Effects of Unconventional Monetary Policy on Financial Institutions

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September 16, 2014

Policy response to the 2007-09 Crisis

- Fed relied on unconventional monetary policy
  - Zero fed funds rate, asset purchases, agency bonds, forward guidance...
- Based on the idea that lower long-term rates may lead to faster recovery
- Trade-off: financial stability
  - Lower rates may induce excessive risk-taking behavior
  - Risk-taking *beyond* what ultimate holders of the risk would find optimal

This paper

What was the impact of unconventional monetary policy on four classes of financial institutions?

- **Banks and Life Insurers**: Positive effects on yields and stock prices after Fed announcements, especially in 2009
- **MMFs and Pension Funds**: Moderate reaching for yield behavior in 2007-09, behavior has disappeared by 2013

No trade-off by 2013: risk-taking dissipated and solvency benefits are still felt

How does Monetary Policy affect Financial Institutions

1. Hurdle rate for risky projects $\downarrow \Rightarrow$ optimal increase in risk in the economy

2. Incentives to "reach for yield" $\Rightarrow$ suboptimal increase in risk-taking

3. General equilibrium effects on asset prices $\Rightarrow$ value of legacy assets $\uparrow$

   - Real spending, real profits increase
   - Discount rates decrease
   - Unemployment, delinquency rates decrease
   - Aggregate demand effects
   - Stealth recapitalization

4. Opportunity cost of holding collateral $\downarrow \Rightarrow$ leverage $\uparrow$

Banks and Life Insurers - Methodology

- Measure impact of (surprise) monetary policy announcements
- High frequency event studies
- Identification:
  1. Window narrow enough to prevent contamination by other shocks
  2. Window wide enough to allow markets to process information
- Focus on equity, bond and CDS prices
  1. Equity and Bonds: difference in average trading prices between $[-7, -2]$ and $[18, 23]$ minute windows
  2. CDS: quasi-intraday window using closing price data from Tokyo, London, and New York

