Measuring the Effect of the Zero Lower Bound on Medium- and Longer-Term Interest Rates

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Three Motivating Observations

1. New Keynesian IS curve:

$$\begin{aligned} y_t &= E_t y_{t+1} - \alpha r_t + \varepsilon_t \\ &= -\alpha E_t \sum_{j=0}^{\infty} r_{t+j} + \varepsilon_t \end{aligned}$$

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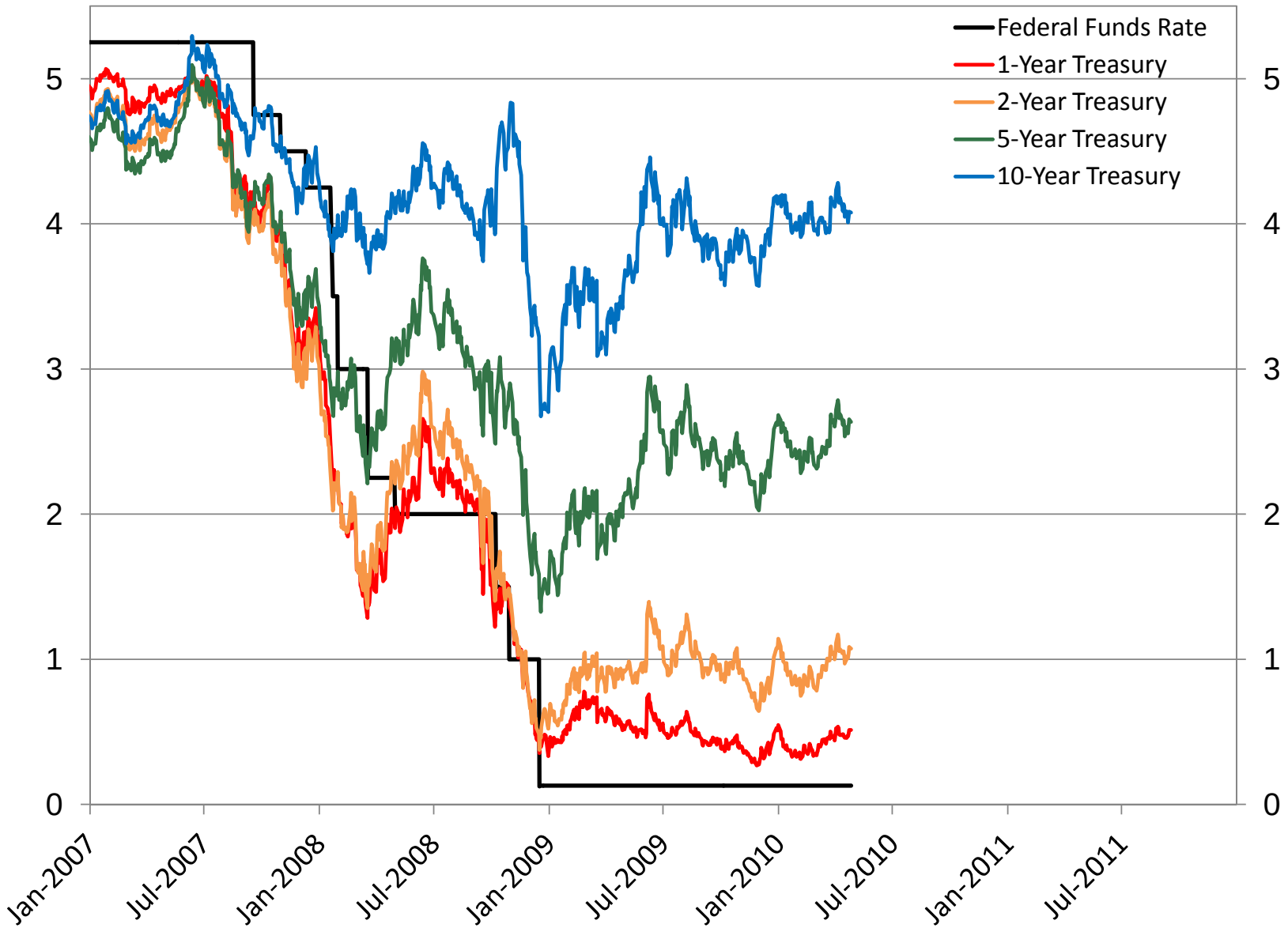
3. The zero lower bound is not a substantial constraint on monetary policy if the central bank can affect longer-term interest rates:
   - Reifschneider-Williams (2000), Eggertsson-Woodford (2003)
   - Gürkaynak, Sack, and Swanson (2005): 60–90% of the response of 2- to 10-year Treasury yields to FOMC announcements is due to *statement,* not funds rate

2-Year Treasury Yield $\gg$ 0 for Much of 2008–10



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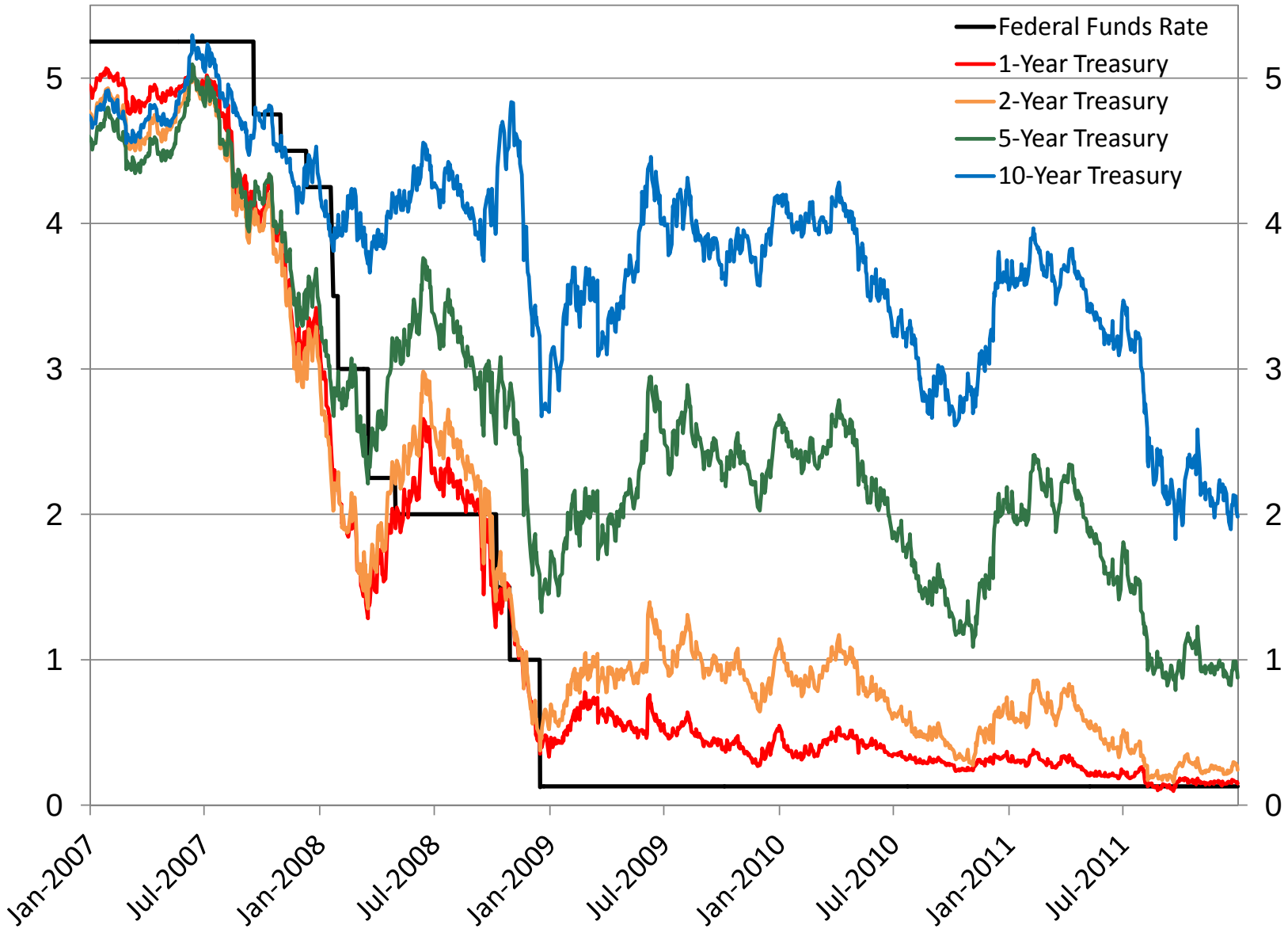

