

# Accounting discretion of banks during a financial crisis

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# Accounting and the crisis

- Large differences have arisen between book and market value of assets, especially for assets carried at values based on historical cost
  - By end-2008, 60% of U.S. bank holding companies had M/B value of assets < 1, compared to only 8% at end-2001
- Incentives for banks to use accounting discretion to preserve book value of the banks
  - Limit loan loss provisioning for bad loans
  - Use advantageous asset classifications to boost valuation

# This paper

- We estimate discounts on book values of real estate related assets implicit in bank share prices to understand low M/B values of banks
- We show that low M/B values do not simply reflect rigid and irresponsive accounting system, but also result from active use of accounting discretion in areas of loan loss provisioning, loan charge-offs, and classification of mortgage-backed securities (MBS)
- While such accounting discretion enables impaired banks to satisfy capital adequacy requirements, it generates highly inaccurate information about the true health of banks

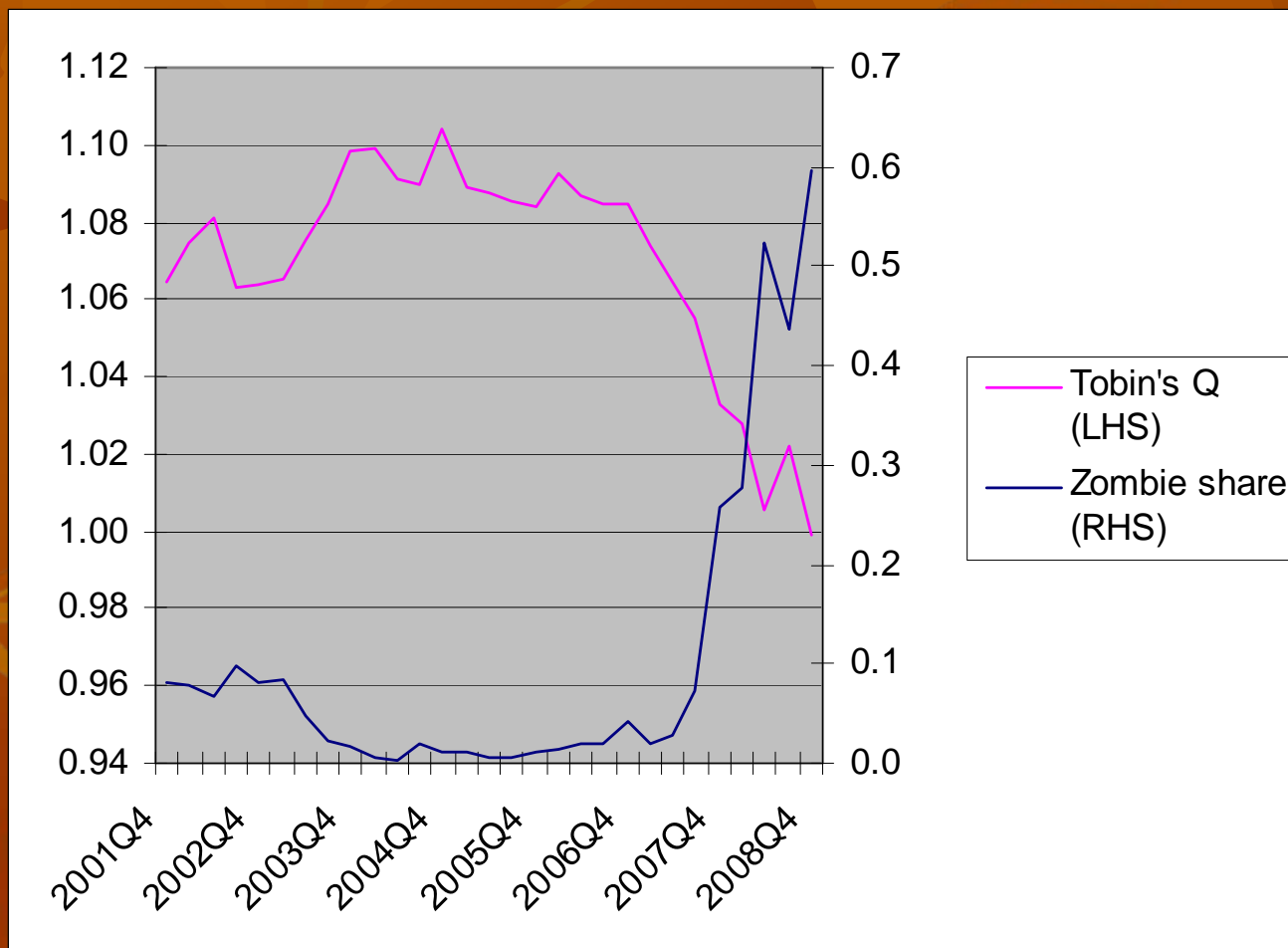
# Related literature

- Accounting principles and systems affect corporate behavior