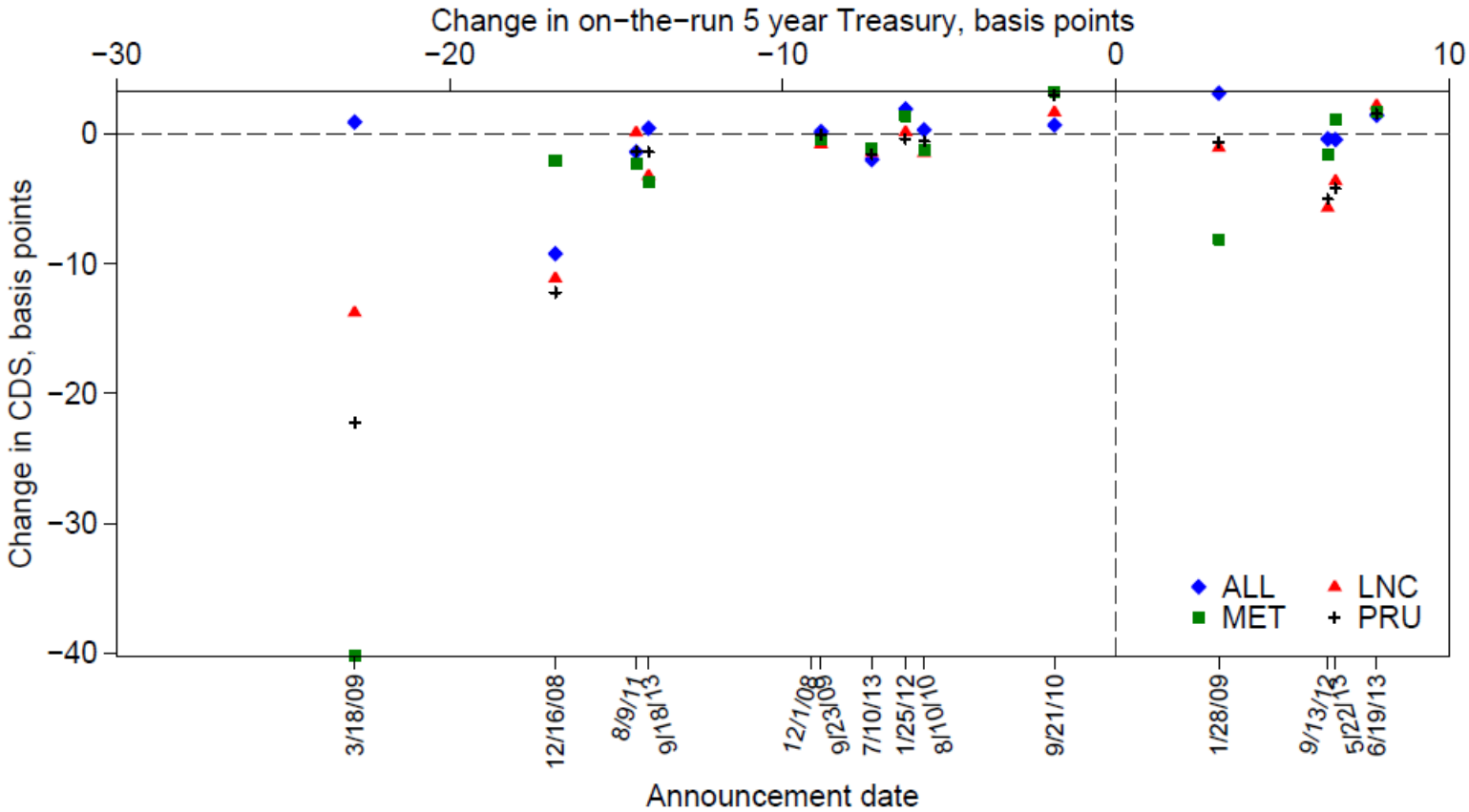
Life Insurers

- Maturity mismatch: shorter term assets than liabilities
- $r \downarrow \Rightarrow$ interest spread $\downarrow$
- Life insurers can try to offset this by reaching for the yield...

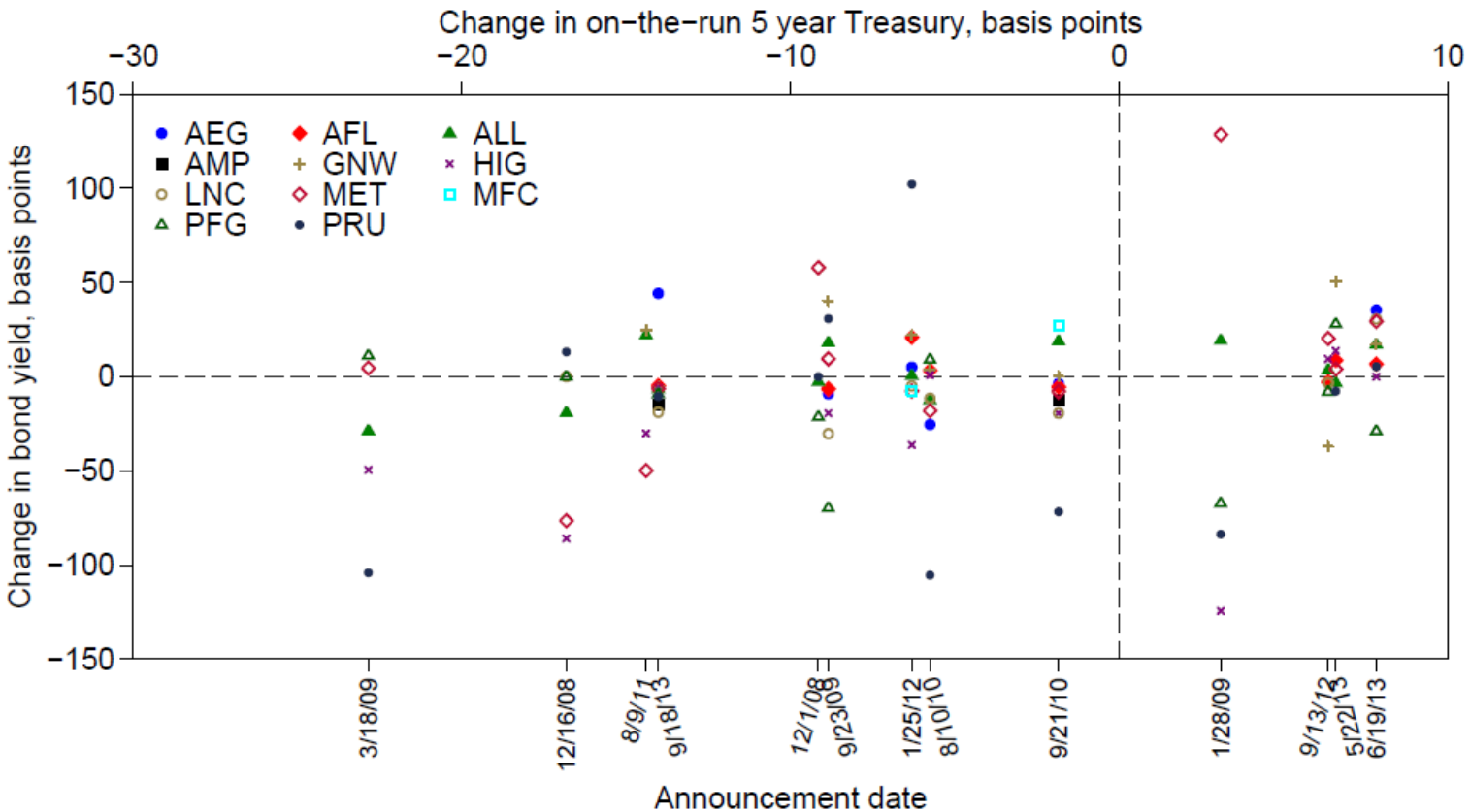
On the other hand...

