Discussion of "The Reanchoring Channel of QE"

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Summary

- Goal: Paper studies effects of ECB Asset Purchase Program (APP)
  - Focus on long-term inflation expectations
- Contributions:
  1. Evidence that the APP re-anchored long-term inflation expectations
  2. DSGE model to understand transmission channel of APP
  3. Empirical evidence in support of the transmission channel
- Very timely and ambitious project! Mechanics of unconventional policies are not fully understood.

Outline of the Discussion

- General comments: The three contributions are somewhat disconnected
  - Next step: Tigther link between theory and empirics
- Specific comments:
  1. Robustness of the reanchoring channel (identification of monetary policy shocks)
  2. Primitive of the signal extraction problem
  3. Reconciling DSGE intuition with cross-sectional evidence
- Note. Analysis would benefit from cross-country comparison

Motivation: The Reanchoring Channel

- APP pushed up long-term inflation expectations
- Methodology:
  1. Monetary policy shock identification:
     - Changes in 5-year German Bund interest rates (Δx) in a small window around ECB announcements
  2. Effect on long-term inflation expectations (Δy_t):

$$\Delta y_t = \alpha + \beta \Delta x_{t-1} + \varepsilon_t$$

Figure 1: 5-year ahead inflation expectations and monetary policy surprises

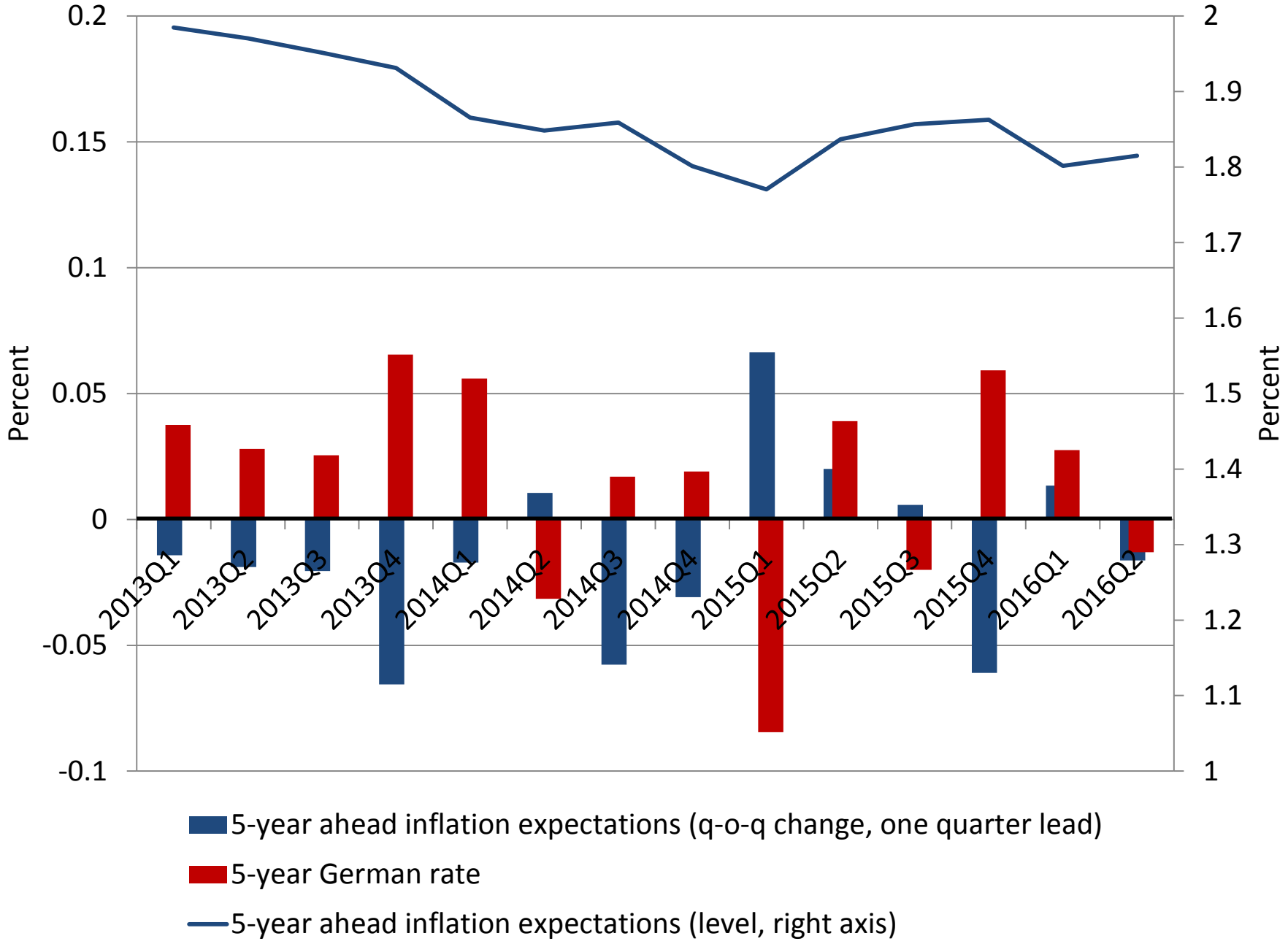


Table 1: Impact of high-frequency surprises in the 5-year German sovereign bond yield on 5-year ahead inflation expectations

	(1)	(2)	(3)	(4)
	Post 2013	Pre 2013	APP	APP, No FG
	Change in 5-year-ahead inflation expectations			
5-year German yield surprise	-0.599***	0.0932	-0.583**	-0.508***
	(-4.392)	(1.551)	(-3.151)	(-3.960)
Sample	2013q1-2016q2	2001q1-2012q4	2014q2-2016q2	2014q2-2016q2
Observations	15	47	10	10
R-squared	0.523	0.051	0.457	0.539

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Monetary Policy Shocks: Identification

- Finance-style identification very common
- Interpretation can sometime be difficult
  - ECB typically announces "packages" (rate cuts with T-LTRO, sovereign and corporate purchases, forward guidance) with possible different implications for various maturities
  - Changes in 5-year rates may reflect reassessment about long-term prospects (expectd rate vs term premium)