  - Earnings management (Leuz et al., 2003; Hutton et al., 2008)
  - Corporate disclosure and accounting transparency (Leuz and Wysocki, 2008)
  - Value relevance of accounting information: Do shareholders use accounting information to price shares? (Barth et al., 2001; Holthausen and Watts, 2001)
  - Market pricing of bank assets reported under different fair valuation techniques (Kolev, 2009; Goh et al., 2009; Song et al., 2009)
- Causes and effects of the 2007 U.S. financial crisis
  - House price appreciation (e.g., Demyanyk and Van Hemert, 2008)
  - Asset securitization (e.g., Keys et al., 2008; Mian and Sufi, 2008, Loutskina and Strahan, 2009)
  - Deterioration of lending standards by banks (e.g., Dell’Ariccia et al., 2008)

# Data

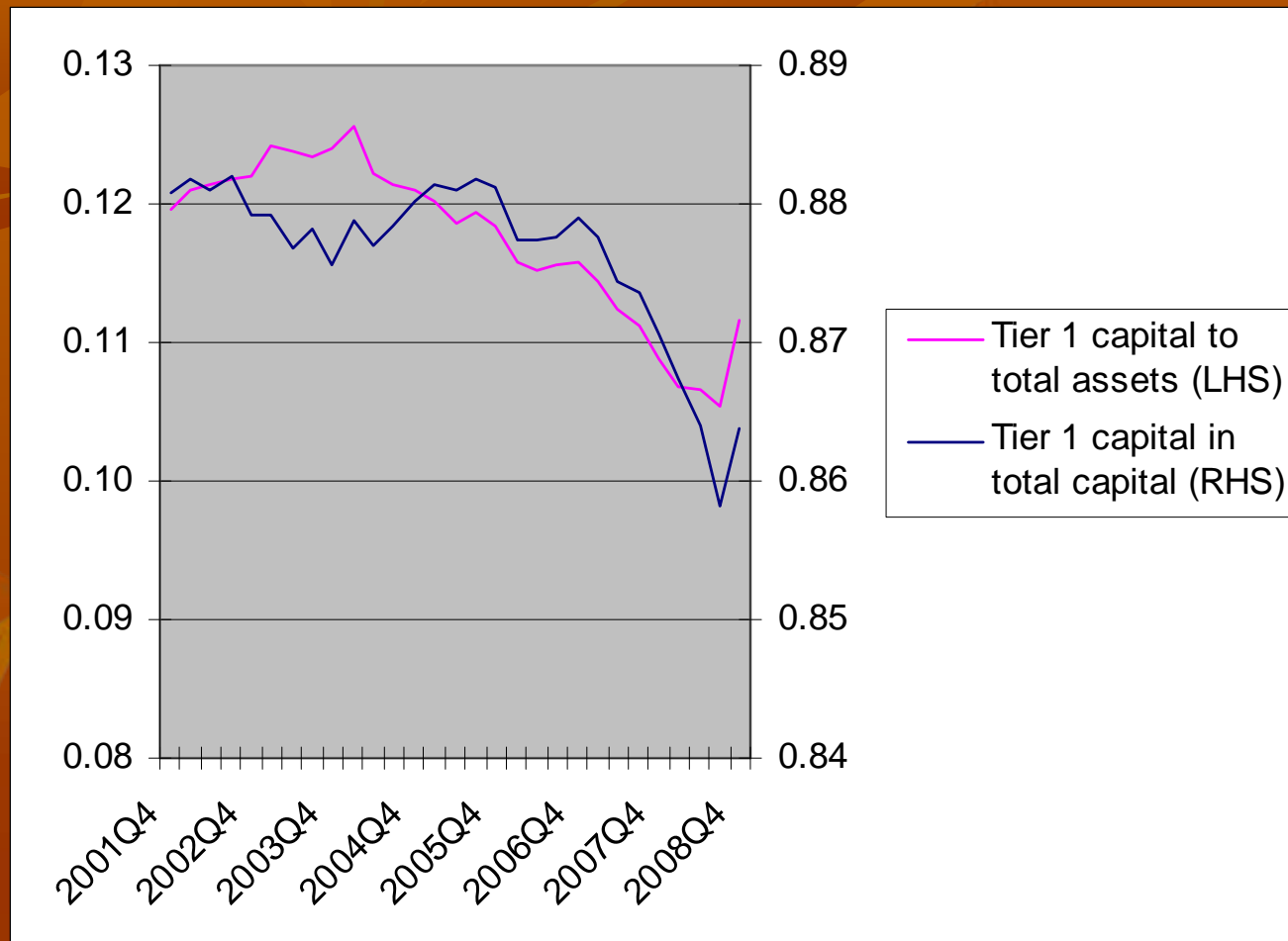
- Quarterly Call Report data on stock exchange listed U.S. bank holding companies for the period end-2001 to end-2008
- Banks report amortized cost and fair value of MBS regardless of whether these are held-to-maturity (valued at amortized cost) or available-for-sale (valued at fair value) → allows us to value MBS on a single accounting basis
- MBS broken down between guaranteed and not-guaranteed by a US government agency
- Stock market data from Datastream

