Evaluating Asset-Market Effects of Unconventional Monetary Policy: A Cross-Country Comparison

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Unconventional Monetary
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  - ▶ Federal Reserve, Bank of England, European Central Bank and Bank of Japan
  - ▶ On bond yields, stock prices and exchange rates

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  - ▶ Emphasize the use of intradaily data to identify the causal effect of monetary policy surprises
  - ▶ Only measure pass-through from a given change in bond yields onto asset prices

Introduction - cont'd

● In this paper

  ▶ Try to disentangle the effects of different policies (i.e. LSAP vs forward guidance)
  ▶ Look at asymmetry
  ▶ Crisis vs non-crisis sample
  ▶ Persistence

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  - ▶ Persistence

- We find that these policies are effective in easing financial conditions when policy rates are stuck at the ZLB

Contribution of this paper

- Literature on event study analysis of unconventional policy is large and growing

    - Gagnon et al. (2011), Arai (2013), D'Amico et al. (2012), D'Amico and King (2013), Ghysels et al. (2012), Gichrist, López-Salido and Zakrajsek (2013), Glick and Leduc (2012), Joyce and Tong (2012), Kiley (2013), Krishnamurthy and Vissing-Jorgensen (2011, 2013), Li and Wei (2013), Meaning and Zhu (2011), Neely (2010), Raskin (2013), Rosa (2012), Swanson (2011) and Wright (2012)

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    Vissing-Jorgensen (2011, 2013), Li and Wei (2013), Meaning
    and Zhu (2011), Neely (2010), Raskin (2013), Rosa (2012),
    Swanson (2011) and Wright (2012)

- We largely confirm existing results

- Add new directions; especially intraday data

- Analyze four CBs on a common methodology

Event Study Methods

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  ▶ Can assess persistence of effect

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- Identification through heteroskedasticity
  - ▶ Announcements are complicated and take time to digest

Four big surprises
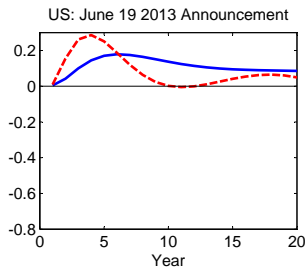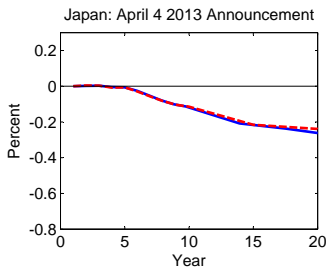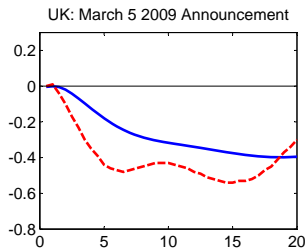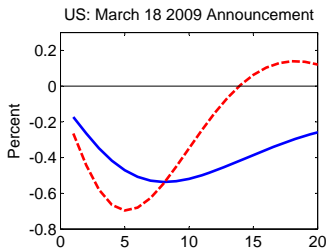
Passthrough

$$\Delta y_t = \beta MPS_t + \varepsilon_t$$

- Monetary policy surprise is intraday change in

  - ▶ US: First PC of 2, 5, 10 & 30 year Treasury futures yields
  - ▶ UK: Long gilt futures yields
  - ▶ EU: Ten-year Italian-German cash spread
  - ▶ JP: Long JGB futures yields

- Δy_t is intradaily/daily change in asset price/yield

- Intradaily data uses either:

  - ▶ Narrow window: 15 minutes before to 15 minutes after
  - ▶ Wide window: 15 minutes before to 1hr 45 minutes after

The Announcements

- All monetary policy meetings and select other news (listed in paper)
- Fed: Nov. 2008 - June 2013
- BOE: Jan 2009 - June 2013
- ECB: Aug 2007 - June 2013
- BOJ: Jan 2000 - June 2013

