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C-1 Factors for Corporate Bonds Project Update

Presentation to the NAIC IRBC Working Group

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Agenda

- Methodology for Calculating C1 Factors
  - Calculating the base C1 Factors
  - Technical Considerations

- Results – round three
  - C1 Factors for Corporate Bonds (complete & compressed)
  - Summary of Major Assumptions
  - Changes from March results
  - Observations

- Next Steps for C1WG

- Decisions for NAIC's Investment Risk Working Group

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Conceptual C1 Methodology

- C1 factors are based on a model of projected bond losses.

- This model contains assumptions that are based on historical experience and reflects behavior that does not change over time.

  - Assumptions must be representative of the entire industry and applied to each company, regardless of the company's investment risks.

  - Assumptions are consistent with a ten year time horizon and attempt to capture changes over that horizon.

  - Passive strategies are modeled – unrealistic, but modeling active strategies would not be possible.

- In reality, a bond portfolio would be actively managed reflecting sector, duration and other allocations; individual security decisions would vary with company needs and market conditions.

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Calculating Base C1 Factors

- The C1 capital charges are derived from a simulation model where the cash flows for a representative bond portfolio are projected assuming different economic scenarios.

- The required capital for a given economic scenario equals the amount of initial funds needed such that the accumulation of this initial amount and subsequent cash flows will not become negative <u>at any point throughout the modeling period.</u> Requiring capital to pre-fund the greatest loss is more conservative than pre-funding the cumulative losses over ten years.

- Additions and subtractions from this fund are projected over the modeling period:
  - Additions include an annualized risk premium, interest and tax recoveries of default loss
  - Subtractions include the loss given default and taxes on earned interest

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- The required capital for a given economic scenario equals PV of the net cash flows discounted at a specified interest rate. DR = 5% before tax.

- The C1 factors pre-fund the greatest cumulative shortfall during the ten year time horizon – not just the cumulative shortfall at the ten year horizon point.

- Simulations project varying economic conditions where default rates and recoveries vary from a baseline assumption dependent on the probability of the future economic state (expansion, recession).

- Required capital amount for each simulation is divided by beginning assets to get a required capital factor
  - Recommended C1 charges shown represent a 92nd percentile, 10 year time horizon safety level for an individual security.
  - The statistical safety level at the portfolio level will be tested; Expected to fall in the 95-96th%

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Key Modeling Assumptions

- Expected default rates from the Moody's Corporate Bond Default Study: 1983-2012.

- Expected recovery rates derived from S&P proprietary study covering 1987-2012.

- Corporate tax rate and timing of loss recognition, updated for current data, reflecting SSAP 43R.

- Representative portfolio constructed to represent the typical portfolio for an insurer
  - Portfolio characteristics capture the key variables that will have the greatest effect on the variability of capital between companies; characteristics include size, and quality ratings.
  - NAIC provided information on every bond position for every life insurance company as of December 31, 2011; data provided did not identify company or asset cusips. Data represented approximately 287,000 positions; 782 companies.

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- Modeling assumes expected losses included in statutory policy reserves are quantified as a constant number of basis points, a risk premium (RP).
  - The RP is defined as the expected loss over ten years for each rating class: a level, annualized risk premium.
  - Essentially, the RP represents the amount of spread contained in statutory reserves that is prefunding expected future defaults.
  - RP varies from 1bp (AAA) to 538bp (Caa3).
- The RP method is more consistent with current methods for statutory reserve requirements.
  - Current formulaic statutory reserving requirements discount future cash flows at a prescribed discount rate; these formulaic requirements are further tested for adequacy using cash flow testing models with current, company-specific assumptions. Many companies quantify future defaults as a level bp charge, where the level might vary by the portfolio.

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Changes from March 2014 Results

- Extensive review of default studies: issuer vs. issue
  - Conclusion: C1 factors now based on loss assumptions for senior unsecured debt.

- Use of lien position in C1 factors (matrix vs. vector)
  - Matrix could not adequately capture risk differences at issue level with tabular averages, especially for below investment grade securities.
  - Rating agency ratings are assumed to capture issue specific risk differentials. RA ratings based on expected results over a shorter time frame than C1, but C1 model could not adequately capture risk.
  - Conclusion: C1 factor recommendation now based solely on NAIC rating class.

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Recommended C1 Factors for Testing
Before Tax

	Rating	Proposed C1 Pre-tax	Current C1 Pre-tax
1	Aaa	0.33%	0.40%
2	Aa1	0.45%	0.40%
3	Aa2	0.53%	0.40%
4	Aa3	0.67%	0.40%
5	A1	0.83%	0.40%
6	A2	1.06%	0.40%
7	A3	1.34%	0.40%
8	Baa1	1.66%	1.30%
9	Baa2	2.06%	1.30%
10	Baa3	2.75%	1.30%

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Recommended C1 Factors for Testing
Before Tax (cont.)

