Regulatory Forbearance in the U.S. Insurance Industry: The Effects of Removing Capital Requirements for an Asset Class

—

INTERNET APPENDIX

Bo Becker Marcus M. Opp Farzad Saidi

Appendix A NAIC Reform Proposal

To: **NAIC Executive Committee/NAIC Members**
From: **Commissioner Al Gross (VA), Chair of the E Committee**
Date: **November 3, 2009**
Re: **Residential Mortgage Backed Securities (RMBS) Proposal**

On October 14, 2009, the Valuation of Securities (E) Task Force held a joint conference call with the Financial Condition (E) Committee to consider the RMBS Proposal. This memo summarizes the issues underlying the proposal as well as the details of the proposal.

History of the RMBS Proposal

Presently residential mortgage-backed securities (RMBS) are treated in the same manner as corporate bonds when determining RBC requirements: the credit-quality designation provided by an Acceptable Rating Organization (ARO) or the NAIC's Securities Valuation Office (SVO) is used to establish the appropriate risk-based capital (RBC) charge. Securities with higher credit quality ratings receive lower RBC charges, and vice versa.

Two main issues have prompted the NAIC to consider a new approach for RMBS: (i) concerns with the ratings provided by AROs, and (ii) concerns the current process does not consider the severity or amount of loss that will be experienced by RMBS. Consequently, an alternative method of handling RMBS ratings has been the subject of discussion by the Valuation of Securities Task Force. Specifically, in trying to determine an alternative approach, members of the Valuation of Securities Task Force agreed consideration needs to be given to the amount of expected loss for a particular RMBS when establishing capital charges in RBC.

In addition to the work of the Valuation of Securities Task Force, the NAIC's Rating Agency Working Group held a public hearing at the NAIC 2009 Fall National Meeting during which rating agency representatives indicated state insurance regulators should not rely upon their ratings for regulatory purposes.

Regulators have therefore developed the RMBS Proposal to address the concerns with reliance upon rating agency ratings as well as to address the need to use expected loss amounts for RBC purposes.

The RMBS Proposal

The proposal would be applicable to year-end 2009 reporting and include utilization of a model to establish ranges of prices for each NAIC designation (1 through 6) for each of the approximately 18,000 RMBS. Assuming this proposal is adopted by the NAIC membership, the plan is for the NAIC to contract with an independent third party to assist with the modeling efforts.

An insurer's carrying value for a particular RMBS would be mapped to the price ranges to identify the appropriate NAIC designation for use in RBC.

Approximately 350 of the RMBS would not be subject to modeling. Of these, roughly 300 would be subject to utilization of the existing ARO ratings along with the carrying value to determine the NAIC designation, and the resulting RBC factor more accurately. The remaining approximately 50 RMBS with no ARO ratings would instead follow the existing 'Not Rated' or 'NR' process, requiring subsequent filing with the NAIC's Securities Valuation Office, or be subjected to the '5*/6* process' (referred to as 'five-star/six-star process,' a certification process set forth in the SVO's Purposes and Procedures Manual).

Finally, re-remics (Re-securitization of Real Estate Mortgage Investment Conduits) are to be subject to the modeler analysis.

EXECUTIVE OFFICE	444 N. Capitol Street, NW, Suite 701	Washington, DC 20001-1509	p | 202 471 3990	f | 816 460 7493
CENTRAL OFFICE	2301 McGee Street, Suite 800	Kansas City, MO 64108-2662	p | 816 842 3600	f | 816 783 8175
SECURITIES VALUATION OFFICE	48 Wall Street, 6th Floor	New York, NY 10005-2906	p | 212 398 9000	f | 212 382 4207

www.naic.org

Appendix B Supplementary Tables

Table Appendix B.1. Effect of Regulatory Reform on Insurers' Selling Legacy Securities – Individual Company Level

