Large-Scale Asset Purchases by the Federal Reserve: Did They Work?

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- November 25, 2008: Fed announces $600 billion purchases of agency debt and agency MBS.

  o Designed to aid mortgage market.

- December 1, 2008: Chairman Bernanke says Fed "could purchase longer-term Treasury securities … in substantial quantities."

- December 16, 2008: FOMC sets federal funds rate at zero bound and affirms possibility of buying longer-term Treasury securities.

- January 28, 2009: FOMC puts off Treasury purchases.

- March 18, 2009: FOMC expands purchases to $1750 billion of longer-term assets, including $300 billion of longer-term Treasury securities.

- Large-scale asset purchases (LSAPs) removed 22% of longer-term Agency, Agency MBS, and Treasury securities from the market.

    o This represents a large reduction in the duration of debt securities available to private investors.

- Portfolio balance model suggests that this policy action could have a significant effect on the term premium.

    o As in Operation Twist, only much bigger.

    o Term premium effect likely to be persistent.

- Purchases also had calming effects on stressed markets.

    o These effects likely faded as conditions returned to normal.

Chart 1: Distribution of Agency Debt Purchases by Maturity
(through January 31, 2010)
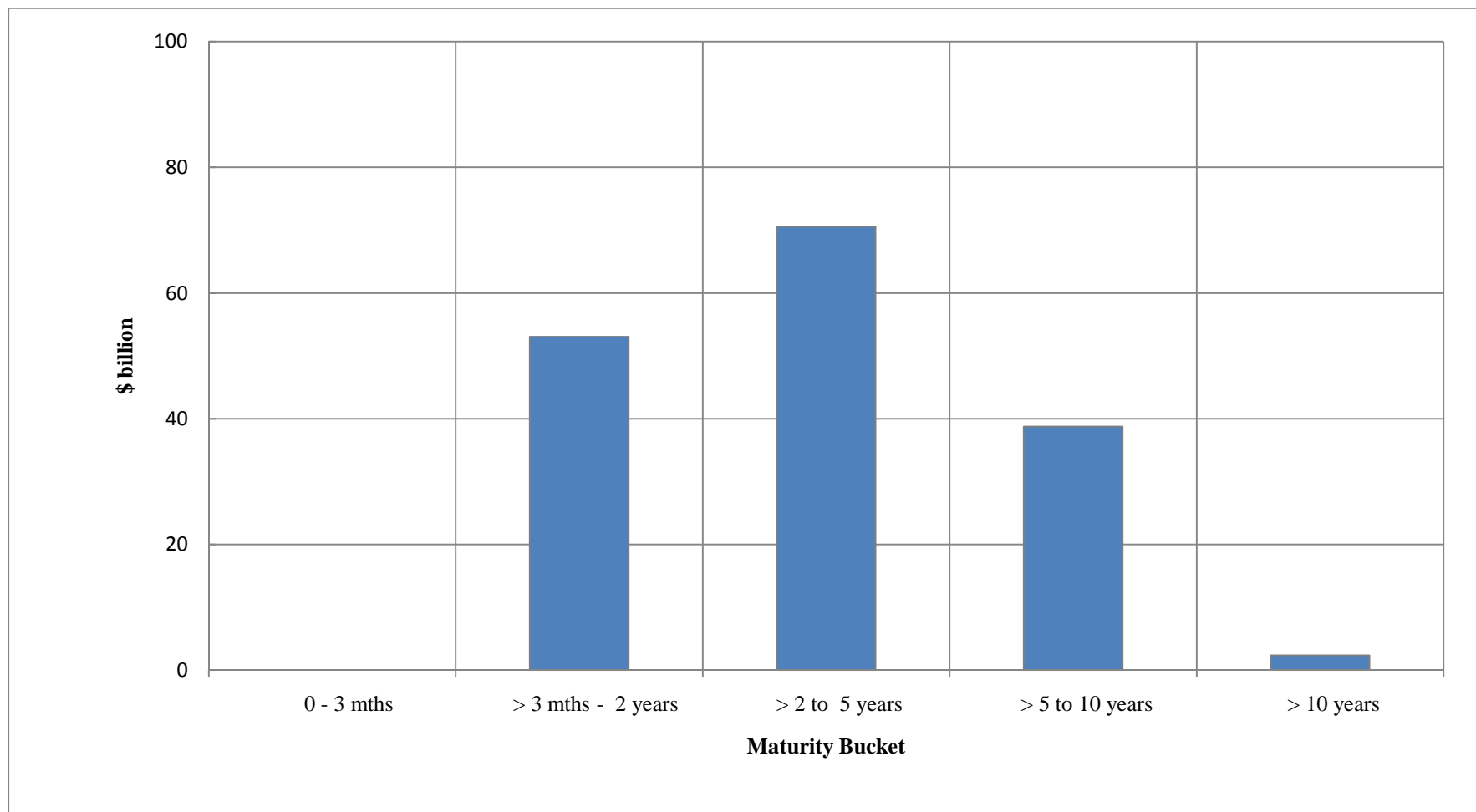
Chart 2: Distribution of MBS Purchases by Coupon
(through January 31, 2010)
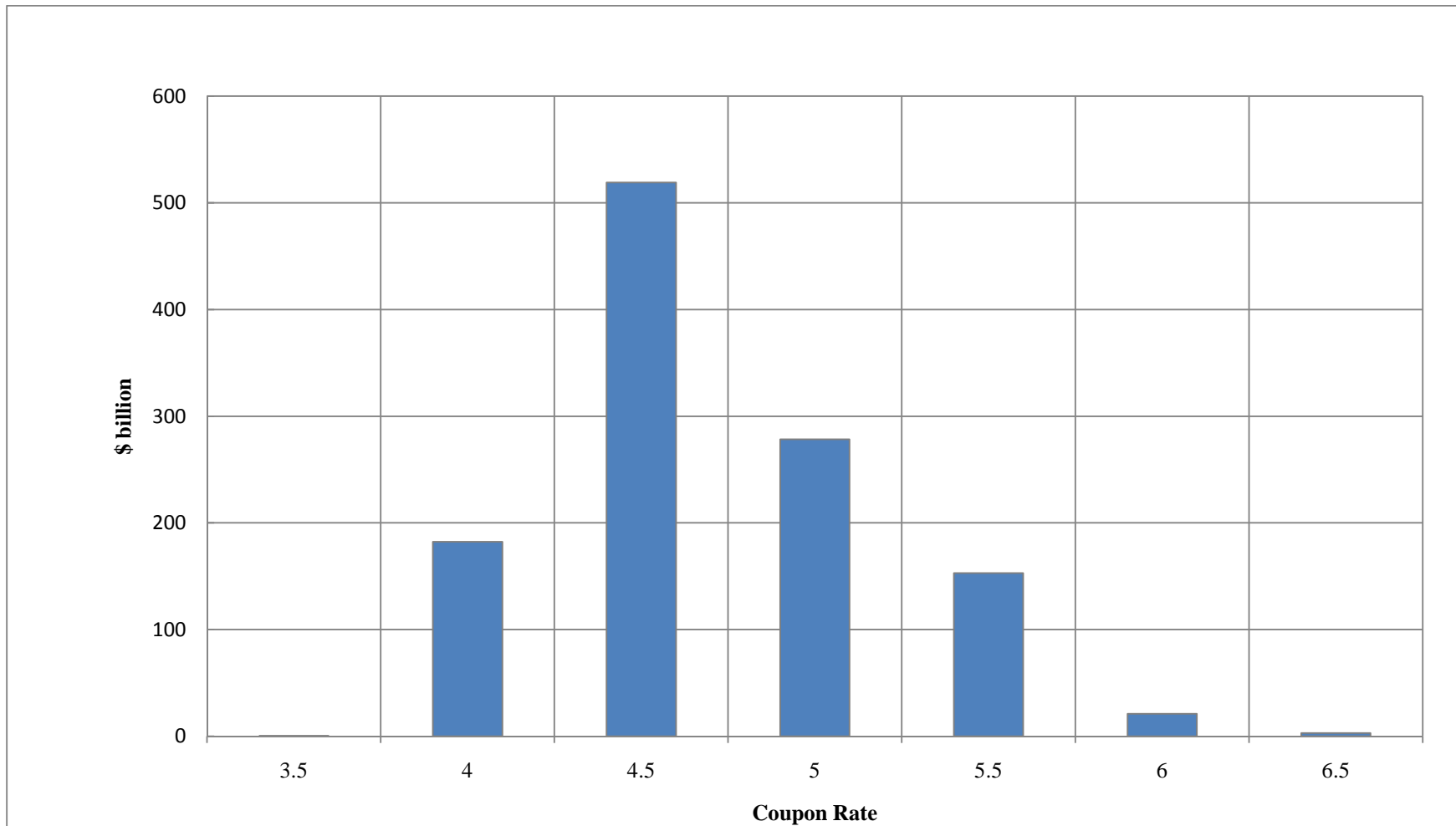
Source: Federal Reserve Bank of New York