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- Was the ZLB a substantial constraint on monetary policy? —e.g., was the 2-year Treasury yield constrained?
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Implications for fiscal as well as monetary policy:

- Several papers show fiscal multiplier larger when ZLB binds (Christiano-Eichenbaum-Rebelo 2011, Erceg-Lindé 2010, Eggertsson-Krugman 2011)
- But did ZLB constrain yields that matter for private-sector spending?

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   - We compute the sensitivity of interest rates of various maturities to macroeconomic news in normal times (1990–2000)
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The level of yields alone is not a good measure of ZLB constraint:

- No way to measure severity or statistical significance —e.g., is a 50 bp 2-year Treasury yield constrained or not?
- Crowding out, fiscal multiplier determined by *response* of yields to fiscal policy, not *level* of yields
- Effective lower bound may be $\gg 0$, e.g. 50bp in the UK

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Surprise component of data release: $x_t - E_{t-1} x_t$.

Market expectation of macroeconomic data releases measured by Money Market Services, Bloomberg surveys.

Measuring Time-Varying Sensitivity to News

Time-varying sensitivity version:

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where δ^i scalar, $i \in 1990, 1991, \ldots, 2012$.

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- Assumption: *relative* responses β constant over time
- Estimate δ^i, β by nonlinear least squares
- Normalize δ^i so that average δ^i from 1990–2000 is 1

