

Recap of VM-20

Asset Default Methodology and Development Process

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Overview of Presentation

- Purpose: In order to help facilitate discussion of assumed net yields on starting assets in VM-20, provide a high-level summary of certain topics related to the prescribed asset default cost methodology in VM-20, including:
 - The 15-month interactive process conducted between the Academy LRWG and LATF to develop and vet the methodology
 - The three components of prescribed asset default costs, including discussion of the “PBR credit rating” system
 - Key observations from illustrative results that drove the final requirements



Overview of Presentation (cont)

- We will focus only on fixed income assets with an NAIC designation. For assets lacking an NAIC designation, LATF adopted a different methodology that did not involve the LRWG:
 - For assets lacking an NAIC designation, the default assumption is established such that the net yield is capped at 104% of the applicable historical U.S. Treasury yield rate most closely coinciding with the purchase date and maturity structure, plus 25 basis points.
 - Current examples: commercial mortgage loans and residential mortgage whole loans.
- For more in-depth review of the detailed requirements, the following sources are recommended:
 - VM-20 Section 9.F and Appendix 2, particularly the Guidance Notes in 9.F
 - Session 7 of the NAIC Training Seminar for VM-20 Impact Study, Nov. 2010



The connection between starting asset net yields and asset default costs

- The net asset earned rate attributable to starting assets can be thought of as the result of:
 - Gross statutory investment income divided by statutory carrying value, determined in accordance with contractual provisions of the asset and consistent with each scenario, less
 - Deduction for prescribed asset default costs, less
 - Deduction for anticipated investment expenses, plus
 - Other adjustments (e.g., statutory capital gains and losses on sale, PIMR, certain derivative income).



The connection between starting asset net yields and asset default costs (cont.)

- The gross yield and expense components for most fixed income assets tend to be relatively stable from time of purchase through different valuation dates.
- However, the projected default cost assumptions are intended to reflect the default risk as of the valuation date, similar to how other risks such as mortality and lapse are assessed in PBR. Thus, they are not “locked in” at purchase.
- The resulting net asset earned rate will vary over time and result in a certain amount of volatility in reserves. A key question in the development has been how much volatility is acceptable and for what reasons (ratings? spreads?).



Regulator / LRWG process to develop asset default requirements

- The Academy LRWG developed the VM-20 prescribed asset default cost methodology at the request of LATF.
- There was substantial interaction and vetting by LATF over a 15-month period.
- LATF adopted the framework developed by the LRWG at the Spring 2010 National Meeting.



Regulator / LRWG process to develop asset default requirements

- Overarching objectives provided by LATF:
 - Default costs for the same or similar assets should be the same across companies.
 - Companies should not be able to lower reserves by investing in riskier assets beyond some threshold. (Later restated as “The method should not reward companies for choosing a long-term strategic asset allocation for which the overall portfolio is riskier than some threshold”).
 - In the short term, default costs should reflect current economic conditions and grade into historic conditions over the longer term.
 - The method should be relatively simple.
 - The method should produce reasonable results as market conditions vary over time.

Note: these objectives are not completely consistent with each other



Regulator / LRWG process to develop asset default requirements

- Overarching objectives added by LRWG given the LATF objectives:
 - Risk-based elements should be incorporated to the extent possible, such as default risk should be measured as of the valuation date.
 - Internal consistency regarding:
 - Default costs on existing assets
 - Gross spreads and default costs on reinvestment assets
 - Market values on assets sold in the model



Three components of projected default costs

Projected default costs are the sum of three components:

- **#1--Baseline annual default cost factor**
 - All assets are mapped to an equivalent corporate bond rating using a 21 class system. Called the “PBR credit rating” system.
 - More granular system than the 6 NAIC designations and thus, can better capture risk (of default) versus return (yield).
 - Basis of mapping generally follows NAIC’s approach to assigning a designation for RBC
 - Assets such as public corporate bonds are mapped based on rating agency ratings.
 - Assets such as non-agency RMBS, CMBS, and traditional private placements are mapped based on NAIC designation, which in turn relies on either NAIC-sanctioned third-party modeling or SVO review.



Three components of projected default costs

- **#1--Baseline annual default cost factor (cont):**
 - Baseline default factor for each asset is level in all projection years and is a table “look-up” based on a current PBR credit rating for each asset and the weighted average life of the asset.
 - Default factors are based on historical corporate bond default and recovery experience covering 38 and 26 years respectively.
 - Cumulative default probability consistent with CTE 70 approach in that it averages the worst 30% of the bond cohorts in the data.
 - Recovery assumption ranges from about 42 cents on the dollar for higher quality bonds to 29 cents on the dollar for lower quality bonds.
 - Implicit margin (quantified in VM-20 Appendix 2, Table B) ranges roughly 70%-100% of expected for 10-year assets and 90%-125% of expected for 5-year assets.



