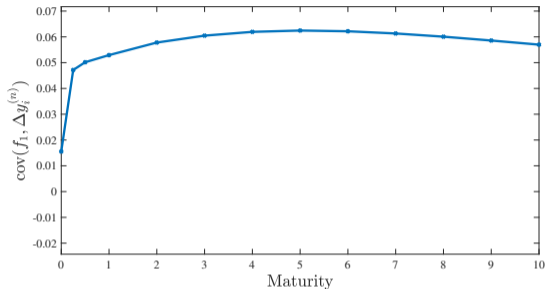
- Factor realizations $f_{j,t} = \sum_n \omega_{j,n} \varepsilon_t^{(n)}$ cannot be observed, only contaminated

$$\tilde{f}_{i,t} = \sum_n \omega_{j,n} \Delta y_t^{(n)}$$



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

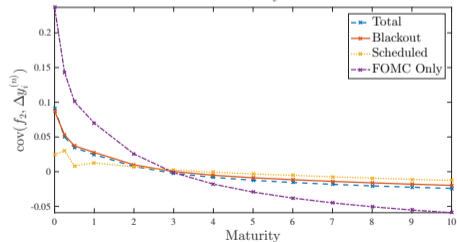
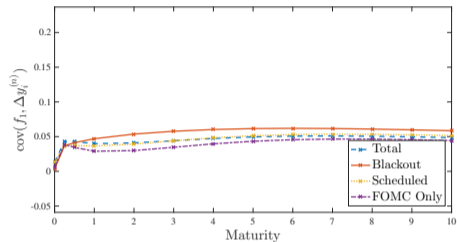


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 - ▶ Path shock reflects market expectations for the stance of policy factor over the next year
 - Confidence and path shocks positively correlated but...
 - ▶ R -squared between the two factors only about 20%
 - ▶ Many instances with significant deviations between the two, with different signs
 - Generally, variation day after the announcement related to
 - ▶ Additional information
 - ▶ Analysis related to monetary policy announcement
- ⇒ Market needs time to process non-rate information



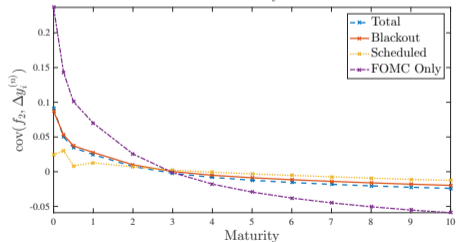
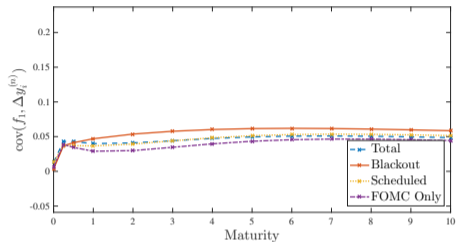
ROBUSTNESS