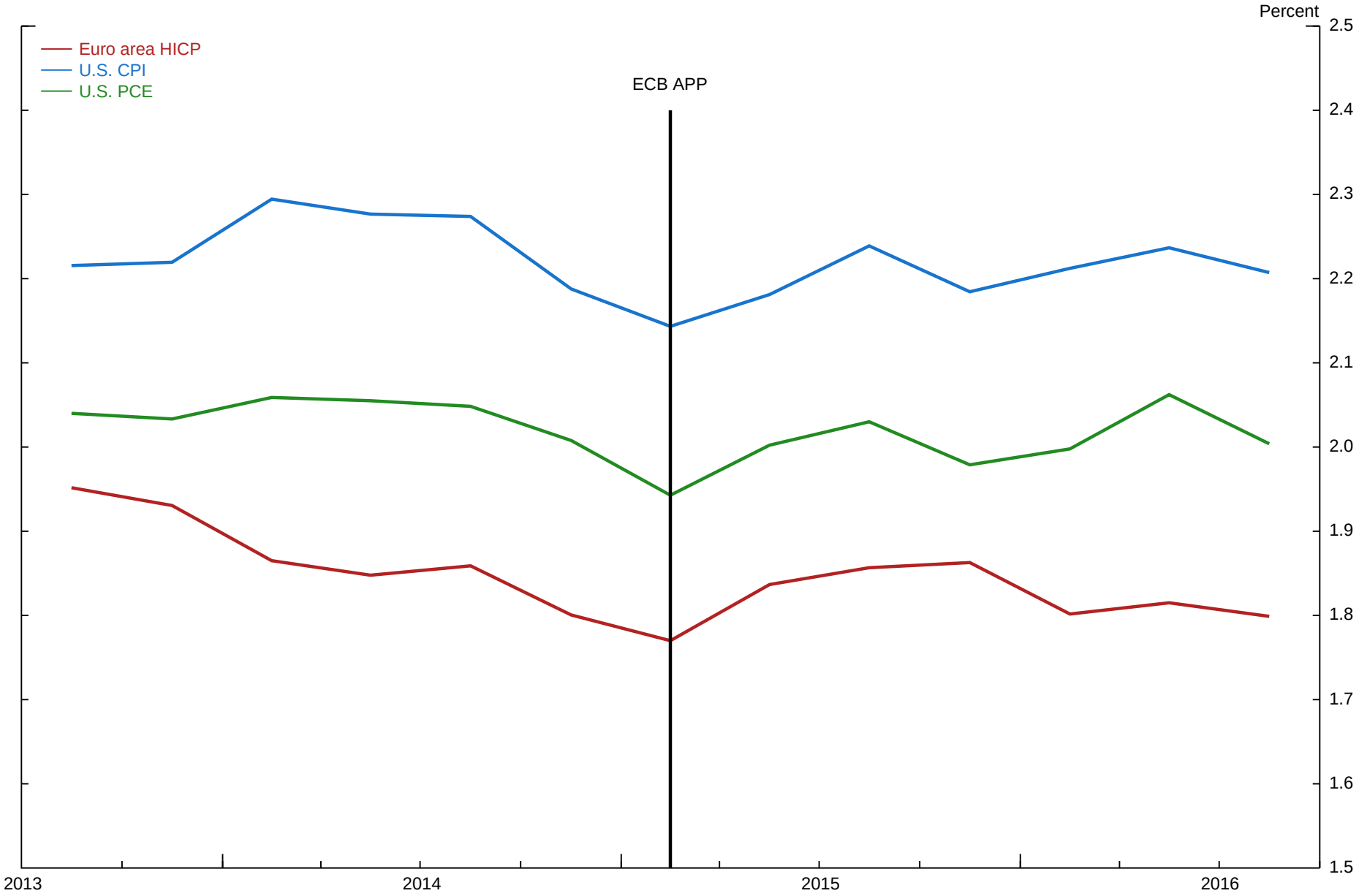
ECB Announcement Event Studies

	Euro		US Yields	Euro Area Yields			German Yields			Peripheral Yields			Peripheral Spreads		
	EUR/USD*	NEER*	10-year	2-year	5-year	10-year	2-year	5-year	10-year	2-year	5-year	10-year	2-year	5-year	10-year
07/26/12: 'Whatever it Takes'	1.21	0.48	0.04	-0.25	-0.19	-0.12	0.01	0.03	0.02	-0.81	-0.62	-0.42	-0.82	-0.65	-0.44
06/05/14: TLTRO, rate cut	-0.00	-0.14	-0.02	-0.05	-0.08	-0.05	0.00	0.02	0.02	-0.13	-0.11	-0.08	-0.13	-0.13	-0.10
08/22/14: JH speech	-0.36	-0.25	0.00	-0.01	-0.01	-0.01	0.00	0.01	0.00	-0.03	-0.03	-0.01	-0.03	-0.04	-0.01
09/04/14: SSAP	-1.62	-1.07	0.05	-0.05	-0.07	-0.03	0.01	0.08	0.03	-0.03	-0.05	-0.11	-0.04	-0.14	-0.14
01/22/15: LSAP	-1.50	-1.29	-0.01	-0.03		-0.10	0.00	-0.02	-0.08	-0.07		-0.13	-0.07		-0.06