Three components of projected default costs (cont.)

■ #2—Spread related factor

- Introduces some change in near-term default expectations based on spread environment.
- Applies at the individual asset level.
- First projection year factor is 25% of the difference between: a) the current market benchmark spread; and b) the long-term market benchmark spread, where both are based on a corporate bond of the same PBR credit rating and weighted average life. The factor is subject to a floor and a cap.
- Can increase or decrease default costs and grades off over three projection years.
- Uses the published VM-20 spread tables.
- Produces the same result for all assets with the same PBR credit rating and weighted average life.



Three components of projected default costs (cont.)

- **#3—Maximum net spread adjustment factor**
 - Portfolio-wide upward default adjustment, graded off over three years.
 - First projection year factor is 100% of the excess, if any, of the current net market spread of the portfolio over the current net market spread of a “regulatory threshold” index bond.
 - Comparison is based on the current weighted average gross spread implied in the market value of the portfolio and the current gross spread of the threshold bond, net of the corresponding VM-20 default costs (components #1 and #2) that apply to the portfolio and the threshold bond respectively.
 - Method of determining the weighted average is specified in VM-20.
 - Regulatory threshold is set at Baa/BBB, i.e. PBR credit rating 9.



The maximum net spread adjustment factor and reserve volatility

- The maximum net spread adjustment factor component was primarily aimed at addressing the LATF objective that investing in riskier asset allocations beyond some threshold should not produce lower reserves.
- The LRWG originally illustrated the regulatory threshold at a PBR credit rating of 7 (A3/A-) instead of the current 9 (Baa/BBB) and that the additional default costs would be assessed in all projection years for the assets instead of grading off over three years.
- At the June 2009 meeting, LRWG illustrated the development of reserves through a four-year time period (2005-2008) for a 10-year Funding Agreement issued 2/28/2005 with proceeds invested in a matching sample portfolio of 10-year bonds.



The maximum net spread adjustment factor and reserve volatility (cont.)

- LATF and interested parties viewed the reserves as exhibiting unacceptable volatility especially in the 2007-2008 period, when the reserves increased about 10% solely due to spread widening driving up assumed default costs, with no actual downgrades assumed.
- An assumed 5% allocation to Ba/BB bonds and a 20% allocation to structured securities were the largest contributors to the increase in assumed defaults.
- LRWG agreed to devise refinements to cut volatility. The length of the excess default cost period was shown to be the primary driver, with the level of the threshold the secondary driver.



The maximum net spread adjustment factor and reserve volatility (cont.)

- Moving to a 3-year grade off (same as component #2) reduced the illustrated reserve increase to about 4%.
- The final LRWG recommendation incorporated in the March 2010 VM-20 amendment proposal also moved the threshold to PBR credit rating 9, again citing volatility concerns.
- The LATF “riskier assets” objective had been softened to apply “in most circumstances,” recognizing a balance between this objective and the objective to produce reasonable results as market conditions vary over time.



The maximum net spread adjustment factor and reserve volatility (cont.)

- NAIC's ruling on accounting for impairments via SSAP 43R in late 2009 had also provided some perspective on this period of extreme spreads, especially for structured securities. SSAP 43R had indicated that companies should bifurcate the true credit risk from other market factors and only write down value based on the credit portion.
- The LRWG has consistently cautioned that the Maximum Net Spread Adjustment Factor may result in excessive reserve volatility. That concern remains even with the current specifications of a Baa/BBB public corporate bond threshold and a 3-year grade-off.



The maximum net spread adjustment factor and reserve volatility (cont.)

- A drafting note in VM-20 Section 9.F.1 states, “the maximum net spread adjustment factor still needs further study as to potential reserve volatility it could produce.” This feature was not addressed by the Impact Study.
 - A main driver of volatility is the basis difference between the market spreads of the assets life insurers actually hold versus that of any particular public corporate bond threshold.
 - The significant widening of structured securities (e.g., non-agency RMBS) spreads relative to corporate bonds during the financial crisis is one example. The typical spread widening of lower quality investment grade assets (e.g., BBB) versus Treasuries and higher quality investment grade assets (e.g., AA or A) in times of market stress is another.
- The LRWG continues to caution against any significant tightening of either the threshold or the grade-off period



Final Thoughts

Strength of the Baseline Default Costs

- The baseline default cost component already produces a level of conservatism consistent with the overall PBR methodology and meets the primary LATF objective of producing the same default costs for the same or similar assets held across companies.
- The LRWG believes the baseline component also substantially addresses the second LATF objective in relation to not rewarding riskier asset allocations, with the maximum net spread adjustment serving a supplemental role.
- Riskier asset allocations backing PBR reserves are likely to produce more volatile reserves and surplus since they are more likely to trigger downgrades in the PBR credit ratings. Downgrades result in a significant escalation of assumed baseline default costs in all projection years and increased reserves.