Chart 3: Distribution of Treasury Purchases by Maturity
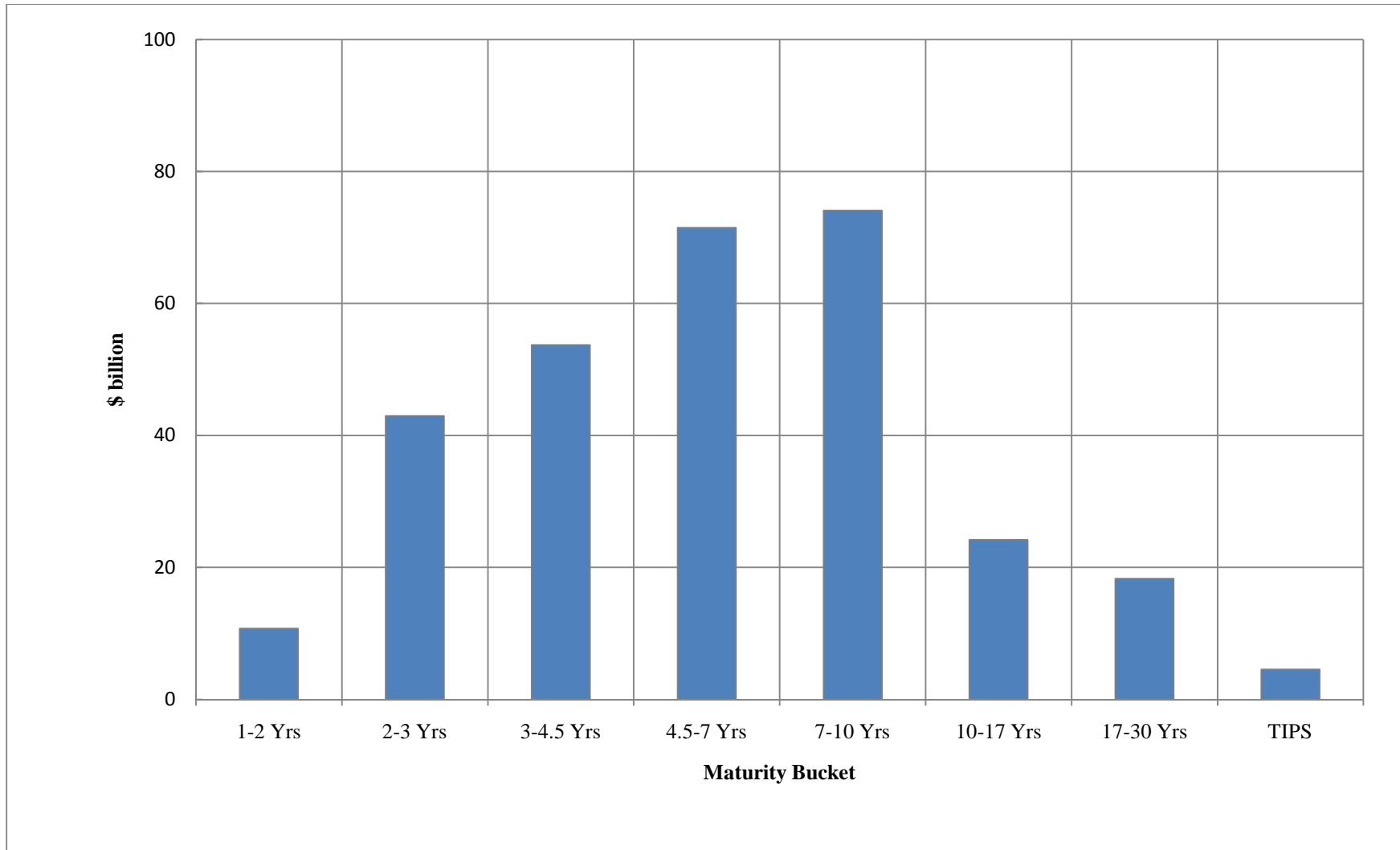
Source: Federal Reserve Bank of New York