- We record dates and times

The Data

Category	US	UK	EU	Japan
	Intradaily Data			
Bond Futures	Two-year Treasury	Long Gilt		10-year JGB
	Five-year Treasury			
	Ten-year Treasury			
	Thirty-year Treasury			
Stock Futures	S&P	FTSE	DAX	Nikkei
Currency Futures		Sterling futures	Euro futures	Yen futures
10Y Bond Yields			Germany	
			Italy	
	Daily Data			
Corp: Higher Grade	AAA Moodys	5 year AA	AA	5 year A Ind.
Corp: Lower Grade	BAA Moodys	5 year BBB	BBB	5 year BBB Ind
Interest Rate IV	MOVE Index			
Sovereign 10 year			Spain	
			France	

Effects of Surprises: Narrow Window

	Fed		BOE		ECB		BOJ	
Intradaily								
Two-year Treasury	-0.11***	(0.01)	-0.01***	(0.00)	0.00	(0.00)	0.03	(0.04)
Five-year Treasury	-0.22***	(0.01)	-0.03***	(0.00)	0.00	(0.00)	-0.08	(0.05)
Ten-year Treasury	-0.25		-0.03***	(0.00)	-0.01	(0.00)	-0.04	(0.03)
30-Year Treasury	-0.16***	(0.01)	-0.03***	(0.00)	0.00	(0.00)	-0.02	(0.02)
UK Gilt	-0.12***	(0.01)	-0.25		0.02***	(0.00)	-0.03	(0.02)
Italian 10 Year	-0.04***	(0.01)	-0.02***	(0.01)	-0.20***	(0.00)	0.01	(0.03)
German 10 Year	-0.09***	(0.01)	-0.05***	(0.00)	0.05***	(0.00)	-0.01	(0.02)
Ten-year JGB	-0.05***	(0.01)	-0.01	(0.01)	0.00	(0.01)	-0.25	
GBP	0.66***	(0.07)	-0.82***	(0.12)	0.14***	(0.04)	-0.13	(0.20)
EUR	0.86***	(0.11)	-0.02	(0.07)	0.28***	(0.05)	-0.28	(0.24)
JPY	1.21***	(0.09)	0.10**	(0.05)	0.09**	(0.04)	-0.94***	(0.32)
Stock Returns	0.86***	(0.15)	0.23*	(0.12)	0.92***	(0.06)	-0.18	(0.83)
Daily								
Corp: Higher Grade	-0.14***	(0.04)	-0.14***	(0.04)	0.11***	(0.02)	-0.06**	(0.03)
Corp: Lower Grade	-0.14***	(0.04)	-0.13***	(0.04)	0.11***	(0.02)	-0.06	(0.04)
MOVE Index	-0.02	(0.03)						
Spanish 10 Year					-0.37***	(0.04)		
French 10 Year					0.01	(0.02)		

Breakdown by announcement types

- Methodology so far assumes that there is a one-dimensional monetary policy surprise

- Blends forward guidance, LSAPs etc.

- Assembled a **panel of experts** to split announcements into different types

- Ran regression for each type of announcement separately

The Panel of Experts

Effects of Fed Surprises: LSAP and other days

	LSAP		Other	
Intradaily				
Two-year Treasury	-0.05***	(0.01)	-0.18***	(0.02)
Five-year Treasury	-0.21***	(0.01)	-0.25***	(0.01)
Ten-year Treasury	-0.25***	(0.00)	-0.25***	(0.00)
30-Year Treasury	-0.22***	(0.02)	-0.16***	(0.01)
UK Gilt	-0.12***	(0.01)	-0.13***	(0.02)
Italian 10 Year	-0.03***	(0.01)	-0.06*	(0.03)
German 10 Year	-0.09***	(0.01)	-0.06***	(0.01)
Ten-year JGB	-0.04***	(0.01)	-0.09***	(0.01)
GBP	0.67***	(0.14)	0.72***	(0.13)
EUR	0.85***	(0.18)	0.98***	(0.25)
JPY	0.68***	(0.16)	1.45***	(0.20)
Stock Returns	0.91***	(0.26)	0.27	(0.34)
Daily				
Corp: Higher Grade	-0.15***	(0.05)	-0.09	(0.09)
Corp: Lower Grade	-0.14***	(0.05)	-0.14*	(0.08)
MOVE Index	-0.01	(0.04)	-0.10	(0.06)