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



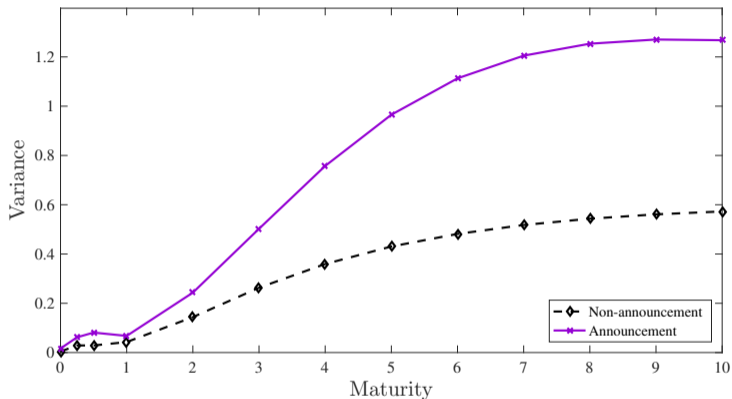
ROBUSTNESS



- 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



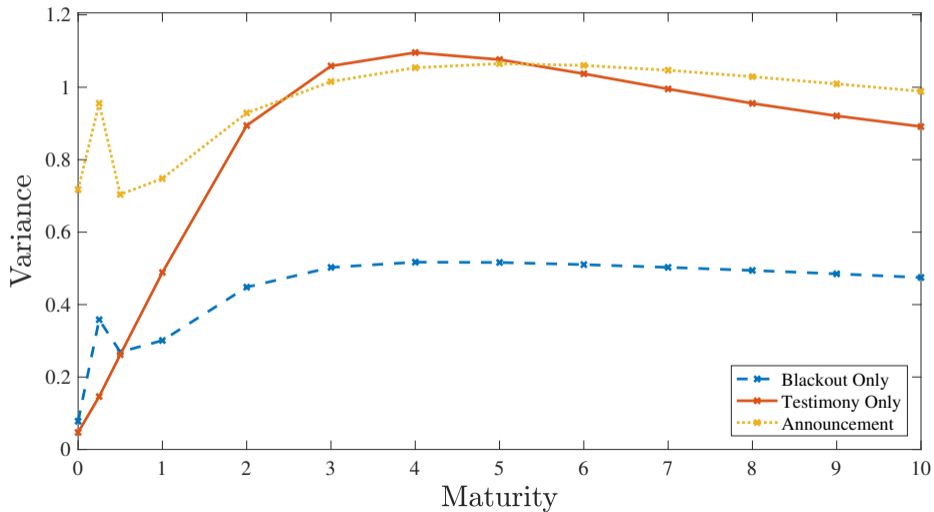
■ Zero lower bound: no standard monetary policy shock