Chart 4: Pace of Purchases by Asset Class (through January 31, 2010)
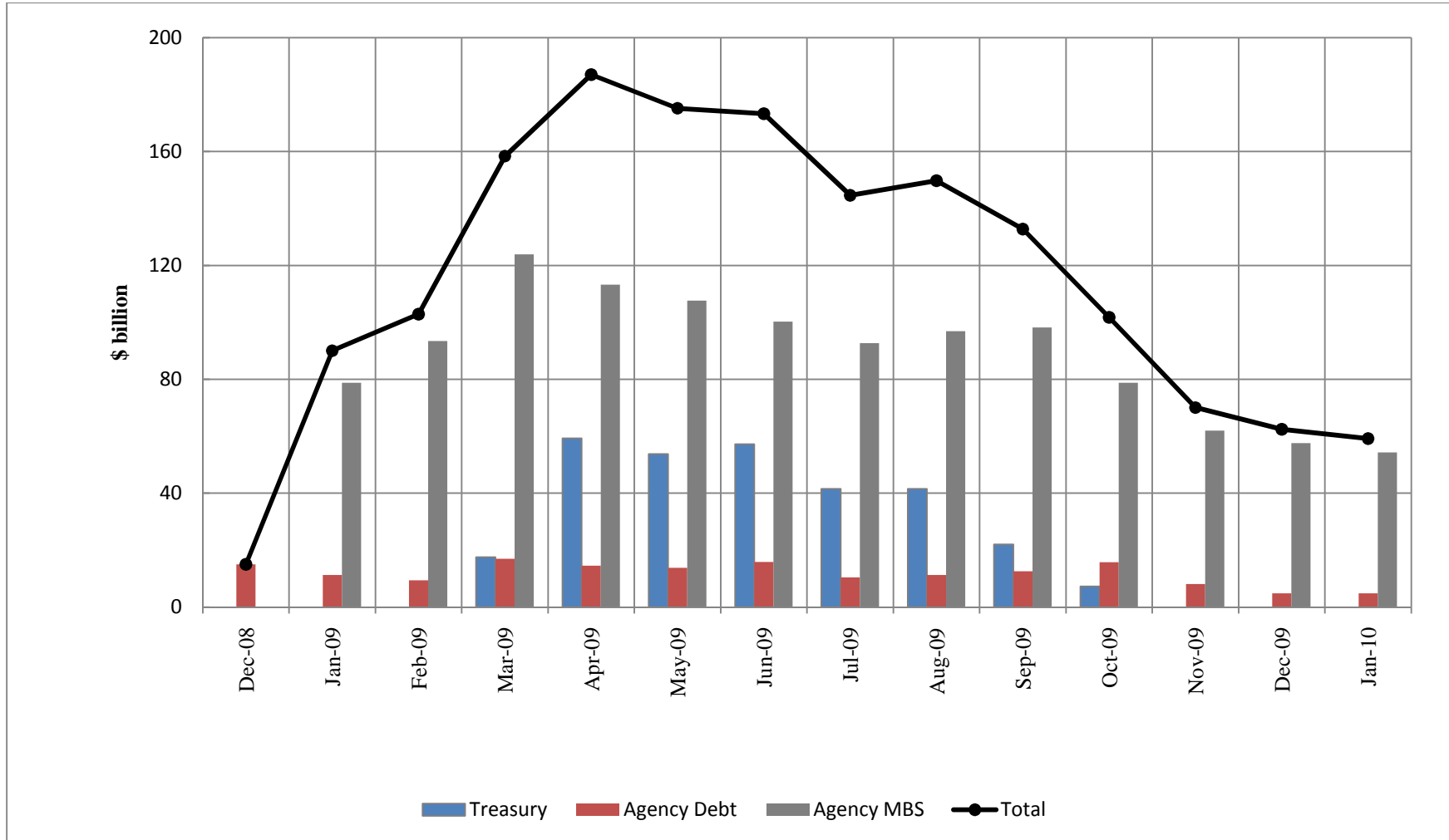
Source: Federal Reserve Bank of New York

Two Ways to Measure Effects:

1. Add up interest rate movements on days with Federal Reserve communications on LSAPs.

    - **Assumes market prices adjust quickly to news**

    - **Assumes expected purchases have no effect**

    - **Assumes all news is in Fed communications**

    - **Assumes no other news occurred on those days**

    - **Assumes effect is linked to Fed holdings, i.e., persistent**

2. Regression analysis of term premium and net supply of long-term bonds by the official sector <u>prior</u> to LSAPs.

Table 1: Interest Rate Changes around Baseline and Extended Event Set Announcements

Date	Event	2y UST	10y UST	10y Agy	Agy MBS	10y TP	10y Swap	Baa Index
11/25/2008*	Initial LSAP Announcement	-2	-22	-58	-44	-17	-29	-18
12/1/2008*	Chairman Speech	-8	-19	-39	-15	-17	-17	-12
12/16/2008*	FOMC Statement	-9	-26	-29	-37	-12	-32	-11
1/28/2009*	FOMC Statement	10	14	14	11	9	14	2
3/18/2009*	FOMC Statement	-22	-47	-52	$-31^{\#}$	-40	-39	-29
4/29/2009	FOMC Statement	1	10	-1	6	6	8	-3
6/24/2009	FOMC Statement	10	6	3	2	4	4	5