- Lost considerable asset value
- GE effects $\Rightarrow$ monetary easing may have had a *positive effect* on life insurers

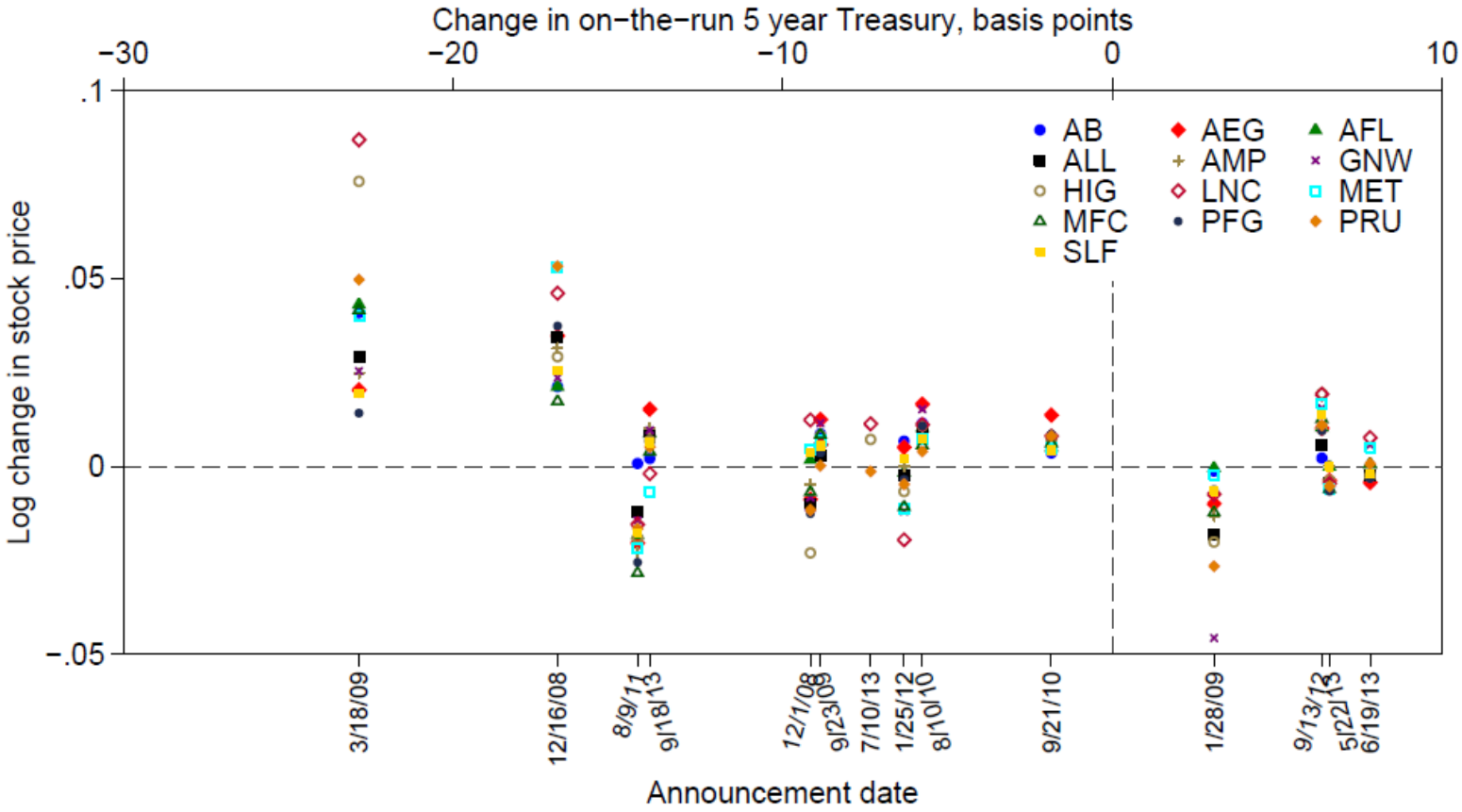
Life Insurers: CDS



Life Insurers: Bond Yields



Life Insurers: Equity Prices



Life Insurers: Results

$$\Delta P_i = \beta_0 + \varepsilon_i$$

	Treasury[a]	Life insurers			Bank holding companies			Market	
		CDS[b]	Bond[c]	Stock[d]	CDS[b]	Bond[c]	Stock[d]	CDX[e]	Stock[f]
12/1/08	−9.2		52.6	−0.4		18.1^{+}	−0.6**		−0.5**
12/16/08	−16.8	−7.2	−42.9	3.6**	−0.7	−9.1	2.2**	−3.9	1.3**
1/28/09	3.1	−3.1	−7.6	−1.2**	−9.4*	−0.9	−0.3	−0.4	−0.3**
3/18/09	−22.8	−24.5^{+}	−33.9	4.0**	−2.6*	−16.6	2.5**	−3.7	1.5**
9/23/09	−8.9	−0.2	3.3	0.6**	0.2	−12.5	0.6**	2.5	0.6**
8/10/10	−5.8	−0.8	−25.1	0.8**	−0.2*	−1.5	0.9**	−0.5	0.7**
9/21/10	−1.8	2.5*	−10.5	0.6**	−0.2	−16.1	0.7**	1.1	0.5**
8/9/11	−14.4	−1.6*	−98.8	−2.0**	1.3	−5.5	−1.7**	−2.8	−1.4**
1/25/12	−6.3	0.9	15.4	−0.6**	−1.1*	−2.5	0.0	−2.3	0.3**
9/13/12	6.4	−2.7^{+}	−39.4	1.3**	−4.1**	−10.5	1.0**	−7.0	0.5**