Effects of BOE Surprises: APF and other days

	APF		Other	
Intradaily				
Two-year Treasury	-0.01*	(0.01)	-0.02***	(0.01)
Five-year Treasury	-0.06***	(0.01)	-0.03***	(0.00)
Ten-year Treasury	-0.06***	(0.01)	-0.03***	(0.01)
30-Year Treasury	-0.03***	(0.01)	-0.02***	(0.01)
Italian 10 Year	-0.01	(0.02)	-0.03***	(0.01)
German 10 Year	-0.04***	(0.01)	-0.05***	(0.00)
Ten-year JGB	-0.02	(0.02)	-0.01	(0.02)
GBP	-1.49***	(0.24)	-0.83***	(0.14)
EUR	-0.15	(0.16)	0.00	(0.09)
JPY	0.06	(0.10)	0.13**	(0.05)
Stock Returns	-0.01	(0.20)	0.29	(0.19)
Daily				
Corp: Higher Grade	-0.27***	(0.07)	-0.08	(0.08)
Corp: Lower Grade	-0.24***	(0.07)	-0.08	(0.07)

Effects of ECB Surprises

	Bond		LTRO		Other	
Intradaily						
Two-year Treasury	0.00	(0.01)	0.15***	(0.02)	0.00	(0.02)
Five-year Treasury	-0.01*	(0.01)	0.08***	(0.02)	0.00	(0.02)
Ten-year Treasury	-0.01	(0.01)	0.09***	(0.01)	0.01	(0.03)
30-Year Treasury	0.00	(0.01)	0.03***	(0.01)	0.00	(0.02)
UK Gilt	0.01	(0.01)	0.07***	(0.02)	0.02	(0.03)
Italian 10 Year	-0.20***	(0.01)	-0.21***	(0.04)	-0.16***	(0.01)
German 10 Year	0.05***	(0.01)	0.04	(0.04)	0.09***	(0.01)
Ten-year JGB	0.00	(0.01)	0.03	(0.05)	0.00	(0.04)
GBP	0.13	(0.08)	0.35*	(0.19)	0.41*	(0.23)
EUR	0.25	(0.17)	0.68	(0.51)	0.29	(0.26)
JPY	0.02	(0.23)	-0.07	(0.81)	-0.48**	(0.24)
Stock Returns	1.67***	(0.51)	2.46***	(0.52)	0.81**	(0.33)
Daily						
Corp: Higher Grade	0.11***	(0.02)	0.17*	(0.10)	0.06	(0.11)
Corp: Lower Grade	0.11***	(0.03)	0.15*	(0.09)	0.08	(0.12)
Spain 10 Year	-0.39***	(0.07)	-0.50***	(0.15)	0.15	(0.21)
France 10 Year	0.01	(0.02)	0.29**	(0.12)	0.11	(0.12)

Effects of BOJ Surprises: APP and other days

	APP		Other	
Intradaily				
Two-year Treasury	-0.08*	(0.04)	0.04	(0.04)
Five-year Treasury	0.03*	(0.01)	-0.08	(0.06)
Ten-year Treasury	0.05***	(0.02)	-0.04	(0.04)
30-Year Treasury	0.06***	(0.01)	-0.02	(0.02)
UK Gilt	-0.14*	(0.10)	-0.02	(0.02)
Italian 10 Year	-0.02	(0.06)	0.01	(0.03)
German 10 Year	-0.09	(0.09)	-0.01	(0.02)
GBP	-0.02	(0.44)	-0.14	(0.21)
EUR	0.10**	(0.57)	-0.30	(0.25)
JPY	-5.05***	(1.31)	-0.67***	(0.30)
Stock Returns	7.29**	(2.89)	-0.66	(0.84)
Daily				
Corp: Higher Grade	-0.21	(0.14)	-0.05*	(0.03)
Corp: Lower Grade	-0.24	(0.13)	-0.02	(0.03)