	Sold any fraction of security $\in \{0,1\}$				
Securities	MBS	MBS	MBS	All	All
Variable	(1)	(2)	(3)	(4)	(5)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{MBS} \times \text{Post}$				-0.731***	-0.616***
				(0.144)	(0.148)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{Post}$	-0.403***	-0.638***	-0.657***	0.085	-0.049
	(0.053)	(0.087)	(0.089)	(0.114)	(0.117)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{MBS}$				0.471***	0.153
				(0.126)	(0.130)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\}$	0.689***	0.645***	0.687***	0.156*	0.533***
	(0.050)	(0.084)	(0.085)	(0.094)	(0.097)
Security FE	N	Y	N	Y	N
Security-insurer FE	N	N	Y	N	Y
Year FE	Y	N	N	N	N
Rating-asset-class-year FE	N	Y	Y	Y	Y
ΔRating-asset-class-year FE	N	Y	Y	Y	Y
Insurer-year FE	N	Y	Y	Y	Y
N	662,713	656,780	621,402	7,563,474	6,959,957

The sample is a panel at the security-insurer-year level *sit* from 2006 to 2015, i.e., non-maturing security s held by insurer i (individual company level) in year $t-1$ and traded in year t. In the first three columns, we consider only (non-agency) mortgage-backed securities. The dependent variable is an indicator variable for whether insurer i sold a non-zero fraction of security s in year t. $\max\{\Delta RBC^{ratings}_{sit-1}, 0\}$ is the absolute increase in risk-based charges (RBC, from 0 to 0.297) of security s as a function of the NAIC risk category according to credit ratings (also after the regulatory reform) for life and P&C insurers i in year-end $t-1$ (compared to the previous year). MBS_s is an indicator variable for whether security s is a mortgage-backed security, and $Post_t$ is an indicator variable for the year 2010 and onwards. Rating-asset-class-year fixed effects are determined by security s's rating in year-end $t-2$, and ΔRating-asset-class-year fixed effects are determined by the change in ratings (in notches) between year-end $t-2$ and $t-1$. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the security level) are in parentheses. $^*p<.1$; $^{**}p<.05$; $^{***}p<.01$.

Table Appendix B.2. Effect of Regulatory Reform on Insurers' Selling Legacy Securities – Restrictive Sales Definition

	Sold > 50% of position in security $\in \{0,1\}$				
Securities	MBS	MBS	MBS	All	All
Variable	(1)	(2)	(3)	(4)	(5)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{MBS} \times \text{Post}$				-0.481***	-0.346***
				(0.130)	(0.130)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{Post}$	-0.518***	-0.541***	-0.508***	-0.097	-0.185*
	(0.050)	(0.084)	(0.082)	(0.098)	(0.100)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\} \times \text{MBS}$				0.267**	-0.067
				(0.115)	(0.116)
$\max\{\Delta\text{RBC}^{\text{ratings}}, 0\}$	0.678***	0.520***	0.535***	0.274***	0.625***
	(0.048)	(0.081)	(0.080)	(0.081)	(0.083)
Security FE	N	Y	N	Y	N
Security-insurer FE	N	N	Y	N	Y
Year FE	Y	N	N	N	N
Rating-asset-class-year FE	N	Y	Y	Y	Y
ΔRating-asset-class-year FE	N	Y	Y	Y	Y
Insurer-year FE	N	Y	Y	Y	Y
N	482,888	477,510	454,125	5,677,802	5,264,392

The sample is a panel at the security-insurer-year level *sit* from 2006 to 2015, i.e., non-maturing security s held by insurer i (group level) in year $t-1$ and traded in year t. In the first three columns, we consider only (non-agency) mortgage-backed securities. The dependent variable is an indicator variable for whether insurer i sold more than half of its position in security s in year t. $\max\{\Delta RBC^{ratings}_{sit-1}, 0\}$ is the absolute increase in risk-based charges (RBC, from 0 to 0.297) of security s as a function of the NAIC risk category according to credit ratings (also after the regulatory reform) for life and P&C insurers i in year-end $t-1$ (compared to the previous year). MBS_s is an indicator variable for whether security s is a mortgage-backed security, and $Post_t$ is an indicator variable for the year 2010 and onwards. Rating-asset-class-year fixed effects are determined by security s's rating in year-end $t-2$, and ΔRating-asset-class-year fixed effects are determined by the change in ratings (in notches) between year-end $t-2$ and $t-1$. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the security level) are in parentheses. *p <.1; **p <.05; ***p <.01.