# Tobin's q and share of zombie banks



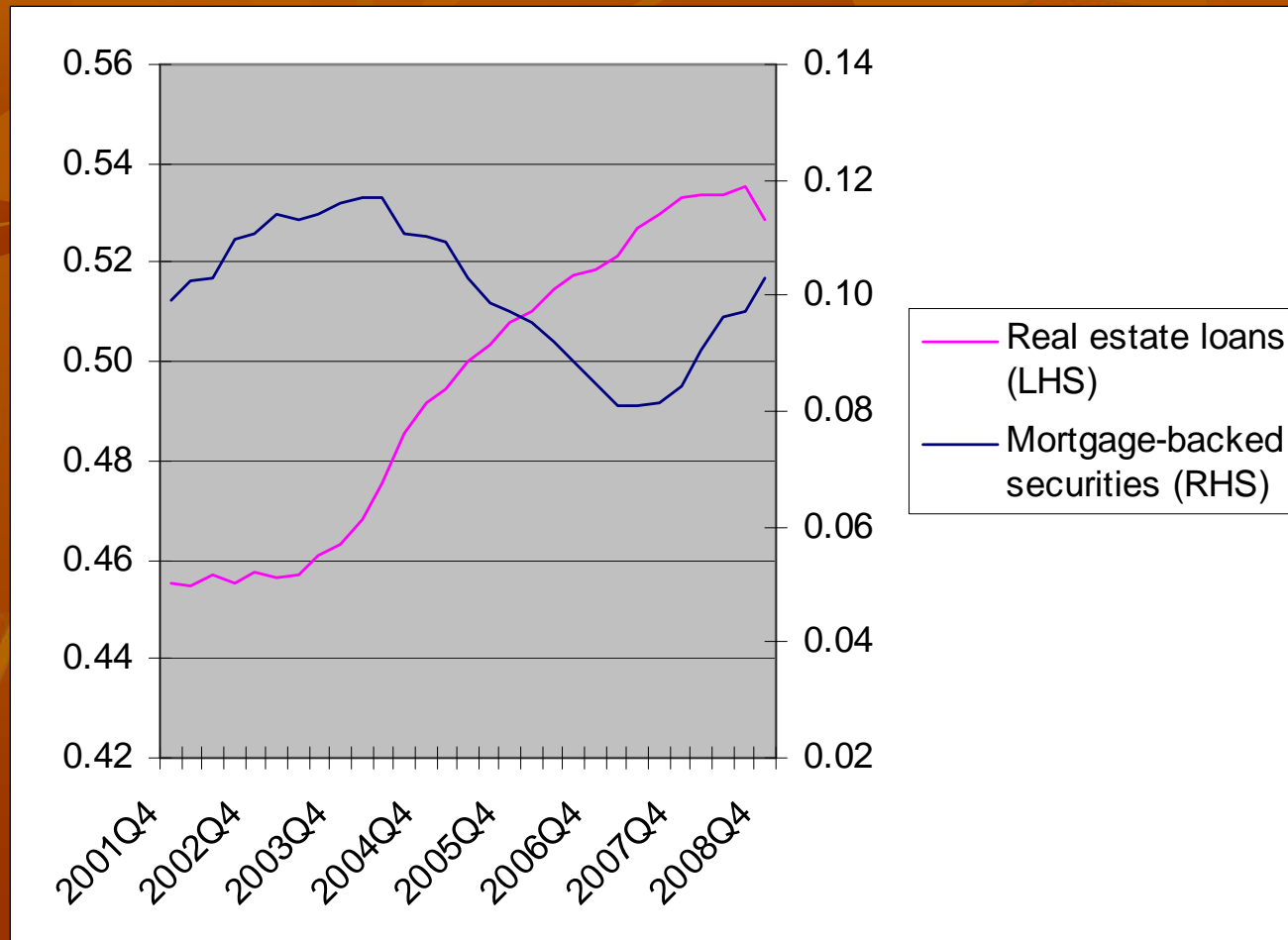
Tobin's Q is the ratio of market value to book value of assets.  
Zombie share is the fraction of banks with Tobin's Q less than 1.

