

Panacea, Pandora's Box, or Placebo:

Feedback in Bank Holdings of Mortgage-
Backed Securities and Fair Value
Accounting

Gauri Bhat

Richard Frankel

Xiumin Martin

(Washington University in St. Louis)

FASRI Round Table on Fair Value and Feedback Effects

17 November 2010

Main Research Question

- How does mark-to-market accounting affect bank trading of mortgage backed securities (MBS)?

Four Sub-research Questions

- Do we observe “feedback” in changes in bank holdings of non-agency mortgage-backed securities?
- Does the easing of mark-to-market accounting requirements reduce feedback?
- Does bank stock react positively to the easing of mark-to-market accounting rule?
- Is bank stock reaction related with prior feedback?

Motivation

- Why study changes in bank non-agency MBS holdings?
 - What is feedback and why would we expect it to occur?
- Why should mark-to-market accounting requirements cause sales of MBS securities?

What is feedback?

Feedback \equiv an increased tendency of banks to liquidate asset holdings when they confront asset-price declines

Why would we expect it to occur?

- Feedback can occur when assets price falls:
 - ❖ negative liquidity shocks: cause prices to divergence from expected cash flows (liquidity driven)
 - ❖ negative shocks to the fundamentals (fundamental driven)
- Traders are forced to de-lever
 - by creditors (Brunnermeier and Petersen, 2009)
 - by bank regulators (Allen and Carletti, 2008)
 - for maximizing bottom line earnings (Plantin et al., 2008)

Theory suggests Feedback

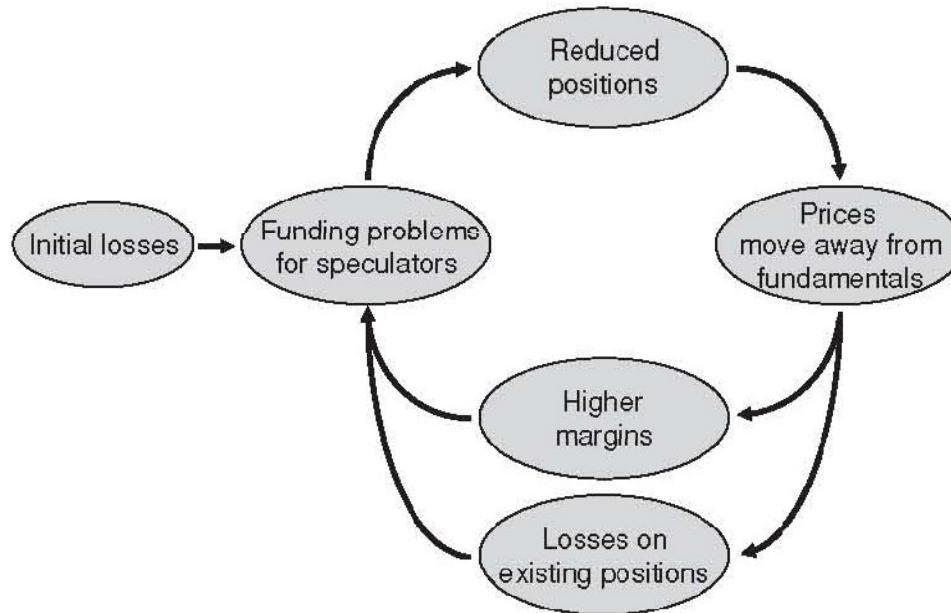


Figure 2
Liquidity spirals
The figure shows the loss spiral and the margin/haicut spiral.

Burnnermeier and Pedersen (2009)

Why study changes in bank MBS holdings?

- Banks are no longer simply intermediaries between households (depositors) and business (loans)
- Bank security investments contributed to the financial crises (Diamond and Rajan, 2009)
- By trying to profit from fluctuations in investor sentiment, banks transmit these fluctuations to the real economy (Shleifer and Vishny, 2009)
- SV further argue that banks will not lend, preferring instead to hold on to underpriced securities

Why should mark-to-market accounting requirements cause sales of MBS securities?

- Plantin, Sapra, and Shin (2008) – In ‘bad’ states and illiquid markets,
 - MtM amplifies movements away from fundamental values.
 - Banks sell, pushing asset prices down further rather than waiting for cash flows.
 - ⇒ MtM leads to more selling and lower prices
- Allen and Carletti (2008) – security price falls due to illiquidity and shock
 - Under historical cost banks can hold security until it pays off
 - Under MtM regulator shuts down bank forcing security sales
 - ⇒ MtM leads to more selling and lower prices; increases “liquidity premium” in prices.