Table Appendix B.3. Effect of Regulatory Reform on Insurers' Total Fixed-income Holdings

	Δln(Par)	Δln(Par)	Δln(Par)	min$\{\Delta$ln(Par), 0$\}$	max$\{\Delta$ln(Par), 0$\}$
Sample	MBS	non-MBS	All	All	All
Variable	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\left\{\Delta\text{RBC}^{\text{ratings}} > 0\right\}$			0.048***	0.046***	0.002
$\times$ MBS $\times$ Post			(0.013)	(0.012)	(0.006)
$\mathbb{1}\left\{\Delta\text{RBC}^{\text{ratings}} > 0\right\}$	0.021**	-0.009	-0.027***	-0.026***	-0.001
$\times$ Post	(0.008)	(0.010)	(0.010)	(0.009)	(0.005)
$\mathbb{1}\left\{\Delta\text{RBC}^{\text{ratings}} > 0\right\}$			0.069***	0.084***	-0.015***
$\times$ MBS			(0.010)	(0.009)	(0.005)
$\mathbb{1}\left\{\Delta\text{RBC}^{\text{ratings}} > 0\right\}$	0.028***	0.007	-0.041***	-0.048***	0.007*
	(0.007)	(0.007)	(0.008)	(0.007)	(0.004)
Year FE	Y	Y	N	N	N
Asset-class-year FE	N	N	Y	Y	Y
N	193,780	1,955,974	2,149,754	2,149,754	2,149,754

The sample is a panel at the security-year level st from 2006 to 2015, i.e., non-maturing security s held by any insurers in year t. In the first two columns, the sample is limited to MBS and all remaining securities, respectively. The dependent variable in the first three columns is the first difference in the natural logarithm of the total par value of security s held by any insurers in year t (in comparison to $t-1$). The dependent variable in the fourth (fifth) column is the minimum (maximum) of zero and the first difference in the natural logarithm of the total par value of security s held by any insurers in year t (in comparison to $t-1$). $\mathbb{1}\left\{\Delta RBC^{ratings} > 0\right\}_{st-1}$ is an indicator variable for whether security s is downgraded such that it is, or would be, assigned a higher NAIC risk category associated with higher risk-based charges (also after the regulatory reform) in year-end $t-1$. MBS_s is an indicator variable for whether security s is a mortgage-backed security, and $Post_t$ is an indicator variable for the year 2010 and onwards. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the security level) are in parentheses. *p <.1; **p <.05; ***p <.01.

Table Appendix B.4. Effect of Regulatory Reform on Insurers' Total Fixed-income Holdings – Heterogeneity

Insurers	Δln(Par) Life	Δln(Par) P&C	Δln(Par) High variable annuities	Δln(Par) Low variable annuities	Δln(Par) Low RBC	Δln(Par) High RBC	Δln(Par) Low BCAR	Δln(Par) High BCAR
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{1}\{\Delta\text{RBC}^{\text{ratings}} > 0\} \times \text{MBS} \times \text{Post}$	0.223***	-0.119**	0.171**	0.094	0.299***	0.154*	0.972***	0.646***
	(0.047)	(0.055)	(0.075)	(0.081)	(0.104)	(0.089)	(0.136)	(0.089)
$\mathbb{1}\{\Delta\text{RBC}^{\text{ratings}} > 0\} \times \text{Post}$	-0.082**	-0.005	-0.005	-0.073	-0.231***	-0.102	-0.468***	-0.701***
	(0.038)	(0.044)	(0.053)	(0.055)	(0.078)	(0.067)	(0.090)	(0.072)
$\mathbb{1}\{\Delta\text{RBC}^{\text{ratings}} > 0\} \times \text{MBS}$	0.079**	0.193***	0.102*	0.089	0.028	0.185***	-0.661***	0.018
	(0.031)	(0.039)	(0.060)	(0.065)	(0.079)	(0.060)	(0.104)	(0.066)
$\mathbb{1}\{\Delta\text{RBC}^{\text{ratings}} > 0\}$	-0.120***	-0.210***	-0.225***	-0.129***	-0.173***	-0.162***	0.232***	0.000
	(0.024)	(0.031)	(0.037)	(0.040)	(0.062)	(0.046)	(0.067)	(0.052)
Asset-class-year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2,149,746	2,149,751	2,149,747	2,149,747	2,149,752	2,149,751	2,149,749	2,149,751