03/05/15: LSAP details	-0.35	-0.44	0.00	-0.02	-0.04	-0.05	0.00	-0.03	-0.04	-0.06	-0.08	-0.08	-0.06	-0.06	-0.05
10/22/15: ECB meeting	-1.71	-1.49	0.00	-0.07	-0.10	-0.10	-0.06	-0.07	-0.07	-0.09	-0.17	-0.16	-0.03	-0.10	-0.08
12/03/15: ECB meeting	2.64	2.28	0.13	0.11	0.18	0.22	0.13	0.18	0.20	0.08	0.19	0.25	-0.05	0.01	0.06
01/21/16: ECB meeting	-0.68	-0.69	0.05	-0.02	-0.04	-0.05	-0.03	-0.04	-0.03	-0.02	-0.07	-0.07	0.01	-0.03	-0.04
02/22/16: Brexit fears	-0.71	-0.83	0.01	ND	-0.02	-0.04	-0.00	-0.01	-0.03	-0.02	-0.03	-0.05	-0.01	-0.02	-0.02
03/10/16: ECB rate cut	1.24	0.98	0.06	ND	0.07	0.05	0.09	0.10	0.07	0.02	0.02	0.04	-0.06	-0.09	-0.03
09/08/16: Brexit nonresponse															
Percent change/basis points	0.28	0.26	0.06	0.02	0.05	0.06	0.03	0.05	0.06	0.03	0.05	0.07	0.00	0.00	0.01
Standard Deviations	0.5	0.7	1.4	0.5	0.8	1.5	1.0	1.0	1.3	0.3	0.0	0.9	0.0	-0.3	0.1