Why should mark-to-market accounting requirements cause sales of MBS securities?

- **Let's not forget Ben Bernanke** (10 March 2009)
“We should review regulatory policies and accounting rules to ensure that they do not induce excessive procyclicality--that is, do not overly magnify the ups and downs in the financial system and the economy.”
- **American Bankers Association is a bit more negative**
(10 April 2009)
“We have worked for over a year to educate policymakers and stakeholders about the destructive effects of mark-to-market accounting for banks.”

What Accounting Rule Change?

- FSP 157-4 and 115-2 and 124-2

FSP FAS 157-4

- Guidance on determining fair value in inactive markets
- Provides examples of factors that may lead a company to conclude, a market is not active
- Emphasizes that in inactive markets firm can classify securities as level 3 or level 2

FSP FAS 115-2 and 124-2

Changes the earnings effect of OTTI:

Old OTTI recognized in Earnings

New Divide OTTI into

(1) credit-related loss: *recognized in Earnings*

(2) other: *recognized in OCI*



Higher earnings



Higher Tier 1 capital ratio

FSP FAS 115-2 and 124-2

Alters Criteria for OTTI recognition:

Old Holder has the positive intent and ability to hold an impaired security to recovery

New Holder does NOT intend to sell an impaired security and it is NOT likely to be required to sell the security before the recovery

⇒ New rule *marginally* reduces the likelihood of OTTI

CITIGROUP Income Statement

Changes the earnings effect of OTTI:

From March 31, 2009 10Q:

<i>In millions</i>		2009:Q1
Interest revenue	\$	20,609
....	
Other-than-temporary impairment losses on investments (For the three months ended March 31, 2009, gross impairment losses were \$1,379 of which \$631 was recognized in AOCI.)		(748)
....	
Citigroup's net income (loss)	\$	1,593

Research Design

- Measuring liquidity shocks:

$$ABX_RET_m = \alpha_0 + \alpha_1 CS_RET_m + \alpha_2 REIT_RET_m + \alpha_3 TB_RET_m + \eta_m$$

- Testing whether MtM causes banks to sell into liquidity shocks:

$$\Delta NA_MBS_HC_{i,q} = \beta_0 + \beta_1 RES_RET_q + \beta_2 Pred_RET + \beta_3 Post_q + \beta_4 RES_RET_q * Post_q + \beta_5 Pred_RET * Post_q + \mathbf{Controls} + \varepsilon_{i,q}$$

[Δ (AFS MBS+HTM MBS)/Total Assets]

Feedback

$$\Delta NA_MBS_HC_{i,q} = \beta_0 + \beta_1 RES_RET_q + \beta_2 Pred_RET + \beta_3 Post_q + \\ + \beta_4 RES_RET_q * Post_q + \beta_5 Pred_RET * Post_q + \mathbf{Controls} + \varepsilon_{i,q}$$

Banks with NA_MBS and sub-samples of banks
with

- (a) high MBS holdings
- (b) high non-performing loans
- (c) low regulatory capital

Change in Feedback

2nd Quarter of 2009 - 1st Quarter of 2010

$$\Delta NA_MBS_HC_{i,q} = \beta_0 + \beta_1 RES_RET_q + \beta_2 Pred_RET + \beta_3 Post_q + \\ + \beta_4 RES_RET_q * Post_q + \beta_5 Pred_RET * Post_q + \mathbf{Controls} + \varepsilon_{i,q}$$

Examine changes in β_1 in quarters after easing of MtM requirements

Event Study

Bank returns around the announcement of the FASB decision to “ease” MtM requirements.