8/12/ 2009*	FOMC Statement	-2	5	4	2	3	1	2
9/23/ 2009*	FOMC Statement	1	-3	-3	-1	-1	-5	-4
11/4/ 2009*	FOMC Statement	-2	6	8	1	5	5	3
12/16/ 2009	FOMC Statement	-2	1	0	-1	1	1	-1
1/28/ 2010	FOMC Statement	-6	-1	0	-1	1	-1	0
1/6/ 2009	Minutes Release	0	-4	3	-17	-1	-9	-14
2/18/ 2009	Minutes Release	9	11	4	6	8	9	16
4/8/ 2009	Minutes Release	2	-4	-7	-9	-4	-6	-6
5/20/ 2009	Minutes Release	-5	-5	-5	-7	-4	-4	-10
7/15/ 2009	Minutes Release	7	13	16	16	10	16	7

Date	Event	2y UST	10y UST	10y Agy	Agy MBS	10y TP	10y Swap	Baa Index
9/2/ 2009	Minutes Release	-1	-6	-6	-4	-7	-8	-5
10/14/ 2009	Minutes Release	1	7	10	3	7	7	8
11/24/ 2009	Minutes Release	0	-5	-5	-9	-5	-6	-3
1/6/ 2010	Minutes Release	-2	6	5	4	6	7	-1
Baseline Event Set		*-34*	*-91*	*-156*	*-113*	*-71*	*-101*	*-67*
Baseline Set + All FOMC		*-19*	*-62*	*-140*	*-123*	*-50*	*-83*	*-74*
Cumulative Change: 11/24/08 to 1/28/2010		*-39*	*30*	*-96*	*-109*	*21*	*20*	*-482*

* Included in the baseline event set.

\# Two-day change for agency MBS on March 18, 2009 due to a Bloomberg data error.