# Capitalization and composition of bank regulatory capital



Tier 1 capital to total assets is the ratio of tier 1 capital to total risk-weighted assets  
Tier 1 capital in total capital is the ratio of tier 1 capital to total regulatory capital

# Real estate loans and mortgage-backed securities

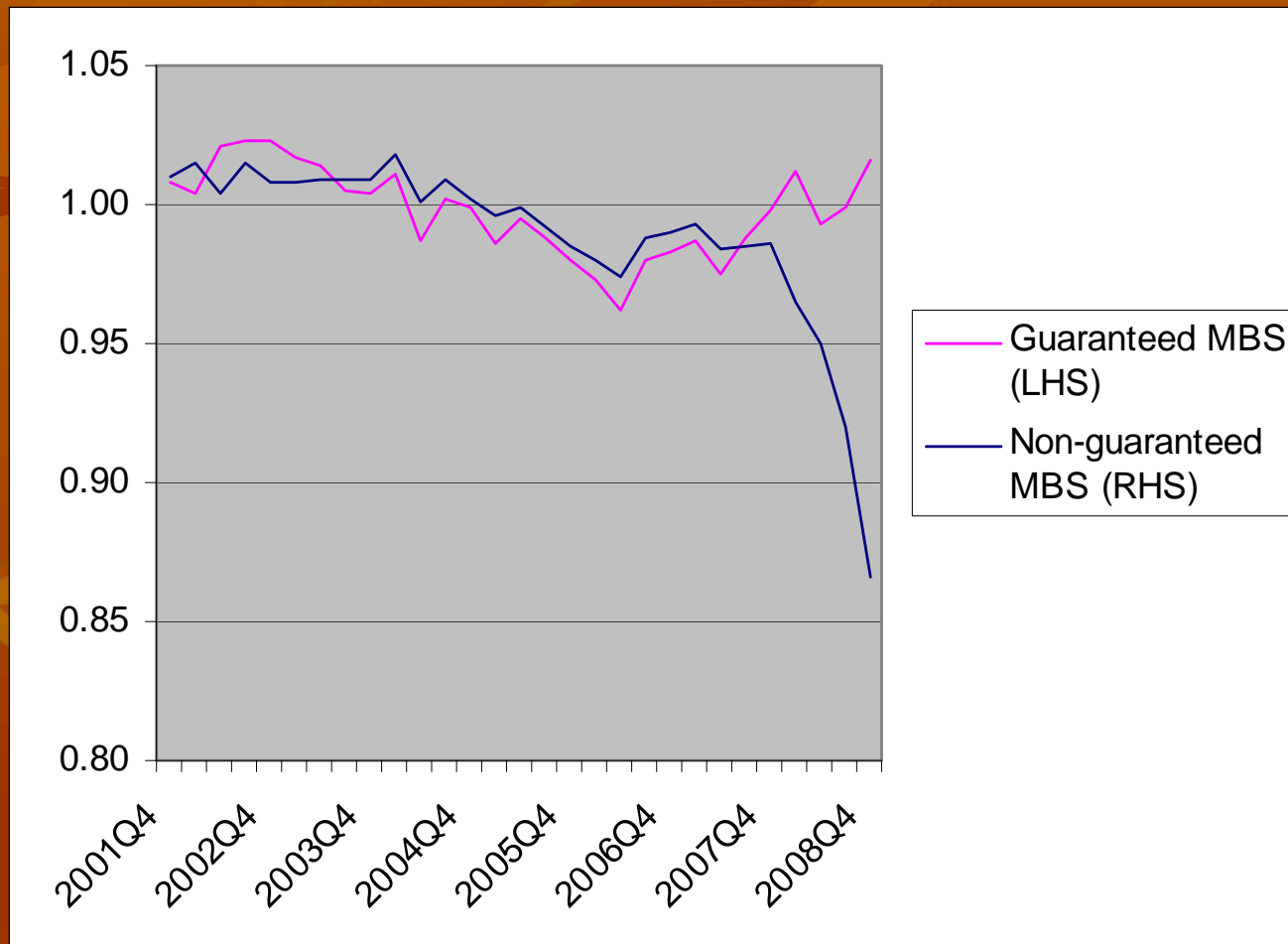


Real estate loans is the ratio of real estate loans to total assets

Mortgage-backed securities is the ratio of MBS to total assets; Securities are valued at amortized cost if held-to-maturity and at fair value if available-for-sale