Nonlinear Regression Results for β, 1990–2012

	Treasury yield maturity					
	3-month		2-year		10-year	
Capacity Util.	0.72	(1.52)	1.48	(2.89)	0.83	(2.48)
Consumer Conf.	0.76	(2.90)	1.37	(3.72)	0.88	(2.50)
Core CPI	0.40	(1.91)	1.91	(5.01)	1.27	(3.82)
GDP	0.93	(3.17)	1.44	(2.41)	0.98	(1.70)
Initial Claims	−0.30	(−1.81)	−1.10	(−5.35)	−0.98	(−5.08)
ISM Manufact.	1.24	(3.23)	2.74	(7.09)	2.02	(5.97)
New Home Sales	0.84	(2.63)	0.66	(1.99)	0.52	(1.96)
Nonfarm Payrolls	3.06	(7.67)	4.84	(9.55)	2.96	(6.73)
Retail Sales	0.84	(3.77)	1.87	(4.91)	1.60	(4.18)
Unemployment	−1.23	(−3.51)	−1.26	(−2.77)	−0.35	(−0.88)
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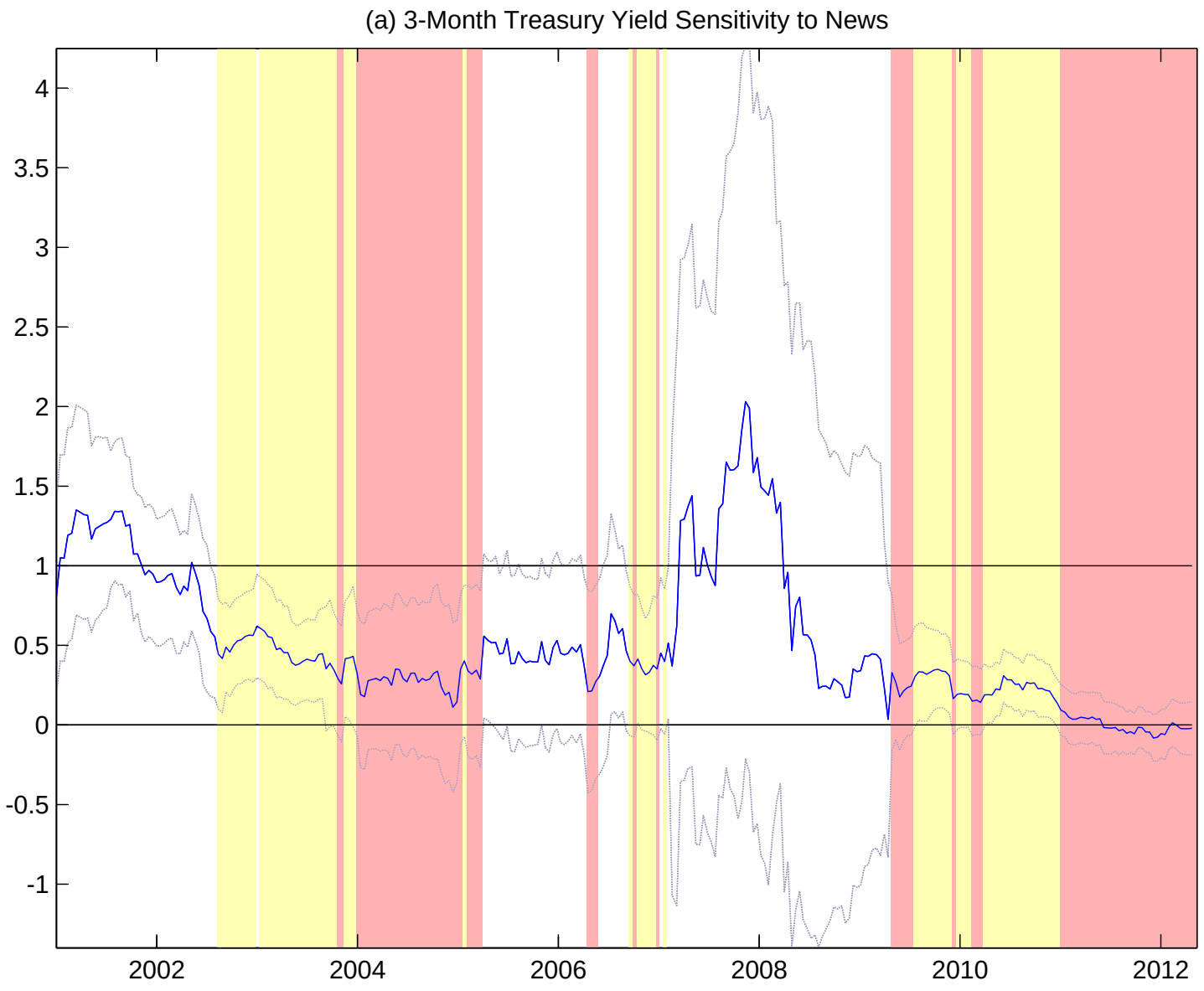
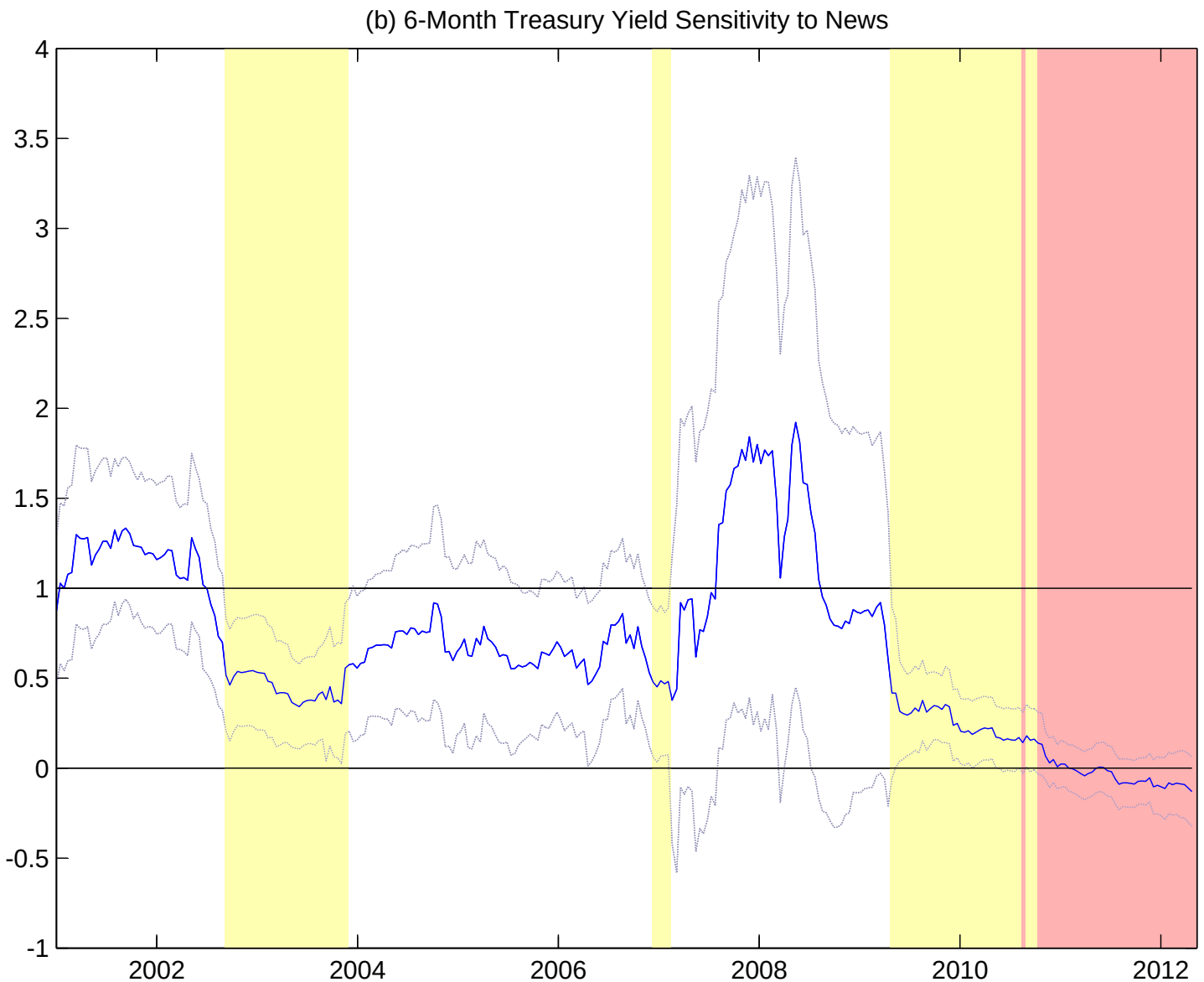
Account for 2-stage sampling uncertainty in rolling regressions:

- Use standard errors for δ^i in $(*)$ as benchmarks
- Interpolate between them using estimates for δ^τ

