Why did U.S. banks invest in highly-rated securitization tranches?

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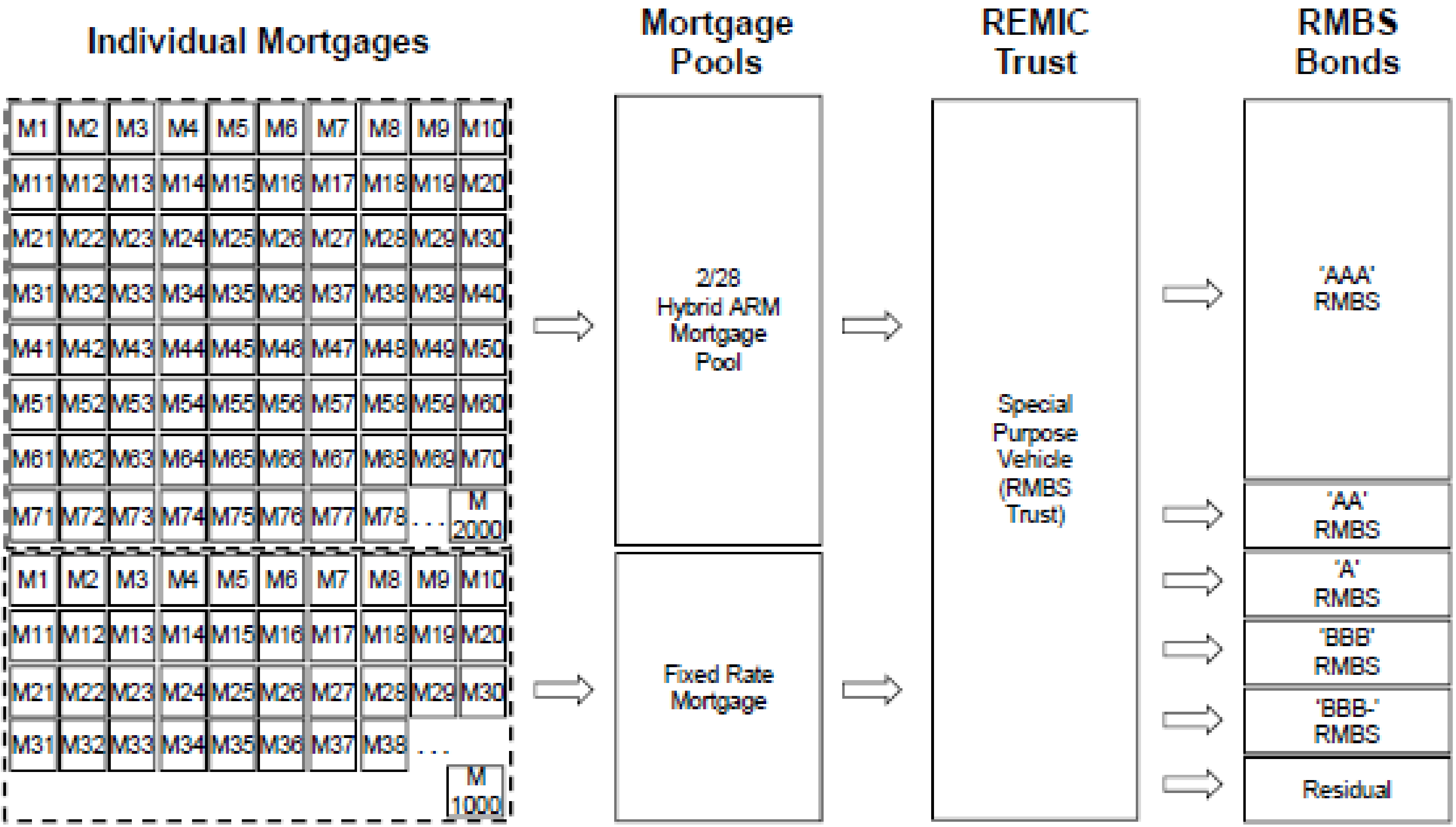
RMBS securitization



Overview

- "Toxic assets" held by U.S. banks were at the heart of the recent financial crisis.
  - Losses led to capital raising and fire sales, TARP, etc.
- Originate-to-distribute model led banks to create highly-rated securities through securitizations (e.g., A-AAA tranches of MBSs as well as CDOs).
  - A substantial fraction of these securities did not leave the banking system and eventually became toxic assets!
    - Citibank had writedowns of $17 billion in highly-rated tranches in Q4 2007.
- In this paper, we estimate holdings of highly-rated tranches that became toxic and explore which theories explain these holdings.