# Fair value of mortgage-backed securities relative to amortized cost



Guaranteed MBS is the fair value to the amortized value of guaranteed MBS

Non-guaranteed MBS is the fair value to the amortized value of non-guaranteed MBS

# Tobin's $q$ and market discounts

- Let bank's market value be:  $MV = \sum_i v_i^a A_i - \sum_i v_i^l L_i$

where  $v^a$  is the market value of asset  $i$  and  $v^l$  is the market value of liability  $i$

- Define Tobin's  $q$  as

$$q = \frac{MV + \sum_i L_i}{\sum_i A_i}$$

- Substituting for  $MV$  implies

$$q = 1 - \sum_i d_i^a a_i + \sum_i d_i^l l_i$$

where

$$d_i^a = 1 - v_i^a, d_i^l = 1 - v_i^l, a_i = \frac{A_i}{\sum_i A_i}, l_i = \frac{L_i}{\sum_i A_i}$$

$d^a$  is the market discount of asset  $i$  and  $d^l$  is the market discount of liability  $i$

# Evidence on market discounts

- Focus on real estate related assets as these constitute the majority of assets of the average bank, and as recent declines in US real estate prices have raised doubts about the underlying value of these assets
- We include several additional balance sheet items, in particular trading assets and proportion of Tier 1 capital in total capital
- For 2008, we use quarterly data with state and quarterly fixed effects
- We also present regressions for individual quarters in 2008 without quarterly fixed effects

# Results on market discounts

- We estimate an average discount on real estate loans of 17% and on MBS of 14% in 2008 (up to 22% for MBS that are held-to-maturity) (Regr 1-2, Tb 2)
- Discounts are fairly stable over individual quarters; discount on MBS, held-to-maturity peaks during 2008Q3 (Regr 3-6, Tb 2)
- Market discount for Trading assets; premium when large proportion of Tier 1 capital in total regulatory capital

## Tb 2. Tobin's $q$ and real estate assets in 2008

VARIABLES	2008 (1)	2008 (2)	2008Q1 (3)	2008Q2 (4)	2008Q3 (5)	2008Q4 (6)
Non-real estate loans	-0.0424 (0.0576)	-0.0489 (0.0563)	-0.0461 (0.0644)	-0.0594 (0.0725)	-0.0563 (0.0807)	-0.0412 (0.0521)
Real estate loans	-0.173*** (0.0517)	-0.176*** (0.0514)	-0.169*** (0.0558)	-0.180*** (0.0670)	-0.223*** (0.0740)	-0.142*** (0.0471)
MBS	-0.136** (0.0625)					
MBS, held		-0.219*** (0.0769)	-0.209** (0.0967)	-0.237** (0.0962)	-0.282*** (0.0971)	-0.170** (0.0815)
MBS, for sale		-0.119* (0.0680)	-0.165** (0.0768)	-0.127 (0.0855)	-0.109 (0.0915)	-0.0992 (0.0632)
Trading	-0.285*** (0.0876)	-0.288*** (0.0872)	-0.271*** (0.101)	-0.269** (0.106)	-0.326** (0.147)	-0.286*** (0.0931)
Share of Tier 1	0.103*** (0.0300)	0.105*** (0.0298)	0.0834** (0.0407)	0.122*** (0.0397)	0.150*** (0.0491)	0.0930*** (0.0310)
Constant	1.011*** (0.0434)	1.012*** (0.0433)	1.031*** (0.0568)	0.999*** (0.0578)	0.987*** (0.0721)	0.959*** (0.0394)
Time fixed effects	Y	Y	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y	Y	Y
Observations	1114	1114	286	279	277	272
R-squared	0.377	0.380	0.343	0.389	0.418	0.327

All regressions include state fixed effects, and regressions in columns (1) and (2) also include quarterly period fixed effects. Standard errors in columns (1) and (2) are corrected for clustering at the bank level.

# Additional evidence on market discounts

- Economic effect is substantial in 2008: one std increase in real estate loans would reduce  $q$  by 2.4 % points; substantial given std of  $q$  of 5.5%
- Rerun the regressions using quarterly data for each of the years during 2001 to 2008; Real estate loan and MBS variables are not estimated with significant discounts before 2008 (Regr 1-7, Tb 3)
- Discounts on real estate loans and MBS are significantly higher in 2008 than before in regression that includes firm fixed effects (Regr 8, Tb 3)