■ Larger market confidence shock than pre-crisis



TESTIMONIES

- 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

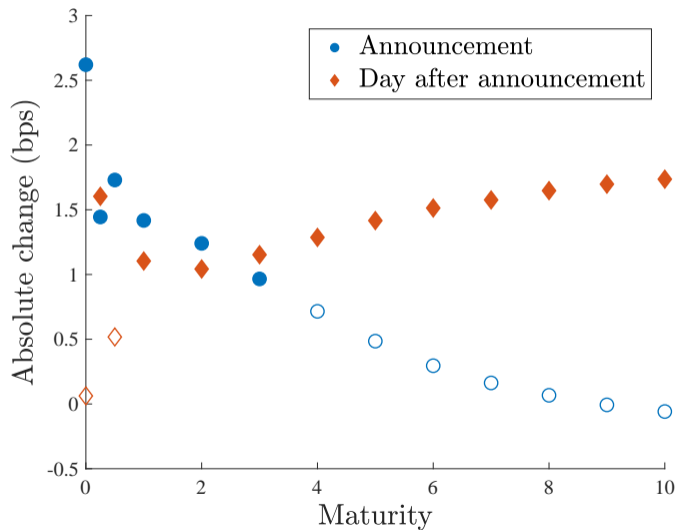
Treasurys take a plunge

By Julie Rannazzisi

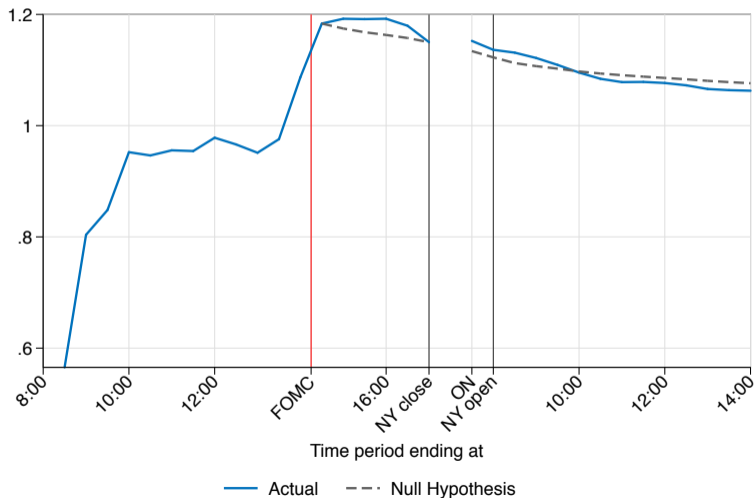
Published: Aug 13, 2003 4:37 pm ET



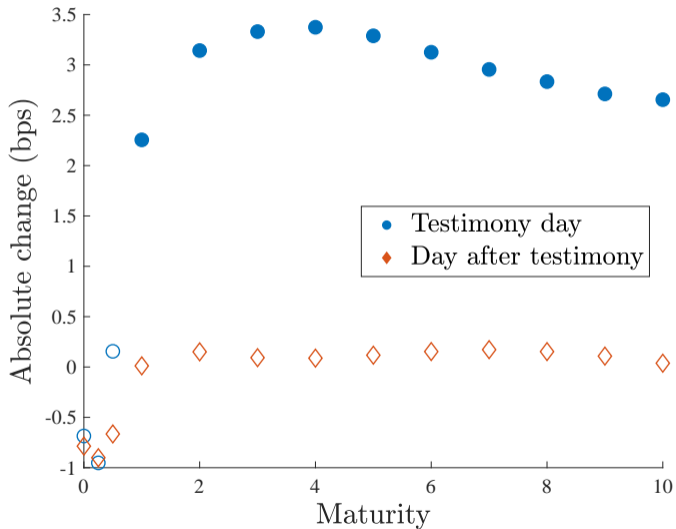
EXCESS VARIATION OVER EACH DAY



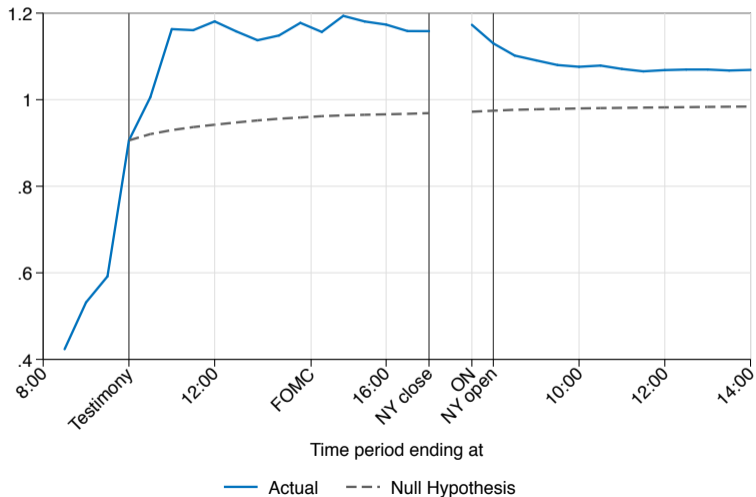
HIGH-FREQUENCY VARIATION FOR 10-YEAR YIELD



EXCESS VARIATION OVER EACH TESTIMONY DATE



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

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 - ▶ *Standard monetary policy* f_2 : Shift in the short rate that mean reverts over a couple of years
- 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: $R_{i,t} = \underbrace{\xi_{i,t}}_{\text{return}} + \underbrace{\beta_{1,i}f_{1,t} + \beta_{2,i}f_{2,t}}_{\text{policy}}$

- Identification: do we observe different covariance of asset returns with the contaminated factors around announcements?
- Operationalize as a regression

$$R_{i,t} = \alpha_{0,i} + \alpha_{1,i}\mathbb{A}_t + \gamma_{1,i}f_{1,t}^* + \gamma_{2,i}f_{2,t}^* + \beta_{1,i}(f_{1,t}^* \times \mathbb{A}_t) + \beta_{2,i}(f_{2,t}^* \times \mathbb{A}_t) + \varepsilon_{i,t}$$



REAL RATE, INFLATION, AND RISK PREMIUM

- Accounting identity:

$$\underbrace{n \times y_t^{(n)}}_{\text{n-year rate}} = \underbrace{\mathbb{E}_t \left[\sum_{j=0}^{n-1} r_{t+j} \right]}_{\text{expected real rate}} + \underbrace{\mathbb{E}_t \left[\sum_{j=0}^{n-1} \pi_{t+j} \right]}_{\text{expected inflation}} + \underbrace{\mathbb{E}_t \left[\sum_{j=0}^{n-1} r x_{t+j}^{(n-j)} \right]}_{\text{expected excess return}}$$



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 - ▶ long-lasting impact on future inflation
 - ▶ long or short-lasting impact on risk premium