Asymmetry

$$\Delta y_t = \beta_1 MPS_t + \beta_2 MPS_t 1(MPS_t > 0) + \varepsilon_t$$

Estimates of Asymmetry

		Fed		BOE		ECB		BOJ	
Intradaily									
Stock Returns	β_1	-0.90	(0.82)	-.028	(0.37)	1.40***	(0.13)	-0.72	(1.45)
	β_2	1.79**	(0.83)	0.68*	(0.39)	-0.21	(0.16)	0.81	(1.75)
GBP	β_1	0.59**	(0.26)	-0.99***	(0.34)	0.10	(0.07)	-0.21	(0.38)
	β_2	0.07	(0.27)	0.04	(0.44)	0.05	(0.09)	0.12	(0.45)
EUR	β_1	0.67**	(0.33)	0.00	(0.10)	0.37***	(0.10)	-0.73***	(0.26)
	β_2	0.20	(0.34)	-0.19	(0.18)	-0.15	(0.12)	0.68*	(0.41)
JPY	β_1	1.57***	(0.35)	0.15	(0.10)	0.04	(0.08)	-1.24**	(0.54)
	β_2	-0.89**	(0.36)	-0.03	(0.13)	-0.11	(0.10)	0.44	(0.68)
Daily									
Corp: Higher Grade	β_1	-0.21**	(0.08)	-0.13*	(0.07)	0.11***	(0.03)	0.00	(0.07)
	β_2	0.07	(0.09)	-0.01	(0.09)	0.01	(0.04)	-0.09	(0.08)
Corp: Lower Grade	β_1	-0.22***	(0.08)	-0.15**	(0.07)	0.11***	(0.04)	-0.01	(0.08)
	β_2	0.09	(0.08)	-0.01	(0.09)	0.02	(0.04)	-0.07	(0.09)

Crisis and Non-Crisis Subsamples

- Split sample into (a) 2008-2009 and (b) all other years
- No consistent findings
  - ▶ Fed and BOE: larger standard errors in non-crisis period
  - ▶ ECB: Significant pass-through only in non-crisis period(Euro-specific crisis)
  - ▶ Japan: Large surprises in both periods, significant pass-through only outside of 2008-2009

Effects of Monetary Policy Surprises on Yields/Returns in crisis and non-crisis times