5/22/13	6.6	−1.1	5.5	−0.4**	−1.8**	−5.5	−0.5**	−2.8	−0.5**
6/19/13	7.8	1.6**	13.5^{+}	0.1	2.9**	−24.4	0.2**	7.4	−0.2**
7/10/13	−7.3	−1.5**		0.3	0.4	−5.2		0.5	0.3**
9/18/13	−14.0	−2.1	−8.0**	0.4	−0.9	−33.5^{+}	0.9**	−5.7	1.0**
Initial QE[g]	−39.7	−31.7*	−72.8*	7.6**	−3.3*	−25.0	4.5**	−7.6	2.9**
Taper[h]	14.4	0.5	18.6*	−0.3**	0.8	−28.7	−0.4**	4.6	−0.6**
Sample end[i]	−21.4	−3.6*	−8.0**	0.4	−0.5	−37.0*	0.9**	−5.2	1.2

Bank Holding Companies

- Converse maturity mismatch
- Low interest rates can function as "stealth recapitalizations"
- GE effects on legacy asset values, as well as higher returns due to lower delinquency rates
- Low opportunity cost of collateral may increase leverage and induce suboptimal risk-taking

Bank Holding Companies: Results

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Money Market Funds - Institutional

- Stable NAV of \$1 per share
- Subject to runs
- Fees cover fund's running costs, affecting total net return

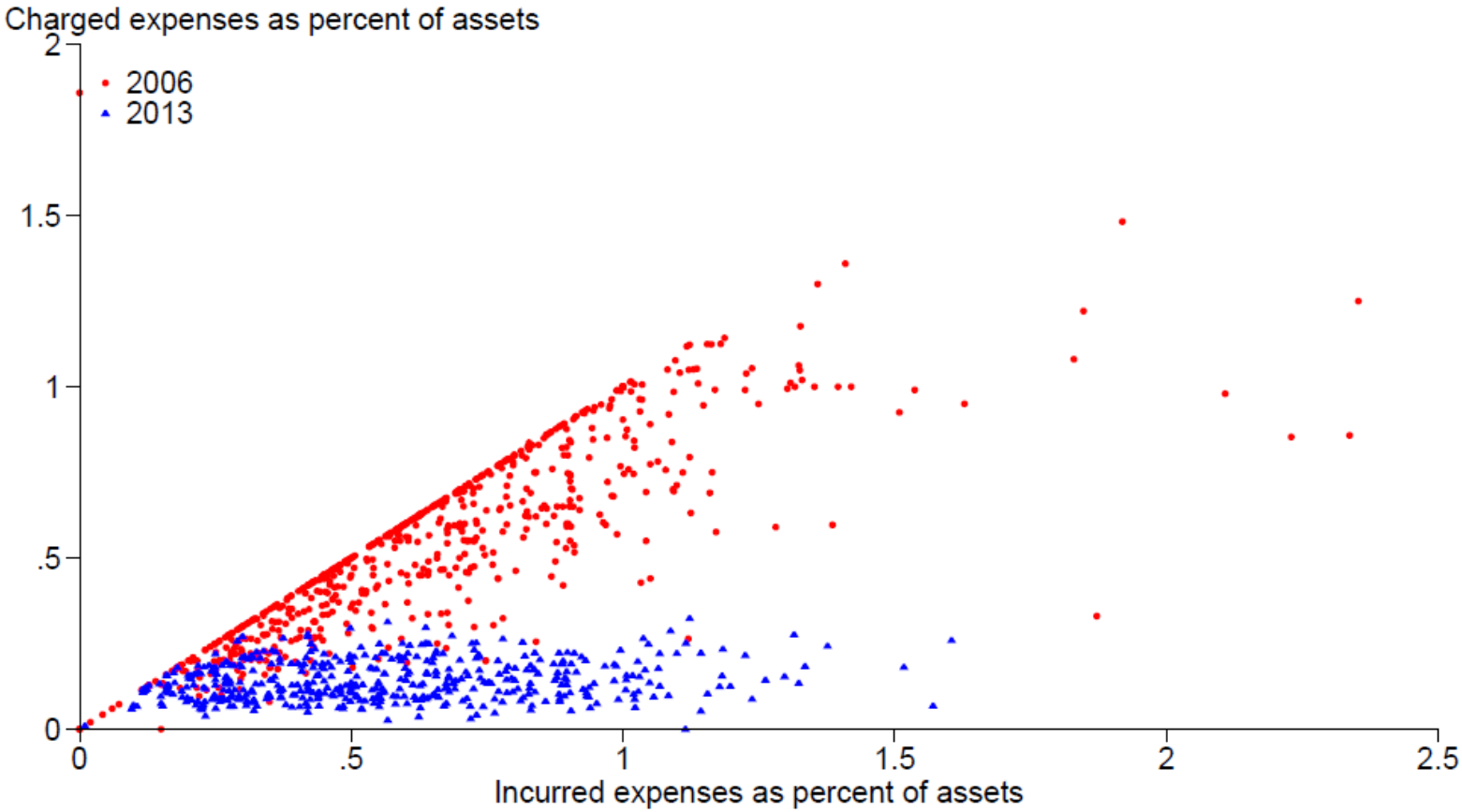
"Breaking the buck"