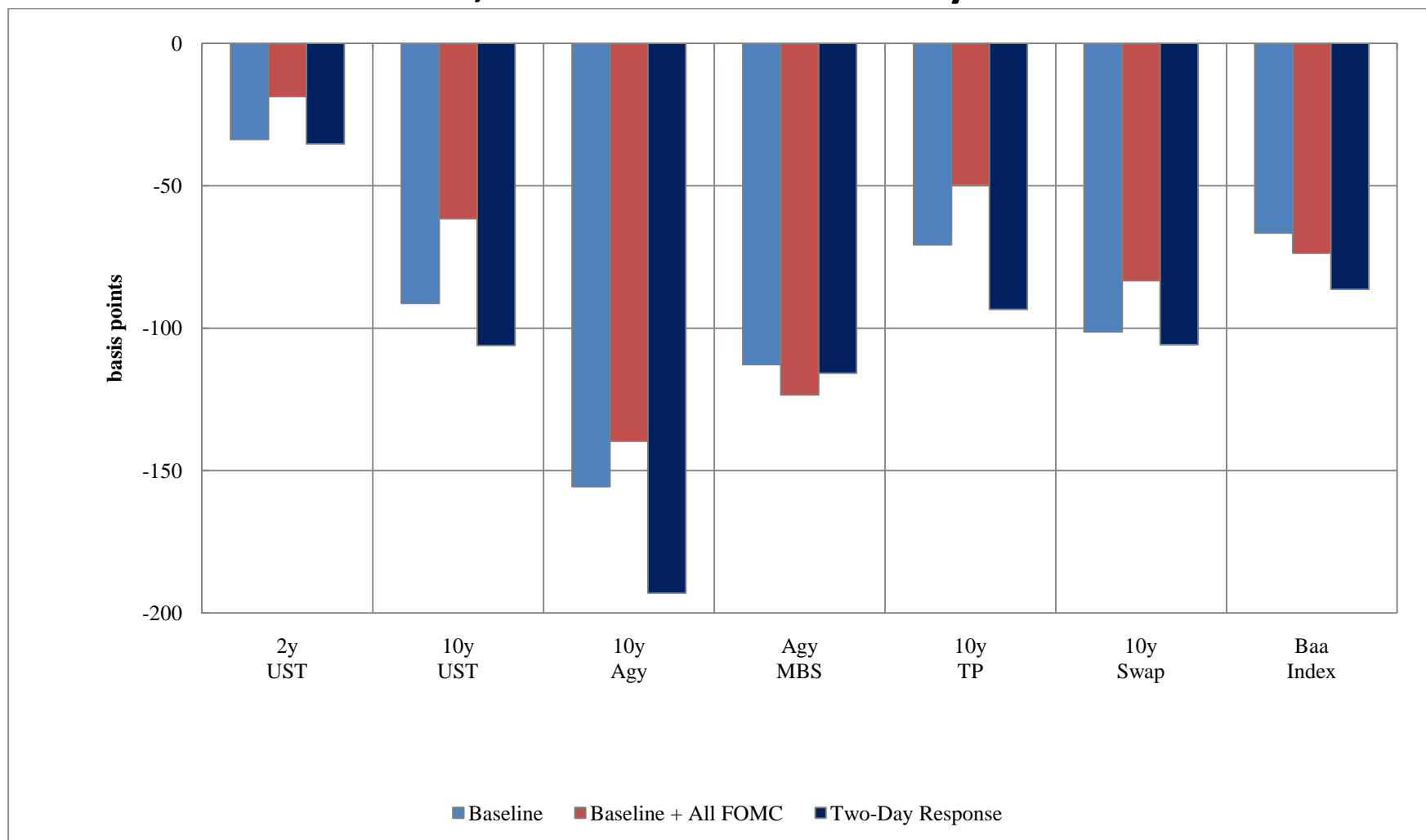# Chart 5: Cumulative Interest Changes on Baseline Event Set Days
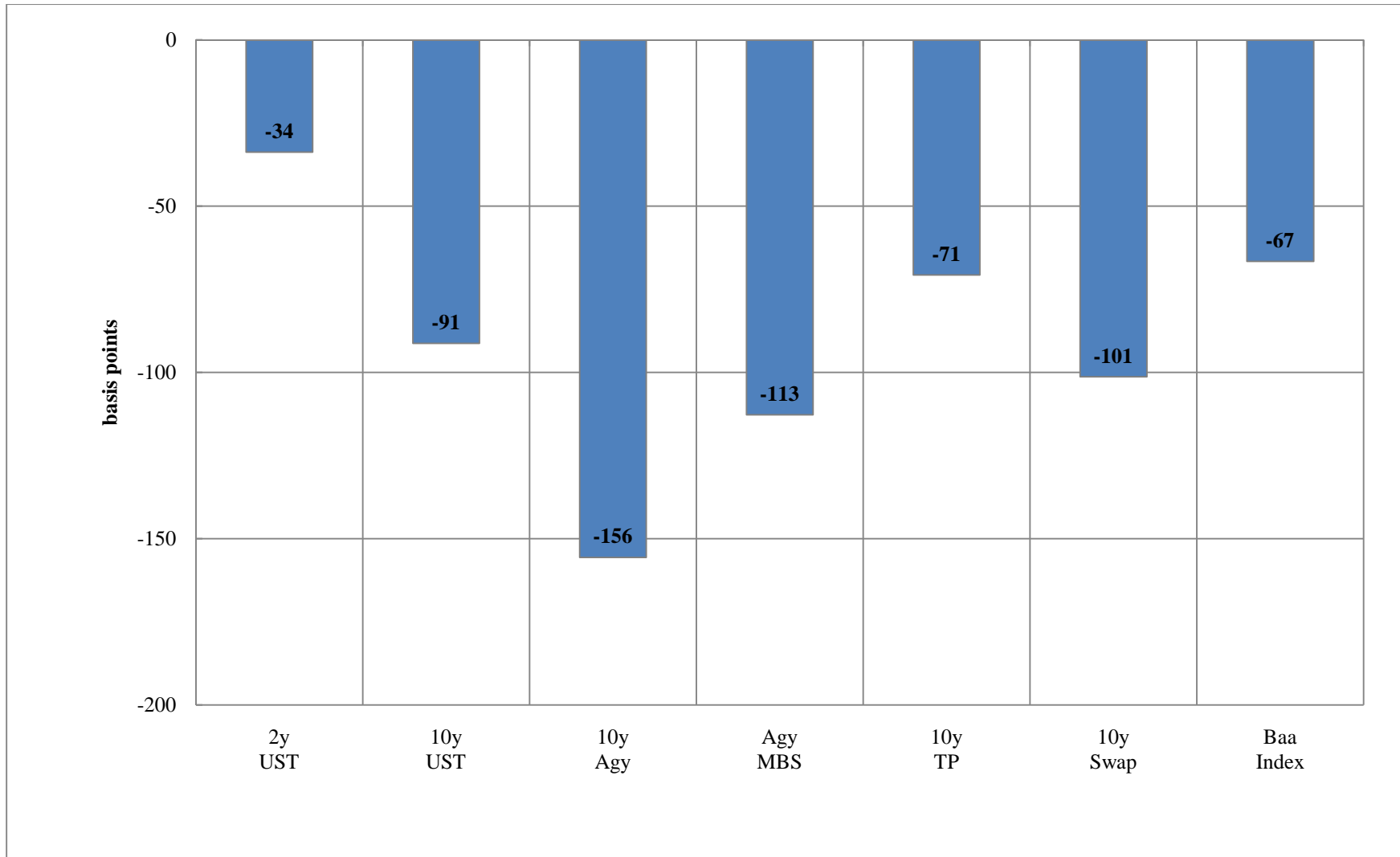
Source: Bloomberg, Barclay's Capital