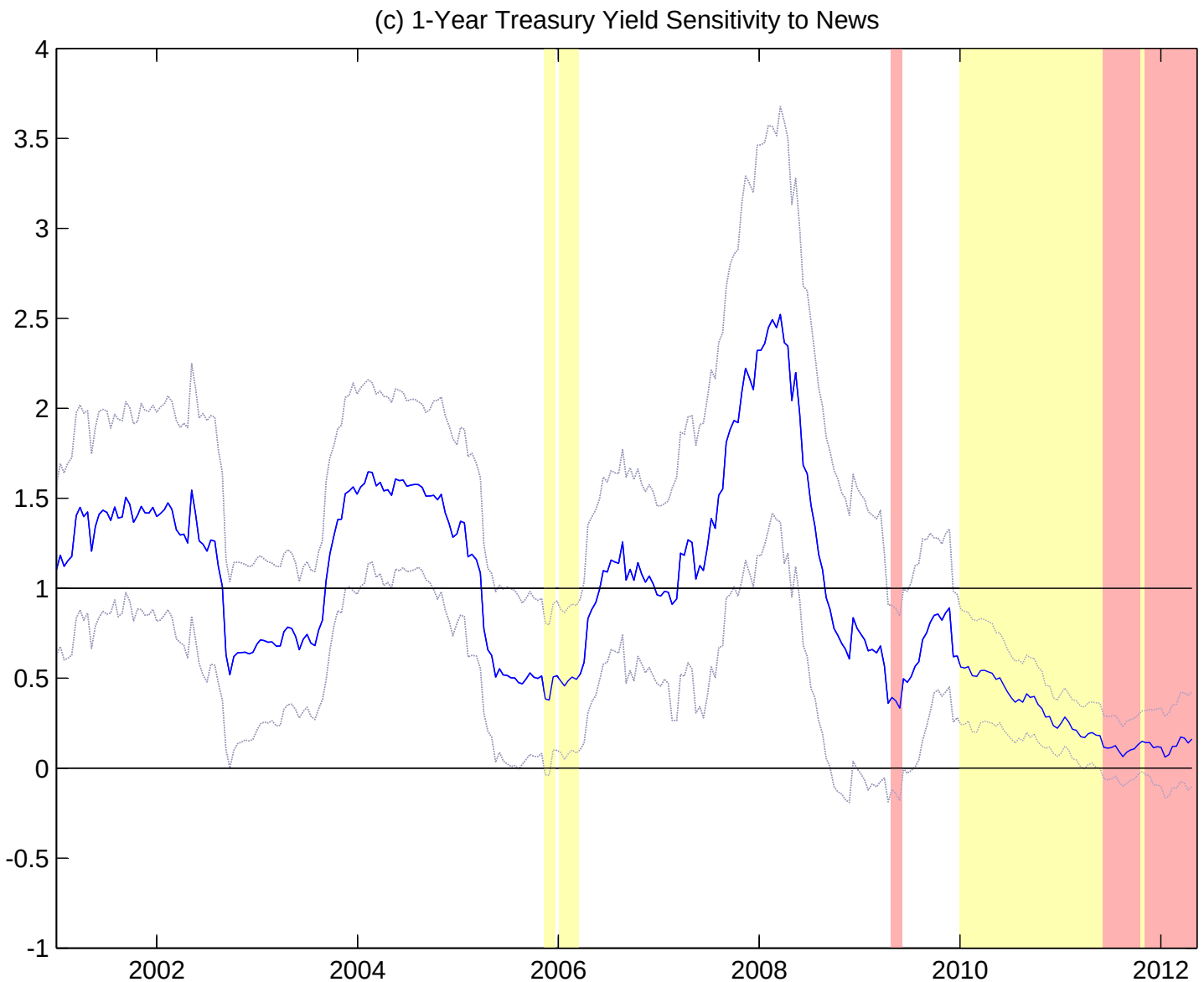
Time-Varying Sensitivity δ^{τ}, 3-month Treasury



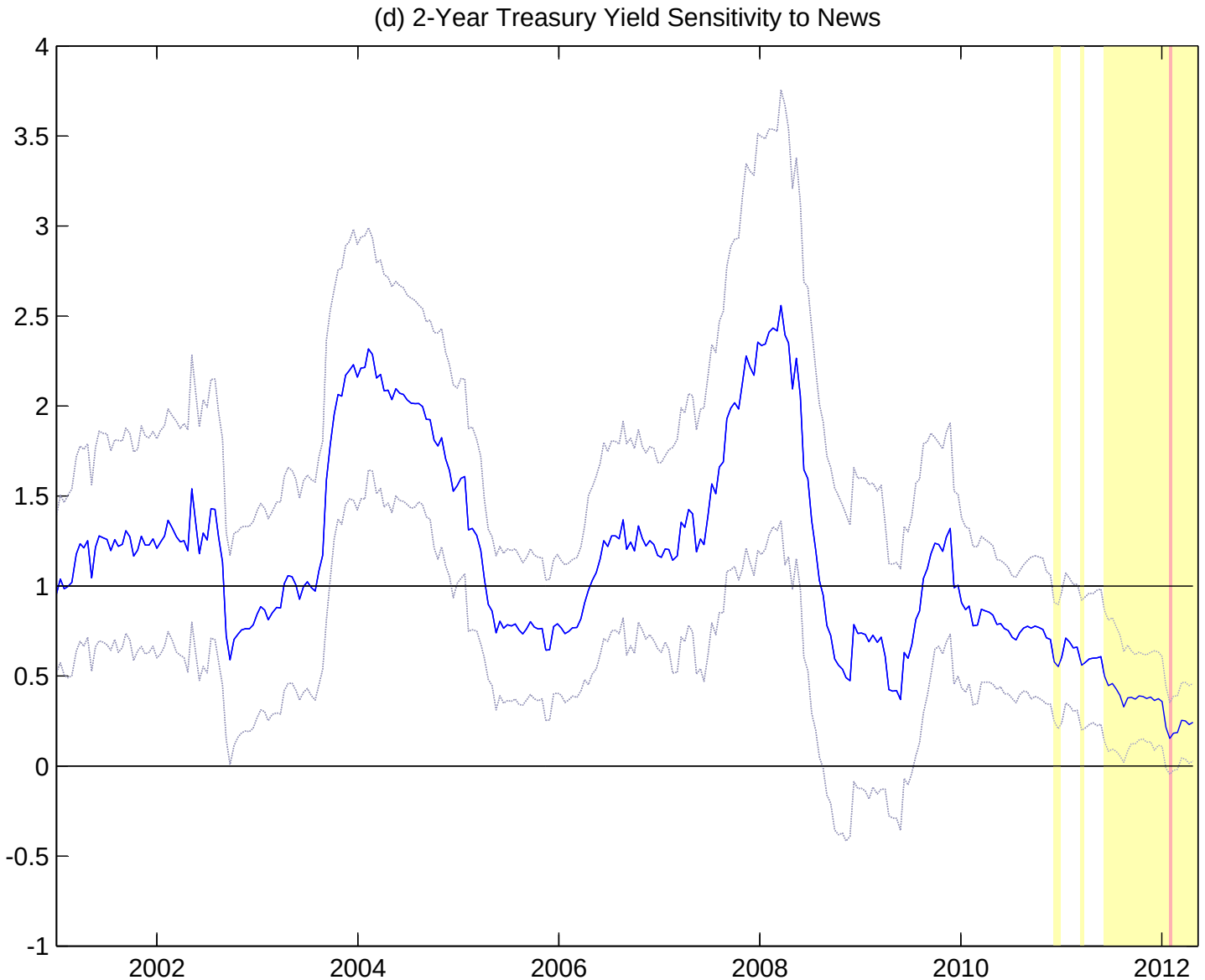
Time-Varying Sensitivity δ^{τ}, 6-month Treasury