- Fund forced to liquidate its portfolio
- Massive pecuniary externalities (fire sales, etc.)

In normal times, spreads easily cover expenses, but when $r \downarrow$

- Suspend fees to avoid negative returns
- ...or avoid fee waivers by reaching for yield

Fee waiving during the crisis



Why are fees decreasing?

- Gross yields have become compressed around zero
- Fee reductions explained by low yields, not lower costs
- Does this make high cost funds reach for yield?

$$y_{i,t} = \alpha_i + \delta_t + \beta_t[\text{Administrative costs}_{i,t}] + \gamma_t' x_i + e_{i,t}$$

- $y_{i,t}$ is a measure of risk-taking

Results (Annual)

	Dependent variable:			
	Gross yield (1)	Std. dev. return (2)	Risky asset allocation (3)	Average maturity (4)
Right hand side variables:				
2007 incurred expenses (IV: 2005 value)	0.000	0.006	1.482	0.496
	(0.011)	(0.011)	(2.302)	(1.471)
2008 incurred expenses (IV: 2005 value)	0.125^{+}	0.060	0.630	−1.833
	(0.076)	(0.045)	(4.007)	(2.067)
2009 incurred expenses (IV: 2005 value)	0.184*	0.058	−0.725	−2.996
	(0.078)	(0.041)	(4.808)	(2.535)
2010 incurred expenses (IV: 2005 value)	0.064**	0.010	−0.744	−2.091
	(0.016)	(0.007)	(5.333)	(2.106)
2011 incurred expenses (IV: 2005 value)	0.049*	0.018**	2.571	−1.549
	(0.024)	(0.005)	(7.387)	(3.289)
2012 incurred expenses (IV: 2005 value)	0.029	0.011	5.952	−5.504
	(0.019)	(0.008)	(7.299)	(4.024)
2013 incurred expenses (IV: 2005 value)	0.013	0.002	1.362	−4.455
	(0.012)	(0.005)	(7.504)	(3.749)
Sample period	2006-13	2006-13	2006-13	2006-13
Fund FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Time-varying controls	Yes	Yes	No	No
2013 first stage F statistic	149.6	149.6	382.0	352.3
Unique funds	379	379	135	379
Fund sponsor clusters	76	76	65	76
Observations	3,032	3,032	1,080	3,032

Pension Funds: Institutional

- Documented facts regarding risk taking:
  1. PFs reduce risk exposure as liability duration decreases
  2. Underfunded PFs take less risk (opposite of risk shifting)
- Does this behavior change when interest rates are low?

Plan measures:

1. Liability duration: benefit expenses / assets
2. Solvency: NPV of benefits /assets

Specification

Two measures of risk-taking:

1. Annual return on assets, total earnings on investments divided by assets plus one-half of net contributions
2. Standard deviation of the fund's return in the 2004-08 and 2009-12 periods

How did funds with different measures load on market excess returns?

$$y_{i,t} = \gamma[r^e_{m,t}][\text{Plan measure}]_{i,t} + \mathbb{I}\{t \geq 2006\}\gamma_t[r^e_{m,t}][\text{Plan measure}]_{i,t} + \text{Controls}$$