Chart 6: Cumulative Changes since November 2008, Event vs. non-Event Days
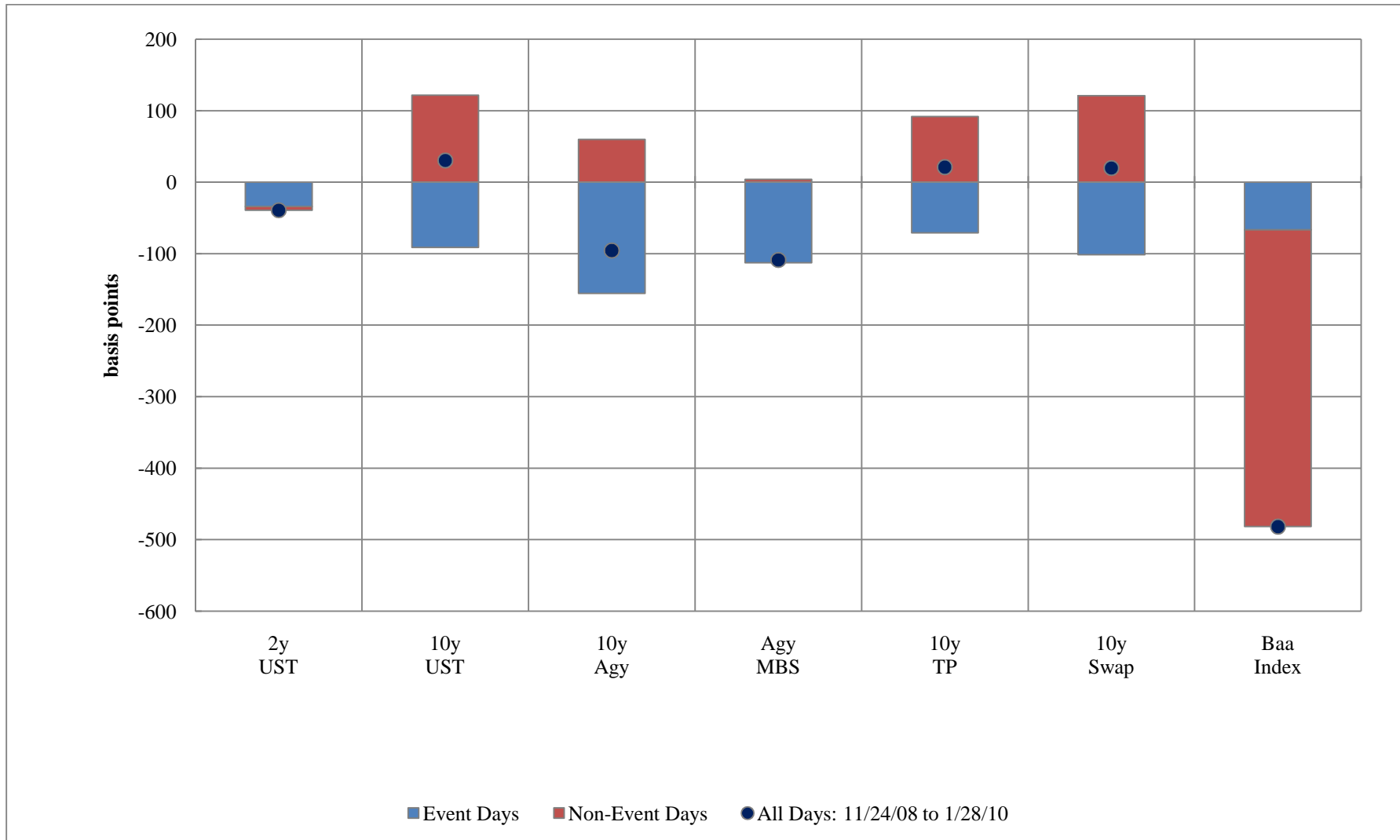
Source: Bloomberg, Barclay's Capital