# Tb 3. Tobin's $q$ and real estate assets during 2001-2008

VARIABLES	2001 (1)	2002 (2)	2003 (3)	2004 (4)	2005 (5)	2006 (6)	2007 (7)	2001-2008 (8)
Non-real estate loans	0.0679 (0.0775)	0.0905 (0.0589)	0.00244 (0.0487)	0.0927* (0.0509)	0.104** (0.0456)	0.0836* (0.0497)	0.0421 (0.0537)	0.0524*** (0.0134)
Real estate loans	-0.0108 (0.0581)	0.0645 (0.0451)	0.0232 (0.0401)	0.0255 (0.0413)	0.0226 (0.0394)	-0.0142 (0.0453)	-0.0633 (0.0487)	0.0572*** (0.0101)
MBS, held	0.0658 (0.121)	0.150 (0.106)	0.0628 (0.0998)	0.0241 (0.0700)	0.00231 (0.0621)	-0.0287 (0.0701)	-0.0515 (0.0803)	-0.00675 (0.0251)
MBS, for sale	0.0430 (0.0747)	0.0658 (0.0580)	0.0131 (0.0506)	0.0532 (0.0495)	0.0271 (0.0482)	-0.000414 (0.0556)	-0.0677 (0.0621)	0.0453*** (0.0116)
Trading	0.198 (0.263)	0.117 (0.202)	0.0376 (0.161)	-0.00533 (0.127)	-0.209* (0.110)	-0.193* (0.105)	-0.139* (0.0749)	0.140*** (0.0462)
Share of Tier1	-0.0369 (0.0683)	-0.0377 (0.0555)	-0.0110 (0.0406)	0.0299 (0.0374)	-0.0385 (0.0368)	0.0109 (0.0421)	0.00872 (0.0331)	0.0645*** (0.00986)
Non-real estate loans * 2008								-0.0982*** (0.0174)
Real estate loans * 2008								-0.147*** (0.0136)
MBS, held * 2008								-0.0896*** (0.0344)
MBS, for sale * 2008								-0.0207 (0.0186)
Trading * 2008								-0.134*** (0.0476)
Share of Tier1 * 2008								0.127*** (0.0142)
Constant	1.087*** (0.0871)	1.017*** (0.0695)	1.046*** (0.0493)	1.016*** (0.0525)	1.068*** (0.0496)	1.045*** (0.0554)	1.057*** (0.0482)	0.964*** (0.0119)
Time fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y	Y	Y	Y	N
Firm fixed effects	N	N	N	N	N	N	N	Y
N	287	1189	1247	1264	1287	1167	1155	8710
R <sup>2</sup>	0.206	0.183	0.190	0.245	0.310	0.318	0.362	0.463

Regressions in columns (1) to (7) include state fixed effects and quarterly period fixed effects,

with standard errors corrected for clustering at the bank level . Regression in column (8) includes firm fixed effects.

# Accounting discretion regarding the realization of loan losses

- Banks have considerable discretion in the timing of their loans loss provisioning for bad loans and in the realization of loan losses in the form of charge-offs
- Banks with large exposure to MBS can attempt to compensate by reducing the provisioning for bad debt in an effort to preserve book capital
- In regressions of loan loss provisioning rate and loan charge-off rate, we use quarterly data over 2001-2008 period with firm and quarterly fixed effects



# Results on realization of loan losses

- Relative to earlier years, banks with large MBS exposure have significantly lower loan loss provisioning and loan charge-offs in 2008
- This effect is more pronounced for MBS that are held-to-maturity, perhaps because these MBS will need to be written down more in the future
- This effect is found only for low-valuation banks, with Tobin's  $q$  less than one