NOTE: All changes are in basis points unless otherwise noted.

*Percentage change

SPF Long Run Inflation Expectations



Are these Monetary Policy Shocks?

- Macroeconomic effects of the identified monetary policy shocks

Macroeconomic Effects

	Post-2013	Pre-2013	APP
GDP	-0.008^{**}	0.0024	-0.020
HICP	0.186^{**}	0.008^{**}	0.027^{**}

Note. No lead effects on these variables.

Motivation: Next Step

- Evidence of Figure 1 and Table 1 is not used in the quantitative section
- (One) Alternative approach:
  - Step 1: SVAR with external instrument (Gertler and Karadi [2014], Rogers, Scotti, Wright [2016])
  - Step 2: Use this evidence to discipline the (DSGE-based) quantitative analysis.
- Key point: Some external validation of macroeconomic linkages as well as discipline for the model would be useful.

Model: Summary

- Gertler-Karadi (2013): Banks invest in two long-term assets.

$$Q_t S_t + q_t b_t = n_t + d_t \tag{1}$$

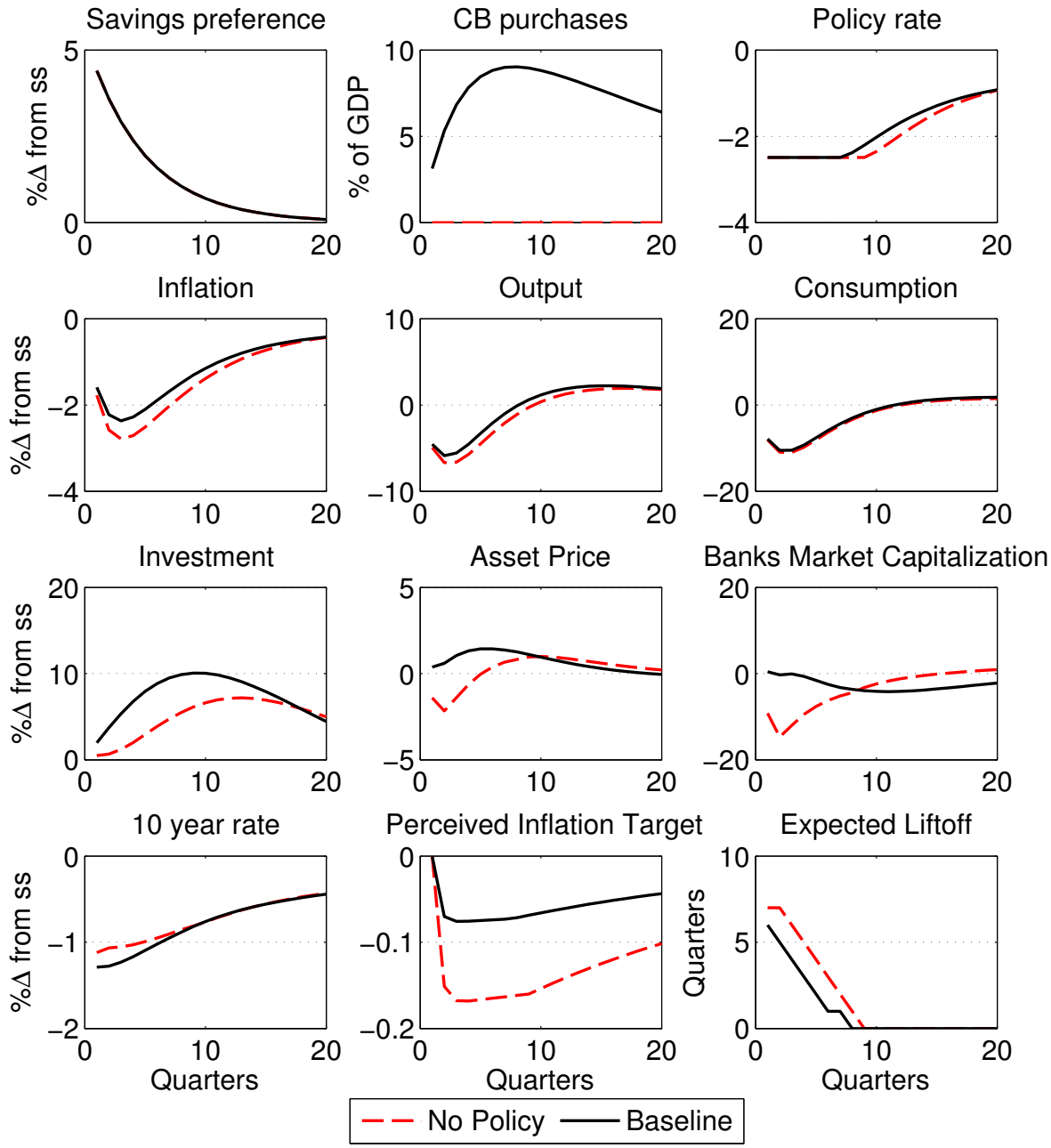
$$Q_t s_t + \Delta q_t b_t \leq \phi_t n_t \tag{2}$$

- New: Signal extraction about long-term inflation expectations

$$\pi^{*e}_{t+1} = \rho_{\pi^{*e}} \pi^{*e}_{t+1} - \xi \left\{ s_t - \widetilde{E}_{t-1}(s_t) \right\} \tag{3}$$

