The High-Frequency Impact of News on Long-Term Yields and Forward Rates: Is it Real?

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Literature on announcement effects

- Exchange rates
  - Anderson, Bollerslev, Diebold and Vega (2003)
- Stock returns
  - Cutler, Poterba and Summers (1989)
- Bond returns
  - Fleming and Remolona (1997, 1999)
  - Gürkaynak, Sack and Swanson (2003)
- Multiple assets
  - Boyd, Jagannathan and Hu (2001)
  - Andersen, Bollerslev, Diebold and Vega (2007)

Announcement effects

- General pattern:
  - Surprises causes a jump in the conditional mean
  - Best identified with high-frequency data
  - Period of elevated volatility
- Effects on nominal bond yields are big:
  - Big payrolls shock moves 10 year yields 15 bps!
  - Long-term forward rates move nearly as much

Interpretation of the sensitivity of nominal forward rates

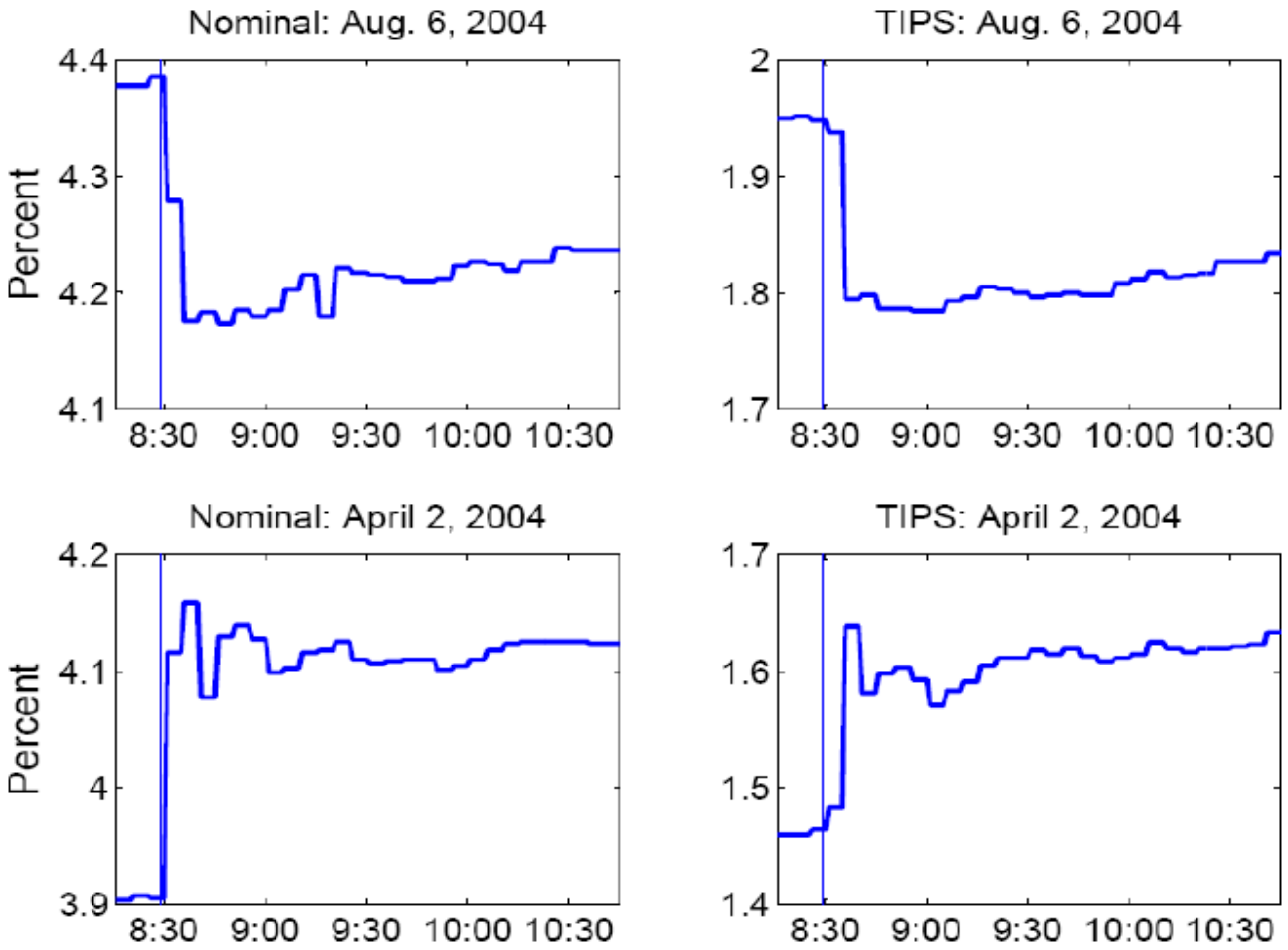
- Long-term nominal forward rate is the sum of:
  1. Long-term inflation expectations
  2. Inflation risk premium
  3. Long-term expected real short-term rates
  4. Real risk premium