# Tb 4. Loan loss provisions and net loan charge-offs in 2001-2008

VARIABLES	Loan loss provisioning rate				Loan charge-off rate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of real estate loans (t-1)	-0.618*** (0.104)	-0.629*** (0.104)	-0.618*** (0.103)	-0.631*** (0.103)	-0.883*** (0.0877)	-0.886*** (0.0878)	-0.932*** (0.0877)	-0.937*** (0.0877)
MBS (t-1)	-0.144 (0.124)		-0.139 (0.124)		-0.104 (0.105)		-0.0806 (0.105)	
MBS, held (t-1)		-0.0406 (0.306)		0.0386 (0.300)			-0.0974 (0.258)	-0.0295 (0.255)
MBS, for sale (t-1)		-0.173 (0.127)		-0.191 (0.127)		-0.110 (0.107)		-0.0987 (0.108)
Share of real estate loans (t-1) * 2008	0.265*** (0.101)	0.318*** (0.102)			0.486*** (0.0851)	0.502*** (0.0858)		
MBS (t-1) * 2008	-1.738*** (0.197)				-1.191*** (0.166)			
MBS, held (t-1) * 2008		-3.356*** (0.455)				-1.685*** (0.384)		
MBS, for sale (t-1) * 2008		-1.380*** (0.216)				-1.083*** (0.183)		
Low valuation (t-1)			0.492*** (0.0991)	0.381*** (0.101)			-0.0363 (0.0842)	-0.0789 (0.0862)
Share of real estate loans (t-1) * Low valuation (t-1)			-0.0187 (0.123)	0.0972 (0.125)			0.491*** (0.104)	0.536*** (0.106)
MBS (t-1) * Low valuation (t-1)			-0.986*** (0.225)				-0.803*** (0.191)	
MBS, held (t-1) * Low valuation				-3.563*** (0.558)				-1.793*** (0.475)
MBS, for sale (t-1) * Low valuation				-0.474* (0.247)				-0.606*** (0.210)
Constant	1.911*** (0.110)	1.864*** (0.110)	1.121*** (0.0820)	1.140*** (0.0820)	1.379*** (0.0927)	1.365*** (0.0933)	1.120*** (0.0697)	1.127*** (0.0698)
N	8325	8325	8325	8325	8325	8325	8325	8325
R <sup>2</sup>	0.357	0.358	0.382	0.384	0.256	0.256	0.274	0.275

Explanatory variables are lagged one quarterly period. Regressions include firm and quarterly period fixed effects.

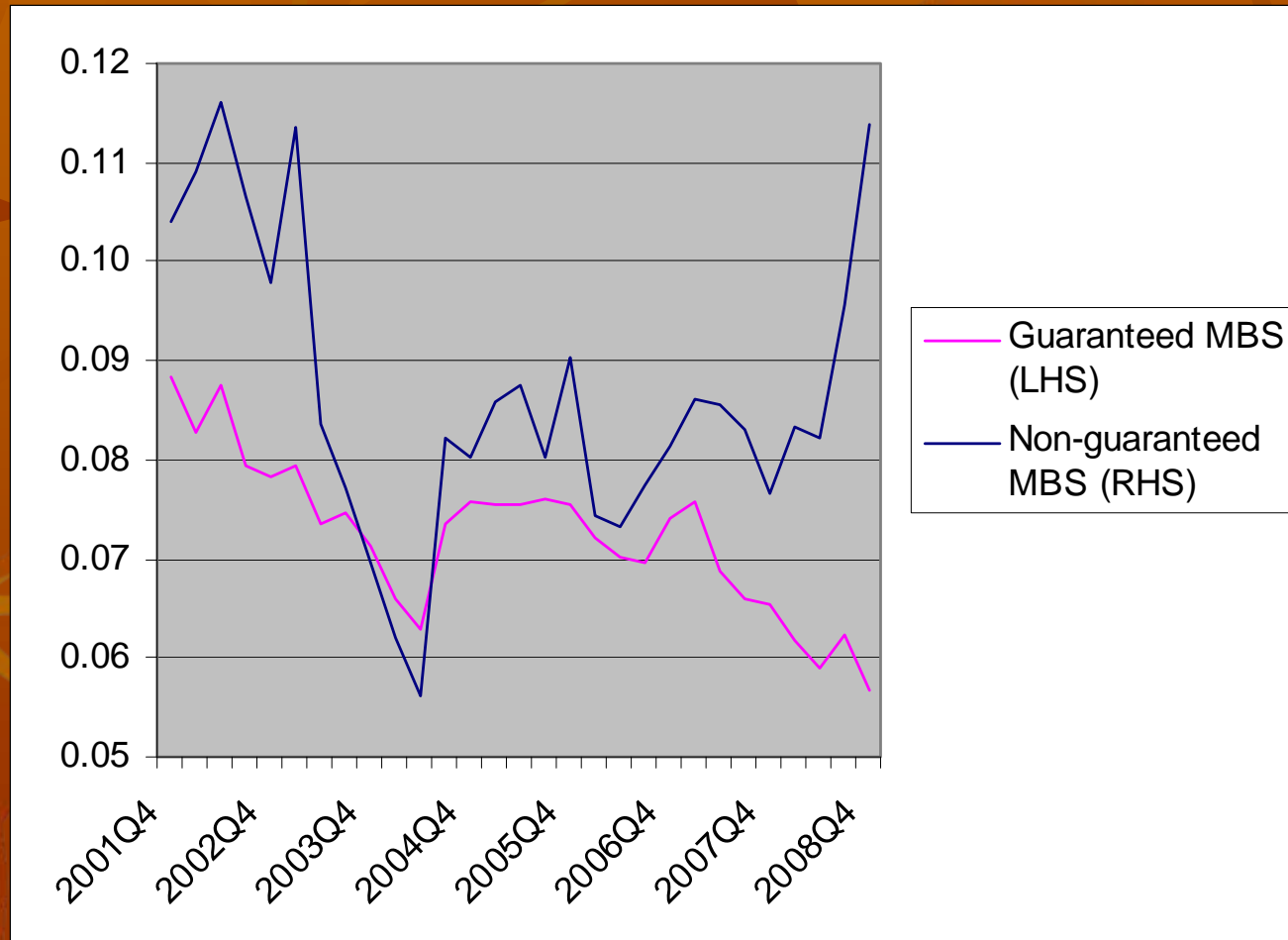
# Accounting discretion regarding asset classification