Pension Funds: Results

	Plan measure:				
	Benefits / Assets		Benefits NPV / Assets		
	Dependent variable (p.p.):				
	$r_{i,t}$	$\sigma(r_{i,t})$	$r_{i,t}$	$\sigma(r_{i,t})$	$r_{i,t}$
	(1)	(2)	(3)	(4)	(5)
Right hand side variables:					
r_m^e X (Plan measure)	−0.67**		−0.13**		
	(0.12)		(0.03)		
2006 X r_m^e X (Plan measure)					−0.07*
					(0.03)
2007 X r_m^e X (Plan measure)	−0.32		−0.45+		0.63
	(1.14)		(0.27)		(0.55)
2008 X r_m^e X (Plan measure)	0.10				
	(0.14)				
2009 X r_m^e X (Plan measure)	0.52**		0.33**		0.14**
	(0.13)		(0.03)		(0.02)
2010 X r_m^e X (Plan measure)	0.32*		0.13**		0.04
	(0.14)		(0.03)		(0.03)
2011 X r_m^e X (Plan measure)	0.41		−6.38**		−5.32**
	(3.47)		(1.01)		(1.32)
2012 X r_m^e X (Plan measure)	0.08		0.07+		0.05+
	(0.17)		(0.04)		(0.03)
$\sigma(r_m^e)$ X (Plan measure)		−0.36**		0.01	
		(0.11)		(0.02)	
2009 X $\sigma(r_m^e)$ X (Plan measure)		0.24*		0.18**	
		(0.11)		(0.03)	
Year FE	Yes	Yes	Yes	Yes	Yes
Size, age controls	Yes	Yes	Yes	Yes	No
Fund FE	No	No	No	No	Yes
Fund-specific r_m^e loading	No	No	No	No	Yes
Unique funds	4,225	3,580	3,665	3,177	3,665
Fund sponsor clusters	3,719	3,186	3,177	2,806	3,177
Observations	29,575	7,160	21,990	6,353	21,990