Summary of Main Results

- For the typical bank, holdings of highly-rated tranches were economically trivial.
  - Mean (median) holdings over assets of less than 1.3% (0.15%) in 2006.
- These holdings are negatively related to bank performance during the crisis.
- Holdings increase with bank assets, but not for banks with more than $50 billion of assets,
  - inconsistent with "too-big-to-fail" incentives of banks as an explanation.
- No support for "bad incentives" or "bad risk management."
- Securitization-active banks hold more such tranches.
  - Evidence more consistent with "skin in the game" arguments rather than regulatory arbitrage.

Theories Explaining Holdings

- In Fama (1985), banks' cost of funding is a market rate.

- If banks pay a market rate of return on their sources of finance and earn a market rate of return on their investments in securities, how can it be a positive NPV project for banks to hold securities?

1. Securitization by-product

- Banks engaged in securitization hold them through the process of creating and marketing these securities; "skin-in-the-game" (Shleifer and Vishny (2010) and Gennaioli et al. (2011)).

  (Securitization H1; activity) Highly-rated holdings were higher for banks engaged in securitization activity.

  (Securitization H2; cumulative activity) Holdings for banks active in securitization increased over time as each securitization would require skin in the game.

2. Regulatory Arbitrage

- These tranches require lower regulatory capital than the underlying loans, making securitizations advantageous (Acharya and Richardson (2009)).
  - But, some banks might have enough regulatory cushion.
  - Also, unlikely to be beneficial for small banks due to fixed costs of securitization.

(Regulatory Arbitrage H1) Banks that are more constrained in regulatory capital and larger banks have greater holdings of highly-rated tranches as a fraction of assets.

(Regulatory Arbitrage H2) Banks that engage in more regulatory arbitrage activities have more highly-rated tranches.

3. Bad Incentives

- Managers and/or traders might have inappropriate incentive systems that make excessive risk taking more advantageous (Rajan (2006)).
  - If incentives are set improperly, it is possible for executives or traders of banks to benefit from profits generated by investing in assets that have a higher return due to more systematic risk.

(Bad incentives H1) Banks with trading operations and poor incentives have more highly-rated tranches.

(Bad incentives H2) Banks more focused on ROE hold more highly-rated tranches.

4. Risk Management Failure

- Bank risk management failed to assess correctly the risks of these tranches, perhaps due to model mistakes (The Financial Crisis Inquiry Commission).
- Or, risk management function did not have enough influence to limit the holdings.

(Poor Risk Management H1) Banks where risk management was less central and less independent held more highly-rated tranches.

5. Good Deals

- Managers might have thought they were good deals since yields of these highly-rated securitization tranches were higher than the yields of comparably rated securities (Gennaioli et al. (2011)).

  (Good deal H1) Managers of banks that invest more in highly-rated tranches of securitizations have stronger incentives to maximize shareholder wealth.

6. Too-big-to-fail

- Big banks could make profits from investing in risky assets as doing so does not increase their cost of funding to reflect the risk fully (Carbo-Valverde et al. (2010)).
  - If a bank is likely to be bailed out in systemic crises, it has incentives to take on more risks that have poor payoffs in systemic crises.