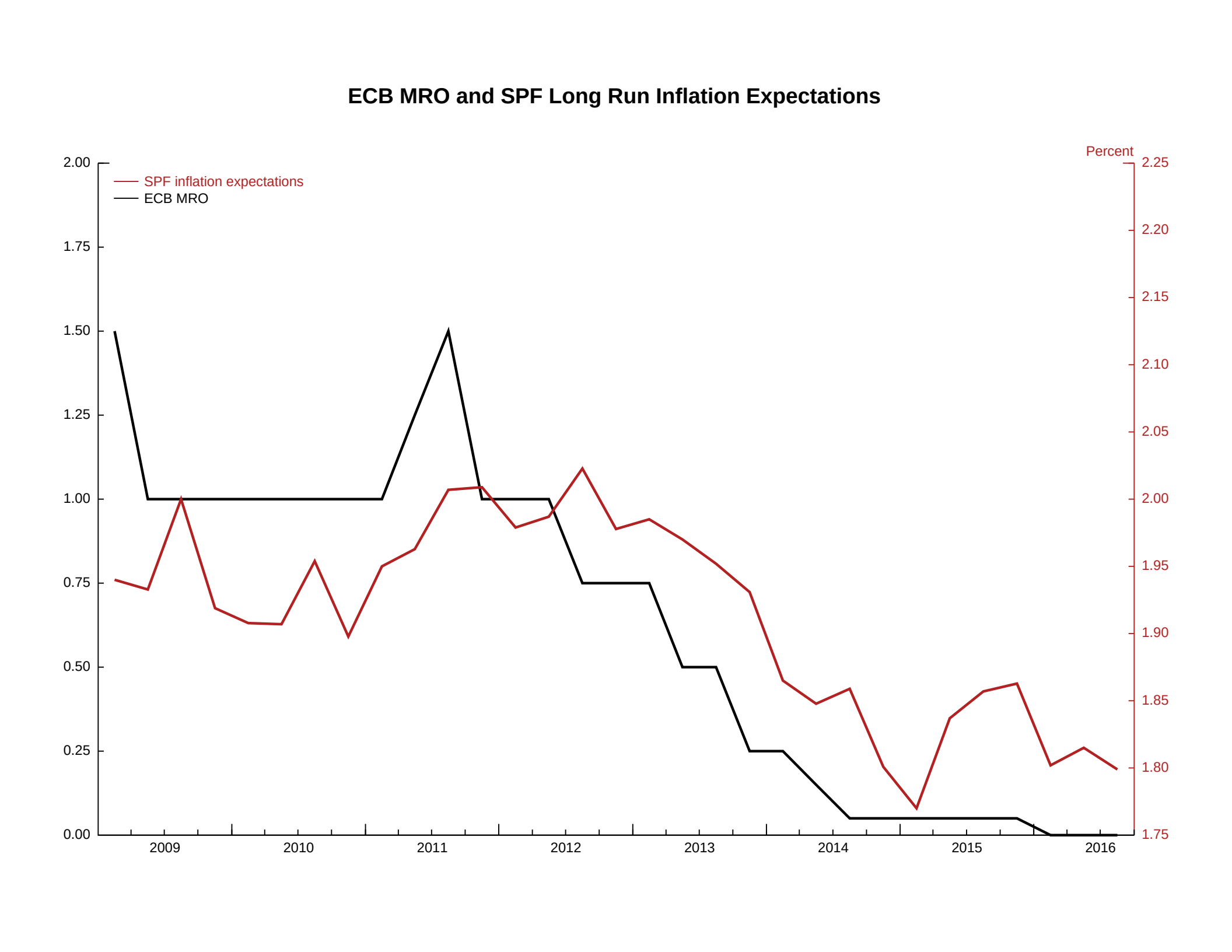
$$s_t = i_t - \varsigma \Psi_t - \kappa_\pi \pi_t - \kappa_y y_t \tag{4}$$

Figure 2: A stylized demand shock and the asset purchase program



Model: Comments

- Difficult to understand the primitive of the signal extraction equations
  - Authors calibrate both law of motion and learning process. Consistency?
  - Is this the solution of the Kalman filter?
- Empirical motivation suggests that we observe π^{*e}_{t+1}. Why not used it in the calibration/validation?
- Sensitivity analysis to this process would be informative
- Can this process account for history $(\Psi = 0)$?


ECB MRO and SPF Long Run Inflation Expectations
Percent
SPF inflation expectations
ECB MRO
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
2009
2010
2011
2012
2013
2014
2015
2016

APP Transmission Mechanism: Empirical Evidence

- Hypothesis: Banks with larger exposure to sovereign bonds should benefit more from ECB asset purchases ("stealth recapitalization")

- Methodology: Cross-sectional regression
  - Dep. variable: changes in bank stock prices around APP announcements
  - Controls: changes in national stock market index and 10-year bond yield (slope)
  - Exposure: Sovereign bond holdings relative to total assets

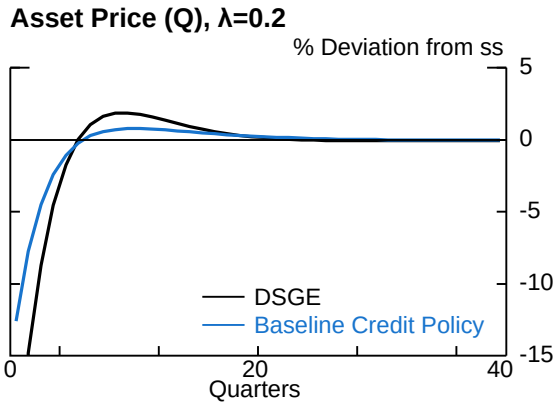
Table 4: Equity price reactions between January 21 and 23, 2015
SNL sample