The sample is a panel at the security-year level st from 2006 to 2015, i.e., non-maturing security s held by any insurers in year t. The dependent variable in the first (second) column is the first difference in the natural logarithm of the total par value of security s held by insurance groups with the majority of their assets held by life (P&C) insurers in year t (in comparison to $t-1$). The dependent variable in the third (fourth) column is the first difference in the natural logarithm of the total par value of security s held by insurance groups with a non-zero share of their assets held by life insurers and variable annuity liabilities amounting to over (at most) 5% of their assets in year t (in comparison to $t-1$). The dependent variable in the fifth (sixth) column is the first difference in the natural logarithm of the total par value of security s held by insurance groups with RBC ratios in the bottom (top) third of the distribution in year t (in comparison to $t-1$). The dependent variable in the seventh (eighth) column is the first difference in the natural logarithm of the total par value of security s held by insurance groups with (intra-group median) A.M. Best Capital Adequacy Ratios in the bottom (top) third of the distribution in year t (in comparison to $t-1$). $\mathbb{1}\{\Delta RBC^{ratings} > 0\}_{st-1}$ is an indicator variable for whether security s is downgraded such that it is, or would be, assigned a higher NAIC risk category associated with higher risk-based charges (also after the regulatory reform) in year-end $t-1$. MBS_s is an indicator variable for whether security s is a mortgage-backed security, and $Post_t$ is an indicator variable for the year 2010 and onwards. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the security level) are in parentheses. $^*p<.1$; $^{**}p<.05$; $^{***}p<.01$.

Table Appendix B.5. Participation by Insurance Companies in Newly Issued Securities

		Participation by insurers $\in \{0,1\}$				Life	P&C
Sample	All	$\geq$ \$5m	$\geq$ \$5m	$\geq$ \$5m	$\geq$ \$20m	$\geq$ \$20m	$\geq$ \$20m
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MBS × Post	0.164***	0.075***					
	(0.005)	(0.006)					
MBS × HY × Post			0.036**	0.053***	0.112***	0.087***	0.010
			(0.017)	(0.017)	(0.029)	(0.027)	(0.023)
MBS × HY			-0.234***				
			(0.007)				
HY × Post			-0.117***				
			(0.007)				
High yield (HY)			0.040***				
			(0.005)				
Asset-class FE	Y	Y	N	N	N	N	N
Year FE	Y	Y	N	N	N	N	N
Asset-class-year FE	N	N	Y	Y	Y	Y	Y
HY-asset-class FE	N	N	N	Y	Y	Y	Y
HY-year FE	N	N	N	Y	Y	Y	Y
N	1,552,612	403,506	403,506	403,506	221,580	221,580	221,580

The sample consists of all new securities s rated and issued at date t anytime from 2005 to 2015. The sample in the second to fourth (fifth to seventh) column is limited to all new issues with a size of at least \$5m (\$20m). The dependent variable in the first five columns is an indicator for whether insurance companies hold any non-zero fraction of newly issued security s. The dependent variable in the sixth and seventh column is an indicator for whether insurance groups with the majority of their assets held by life or P&C insurers, respectively, hold any non-zero fraction of newly issued security s. MBS_s is an indicator variable for whether security s is a mortgage-backed security, HY_s is an indicator variable for whether security s is a (high-yield) security rated BB+ or worse, and $Post_t$ is an indicator variable for the year 2010 and onwards. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the security level) are in parentheses. $^*p < .1$; $^{**}p < .05$; $^{***}p < .01$.