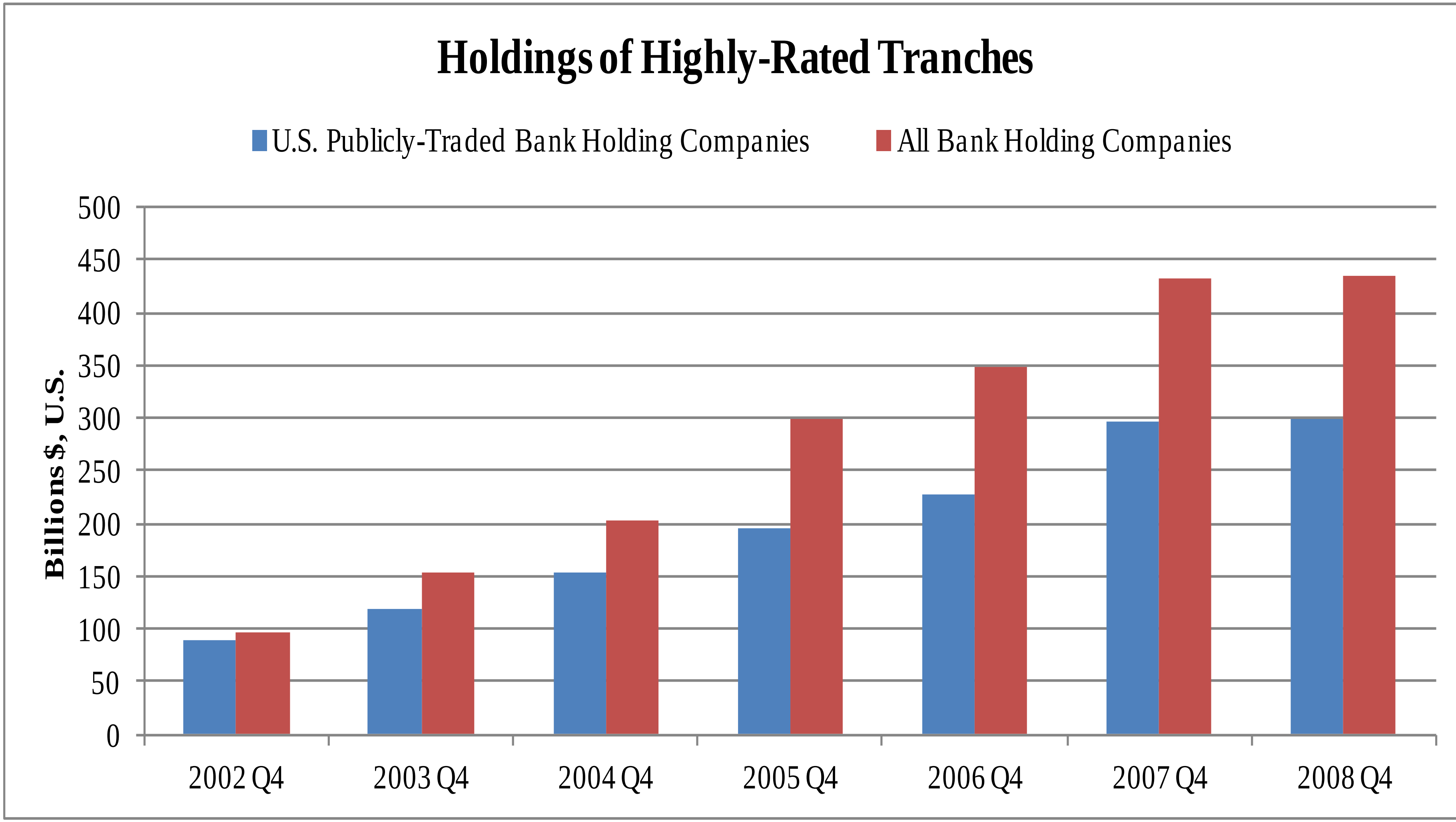
(Too-big-to-fail H1) Banks deemed too-big-to-fail invested more in highly-rated tranches of securitizations than other banks.

Data

- Our primary data source is the Consolidated Financial Statements for BHCs.
- We focus on publicly traded U.S. BHCs as of December 31, 2006.
- "Highly-rated Tranches": highly-rated non-government and non-agency securities issued in securitizations and held on BHC balance sheets.
- We "back out" the amount of these holdings using data from the regulatory-capital portion of the consolidated financial statements (schedule HC-R).