Chart 7: Cumulative Interest Rate Changes around Announcement Events, Alternative Event Study Parameters

Source: Bloomberg, Barclay's Capital

Term Premium = α + β Unemp. + γ ΔCore CPI + δ Inf. Dis. + θ Bond Vol. + λ Bond Supply

Bond Supply = [US Treasuries (>1 year maturity) held by private investors]/US GDP

Table 2: OLS Regression of 10-Year Term Premium, January 1985 – June 2008

	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Constant	-2.182***	0.348	-2.324***	0.349	-1.852***	0.334
Cyclical Factors						
Unemployment Gap	0.180**	0.064	0.185**	0.063	0.252***	0.070
Core CPI Inflation	0.307***	0.056	0.298***	0.057	0.480***	0.062
Uncertainty						
Inflation Disagreement	0.377**	0.131	0.394**	0.133	0.286*	0.123
Realized Volatility	0.943***	0.207	0.994***	0.206	0.944***	0.271
Supply						
Unadjusted	0.044***	0.009	-	-	-	-
Duration-Adjusted	-	-	0.064***	0.014	-	-
Adjusted R-squared	0.84		0.84		0.78	
Std Err of Regression	0.36		0.37		0.43	
Number of Obs	282		282		282	

Newey West standard errors (12 lags). ***, **, * denote significance at the 1, 5, 10 percent levels.

Table 3: Dynamic OLS Regression of 10-Year Term Premium, January 1985 – June 2008

	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Constant	-2.288***	0.388	-2.351***	0.425	-1.879***	0.355
Cyclical Factors						
Unemployment Gap	0.222***	0.062	0.219***	0.063	0.283***	0.071
Core CPI Inflation	0.302***	0.065	0.281***	0.063	0.502***	0.067
Uncertainty						
Inflation Disagreement	0.458**	0.173	0.454*	0.180	0.292	0.152
Realized Volatility	0.822***	0.221	0.901***	0.229	0.867**	0.296
Supply						
Unadjusted	0.042***	0.008	-	-	-	-
Duration-Adjusted	-	-	0.062***	0.014	-	-
Long-Run Properties						
Adjustment Parameter[1]	-0.154***	0.03	-0.151***	0.024	-0.116***	0.021
ADF Test on Coint. Error[2]	-6.051***		-5.957***		-3.441**	
Number of Obs	282		280		282	

Newey West standard errors (12 lags). ***, **, * denote significance at the 1, 5, 10 percent levels.

1. Estimated by regressing the change in the term premium on the contemporaneous change in each explanatory variable and on the lagged level of the cointegration error.

2. Null hypothesis: no cointegrating relationship

Table 4: OLS Regression of 10-Year Treasury Yield, December 1986 – June 2008

	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Constant	0.297	0.432	0.103	0.443	-0.013	0.513
Rate Expectations						
Target Fed Funds	0.403***	0.114	0.424***	0.118	0.742***	0.114
Eurodollar Slope	0.477*	0.214	0.478*	0.225	0.602*	0.273
Cyclical Factors						
Unemployment Gap	0.127	0.208	0.172	0.210	0.784***	0.198
Core CPI Inflation	0.378**	0.125	0.342**	0.131	0.163	0.157
Uncertainty						
Inflation Disagreement	0.210	0.165	0.215	0.170	0.111	0.187
Realized Volatility	1.057***	0.25	1.145***	0.27	1.340***	0.31
Supply						
Unadjusted	0.069***	0.014	-	-	-	-
Duration-Adjusted	-	-	0.098***	0.023	-	-
Adjusted R-squared	0.92		0.91		0.88	
Std Err of Regression	0.45		0.46		0.53	
Number of Obs	259		259		259	

Newey West standard errors (12 lags). ***, **, * denote significance at the 1, 5, 10 percent levels.

Table 5b: Total Effect of LSAPs on 10-Year Term Premium (bps)

	OLS Term Premium Model	DOLS Term Premium Model*	Yield Level Model
Unadjusted	52	50	82
[95% CI]	[31 to 74]	[31 to 69]	[50 to 115]
Duration-Adjusted	38	36	58
[95% CI]	[22 to 54]	[20 to 53]	[31 to 84]

* Long-run effect.

Note: As of February 1, 2010, Treasury purchases equaled $169 billion in 10-year equivalents, agency debt purchases equaled $59 billion in 10-year equivalents, and agency MBS purchases (including unsettled transactions) equaled $573 billion in 10-year equivalents. We assume that the ratio of 10-year equivalents to unadjusted amounts will be the same for future purchases as it has been for purchases through this date.