	Fed				BOE				ECB				BOJ			
	2008/09		Other		2008/09		Other		2008/09		Other		2008/09		Other	
Intradaily																
Two-year Treasury	-0.15***	(0.02)	-0.10***	(0.02)	-0.03***	(0.01)	0.00	(0.01)	0.14***	(0.04)	0.00	(0.00)	0.05	(0.05)	0.03	(0.05)
Five-year Treasury	-0.21***	(0.00)	-0.24***	(0.02)	-0.04***	(0.01)	-0.03***	(0.01)	0.08*	(0.04)	-0.01***	(0.00)	-0.02	(0.02)	-0.11	(0.08)
Ten-year Treasury	-0.25***	(0.00)	-0.25***	(0.00)	-0.03***	(0.01)	-0.04***	(0.01)	0.09*	(0.05)	-0.01*	(0.00)	-0.02	(0.01)	-0.04	(0.05)
30-year Treasury	-0.15***	(0.01)	-0.17***	(0.02)	-0.03***	(0.01)	-0.03***	(0.01)	0.09**	(0.04)	0.00	(0.00)	-0.01**	(0.00)	-0.02	(0.02)
UK Gilt	-0.14***	(0.02)	-0.13***	(0.02)	-0.25		-0.25		0.01	(0.04)	0.02***	(0.00)	-0.02	(0.04)	-0.03	(0.03)
Italian 10 Year	-0.08***	(0.01)	-0.01	(0.01)	-0.02***	(0.01)	-0.01	(0.02)	-0.19***	(0.03)	-0.20***	(0.00)	0.01	(0.02)	0.01	(0.05)
German 10 Year	-0.09***	(0.01)	-0.08***	(0.01)	-0.05***	(0.01)	-0.04***	(0.01)	0.06*	(0.03)	0.05***	(0.00)	0.02	(0.03)	-0.03	(0.02)
Ten-year JGB	-0.09***	(0.01)	-0.04*	(0.02)	-0.02	(0.02)	0.00	(0.01)	0.05	(0.14)	0.01	(0.01)	-0.25		-0.25	
GBP	0.65***	(0.10)	1.10***	(0.19)	-0.72***	(0.24)	-1.28***	(0.21)	-0.28	(0.57)	0.14***	(0.04)	-0.04	(0.35)	-0.18	(0.23)
EUR	0.84***	(0.17)	1.42***	(0.25)	-0.05	(0.12)	0.06	(0.14)	-0.13	(0.64)	0.43***	(0.05)	0.05	(0.27)	-0.44	(0.28)
JPY	0.74***	(0.18)	1.08***	(0.21)	0.12	(0.09)	0.06	(0.10)	-0.35	(0.77)	0.10***	(0.04)	-0.79*	(0.41)	-1.01**	(0.44)
Stock Returns	0.91***	(0.30)	0.00	(0.39)	0.34	(0.24)	0.07	(0.21)	0.86	(0.85)	0.95***	(0.06)	0.48	(1.37)	-0.49	(0.94)
Daily																
Corp: Higher Grade	-0.15***	(0.05)	-0.11	(0.09)	-0.17***	(0.07)	-0.04	(0.08)	0.29	(0.26)	0.11***	(0.02)	-0.01	(0.25)	0.36**	(0.15)
Corp: Lower Grade	-0.15***	(0.04)	-0.10	(0.09)	-0.20***	(0.07)	0.02	(0.07)	0.30	(0.27)	0.11***	(0.02)	0.00	(0.22)	0.22*	(0.13)
MOVE Index	-0.02	(0.05)	-0.07	(0.06)												
Spanish 10 Year									0.28	(0.30)	-0.38***	(0.04)				
French 10 Year									0.35	(0.30)	0.01	(0.02)				

Persistence

- Effects seem likely to wear off to some extent

  ▶ Gagnon et al. (2011) estimated that LSAP news from 11/08 to 11/09 reduced ten-year yields by 91 bps

- Natural reasons why the effect should wear off

  ▶ Asset purchases support the economy
  ▶ May increase issuance of long-term bonds (Stein (2012))
  ▶ In long-run, slow moving capital may make financial markets behave more like in the textbook (Duffie (2010))
  ▶ Financial markets were impaired and effects were larger.

Persistence
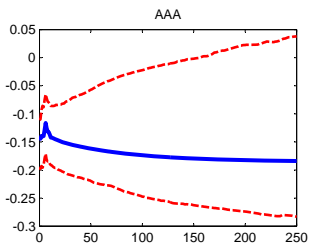
- Consider a VAR in daily yields