Measures of Highly-Rated Tranches

- **Highly-Rated Residual:** highly-rated (A-AAA rated) non-government, non-agency securities held on the banking book (*20% +50% residual)* plus private-label securitization tranches with mortgage collateral from the trading book.
- **Highly-Rated Residual + CDOs** reported under trading assets in June 2008.
- **Highly-Rated Residual + CDOs and Writedowns on** CDOs between December 2006 and June 2008.
- **Highly-Rated Residual + CDOs and Writedowns + Holdings of Conduits and SIVs.**


Holdings of Highly-Rated Tranches
U.S. Publicly-Traded Bank Holding Companies
All Bank Holding Companies
Billions $, U.S.
500
450
400
350
300
250
200
150
100
50
0
2002 Q4
2003 Q4
2004 Q4
2005 Q4
2006 Q4
2007 Q4
2008 Q4

Summary Statistics

	Full Sample				Large Trading-Asset Banks	
Year	Obs	Mean	Med	90th %tile	Obs	Mean
Panel A: "Highly-Rated Residual"						
2002	169	1.29%	0.10%	3.59%	13	3.05%
2003	184	1.27%	0.06%	3.40%	13	3.77%
2004	205	1.37%	0.02%	3.85%	14	3.76%
2005	218	1.50%	0.10%	4.48%	14	4.70%
2006	231	1.31%	0.15%	3.13%	14	4.75%
2007	224	1.27%	0.20%	3.04%	12	3.18%
2008	220	1.13%	0.11%	3.12%	11	2.42%
Panel B: "Highly-Rated Residual + CDOs"						
2006	231	1.31%	0.15%	3.13%	14	4.76%
Panel C: "Highly-Rated Residual + CDOs and Writedowns"						
2006	231	1.33%	0.15%	3.14%	14	4.99%
Panel D: "Highly-Rated Residual + CDOs + Writedowns + Conduit's and SIV's"						
2006	231	1.51%	0.16%	3.73%	14	6.59%

What about three largest banks?

- Citigroup has the largest holdings among the top three with 5.75% in 2006 for second broadest measure (*Highly-rated Holdings+CDOs and Writedowns*),
  - which increases to 10.67% when we add holdings in Conduits and SIVs.
- In contrast, JPMC has only 1.09% (or 4.25%) and BofA has 1.96% (or 5.08%).

Regressions of Bank Stock Returns on Highly-Rated Tranche Holdings

	"Highly-Rated Residual"	"Highly-Rated Residual + CDOs"	"Highly-Rated Residual + CDOs and Writedowns"	"Highly-Rated Residual + CDOs and Writedowns + Conduits and SIV's"
	(1)	(2)	(3)	(4)
80th %tile - 100th%tile Highly-Rated Tranche Holdings Indicator	-0.137**	-0.137**	-0.141**	-0.146**
	(-2.284)	(-2.284)	(-2.341)	(-2.376)
60th %tile - 80th%tile Highly-Rated Tranche Holdings Indicator	-0.108	-0.108	-0.116	-0.129*
	(-1.466)	(-1.466)	(-1.575)	(-1.779)
40th %tile - 60th%tile Highly-Rated Tranche Holdings Indicator	-0.099	-0.099	-0.089	-0.076
	(-1.506)	(-1.506)	(-1.378)	(-1.204)
20th %tile - 40th%tile Highly-Rated Tranche Holdings Indicator	-0.091	-0.091	-0.091	-0.091
	(-0.949)	(-0.949)	(-0.941)	(-0.945)
0%tile - 20th%tile Highly-Rated Tranche Holdings (Omitted Group)				
Unused Loan Commitments	-1.358**	-1.358**	-1.357**	-1.352**
	(-2.402)	(-2.402)	(-2.389)	(-2.385)
Mortgage Loans as % of Total Assets	-0.767**	-0.767**	-0.765**	-0.769**
	(-2.204)	(-2.204)	(-2.221)	(-2.221)
C&I Loans as % of Total Assets	-0.761*	-0.761*	-0.773*	-0.790*
	(-1.824)	(-1.824)	(-1.877)	(-1.932)
"Other" H.T.M. and A.F.S. Securities	0.615	0.615	0.620	0.610
	(1.470)	(1.470)	(1.488)	(1.450)
"Other" Trading Securities	-2.705*	-2.705*	-2.674*	-2.657*
	(-1.801)	(-1.801)	(-1.803)	(-1.743)

Other control variables: Prior returns, market-to-book, Tier-1 Capital, log market cap.