- Sensitivity of nominal forward rates could reflect poorly anchored inflation expectations
  - Argued by Gürkaynak, Sack and Swanson (2003)

The data in this paper

- Fed collected data at the 5 minute frequency on bond yields since February 2004
  - On-the-run five- and ten-year
  - TIPS and nominal yields
- From these, can work out approximate inflation compensation

Ten-year yields around two big news announcements



This paper looks at effects of 14 macro announcements

Data Release	Source	Frequency	Release Time	Standard Deviation	Units
Capacity	Fed	Monthly	9:15	0.31	Percent
Confidence	Michigan	Monthly	10:00	4.84	Index
Core CPI	BLS	Monthly	8:30	0.09	Percent change mom
Durable Goods	Census	Monthly	8:30	3.15	Percent change mom
ECI	BLS	Monthly	8:30	0.24	Percent change mom
GDP (Advance)	BEA	Quarterly	8:30	0.81	Percent change qoq, ar
Claims	ETA	Weekly	8:30	18.5	Thousands
NAPM Index	NAPM	Monthly	10:00	2.09	Index
Nonfarm	BLS	Monthly	8:30	92.5	Thousands
New Homes	Census	Monthly	10:00	73.5	Thousands
Core PPI	BLS	Monthly	8:30	0.29	Percent change mom
Retail Sales	Census	Monthly	8:30	0.70	Percent change mom
Unemployment	BLS	Monthly	8:30	0.13	Percent
FOMC	Fed	8 per year	14:15	5.3	Basis points