$$A(L)Y_t = \mu + \varepsilon_t$$

$$\varepsilon_t = \Sigma_{i=1}^p R_i \eta_{i,t}$$
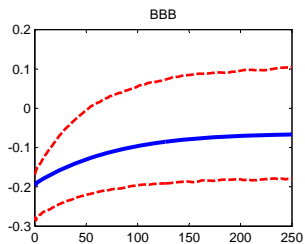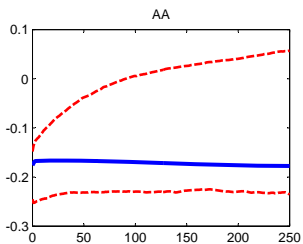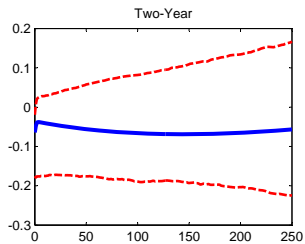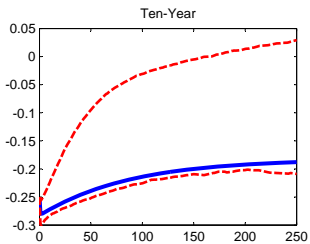
- Estimate R_1 from intradaily data as above

- Can trace out impulse responses and use BA bootstrap for inference

Persistence: Fed
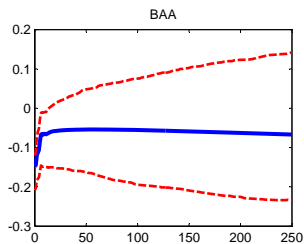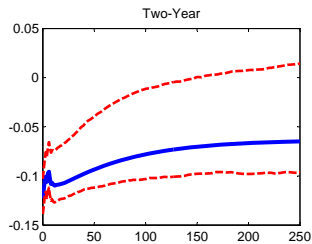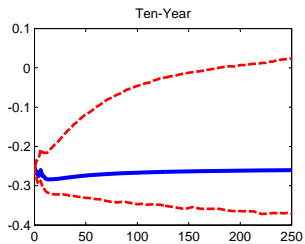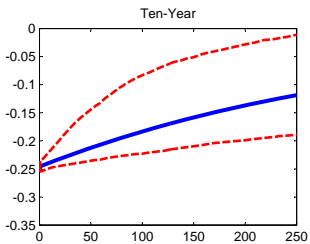
Persistence: BOE

Persistence: ECB
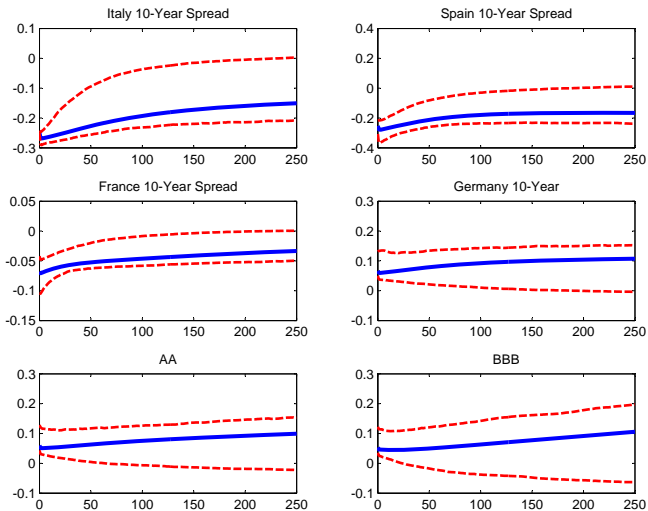
Persistence: BOJ

Identification through Heteroskedasticity

- "Event study" methodology assumes that there are windows in which only news is monetary policy

- May be a stretch, in recent environment

- Identification through heteroskedasticity (Rigobon and Sack) can help

Identification through Heteroskedasticity

$$A(L)Y_t = \mu + \varepsilon_t$$

$$\varepsilon_t = \Sigma_{i=1}^{p} R_i \eta_{i,t}$$

- Let structural monetary policy shock $\eta_{1,t}$ have and variance σ_1^2 on announcement days, and variance σ_0^2 on all other days: $\sigma_0^2 \neq \sigma_1^2$.