Final Thoughts

Strength of the Baseline Default Costs

- Further, the LRWG found in a previous internal study covering 2005-2008 that investing in below investment grade assets would have more often resulted in lower assumed net spreads as compared to investing in investment grade assets.
 - Further study could be conducted with more recent data.
 - The exception was the distressed environment of late 2008. However, even in a relatively wide spread environment such as late 2007, below investment grade assets would generally have resulted in lower assumed net spreads than investment grade assets.



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Appendix

Calculation of Annual Default Cost Factors for Two Sample Portfolios



Two companies: A and B

- Each has \$1B in fixed income assets on valuation date
- Each company's portfolio consists of five bonds with different WALs
- Distribution of WAL is equivalent for the two companies
- Company A maintains higher-rated portfolio than Company B

Note: The current market spread Tables (F and G) may appear high, since they are based on 9/30/2009 bond market conditions. The illustrated OAS for each asset in this example will also seem high, since they are also based on 9/30/2009 bond market conditions.



Ratings (Moody's / S&P) for each company's fixed income asset portfolio by WAL

Bond	WAL	% of fixed income assets	Company A	Company B
1	1	10%	Aaa / AAA	Aa2 / AA
2	5	30%	Aa2 / AA	Baa2 / BBB
3	10	30%	Baa2 / BBB	B2 / B
4	20	10%	Baa1 / BBB+	Caa1 / CCC-
5	30	20%	Aa2 / AA	Baa2 / BBB



Determination of PBR Credit Rating (Section 9.F.3)

Bond	WAL	Company A				Company B			
		NAIC	Moody's	S&P	PBR Rating	NAIC	Moody's	S&P	PBR Rating
1	1	1	Aaa	AAA	1	1	Aa2	AA	3
2	5	1	Aa2	AA	3	2	Baa2	BBB	9
3	10	2	Baa2	BBB	9	4	B2	B	15
4	20	2	Baa1	BBB+	8	5	Caa1	CCC-	18
5	30	1	Aa2	AA	3	2	Baa2	BBB	9

Per 9.F.3.b, must assign PBR rating equivalency for each available ARO rating, using Table J in Appendix 2.

Caa1 → PBR rating of 17

CCC- → PBR rating of 19

Whole # average of PBR equivalent ratings for each ARO is 18 for this bond.



Calculating Baseline Annual Default Costs

(Section 9.F.1.a)

		Company A		Company B	
Bond	WAL	PBR Credit Rating	Annual Default Cost (bps)	PBR Credit Rating	Annual Default Cost (bps)
1	1	1	0	3	0.1
2	5	3	1.2	9	39.8
3	10	9	45.2	15	436.4
4	20	8	24.3	18	952.3
5	30	3	1.8	9	45.2
Wtd Avg Ann Default Cost			16.7	247.1	

From Appendix 2, Table A



Calculating Spread-Related Factor

(Section 9.F.1.b)

Company A

Bond	WAL	(A) PBR Credit Rating	(B) Current Spread (Tables F&G)	(C) Historical Spread (Tables H&I)	25% x (B – C)	Minimum: - (baseline annual default cost)	Maximum: 2x (baseline annual default cost)	Spread Related Factor
1	1	1	108.9	60.3	12.2	0.0	0.0	0.0
2	5	3	150.2	99.1	12.8	-1.2	2.4	2.4
3	10	9	264.2	202.0	15.6	-45.2	90.4	15.6
4	20	8	247.8	187.0	15.2	-24.3	48.6	15.2
5	30	3	190.8	130.2	15.2	-1.8	3.6	3.6

“Spread-related factor” cannot be less than negative of baseline annual default cost (9.F.1.a) and cannot exceed 2 x baseline annual default cost.



Spread-Related Factor by Projection Year

(Section 9.F.1.b)

Company A

Bond				Year 1	Year 2	Year 3	Year 4
1				0.0	0.0	0.0	0.0
2				2.4	1.6	0.8	0.0
3				15.6	10.4	5.2	0.0
4				15.2	10.1	5.1	0.0
5				3.6	2.4	1.2	0.0



Calculating Spread-Related Factor

(Section 9.F.1.b)

Company B

Bond	WAL	(A) PBR Credit Rating	(B) Current Spread (Tables F&G)	(C) Historical Spread (Tables H &I)	25% x (B – C)	Minimum: - (baseline annual default cost)	Maximum: 2x (baseline annual default cost)	Spread Related Factor
1	1	3	120.3	76.3	11.0	-0.1	0.2	0.2
2	5	9	253.3	192.3	15.3	-39.8	79.6	15.3
3	10	15	730.9	650.5	20.1	-436.4	872.8	20.1
4	20	18	1,168.7	1,311.1	-35.6	-952.3	1,904.6	-35.6
5	30	9	272.0	209.1	15.7	-45.2	90.4	15.7

“Spread-related factor” cannot be less than negative of baseline annual default cost and cannot exceed 2 x baseline annual default cost.