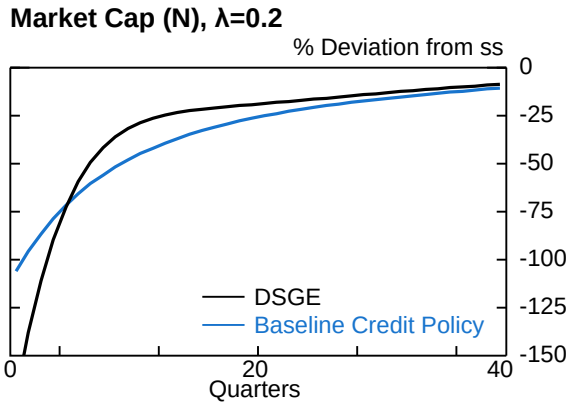
	(1)	(2)	(3)
constant	2.5521***	2.086***	1.7368***
	(4.3814)	(3.8071)	(3.2107)
Δyield	15.6672***	9.124***	8.7575***
	(4.6094)	(2.8323)	(2.7549)
ΔSM	0.3914***	0.7964***	0.7673***
	(2.8819)	(3.9617)	(4.5419)
EA bank (d)		-2.233***	-2.5587***
		(-3.6466)	(-4.6897)
exposure			0.0563***
			(2.7259)
Adj. R^2	0.09	0.1861	0.2585
No. Obs.	150	150	120
	(White robust t-statistics)		

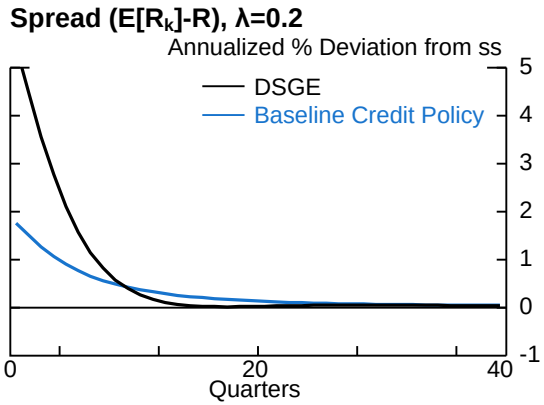
Empirical Evidence: Comments

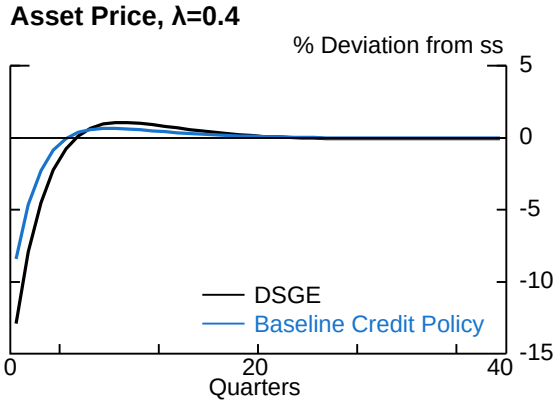
- Is the hypothesis of *stealth recapitalization* a by-product of the model?
  - Model features a "representative" bank (aggregation)
  - This regression in the model may not generate the same results (ambigous GE effects)
    - Transmission: Valuation effects (Q_t *vs* q_t) depend on the relative illiquidity in asset markets
- Where are inflation expectations?
- Closer link between theory and empirics would be preferred