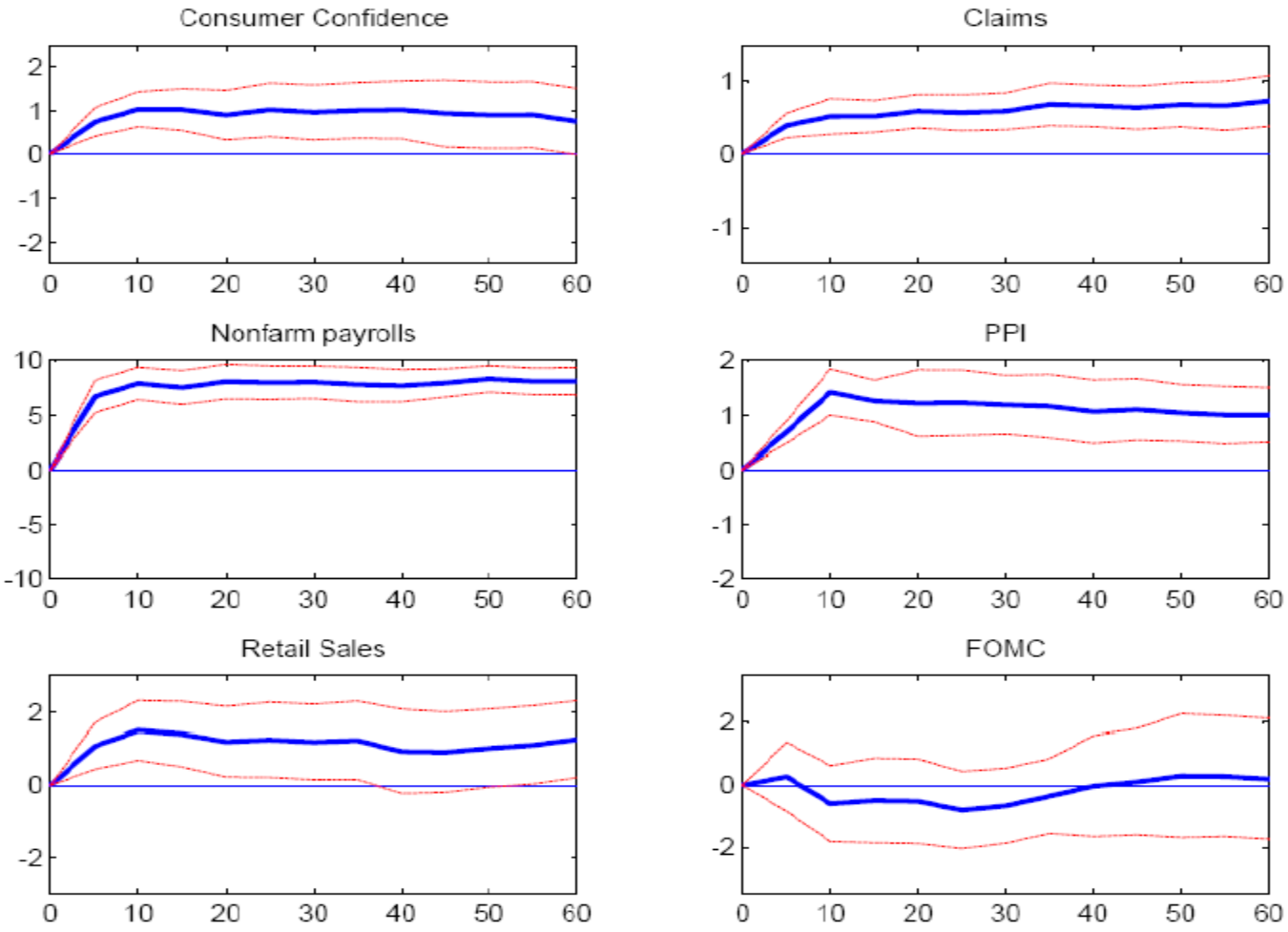
Empirical methodology

$$\Delta y_t(h) = \Sigma_{j=1}^{J} \beta_j(h) s_{j,t} + \varepsilon_t$$

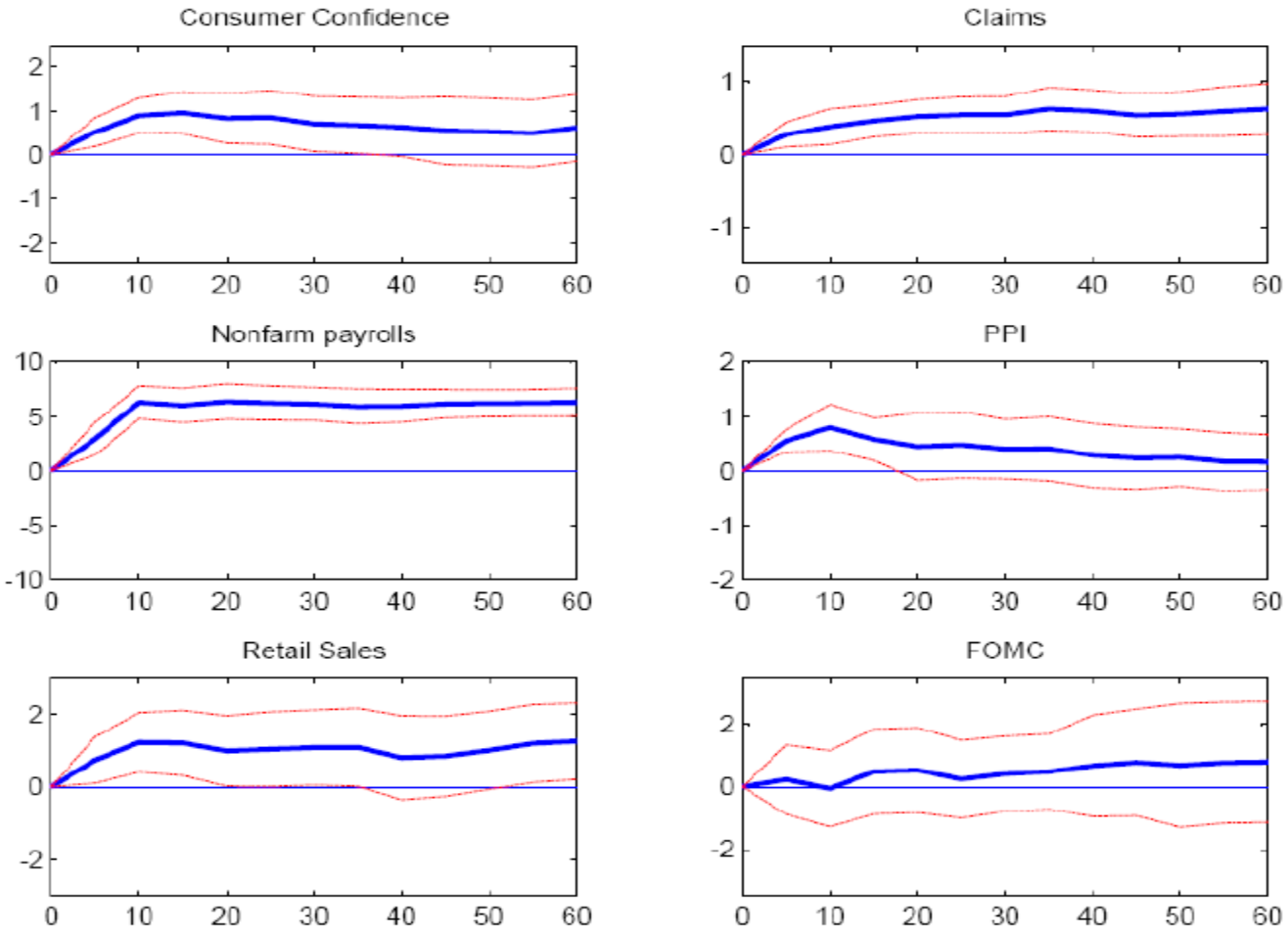
$$s_{j,t} = \frac{A_{j,t} - E_{j,t}}{\sigma(A_{j,t} - E_{j,t})}$$

- All announcements normalized so that positive numbers imply stronger activity

Effects of news surprises on nominal ten-year yields



Effects of news surprises on real ten-year yields



15 minute regression results
Price announcements

	Ten-year			Five-year			Five-to-ten-year forward		
	Nom	TIPS	IC	Nom	TIPS	IC	Nom	TIPS	IC
Core CPI	2.21***	0.64	1.55***	2.55***	0.79	1.74***	1.77***	0.40	1.35***
	(0.34)	(0.41)	(0.31)	(0.45)	(0.51)	(0.39)	(0.26)	(0.40)	(0.39)
Core PPI	1.25***	0.58***	0.66***	1.41***	0.66***	0.74***	1.06***	0.50*	0.55**