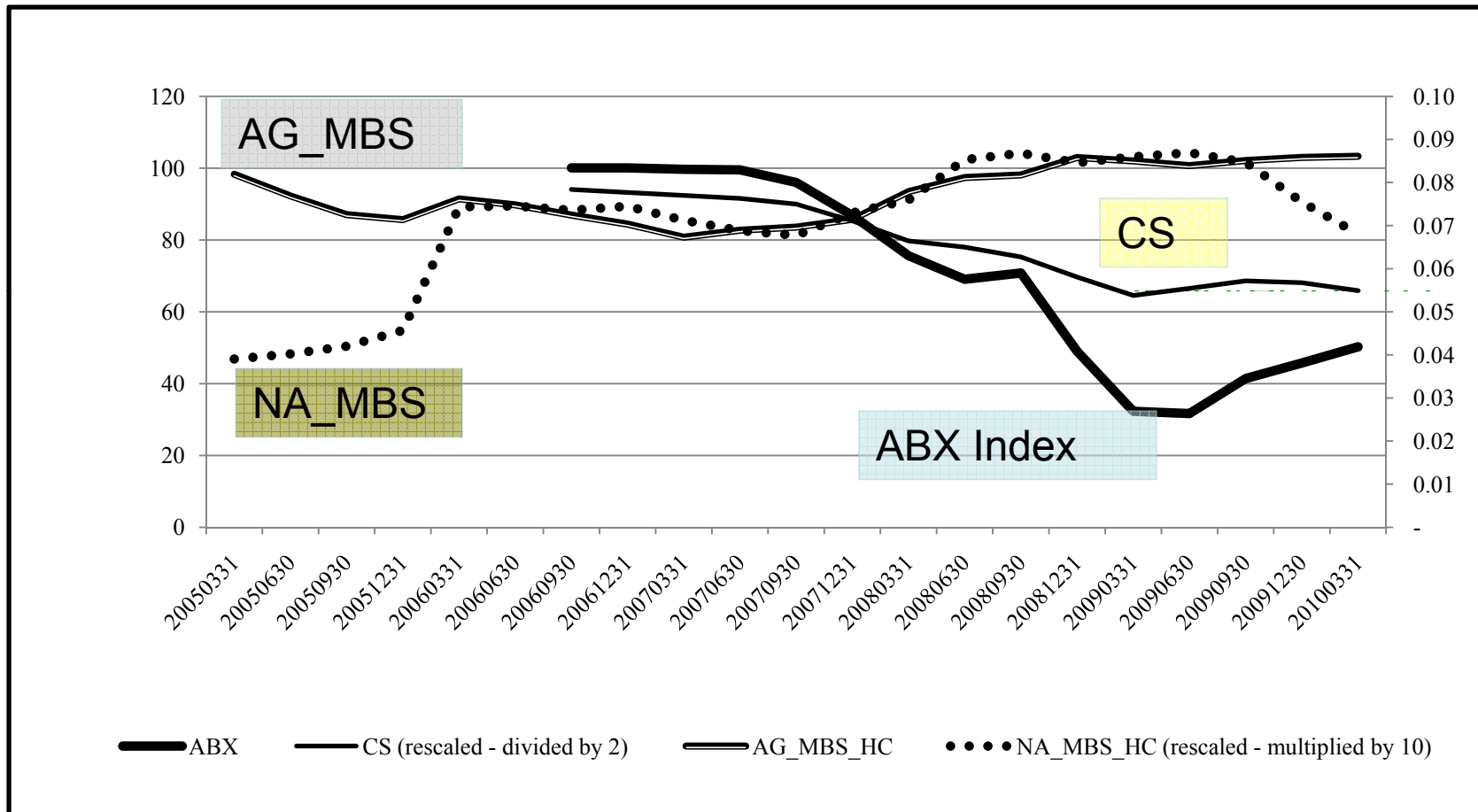
- January 12, 2009 amends impairment guidance
- March 10-12, speeches/hearings suggesting easing
- March 17, FASB proposes guidance on illiquid markets
- April 2, FASB announcement of guidance

Feedback and Event Reaction

$$\Delta NA_MBS_HC_{i,q} = \beta_0 + \beta_1 RES_RET_q + \beta_2 Pred_RET + \beta_3 Post_q + \\ + \beta_4 RES_RET_q * Post_q + \beta_5 Pred_RET * Post_q + \mathbf{Controls} + \varepsilon_{i,q}$$

Is β_1 higher for banks that experience a stronger reaction to easing?