- According to FAS 159, banks have to classify assets when acquired, and subsequent reclassifications are not allowed
- All the same, banks can augment their book value by reclassifying MBS as held-to-maturity when their fair value is less than amortized cost, which was the case in 2008, especially for non-guaranteed MBS
- Indeed, the share of non-guaranteed MBS that are held-to-maturity increased substantially in 2008 (Figure 5)
- Reclassification of this kind is also advantageous for banks whose share price is depressed on account of large real estate exposure
- In regressions of the share of MBS that is held-to-maturity, we use quarterly data over 2001-2008 period with firm and quarterly fixed effects

# Results on asset classification

- Relative to earlier years, banks with large real estate loan exposure had a higher share of MBS that is held-to-maturity in 2008
- The share of MBS that is held-to-maturity was also higher in 2008 on account of a large exposure to non-real estate loans and a high gap between MBS valued at amortized cost and MBS valued at fair value
- This evidence points at covert asset reclassification under GAAP as forbearance policy. IFRS overtly allow reclassification

# Share of mortgage-backed securities that is held-to-maturity



Guaranteed MBS is the fraction of guaranteed MBS that is held-to-maturity  
Non-guaranteed MBS is the fraction of non-guaranteed MBS that is held-to-maturity

## Tb 5. Share of mortgage-backed securities that is held-to-maturity in 2001-2008

VARIABLES	Lagged explanatory variables	
	(1)	(2)
Non-real estate loans	-0.234*** (0.0411)	-0.200*** (0.0419)
Real estate loans	-0.195*** (0.0307)	-0.180*** (0.0315)
MBS, amortized	-0.396*** (0.0347)	-0.321*** (0.0350)
MBS, amortized minus fair value	-0.280*** (0.108)	-0.152 (0.107)
Non-real estate loans * 2008	0.191*** (0.0500)	0.169*** (0.0560)
Real estate loans * 2008	0.128*** (0.0377)	0.121*** (0.0424)
MBS, amortized * 2008	0.0895* (0.0526)	0.0533 (0.0593)
MBS, amortized minus fair value * 2008	0.487*** (0.180)	0.569** (0.234)
Constant	0.267*** (0.0228)	0.118*** (0.0408)
N	8463	8072
R <sup>2</sup>	0.028	0.021

Regressions include firm and quarterly period fixed effects.

Explanatory variables in column (2) are lagged one quarterly period.

# How does higher share of held-to-maturity MBS come about?

- Banks can achieve some reclassification of previously acquired securities in compliance with FAS 159 by selling and buying equivalent securities that are categorized differently
- In an exceptional case, Citigroup has publicly been allowed a straight reclassification of MBS
- Other U.S. banks similarly seem to have reclassified MBS, with or without regulatory approval
- This evidence is consistent with reclassification as a way to covertly exercise forbearance by U.S. regulators
- This contrasts with Europe where banks subject to IFRS are now overtly allowed reclassifications

# Conclusions

- At end-2008, the majority of US banks were zombie banks → *prima facie* evidence that banks' book value is inflated
- We offer three pieces of compelling evidence that banks use accounting discretion to inflate their books
  - We estimate large market discounts on real estate related assets, including mortgage loans and MBS
  - Banks with large exposure to MBS report relatively low rates of loan loss provisioning and loan charge-offs
  - Banks with large exposure to real estate loans classify a greater proportion of MBS as held-to-maturity
- As a consequence, financial statements of banks appear to overstate the book value of assets to the point of becoming misleading guides to investors and regulators
- This may lead to regulatory forbearance with concomitant risks for taxpayers



# Lessons for policy

- Replacing the mixed attribute model of accounting with pure fair value accounting will mitigate market discounting of bank assets during financial crisis, but not eliminate it entirely
- This would also eliminate incentives for accounting arbitrage related to the classification of assets
- Similarly, a more forward-looking approach to provisioning for bad loans on an expected loss basis could mitigate incentives for banks to use current discretion on loan loss provisioning rates to inflate the book value of assets and capital during economic downturns