	(0.24)	(0.21)	(0.18)	(0.27)	(0.20)	(0.15)	(0.21)	(0.27)	(0.23)

15 minute regression results
Econ. activity announcements

	Ten-year			Five-year			Five-to-ten-year forward		
	Nom	TIPS	IC	Nom	TIPS	IC	Nom	TIPS	IC
Durable	0.93***	0.83***	0.09	1.03**	1.00***	0.02	0.79***	0.70**	0.08
	(0.35)	(0.28)	(0.11)	(0.41)	(0.30)	(0.22)	(0.31)	(0.35)	(0.22)
GDP	1.40***	0.97***	0.42*	1.73**	1.30***	0.42	0.94***	0.62*	0.31
	(0.45)	(0.32)	(0.23)	(0.80)	(0.42)	(0.48)	(0.25)	(0.34)	(0.25)
Nonfarm	7.50***	5.98***	1.44***	10.3***	7.37***	2.87***	3.76***	4.54***	-0.83
	(0.71)	(0.55)	(0.25)	(1.02)	(0.80)	(0.70)	(0.56)	(0.65)	(0.53)
R. Sales	1.40***	1.20***	0.18	1.58***	1.42***	0.14	1.17**	0.95**	0.20
	(0.54)	(0.41)	(0.16)	(0.58)	(0.46)	(0.17)	(0.52)	(0.42)	(0.22)