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- Let structural monetary policy shock $\eta_{1,t}$ have and variance σ_1^2 on announcement days, and variance σ_0^2 on all other days: $\sigma_0^2 \neq \sigma_1^2$.

- Let Σ_0 and Σ_1 denote the variances of ε_t on non-announcement and announcement days

$$\Sigma_1 - \Sigma_0 = R_1 R_1' \sigma_1^2 - R_1 R_1' \sigma_0^2 = R_1 R_1' (\sigma_1^2 - \sigma_0^2)$$

- Can use GMM to estimate R_1 and impulse responses

Specification Tests

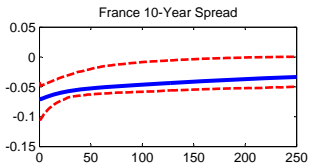| Hypothesis	Wald Statistic	Bootstrap p-value
	United States	
$\Sigma_0 = \Sigma_1$	58.8	0.002
$\Sigma_1 - \Sigma_0 = R_1 R_1'$	8.8	0.673
	United Kingdom	
$\Sigma_0 = \Sigma_1$	24.8	0.066
$\Sigma_1 - \Sigma_0 = R_1 R_1'$	6.5	0.460
	Euro Area	
$\Sigma_0 = \Sigma_1$	63.2	0.001
$\Sigma_1 - \Sigma_0 = R_1 R_1'$	36.5	0.632
	Japan	
$\Sigma_0 = \Sigma_1$	13.9	0.244
$\Sigma_1 - \Sigma_0 = R_1 R_1'$	2.9	0.308

IDH: Fed
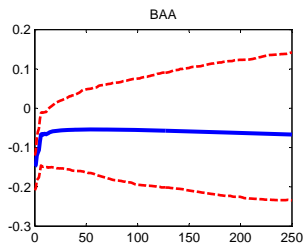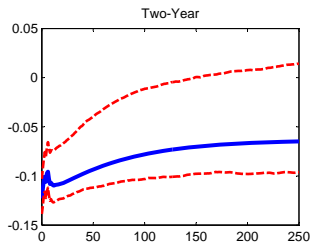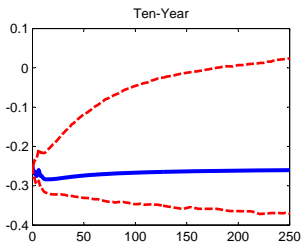
IDH: BOE

IDH: ECB
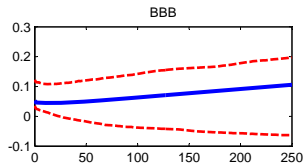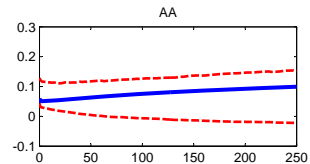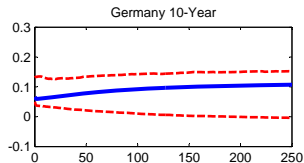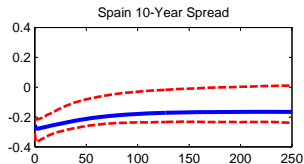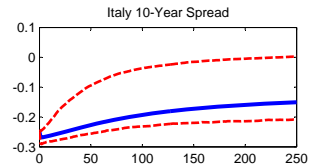
IDH: BOJ

Specification Tests

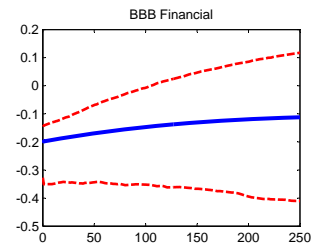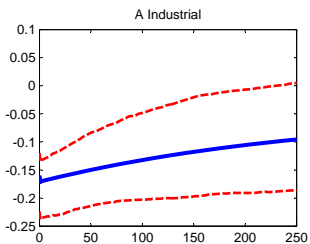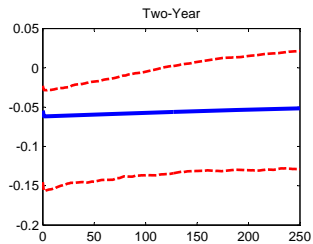- Lack of identification not rejected for BOJ