Results Figure 1



Sample with NA_MBS Table 1 Panel B

Variable	N	Mean	StdDev	Q1	Median	Q3
AG_MBS_AFS_FV	5,068	9.06	6.54	4.56	7.99	12.18
AG_MBS_AFS_HC	5,068	9.00	6.48	4.52	7.94	12.09
AG_MBS_HTM_FV	5,068	0.93	3.27	0.00	0.00	0.03
AG_MBS_HTM_HC	5,068	0.92	3.26	0.00	0.00	0.03
NA_MBS_AFS_FV	5,068	1.58	2.65	0.13	0.58	1.88
NA_MBS_AFS_HC	5,068	1.69	2.81	0.15	0.62	2.04
NA_MBS_HTM_FV	5,068	0.21	1.05	0.00	0.00	0.00
NA_MBS_HTM_HC	5,068	0.23	1.16	0.00	0.00	0.00
LOANS	5,068	67.12	12.84	62.11	69.26	75.31
TA	5,068	34.06	191.10	0.76	1.38	5.17
NPL	5,068	2.66	3.17	0.67	1.52	3.44
TOTALCAP	5,068	13.43	10.86	11.22	12.49	14.49
Δ AG_MBS_HC	5,068	0.09	1.54	(0.53)	(0.07)	0.57
Δ NA_MBS_HC	5,068	(0.02)	0.36	(0.10)	(0.02)	(0.00)
Δ LOANS	5,068	(0.23)	2.34	(1.40)	(0.05)	1.09
Δ TA	5,068	1.60	5.88	(1.02)	0.94	2.98

Table 3 Panel A – Feedback Effect

Variable	Estimate			
	1	2	3	4
Intercept	0.0001 (0.495)	0.0004 (0.080)	0.0001 (0.628)	0.0003 (0.123)
ABX_RET _q	0.0006 (0.321)	0.0012 (0.079)		
RES_RET _q			0.0010 (0.101)	0.0016 (0.039)
PRED_RET _q			0.0002 (0.871)	0.0008 (0.613)
ΔLOANS _q		-0.0178 (0.013)		-0.0177 (0.013)
ΔTA _q		-0.0085 (0.001)		-0.0086 (0.001)
ΔAG_MBS_HC _q		-0.0037 (0.666)		-0.0042 (0.628)
Adj. R-square	0.00	0.02	0.00	0.02
N	3,384	3,384	3,384	3,384

investment
policy
changes

Table 3 Panel B

Cross Sectional Variation in Feedback Effect

Variable	Estimate					
	HIGH	LOW	HIGH	LOW	HIGH	LOW
	NA_MBS_HC	NA_MBS_HC	NPL	NPL	TOTALCAP	TOTALCAP
	1	2	3	4	5	6
Intercept	0.0003 (0.376)	0.0003 (0.010)	0.0003 (0.122)	0.0003 (0.237)	0.0003 (0.092)	0.0004 (0.194)
RES_RET _q	0.0031 (0.007)	0.0000 (0.976)	0.0023 (0.030)	0.0007 (0.303)	0.0006 (0.352)	0.0027 (0.015)
PRED_RET _q	0.0068 (0.784)	0.0007 (0.285)	0.0010 (0.485)	0.0002 (0.915)	0.0005 (0.709)	0.0010 (0.589)
ΔLOANS _q	-0.0275 (0.010)	-0.0037 (0.484)	-0.0124 (0.020)	-0.0190 (0.048)	-0.0169 (0.009)	-0.0188 (0.066)
ΔTA _q	-0.0159 (<0.001)	0.0007 (0.731)	-0.0035 (0.248)	-0.0126 (<0.001)	-0.0099 (0.004)	-0.0062 (0.040)
ΔAG_MBS_HC _q	-0.0054 (0.609)	-0.0038 (0.620)	-0.0061 (0.615)	-0.0028 (0.809)	-0.0014 (0.853)	-0.0099 (0.419)
Adj. R-square	0.04	0.04	0.01	0.04	0.02	0.02
N	1,694	1,690	1,694	1,690	1,694	1,690

Economic significance of feedback

- Standard deviation of RES_RET = 0.102
- Coefficient on RES_RET = 0.0016 (Table 3)
- $0.102 * 0.0016 = 0.00016$
 - ≈0.016% of total assets
 - ≈0.8% of NA_MBS holdings
 - ≈10% of Quarterly NA_MBS turnover
- Banks hold 11% of NA_MBS market (Securities Industry and Financial Markets Association, 2009)
 - Contagion effect?