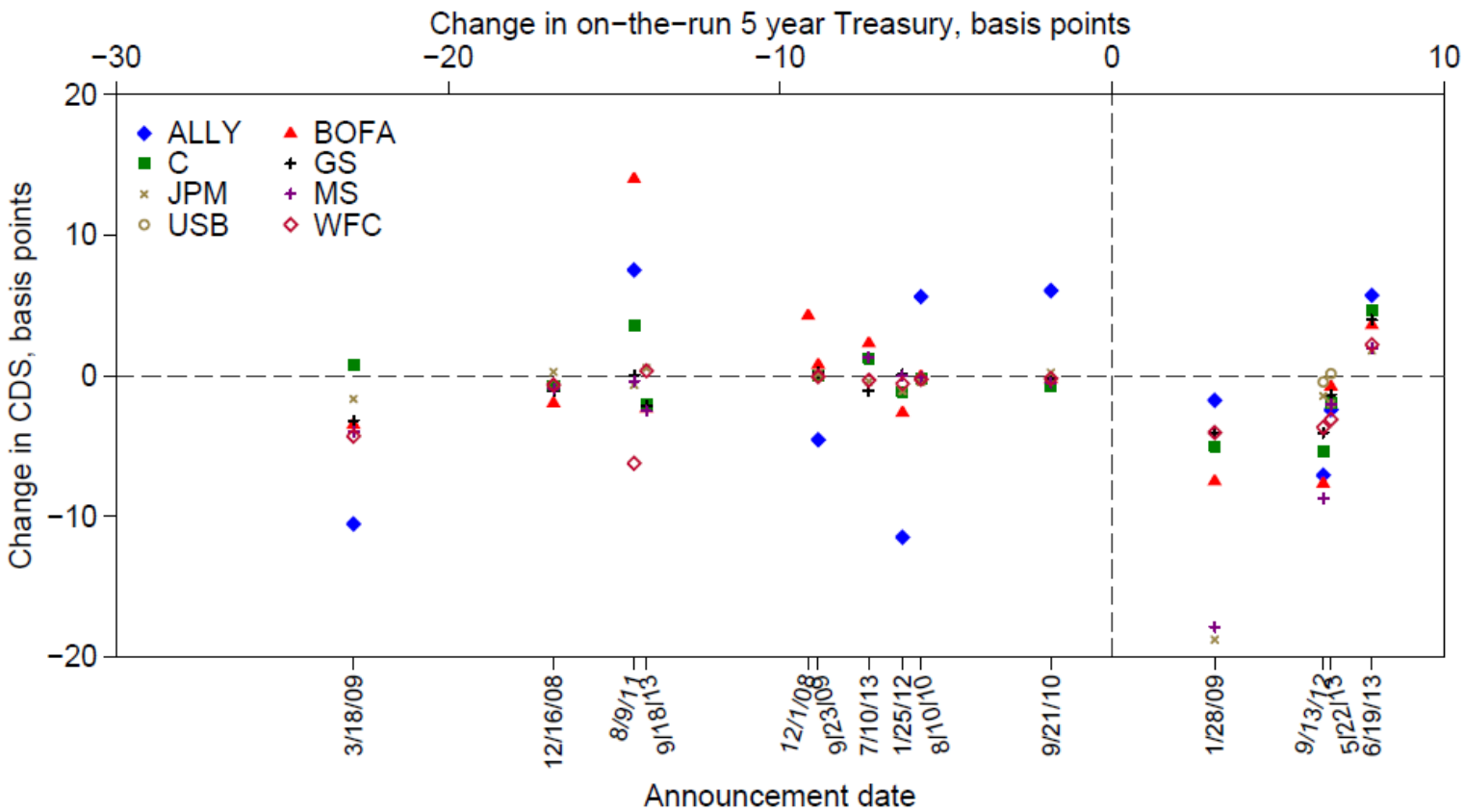
Conclusion

- High frequency event studies: monetary policy had a strong stabilizing impact on banks and life insurers
- These suggest a recapitalizing effect of monetary policy
- Some evidence of modest risk-taking in MMFs and pension funds