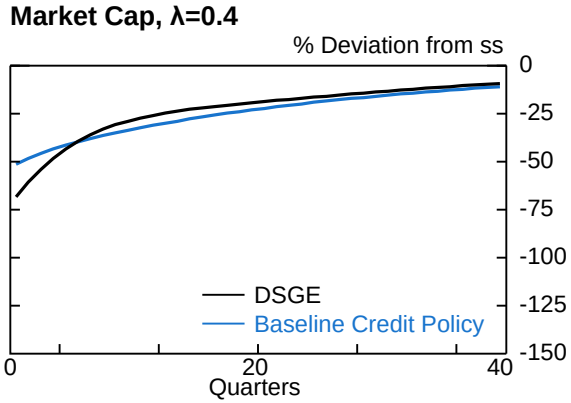
Gertler-Karadi (2011) Model Results

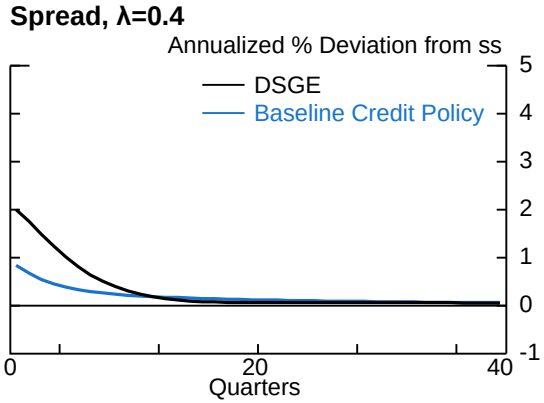


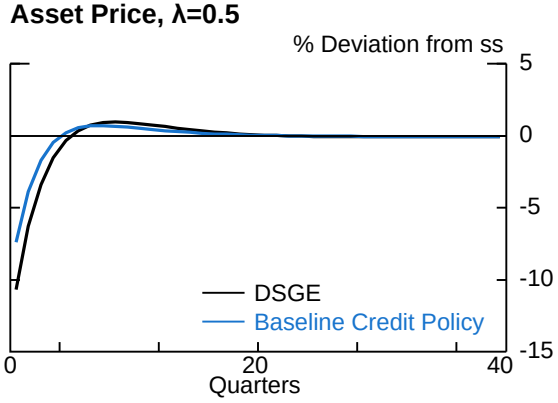


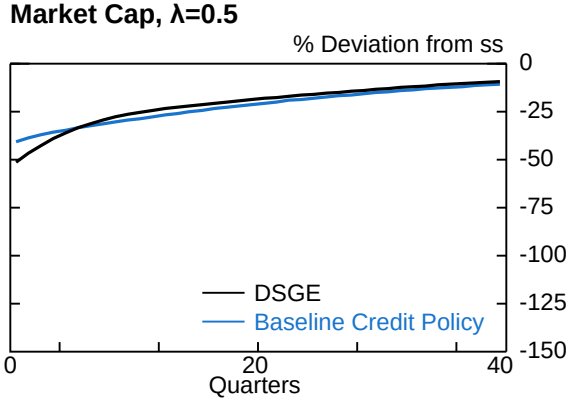


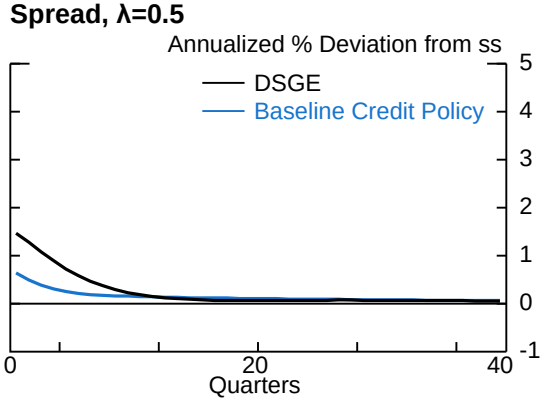












Empirical Evidence: Next Step

- Motivate/Derive the regression from the model:
  - Simulate the model for different value of Δ (i.e. different bank exposures)
  - Report response of 10-year rates, asset prices, and bank capitalization
  - Repeat for different configuration of private vs sovereign bond illiquidity
- Possibly bring back changes in inflation expectations
  - Use 5x5 and other ECB announcement dates?

Conclusions

- This is an interesting paper on a very important issue
  - Mechanics of unconventional issues not fully understood
  - Focus on reanchoring of inflation expectations is warranted
- Next step: Tigther link between theory and empirics
  - Exploit dynamic properties of monetary policy shocks to discipline quantitative analysis
  - Provide better justification for functional form of signal extraction
  - Use model to justify bank stock empirical analysis