Spread-Related Factor by Projection Year

Company B

Bond	Year 1	Year 2	Year 3	Year 4
1	0.2	0.1	0.1	0.0
2	15.3	10.2	5.1	0.0
3	20.1	13.4	6.7	0.0
4	-35.6	-23.7	-11.9	0.0
5	15.7	10.5	5.2	0.0



Maximum Net Spread Adjustment Factor (Section 9.F.1.c.i)

Company A

Bond	WAL	PBR Credit Rating	(A) Baseline Default Cost	(B) Spread Related Factor	(C) Investment Expenses (bps)	(D) OAS (bps)	Prelim Year 1 Net Spread D-A-B-C
1	1	1	0	0	10	100	90
2	5	3	1.2	2.4	10	150	136.4
3	10	9	45.2	15.6	10	275	204.3
4	20	8	24.3	15.2	10	350	300.5
5	30	3	1.8	3.6	10	140	124.6



Maximum Net Spread Adjustment Factor (Section 9.F.1.c.i)

Company B

Bond	WAL	PBR Credit Rating	(A) Baseline Default Cost	(B) Spread Related Factor	(C) Investment Expenses (bps)	(D) OAS (bps)	Prelim Year 1 Net Spread D-A-B-C
1	1	3	.1	.2	10	170	159.7
2	5	9	39.8	15.3	10	305	240.0
3	10	15	436.4	20.1	10	780	313.5
4	20	18	952.3	-35.6	10	1220	293.3
5	30	9	45.2	15.7	10	325	254.1



Weighted Average Preliminary Year 1 Net Spread

(Section 9.F.1.c.ii)

Company A

Bond	WAL	Prelim Yr 1 Net Spread	Weighting
1	1	90.0	3.57%
2	5	136.4	32.14%
3	10	204.3	32.14%
4	20	300.5	10.71%
5	30	124.6	21.43%
Weighted Prelim Year 1 Net Spread			171.6

Company B

Bond	WAL	Prelim Yr 1 Net Spread	Weighting
1	1	159.7	3.57%
2	5	240.0	32.14%
3	10	313.5	32.14%
4	20	293.3	10.71%
5	30	254.1	21.43%
Weighted Prelim Year 1 Net Spread			269.6

Weightings for Prelim Net Spread:

Bond	WAL	(A) Statement Value (000,000s)	(B) Min(WAL,3)	A x B	%
1	1	100	1	100	3.57%
2	5	300	3	900	32.14%
3	10	300	3	900	32.14%
4	20	100	3	300	10.71%
5	30	200	3	600	21.43%



Hypothetical Asset

(Section 9.F.1.c.iii)

- PBR credit rating = 9
- WAL = wtd average of actual portfolio = 12.6. Round to 13
- OAS from Table F = 265.4
- Investment expenses = 10 bps
- Baseline annual default cost factor from Table A = 45.2
- Spread-related factor from Tables F and H = 15.6
- Preliminary year 1 net spread
= $265.4 - 45.2 - 15.6 - 10 = \mathbf{194.6}$



Prescribed Maximum Net Spread Adjustment Factor (Section 9.F.1.c.iv)

% of fixed income assets	Company A	Company B
Wtd Avg Prelim Year 1 Net Spread	171.6	269.6
Hypothetical Asset Prelim Year 1 Net Spread	<u>194.6</u>	<u>194.6</u>
Difference	-23.0	75.0
Max Net Spread Adjust Factor Year 1	0.0	75.0
Year 2	0	50.0
Year 3	0	25.0
Year 4	0	0



Total Annual Default Cost

Company A: Bond 3

	Component	Year 1	Year 2	Year 3	Year 4+
	Baseline	45.2	45.2	45.2	45.2
	Spread-related Factor	15.6	10.4	5.2	0.0
	Max Net Spread Adjustment	0.0	0.0	0.0	0.0
	Total Default Cost	60.8	55.6	50.4	45.2



Total Annual Default Cost

Company B: Bond 3

	Component	Year 1	Year 2	Year 3	Year 4+
	Baseline	436.4	436.4	436.4	436.4
	Spread-related Factor	20.1	13.4	6.7	0.0
	Max Net Spread Adjustment	75.0	50.0	25.0	0.0
	Total Default Cost	531.5	499.8	468.1	436.4



Total Annual Default Cost for Year 1

Company A

$$16.7 + 7.6 + 0 = \mathbf{24.3 \text{ bps}}$$

Company B:

$$247.1 + 10.2 + 75.0 = \mathbf{332.3 \text{ bps}}$$