Table Appendix B.6. Insurers' Portfolios of New Issues Post Reform – Individual Company Level

	Fraction MBS of new-issue purchases in %		Fraction HY MBS of MBS new-issue purchases in %		
Mean dependent variable	2.990	2.990	0.029	0.029	0.029
Variable	(1)	(2)	(3)	(4)	(5)
Life $\in \{0,1\}$	1.183***	0.798***	0.069***	0.066***	0.061***
	(0.313)	(0.302)	(0.027)	(0.025)	(0.023)
Stock $\in \{0,1\}$	0.327	0.271	-0.003	-0.003	-0.005
	(0.333)	(0.318)	(0.005)	(0.006)	(0.006)
Mutual $\in \{0,1\}$	0.332	0.396	0.003	0.003	0.000
	(0.393)	(0.380)	(0.011)	(0.011)	(0.012)
ln(Assets)	0.601***	0.460***	0.019***	0.018***	0.015***
	(0.053)	(0.054)	(0.005)	(0.005)	(0.003)
Variable annuities/Assets	2.387	1.837	-0.090	-0.094	-0.107
	(1.839)	(1.817)	(0.111)	(0.113)	(0.116)
ROE	0.701	0.804	-0.085	-0.084	-0.090
	(0.811)	(0.792)	(0.067)	(0.067)	(0.067)
RBC ratio	-0.000	-0.000	0.000	0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
A.M. Best Capital Adequacy Ratio	-0.001*	-0.001	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Share MBS $2005-2008$		12.676***		0.093	0.004
		(1.557)		(0.078)	(0.052)
Fraction MBS of new-issue purchases					0.007**
					(0.003)
Year FE	Y	Y	Y	Y	Y
N	11,817	11,817	11,817	11,817	11,817
R^2	0.061	0.074	0.009	0.009	0.017

The sample is a panel at the insurer-year level it from 2010 to 2015, for all newly issued securities purchased by insurer i (individual company level) in year t. The dependent variable in the first two columns is the fraction of newly issued (non-agency) MBS to all new issues purchased by insurer i in year t, measured in % (from 0 to 100). The dependent variable in the last three columns is the fraction of newly issued (non-agency) MBS with a rating of BB+ or worse to all newly issued (non-agency) MBS purchased by insurer i in year t, measured in % (from 0 to 100). $Life_i$ is an indicator for whether insurer i is a life insurer. $Stock_i$ is an indicator for whether insurer i is owned by its shareholders. $Mutual_i$ is an indicator for whether insurer i is owned by its policyholders. Each insurer is classified as either stock, mutual, or other. *Variable annuities*$_{it-1}$ captures variable annuity liabilities, measured as the total related account value plus the gross amount of reserves minus the reinsurance reserve credit, of insurer i in year $t-1$. $Assets_{it-1}$ and ROE_{it-1} denote, respectively, total admitted assets and the return on equity ratio of insurer i in year $t-1$. *RBC ratio*$_{it-1}$ is the risk-based capital ratio, equal to total adjusted capital over authorized control level risk-based capital, of insurer i in year $t-1$. i in year $t-1$. A.M. Best Capital Adequacy Ratios range from 0 to 999.9, and are included for each insurer i in year $t-1$. *Share MBS 2005–2008*$_i$ equals the average ratio of (non-agency) MBS to total assets of insurer i in the period $2005-2008$. All singletons are dropped from the total number of observations N. Robust standard errors (clustered at the insurer level) are in parentheses. *$p<.1$; **$p<.05$; ***$p<.01$.