Table 4: Effect of MtM Easing

Variable	Estimate
Intercept	0.0003 (0.119)
RES_RET _q	0.0016 (0.036)
RES_RET _q *POST	-0.0068 (<0.001)
PRED_RET _q	0.0008 (0.608)
PRED_RET _q *POST	0.0015 (0.404)
ΔLOANS _q	-0.0177 (0.011)
ΔLOANS _q *POST	0.0157 (0.040)
ΔTA _q	-0.0086 (0.001)
ΔTA _q *POST	0.0064 (0.045)
ΔAG_MBS_HC _q	-0.0042 (0.623)
ΔAG_MBS_HC _q *POST	-0.0199 (0.030)
POST	-0.0012 (<0.001)
Adj. R-square	0.03
N	5,068

Table 5 – Event Study

	ABRET		
	HIGH	LOW	DIFF
NA_MBS_HC	0.2932 (<0.001) 65 banks	0.1385 (<0.001) 70 banks	0.1546 (0.021)
NON_PERFORMING	0.3003 (<0.001) 70 banks	0.1191 (<0.001) 65 banks	0.1812 (0.005)
TOTALCAP	0.2162 (<0.001) 67 banks	0.2099 (<0.001) 68 banks	0.0063 (0.925)

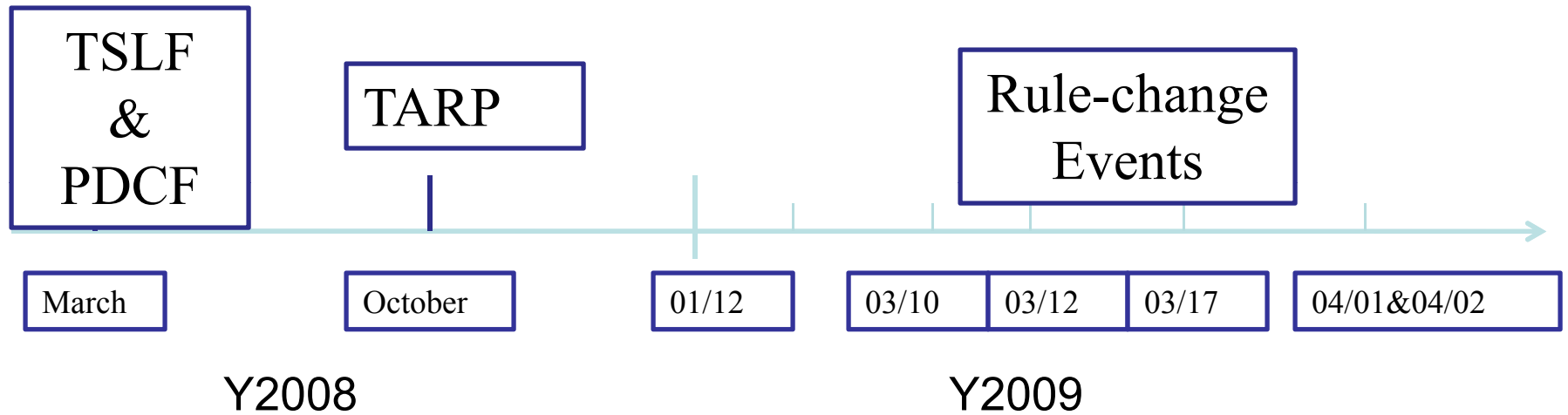
Table 6 – Feedback for Positive Event-day-reaction Banks

Variable	Estimate
Intercept	-0.0000 (0.926)
RES_RET _q	0.0009 (0.303)
RES_RET _q *ABRET	0.0039 (0.015)
PRED_RET _q	-0.0010 (0.422)
PRED_RET _q *ABRET	0.0055 (0.039)
ΔLOANS _q	-0.0109 (0.296)
ΔLOANS _q *ABRET	-0.0191 (0.601)
ΔTA _q	-0.0059 (0.012)
ΔTA _q *ABRET	0.0002 (0.983)
ΔAG_MBS_HC _q	0.0012 (0.933)
ΔAG_MBS_HC _q *ABRET	-0.0157 (0.451)
ABRET	0.0007 (0.222)
Adj. R-square	0.02
N	1,226

Table 7 – Feedback for banks that did not receive TARP

Variable	Estimate
Intercept	0.0003 (0.155)
RES_RET _q	0.0021 (0.009)
RES_RET _q *POST	-0.0061 (<0.001)
PRED_RET _q	0.0011 (0.503)
PRED_RET _q *POST	0.0006 (0.644)
POST	-0.0011 (<0.001)
ΔLOANS _q	-0.0163 (0.023)
ΔLOANS _q * POST	0.0196 (0.016)
ΔTA _q	-0.0077 (0.003)
ΔTA _q * POST	0.0016 (0.595)
ΔAG_MBS_HC _q	-0.0051 (0.374)
ΔAG_MBS_HC _q * POST	-0.0179 (0.006)
Adj. R-square	0.03
N	3,245

Confounding events



Checks

- We computed a firm-specific, post-TARP measure based the date when bank received TARP
- Event study with event days April 1 and 2
- Alternate definitions of POST
 - 042008 to 012009

What do bond return tests tell us?