Highly-Rated Holdings and Bank Size: "Too Big to Fail?"

- We estimate regressions of holdings of highly-rated tranches on asset size and controls.
  - Asset size is allowed to have a nonlinear impact, with one slope for assets from $0 to $50 billion and another for assets in excess of $50 billion.

	"Highly-Rated Residual"	"Highly-Rated Residual + CDOs"	"Highly-Rated Residual + CDOs and Writedowns"	"Highly-Rated Residual + CDOs and Writedowns + Conduits and SIV's"
	(1)	(2)	(3)	(4)
$0-50 Billion	0.797**	0.797**	0.810**	1.030***
	(2.458)	(2.459)	(2.503)	(2.985)
>$50 Billion	-0.063	-0.063	-0.057	-0.047
	(-1.518)	(-1.519)	(-1.353)	(-0.968)
"Other" H.T.M. and A.F.S. Securities	0.029	0.029	0.030	0.027
	(1.170)	(1.170)	(1.174)	(1.078)
"Other" Trading Securities	0.384	0.385	0.369	0.424
	(1.063)	(1.067)	(1.012)	(1.021)

Other control variables: Prior returns, market-to-book, and Tier-1 Capital.

Does Securitization Activity Explain Highly-Rated Holdings?

	"Highly-Rated Residual"	"Highly-Rated Residual + CDOs and Writedowns + Conduits and SIV's"	"Highly-Rated Residual"	"Highly-Rated Residual + CDOs and Writedowns + Conduits and SIV's"	(Highly-Rated Residual \$t - Highly-Rated Residual \$t-4)/Assetst-4	
	(1)	(2)	(3)	(4)	(5)	(6)
Securitization-active Indicator	0.015**	0.017**				
	(2.178)	(2.409)				
Securitization-league-table Indicator			0.015	0.021		
			(0.485)	(0.603)		
(Sec. \$t - Sec \$t-4)/Assetst-4					0.003*	
					(1.69)	
(Mortgage Sec. \$t - Mortgage Sec. \$t-4)/Assetst-4						0.003**
						(1.98)
\$0-50 Billion	0.564*	0.761**	0.736**	0.943***	0.122	0.122
	(1.967)	(2.436)	(2.138)	(2.656)	(1.48)	(1.48)
>\$50 Billion	-0.065	-0.049	-0.062	-0.045	-0.010	-0.010
	(-1.565)	(-1.014)	(-1.577)	(-1.001)	(1.15)	(1.15)
"Other" H.T.M. and A.F.S. Securities	0.032	0.029	0.032	0.030	-0.004	-0.003
	(1.261)	(1.187)	(1.346)	(1.298)	(0.37)	(0.37)
"Other" Trading Securities	0.386	0.426	0.311	0.319	0.048	0.048
	(1.071)	(1.027)	(0.946)	(0.884)	(1.05)	(1.05)

Other control variables: Prior returns, market-to-book, and Tier-1 Capital.

Does Regulatory Arbitrage Explain Highly-Rated Holdings?