- For Japan, weak ident is an issue with IDH (Arai (2013))

Conclusions

- Unconventional monetary policy appears to have effects on term premia that pass-through into other asset prices

  ▶ Differ from Krishnamurthy and Vissing-Jorgensen (2013)

  ▶ LSAP/APF/APP announcements seem more important

  ▶ US announcements have more spillovers

  ▶ Tightening news may have smaller stock market effects

  ▶ Effects generally "wear off", but slowly

- Our analysis has looked at effects on asset prices, not macroeconomic outcomes *per se*

Additional Material

Comparison with Conventional Policy

- Gurkaynak et al. (2005b): 25bp surprise Fed Funds rate drop
  - ▶ 10-yr yields fall 10 bp, stock prices rise 2pp
- Our paper: 25 bp surprise drop in 10-yr yield (with no change in Fed Funds rate)
  - ▶ Stock prices rise by 0.7 pp
- Monetary policy working at different points on the term structure pre- and post-ZLB
  - ▶ Gurkaynak et al. (2005b): Fed Funds rate would have to be cut 60 bp to lower 10-yr yields by 25 bp; would boost stock prices by 5 pp. Our estimates during ZLB period much smaller

Comparison with Conventional Policy

- The UK
  - ▶ We find no effect of unconventional policy surprises on stock prices
  - ▶ Studies from the pre-ZLB period found that surprise easings had a significant positive effect on stock (smaller magnitude than pre-ZLB estimates for US (Bredin et al. (2007))
- Corporate Spreads
  - ▶ We find that unconventional policy surprise easings cause corporate credit spreads to increase
  - ▶ With conventional monetary policy, the reverse is found (e.g. Cenesizoglu and Essid(2012))
- Exchange Rates
  - ▶ Effects roughly similar with conventional and unconventional monetary policy (Glick and Leduc, 2013)

Econometric Comment

- We regress returns onto $\Delta^I i_t$ by OLS
- Kiley (2013) and Gilchrist et al. (2013) regress returns onto $\Delta^D i_t$ by IV using $\Delta^I i_t$ as an instrument

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- In sample they aren't but that's because of "fluke" serial correlation in yield changes

Breakdown by announcement types

- For US used another more "automated" way of breaking out announcements

- Considered the first two principal components of yield changes as policy surprises

$$\Delta y_t = \beta_1 MPS_{1t} + \beta_2 MPS_{2t} \epsilon_t$$

Effects of Two Monetary Policy Surprises

	MPS_{1t}		MPS_{2t}	
Intradaily				
Two-year Treasury	-0.07***	(0.00)	-0.17***	(0.01)
Five-year Treasury	-0.18***	(0.00)	-0.17***	(0.01)
Ten-year Treasury	-0.24***	(0.00)	0.00	(0.00)
30-Year Treasury	-0.21***	(0.00)	0.19***	(0.00)
UK Gilt	-0.12***	(0.01)	-0.01	(0.02)
Italian 10 Year	-0.04***	(0.01)	0.00	(0.02)
German 10 Year	-0.09***	(0.01)	0.02*	(0.01)
Ten-year JGB	-0.05***	(0.01)	-0.03	(0.02)
GBP	0.67***	(0.08)	0.23	(0.19)
EUR	0.86***	(0.11)	0.35	(0.26)
JPY	1.26***	(0.10)	-0.10	(0.23)
Stock Returns	0.83***	(0.16)	-0.49	(0.40)
Daily				
Corp: Higher Grade	-0.14***	(0.04)	0.11	(0.09)
Corp: Lower Grade	-0.14***	(0.04)	0.12	(0.09)
MOVE Index	-0.03	(0.03)	-0.22***	(0.06)