- Small sample for an event study: 28 banks with 437 issues
- These banks are well capitalized (only two banks have Tier 1 capital ratio below 8%)
- Find positive bond returns indicating:
 - Accounting rule changes benefit both shareholders and bondholders
 - No evidence that wealth transfer conflicts were heightened by accounting rule changes
- Using rating matched benchmarks, we find positive, but insignificant bond returns

Summary

- Changes in banks MBS holdings related to asset price changes.
 - more pronounced when (1) controlling for cash flow component of asset returns or (2) banks with more NA_MBS, more non-performing loans, and lower total capital ratio
 - Relation is related with (1) easing of MtM, (2) bank reaction to easing of MtM
 - Relation is not related with (1) TARP financing
- Bank stocks respond positively to easing of MtM for event windows

Take away

- Bank trading behavior is related to market price changes
- Bank feedback trading reduced after accounting rules changes
- Bank feedback trading is associated with shareholder wealth effects

Full Sample Table 1 Panel A

Variable	N	Mean	Std Dev	Q1	Median	Q3
AG_MBS_TR_FV	12,927	0.04	0.46	0.00	0.00	0.00
AG_MBS_AFS_FV	12,927	7.29	6.57	2.12	5.88	10.59
AG_MBS_HTM_FV	12,927	0.64	2.54	0.00	0.00	0.01
NA_MBS_TR_FV	12,927	0.01	0.17	0.00	0.00	0.00
NA_MBS_AFS_FV	12,927	0.63	1.84	0.00	0.00	0.33
NA_MBS_HTM_FV	12,927	0.08	0.67	0.00	0.00	0.00
LOANS	12,927	69.73	12.53	64.06	71.67	77.83
TA	12,927	15.16	121.86	0.64	0.96	2.12
NPL	12,927	2.42	3.36	0.56	1.30	2.89
TOTALCAP	12,927	13.54	17.71	11.18	12.51	14.48

MBS Holdings Table 1 Panel C

Date	N	Agency MBS				Non-Agency MBS				INDEX
		AG_MBS_FV (% of TA)	AG_MBS_HC (% of TA)	AG_MBSDIFF (FV as % of HC)	ΔAG_MBSDIFF (FV as % of HC)	NA_MBS_FV (% of TA)	NA_MBS_HC (% of TA)	NA_MBSDIFF (FV as % of HC)	ΔNA_MBSDIFF (FV as % of HC)	ABX_RET (%)
		1	2	3	4	5	6	7	8	9
31-Dec-06	331	9.63	9.78	98.46	0.27	1.98	2.01	99.39	0.03	0.00
31-Mar-07	315	9.32	9.43	98.96	0.42	2.06	2.07	99.75	0.34	-0.55
30-Jun-07	317	9.27	9.50	97.71	-1.21	1.95	1.98	98.87	-0.90	-0.01
30-Sep-07	324	9.36	9.47	98.94	1.19	1.85	1.88	98.77	0.09	-3.48
31-Dec-07	331	9.35	9.36	99.86	1.00	1.96	1.99	98.69	-0.07	-9.83
31-Mar-08	328	9.74	9.63	101.27	1.28	1.94	2.03	96.54	-2.34	-13.18
30-Jun-08	346	9.83	9.91	99.38	-1.86	1.99	2.12	94.79	-1.92	-6.20
30-Sep-08	360	9.82	9.83	99.93	0.59	1.88	2.08	91.54	-3.33	-0.61
31-Dec-08	364	10.35	10.20	101.57	1.61	1.66	1.97	86.50	-5.08	-29.62
31-Mar-09	368	10.32	10.09	102.42	0.83	1.69	2.02	85.86	-0.65	-44.84
30-Jun-09	386	10.17	9.98	102.03	-0.30	1.75	2.03	87.91	1.61	9.81
30-Sep-09	433	10.57	10.30	102.78	0.79	1.65	1.83	91.93	2.74	26.52
31-Dec-09	438	10.60	10.38	102.23	-0.54	1.48	1.63	93.18	0.57	10.49
31-Mar-10	427	10.71	10.47	102.53	0.29	1.37	1.49	95.49	1.10	9.66
All qtrs	5,068	9.98	9.91	100.73	0.30	1.78	1.92	93.95	-0.44	-3.70