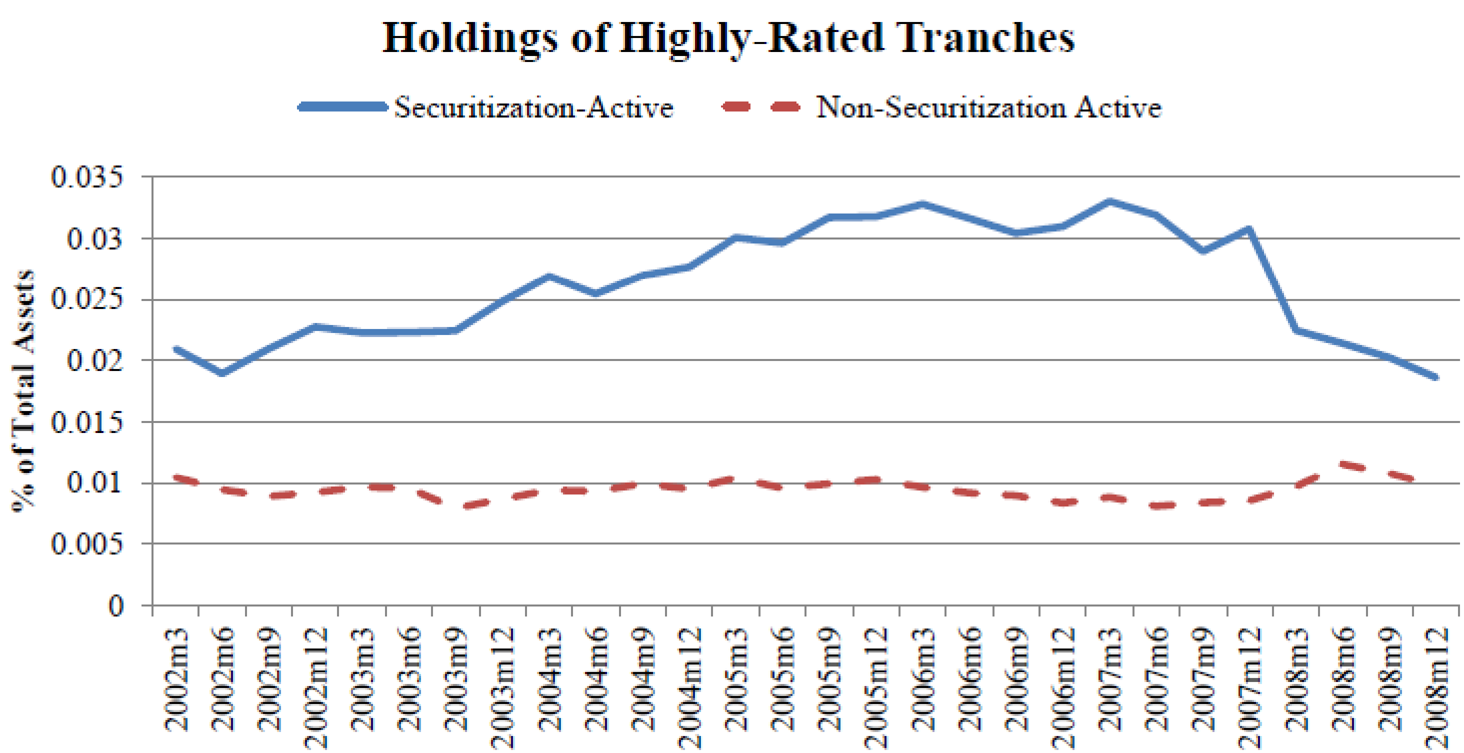
- Overall, not investing in lower-rated tranches can be considered as evidence supporting it.
- Regressions with following proxies for regulatory arbitrage: **No significance!**
  - ABCP activity indicator (Acharya et al. (2010))
  - Change in leverage 2000Q4 – 2002Q4
  - Market risk equivalent bank indicator
- Do they engage in regulatory arbitrage through the securitization channel itself? **Not likely** because
  - Capital cushion of the securitization active banks is not close to the regulatory boundary.
  - Securitization-active banks have higher risk-weighted assets than their (sized-matched) non-securitization-active banks do.

Do Incentives or Risk Management Failure Explain Highly-Rated Holdings?

- Proxies for bad incentives:
  - Governance index;
  - Banks that have trading operations;
  - High (above-median) elasticity of compensation to ROE;
  - Abnormal compensation;
  - Bonus to salary;
  - Gain from increase in equity risk.
- Risk management failure: Risk Management Index (Ellul and Yerramilli)
- Good incentives: Dollar gain from 1% equity return or CEO ownership
- **No significance!**

Conclusion

- We provide estimates of holdings of highly-rated securitization tranches.
- Holdings were not large for the typical bank, but cross-sectional variation does exist.
- Banks with large holdings in 2006 performed more poorly during the crisis.
- Banks more active in securitization held more highly-rated tranches.
- The evidence is not supportive of "too big to fail," regulatory arbitrage (?), risk management failure, and bad/good management incentives theories of toxic asset holdings.


Holdings of Highly-Rated Tranches
Securitization-Active
Non-Securitization Active
% of Total Assets
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
2002m3
2002m6
2002m9
2002m12
2003m3
2003m6
2003m9
2003m12
2004m3
2004m6
2004m9
2004m12
2005m3
2005m6
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