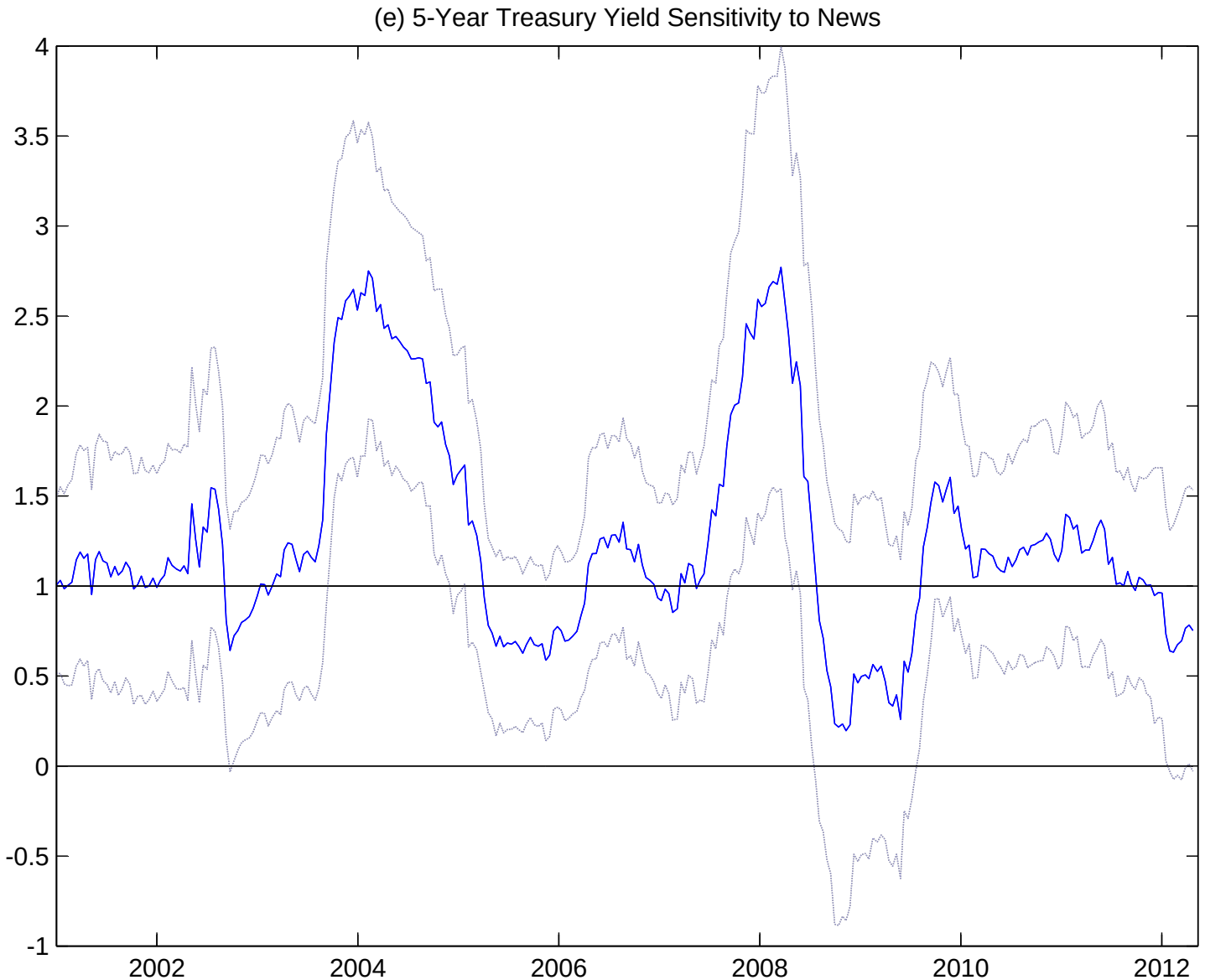
Time-Varying Sensitivity δ^{τ}, 1-year Treasury



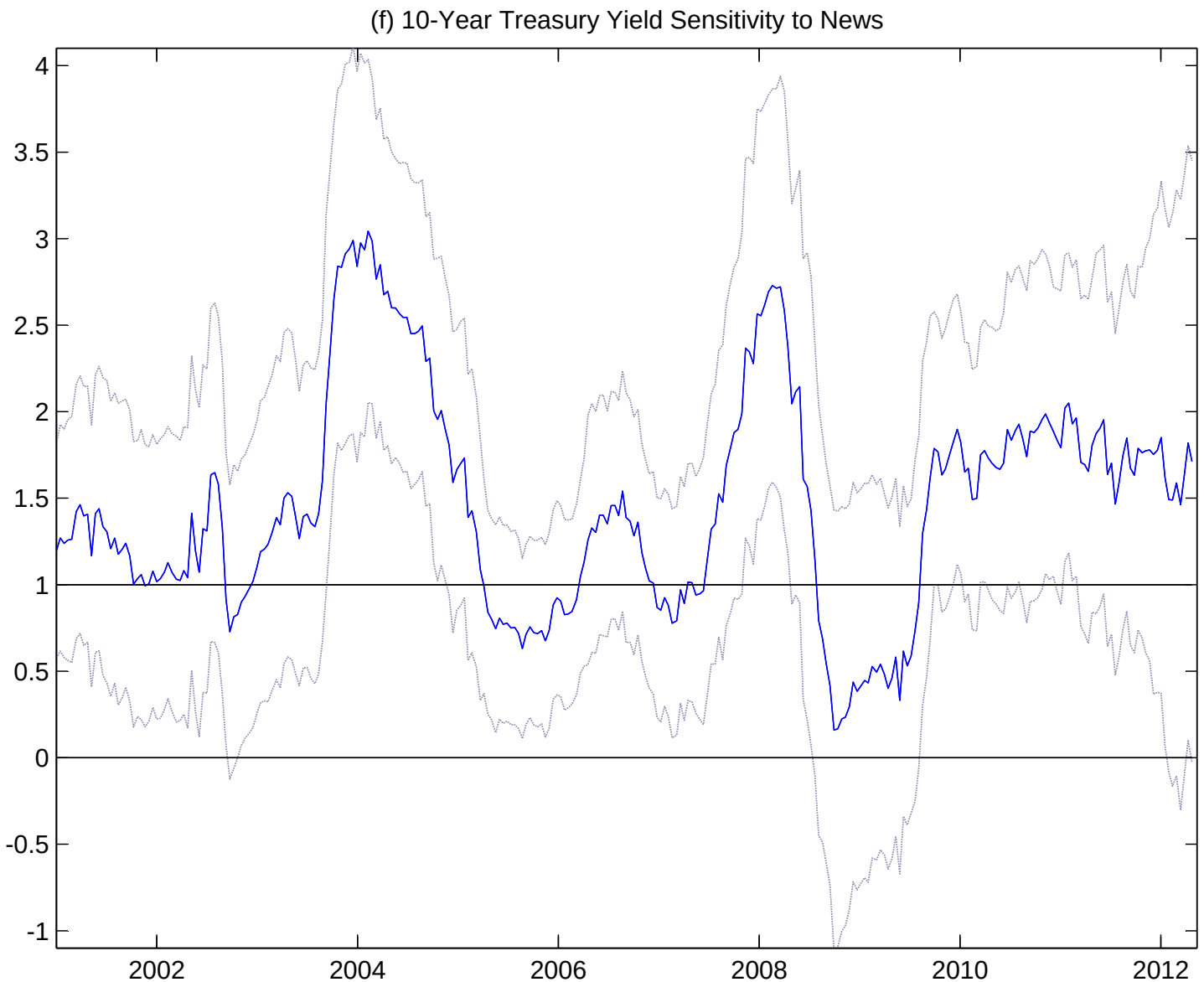
Time-Varying Sensitivity δ^{τ}, 2-year Treasury