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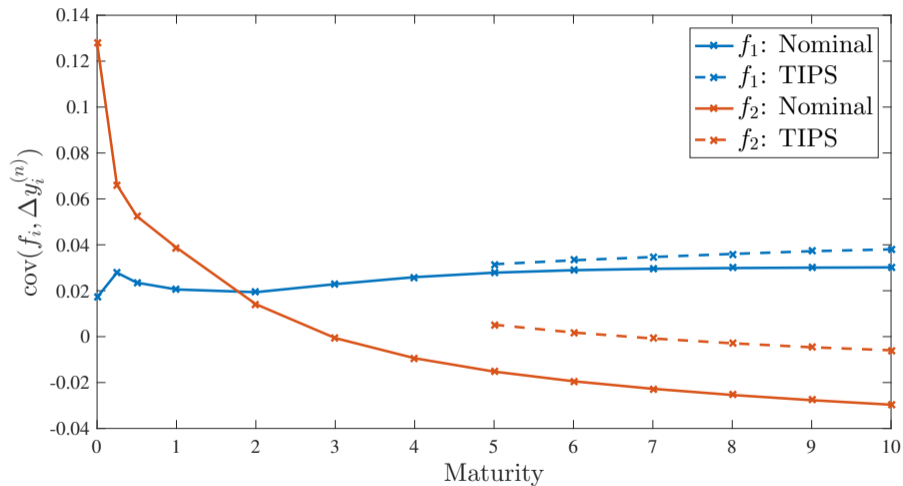
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REAL VS NOMINAL RATES



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 - Forward guidance, long-lasting impact on future real rate ✗
 - long-lasting impact on future inflation ✗
 - short-lasting impact on risk premium ✓
 - One standard deviation shock: 10-yr yield increase by **5bps**, expected excess return over the next year increase by **50bps**



EQUITY RETURNS

	$R_M - r_f$
A	0.33** (0.14)
f_1	0.23*** (0.08)
f_2	0.00 (0.02)
f_1A	-0.55** (0.28)
f_2A	-0.05 (0.45)
Observations	3148
R -squared	0.01



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EQUITY RETURNS

	$R_M - r_f$	HML	SMB
A	0.33** (0.14)	-0.10 (0.09)	0.03 (0.09)
f_1	0.23*** (0.08)	-0.11*** (0.03)	0.17*** (0.04)
f_2	0.00 (0.02)	0.01 (0.01)	-0.04** (0.02)
f_1A	-0.55** (0.28)	-0.03 (0.16)	-0.19 (0.18)
f_2A	-0.05 (0.45)	0.43** (0.20)	0.03 (0.13)
Observations	3148	3148	3148
R -squared	0.01	0.02	0.01

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UNCERTAINTY MEASURES

	Δvix	Δvxo	$\Delta smove$	Δepu
A	-3.93*** (0.80)	-2.40*** (0.82)	-1.17** (0.52)	-49.67*** (11.55)
f_1	-0.53 (0.36)	-0.89** (0.38)	1.38*** (0.30)	-4.97 (3.36)
f_2	0.05 (0.11)	-0.10 (0.12)	-0.78*** (0.11)	3.86*** (1.29)
f_1A	2.70 (1.74)	2.92* (1.76)	1.83** (0.92)	26.86 (19.87)
f_2A	0.52 (0.70)	1.15 (0.82)	0.82 (1.10)	-15.20* (8.96)
Observations	3141	3137	3103	3154
R -squared	0.01	0.01	0.06	0.01

■ Decrease in confidence increases uncertainty in stock and bond market



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R -squared	0.01	0.01	0.06	0.01

■ 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



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- 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)



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

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 - ▶ *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)
- ... 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



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	NFCI	FRM rate	Purchases	Refinance
f_1A				
$t - 1$	0.36 (0.32)	0.89 (2.03)	3.42 (3.95)	1.50 (5.86)
$t - 2$	-0.14 (0.39)	4.19* (2.47)	-5.32 (3.70)	-12.93* (6.67)
f_2A				
$t - 1$	0.65** (0.29)	2.52** (1.06)	2.31 (2.06)	-4.07 (4.52)
$t - 2$	0.50*** (0.16)	-0.91 (1.23)	-7.19*** (2.75)	-18.69*** (5.96)
Observations	706	706	706	706
R-squared	0.63	0.23	0.19	0.21

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



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?