15 minute regression results FOMC announcements

	Ten-year			Five-year			Five-to-ten-year forward		
	Nom	TIPS	IC	Nom	TIPS	IC	Nom	TIPS	IC
Fed funds	-0.49	0.49**	-0.98***	0.92	1.62**	-0.72***	-2.32***	-0.64	-1.65***
	(0.33)	(0.23)	(0.21)	(0.58)	(0.69)	(0.18)	(0.52)	(0.36)	(0.37)

Daily versus 15 minute results
Example: Retail sales

	Ten-year			Five-year			Five-to-ten-year forward		
	Nom	TIPS	IC	Nom	TIPS	IC	Nom	TIPS	IC
Intraday	1.40***	1.20***	0.18	1.58***	1.42***	0.14	1.17**	0.95**	0.20
	(0.54)	(0.41)	(0.16)	(0.58)	(0.46)	(0.17)	(0.52)	(0.42)	(0.22)
Daily	2.20**	2.42***	-0.24	2.64**	2.51***	0.10	1.66	2.25**	-0.61
	(1.05)	(0.86)	(0.43)	(1.20)	(0.93)	(0.59)	(1.08)	(0.94)	(0.41)

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- Can compare daily and intradaily estimates by a Hausman specification test
  - Only 14/126 reject

Simple decomposition

- Can work out implied standard deviation of nominal and real rates per quarter assuming no shocks other than news announcements

	Nominal	Real	IC
Ten-year	15.4	12.1	4.2
Five-year	20.7	14.8	6.5

- Overall biggest puzzle is to get models to explain sensitivity of **real** rates to news.

Implications: for macro models

- Standard DSGE models imply that π^* and r^* are constant
  - Smets and Wouters (2003)
  - Christiano, Eichenbaum and Evans (2005)

- Perhaps should allow more variation in r^*

Implications: for finance models

- Term structure models are often fitted to nominal yields data and inflation
  - Ang, Bekaert and Wei (2007)
  - Chernov and Müller (2008)
- Papers find that long-term real yields are stable.
- But don’t use TIPS data – need more volatility in real rates.

Time-varying risk premia

- Result could be due to variation in risk premia.
- If so, real risk premia are procyclical.
- Not at all the conventional wisdom.

Using smoothed yield curves

- Intraday database uses specific nominal and TIPS securities.
- Idiosyncratic effects should difference out.
- Can use smoothed Svensson yield curve at the daily frequency.
- Results are very close to those using daily frequency data on specific securities.

Structural stability tests

- Using daily smoothed yield curves
  - Jan. 1999-June 2008

	Ten-year			Five-year			Five-to-ten-year forward		
	Nom	TIPS	IC	Nom	TIPS	IC	Nom	TIPS	IC
Nyblom	5.15***	5.96***	5.18***	5.50***	6.95***	5.02***	4.11***	4.41***	4.30***
Sup F	65.60***	76.80***	75.18***	70.06***	87.73***	64.53***	49.62***	51.38***	58.33***
	7/10/03	7/10/03	5/24/01	7/10/03	7/29/03	5/17/02	7/11/03	7/10/03	5/14/01

Structural break

- Averaging over all 14 announcements, the effect of a 1 s.d. surprise on 5-10 year forward rates was:

	1999:01-2004:02	2004:02-2008:06
Nominal	1.19	1.28
Real	0.27	1.00
IC	0.90	0.27

Structural break

- Averaging over all 14 announcements, the effect of a 1 s.d. surprise on 5-10 year forward rates was:

	1999:01-2004:02	2004:02-2008:06
Nominal	1.19	1.28
Real	0.27	1.00
IC	0.90	0.27

- Nature of structural break is that TIPS have become more reactive as the market has matured

Conclusions

- Used a new dataset of high-frequency yields on index-linked bonds
- Investigated puzzling excess sensitivity of *nominal* yields to news
  - It is in both real rates and inflation compensation.
  - But more in real rates
- New stylized fact that is challenging to many macro-finance models