Time-Varying Sensitivity δ^{τ}, 5-year Treasury

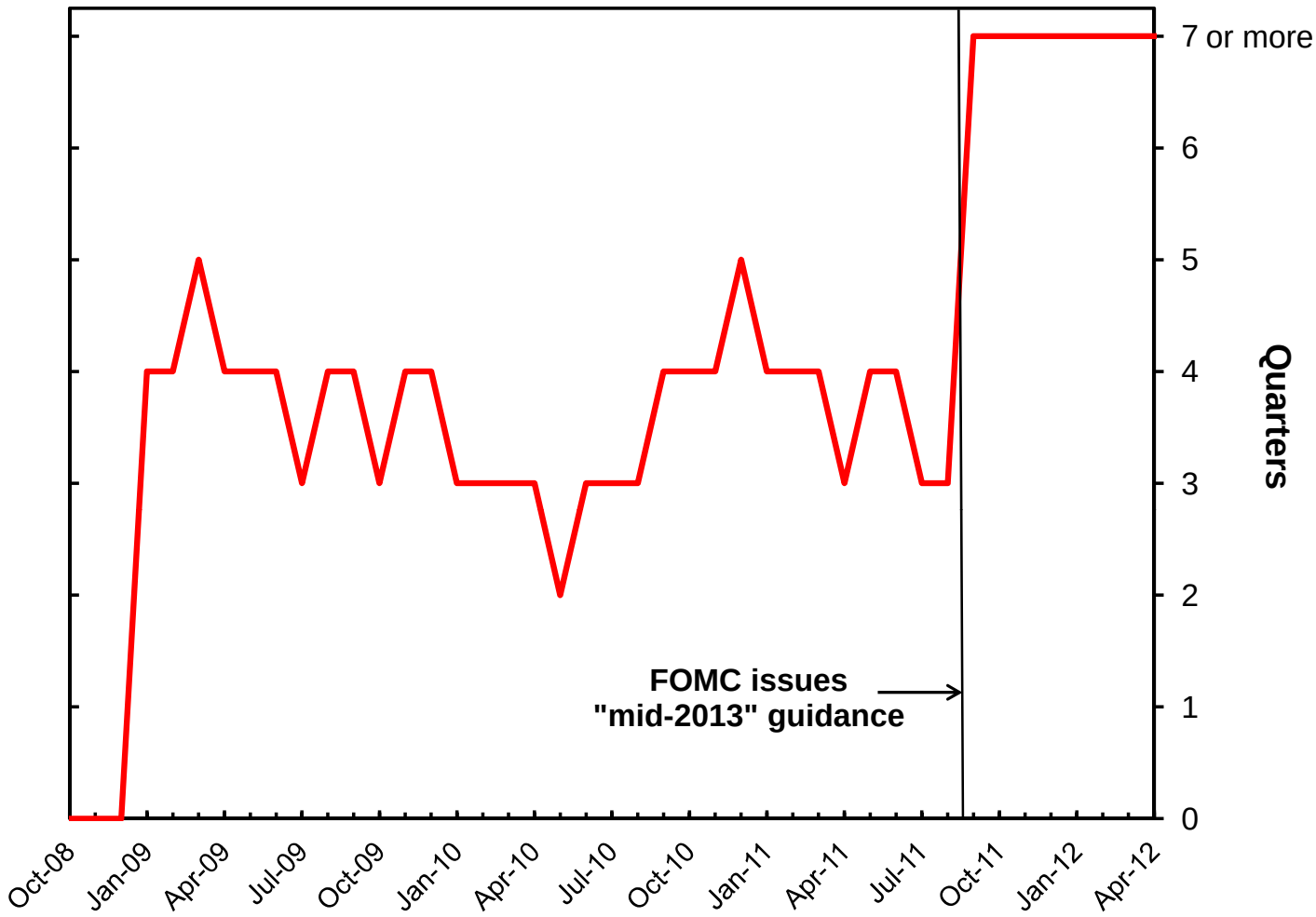


Time-Varying Sensitivity δ^{τ}, 10-year Treasury



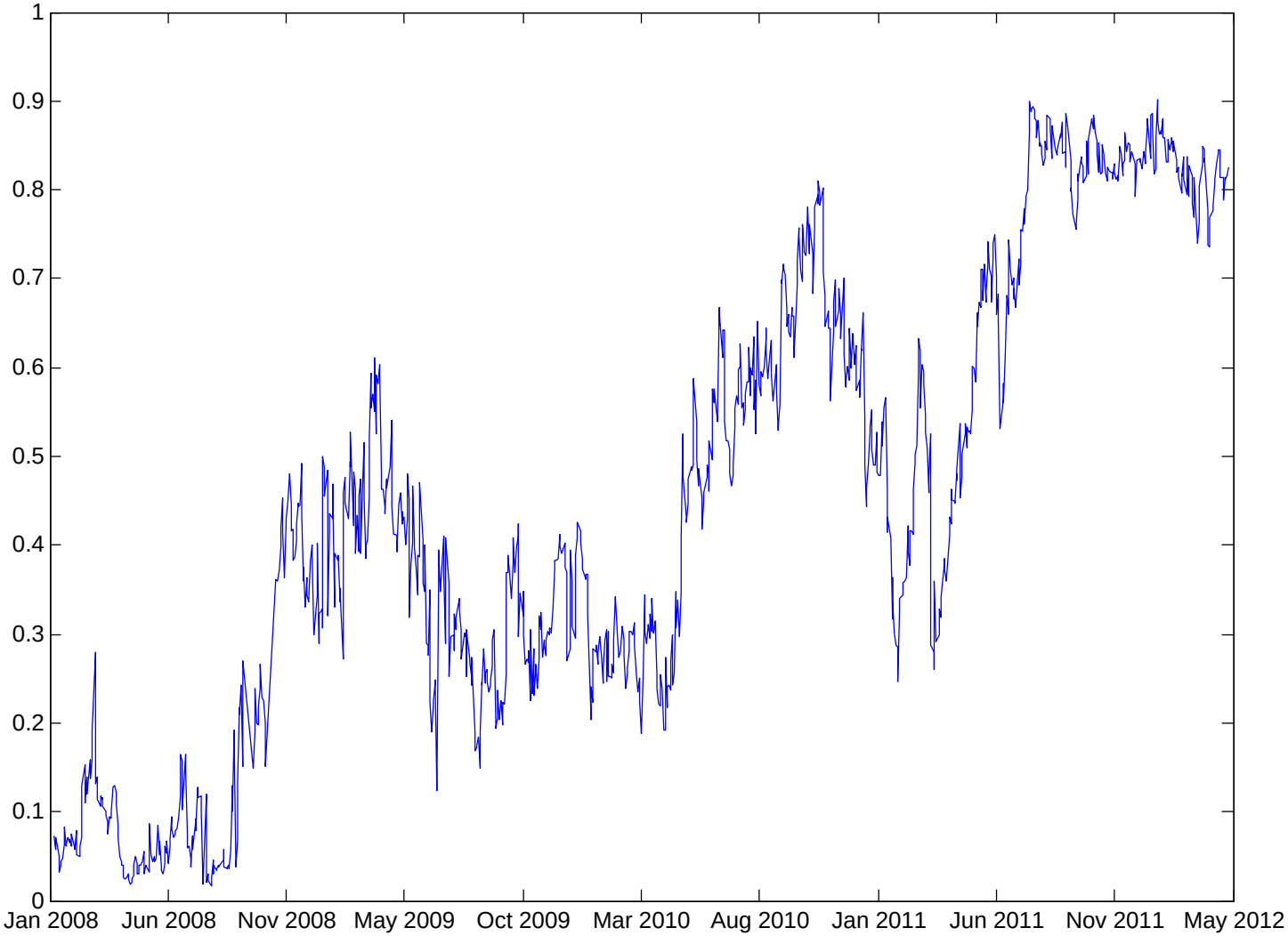
Private-Sector Expectations of Funds Rate "Liftoff"