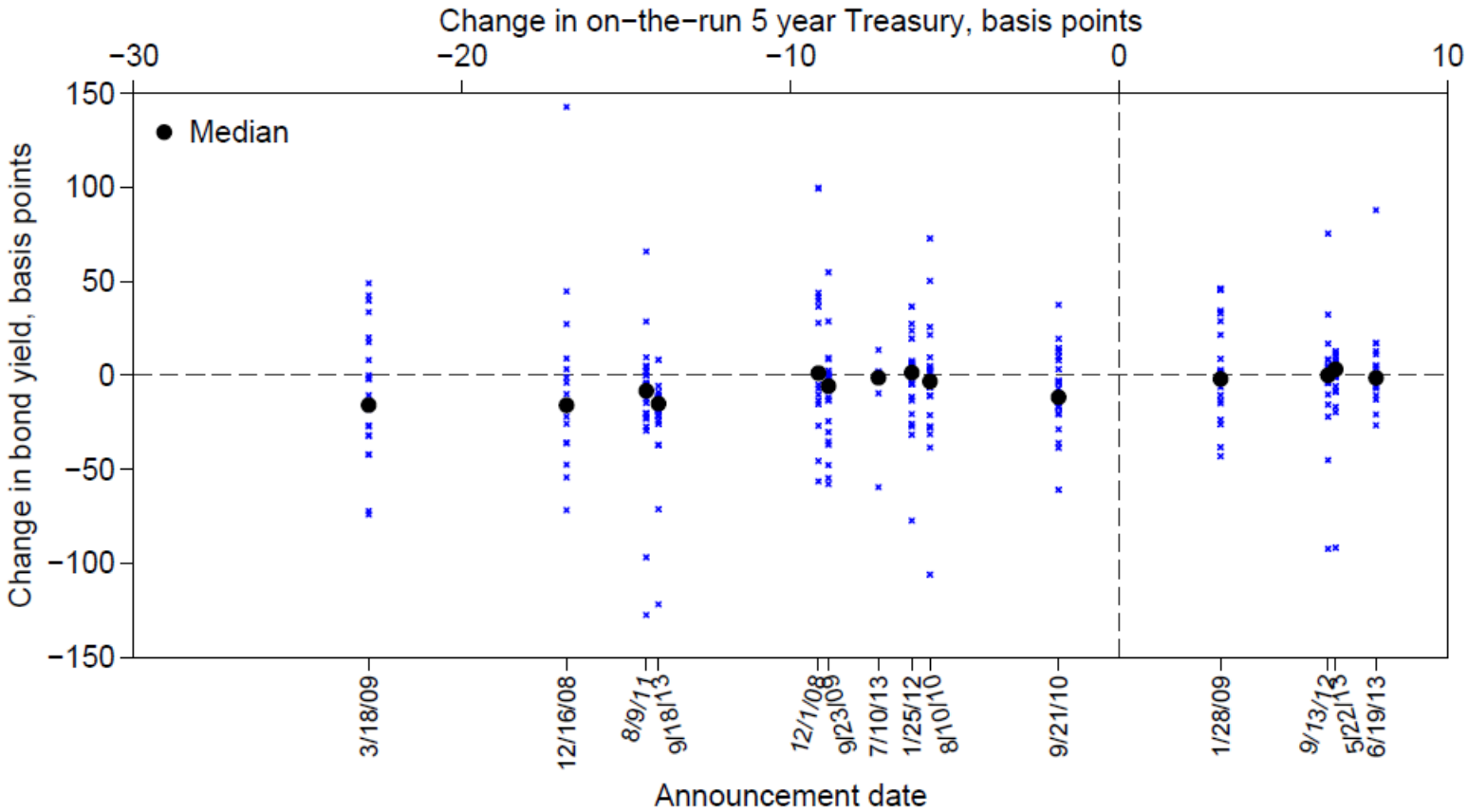
Monetary Policy Surprises

Episode	Date	Time	Event	Effect on 5yr Treasury note[a] (Basis points)
QE1	December 1, 2008	1:45pm	Bernanke speech	−9.2
QE1	December 16, 2008	2:21pm	FOMC statement	−16.8
QE1	January 28, 2009	2:15pm	FOMC statement	3.1
QE1	March 18, 2009	2:17pm	FOMC statement	−22.8
QE1	September 23, 2009	2:16pm	FOMC statement	−8.9
QE2	August 10, 2010	2:14pm	FOMC statement	−5.8
QE2	September 21, 2010	2:14pm	FOMC statement	−1.8
FG	August 9, 2011	2:18pm	FOMC statement	−14.4
FG	January 25, 2012	12:28pm	FOMC statement	−6.3
QE3	September 13, 2012	12:31pm	FOMC statement	6.4
QE3	May 22, 2013	10:30am	Bernanke testimony	6.6
QE3	June 19, 2013	2:00pm	FOMC statement	7.8
QE3	July 10, 2013	4:45pm	Bernanke speech	−7.3
QE3	September 18, 2013	2:00pm	FOMC statement	−14

Bank Holding Companies: Results



Bank Holding Companies: Results



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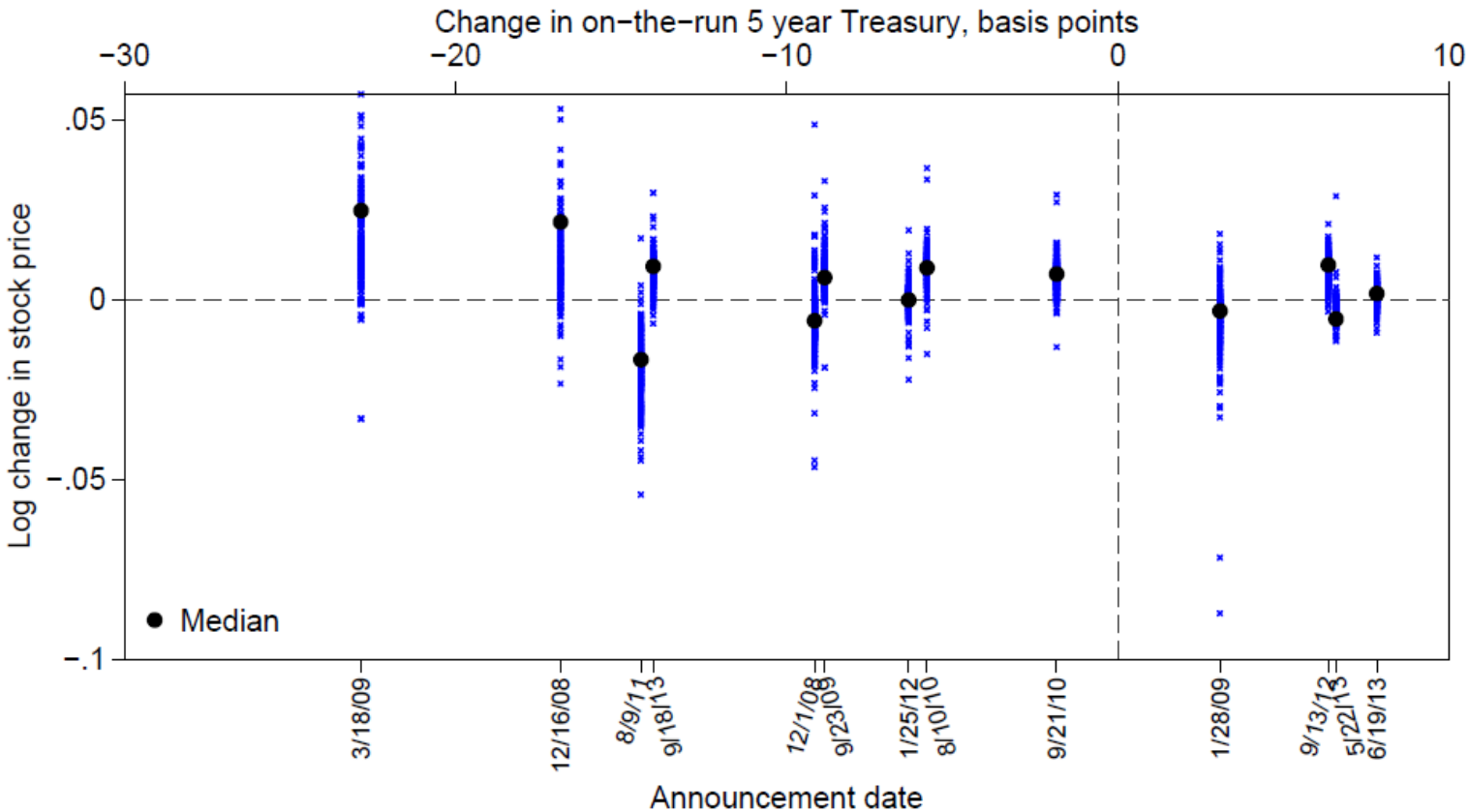

Why are MMF fees decreasing?