Correlations Table 2

Pearson\Spearman	ABX_RET	RES_RET	PRED_RET	Δ AG_MBS_HC	Δ NA_MBS_HC	Δ LOANS	Δ TA	NA_MBS_HC	NPL	TOTALCAP
ABX_RET		-0.0228 (0.185)	0.8726 (<0.001)	-0.1341 (<0.001)	-0.0001 (0.995)	0.1751 (<0.001)	0.0042 (0.807)	-0.0157 (0.360)	-0.4171 (<0.001)	0.0367 (0.033)
RES_RET	0.6419 (<0.001)		-0.4670 (<0.001)	0.0395 (0.021)	0.0312 (0.070)	-0.0049 (0.775)	0.0412 (0.017)	0.0056 (0.743)	-0.0037 (0.829)	-0.0593 (0.001)
PRED_RET	0.6753 (<0.001)	-0.1321 (<0.001)		-0.1127 (<0.001)	-0.0028 (0.870)	0.1747 (<0.001)	-0.0134 (0.437)	-0.0137 (0.426)	-0.3760 (<0.001)	0.0456 (0.008)
Δ AG_MBS_HC	-0.0509 (0.003)	0.0419 (0.015)	-0.1061 (<0.001)		0.0691 (<0.001)	-0.1862 (<0.001)	-0.0637 (<0.001)	-0.0449 (0.009)	0.0914 (<0.001)	0.0187 (0.278)
Δ NA_MBS_HC	0.0246 (0.153)	0.0296 (0.085)	0.0033 (0.848)	0.0120 (0.484)		0.0344 (0.046)	-0.2014 (<0.001)	-0.2607 (<0.001)	0.0524 (0.002)	-0.0356 (0.039)
Δ LOANS	0.2064 (<0.001)	0.0899 (<0.001)	0.1804 (<0.001)	-0.1868 (<0.001)	-0.0417 (0.015)		-0.4387 (<0.001)	0.0115 (0.503)	-0.1017 (<0.001)	-0.0297 (0.084)
Δ TA	0.0086 (0.619)	0.0400 (0.020)	-0.0274 (0.111)	-0.0628 (<0.001)	-0.0920 (<0.001)	-0.3955 (<0.001)		-0.0416 (0.016)	-0.1530 (<0.001)	-0.0814 (<0.001)
NA_MBS_HC	0.0029 (0.867)	-0.0013 (0.940)	0.0050 (0.773)	-0.0172 (0.319)	0.0233 (0.176)	-0.0307 (0.074)	0.0385 (0.025)		-0.0172 (0.318)	0.0723 (<0.001)
NPL	-0.3476 (<0.001)	-0.1815 (<0.001)	-0.2747 (<0.001)	0.0650 (0.000)	-0.0048 (0.781)	-0.1118 (<0.001)	-0.1087 (<0.001)	0.0071 (0.679)		-0.0743 (<0.001)
TOTALCAP	-0.0025 (0.884)	-0.0218 (0.206)	0.0177 (0.303)	0.0090 (0.601)	0.0024 (0.887)	-0.0048 (0.780)	-0.0350 (0.042)	0.0111 (0.519)	-0.0773 (<0.001)	

Residual Index Returns App A

$$ABX_RET_m = \beta_0 + \beta_1 * CS_RET_m + \beta_2 * R_RET_q + \beta_3 * TB_RET_m + \varepsilon_q$$

Parameter	Expected Sign	Estimate
Intercept	?	0.0129 (0.443)
CS_RET _m	+	2.9395 (0.047)
R_RET _m	+	0.2008 (0.101)
TB_RET _m	-	0.4437 (<0.001)
Adj. R-square		0.39
N		42

- ABX.HE index is associated with underlying changes in real-estate prices.
- TB_RET likely captures funding liquidity.

Residual Index Returns App A

Variable	N	Mean	Std Dev	Q1	Median	Q3
ABX_RET _q	14	-0.0370	0.1759	-0.0892	-0.0058	0.0724
RES_RET _q	14	0.0000	0.1021	-0.0191	0.0133	0.0755
PRED_RET _q	14	-0.0370	0.1473	-0.1266	-0.0171	0.0200

- ABX_RET is negative on average