Blue Chip Consensus expectation, time until first funds rate increase:

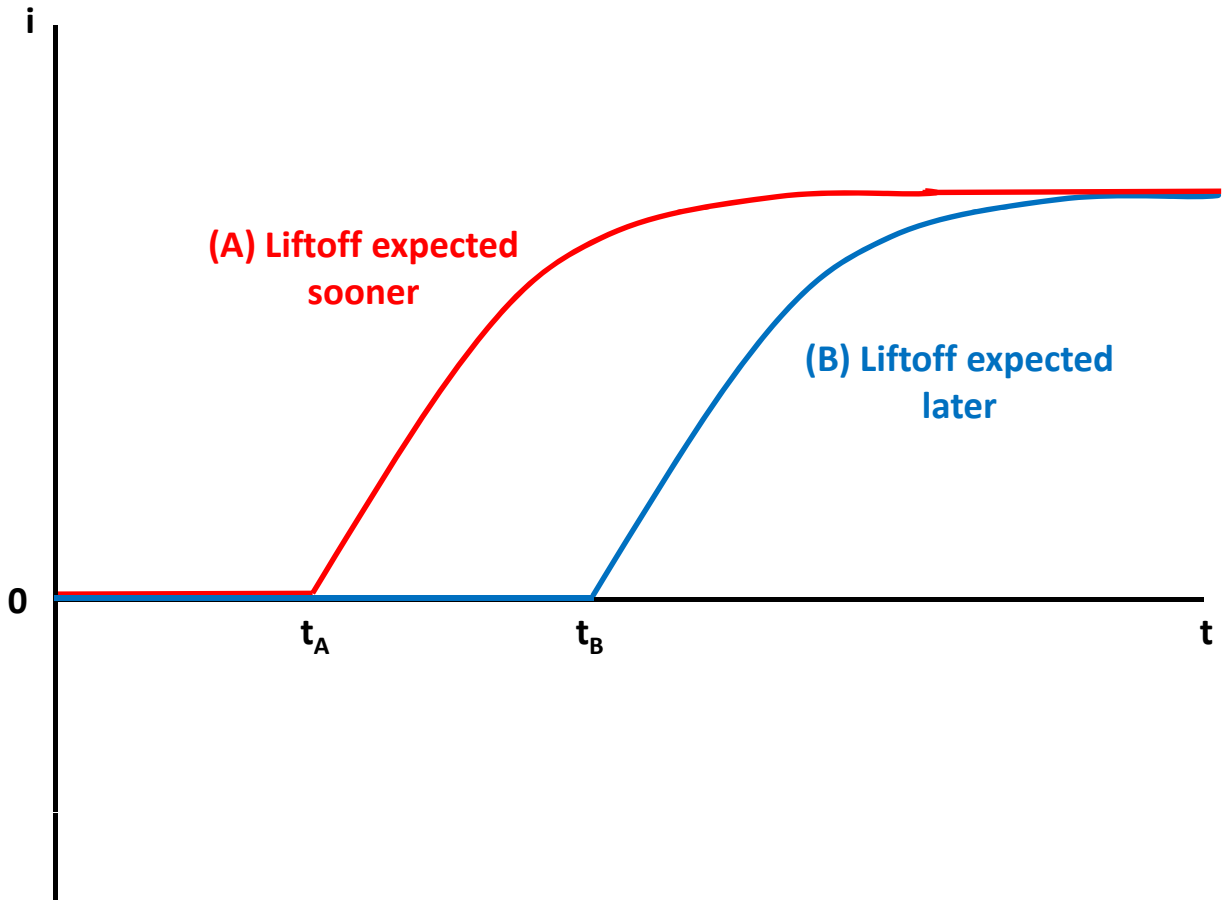


Private-Sector Expectations of Funds Rate "Liftoff"

Probability of funds rate < 50bp in 5 quarters, from options:



Implications for the Fiscal Multiplier



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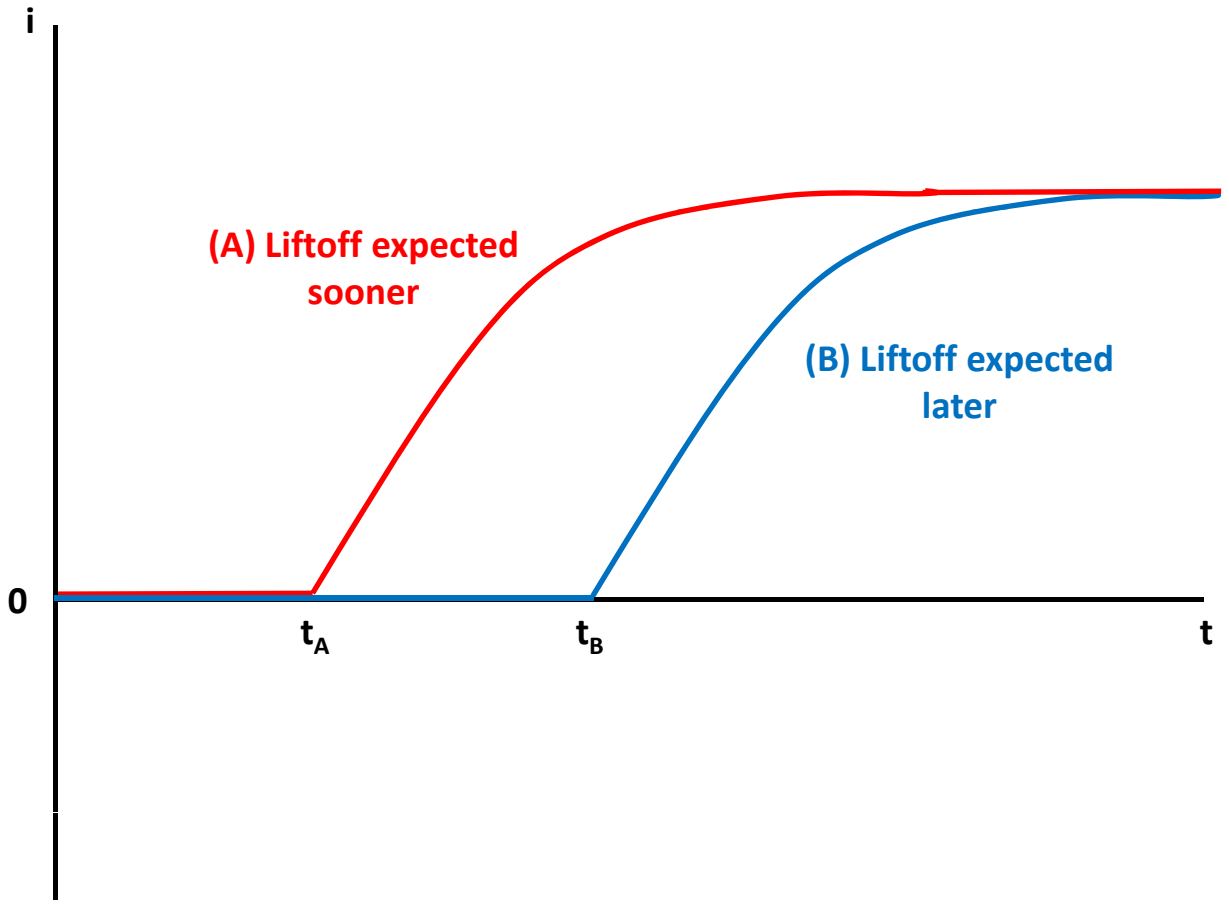

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B) liftoff in 8 qtrs. or more $\Longrightarrow$ large multiplier (CER 2011)

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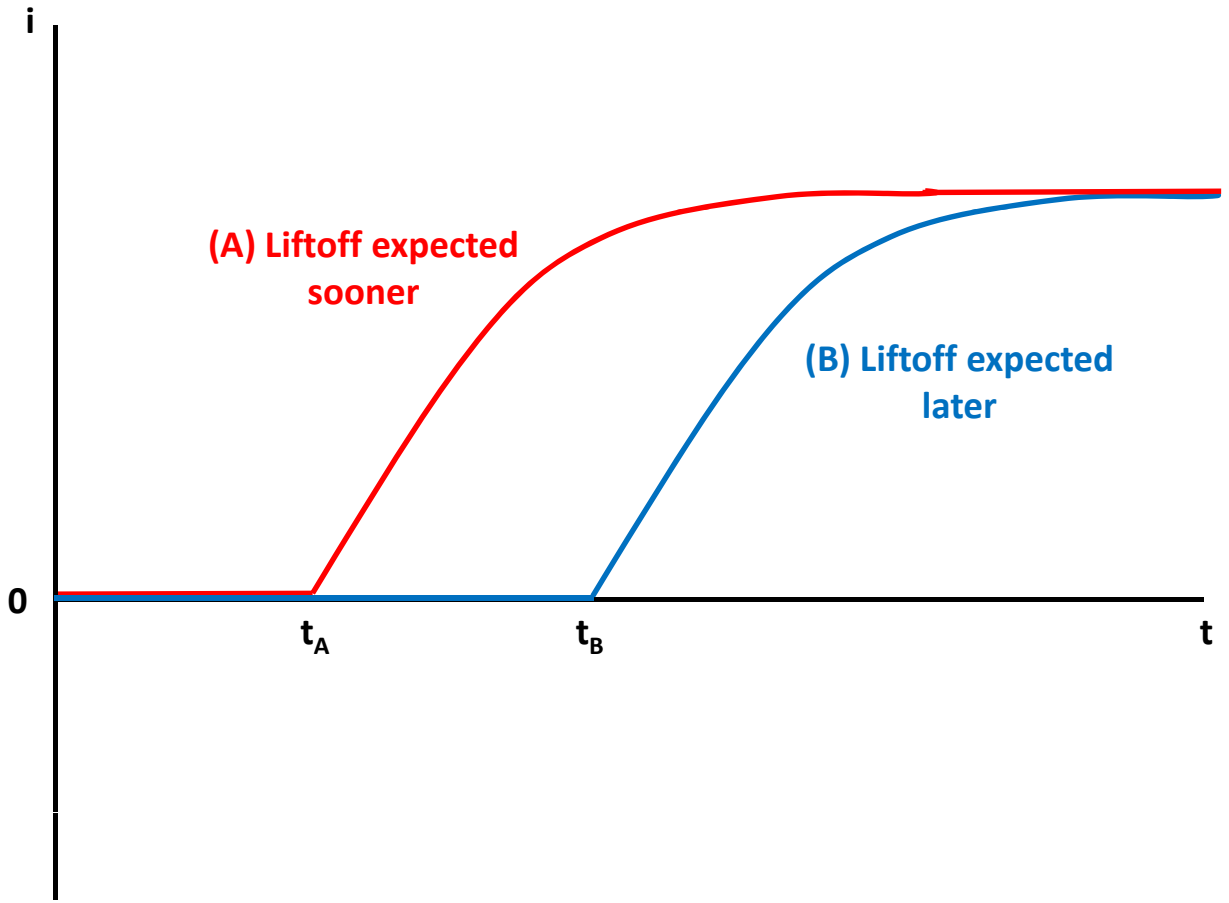

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This paper: 2008–10 look like scenario A

Conclusions

What we do:

- Test whether the ZLB is a significant constraint on interest rates.
- Measure the degree to which interest rates are constrained.

What we find:

- 1- and 2-year Treasury yields were surprisingly responsive to news throughout much of 2008–11.

What we conclude:

- Effectiveness of monetary and fiscal policy likely close to normal throughout much of 2008–11.
- Zero lower bound a more severe constraint since mid-2011.