	Rating	Proposed C1 Pre-tax	Current C1 Pre-tax
11	Ba1	3.22%	4.60%
12	Ba2	4.19%	4.60%
13	Ba3	5.69%	4.60%
14	B1	6.23%	10.00%
15	B2	8.57%	10.00%
16	B3	11.48%	10.00%
17	Caa1	15.23%	23.00%
18	Caa2	20.44%	23.00%
19	Caa3	28.67%	23.00%

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Observations on Results

- Results are pre-tax, based on a statistical confidence level at the 92nd percentile over a ten-year time horizon.

- Results are presented for the largest matrix of factors:
  - C1 factors for 19 rating classes are illustrated.
  - The 19 factors can be compressed into 13 factors.
  - Securities near or in default will also be a rating class. Only securities in NAIC Classes 1-5 are modeled.

- All assumptions have been updated.

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Observations on Results (cont.)

- More comprehensive default and recovery data is available compared to twenty years earlier.
  - Recovery rates have decreased.
    - 1992 model assumed a normal distribution for recoveries, but recoveries don't exhibit a normal distribution.
    - 2014 model uses actual recovery experience from S&P.
    - 2014 recoveries do not vary as much by economic state compared to 1992 model, consistent with S&P data.
  - Generally, default rates for investment grade (IG) are unchanged; below investment grade (BIG) default rates are higher.
  - LGD for IG have increased; LGD for BIG have decreased.

- 2014 factors have been derived from senior unsecured data. The ratings are assumed to capture different LGD expectations for other instrument types.

- Current factors assume 25% AAA, 25% AA, 50% A in NAIC Class 1.

- Discount rate decreased: 3.5% AT vs. 6% AT

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Recommended Bond Classes

	Current NAIC	Proposed
Aaa	1	1
Aa1	1	1
Aa2	1	2
Aa3	1	2
A1	1	3
A2	1	3
A3	1	3
Baa1	2	4
Baa2	2	5
Baa3	2	6

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Recommended Bond Classes

	Current NAIC	Proposed
Ba1	3	7
Ba2	3	8
Ba3	3	9
B1	4	10
B2	4	11
B3	4	12
Caa1	5	13
Caa2	5	13
Caa3	5	13

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Recommended NAIC Classes - Compressed
C1 factor based on weighted issuer count

	Rating	Proposed C1 Pre-tax	Proposed C1 Pre-tax compressed	Current C1 Pre-tax
1	Aaa	0.33%	0.38%	0.40%
2	Aa1	0.45%	0.38%	0.40%
3	Aa2	0.53%	0.61%	0.40%
4	Aa3	0.67%	0.61%	0.40%
5	A1	0.83%	1.13%	0.40%
6	A2	1.06%	1.13%	0.40%
7	A3	1.34%	1.13%	0.40%
8	Baa1	1.66%	1.66%	1.30%
9	Baa2	2.06%	2.06%	1.30%
10	Baa3	2.75%	2.75%	1.30%

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Recommended NAIC Classes – compressed
C1 factor based on weighted issuer count (cont.)

	Rating	Proposed C1 Pre-tax	Proposed C1 Pre-tax compressed	Current C1 Pre-tax
11	Ba1	3.22%	3.22%	4.60%
12	Ba2	4.19%	4.19%	4.60%
13	Ba3	5.69%	5.69%	4.60%
14	B1	6.23%	6.23%	10.00%
15	B2	8.57%	8.57%	10.00%
16	B3	11.48%	11.48%	10.00%
17	Caa1	15.23%	18.66%	23.00%
18	Caa2	20.44%	18.66%	23.00%
19	Caa3	28.67%	18.66%	23.00%

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Major C1WG Q4 Items

- Complete documentation

- Explain and quantify major difference between 2014 and current factors

- Respond to regulator and interested party questions

- Produce AVR factors consistent with C1 factors

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Major 2015 C1WG Items

- Develop adjustments to base C1 factors for portfolio variations (e.g., number of issuers, size distribution); determine statistical coverage for C1 at a portfolio level (e.g., 95th percentile).

- Recommend C1 factors for non-modeled fixed income classes
  - Private Placements
  - Municipals
  - Structured securities (i.e., those structures not modeled by BlackRock/PIMCO such as CLOs, CDOs, ABSs)
  - Hybrids
  - Mezzanine Debt
  - Preferred Stock
  - Other asset classes
  - Bonds in or near default (current NAIC 6 bonds)

- Review consistency of corporate bond factors with other modeled asset classes
  - Structured securities modeled by BlackRock/PIMCO
  - Commercial Mortgages

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Upcoming Major Decisions for NAIC IRBC Working Group

- Decide on the number of NAIC classes for RBC purposes

- Decide on RBC protection level for all asset types
  - Time horizon (Note: C1WG has recommended 10 years)
  - Risk metric (Note: C1WG has recommended percentile until covariance within aggregate RBC formula is reviewed)
  - Statistical level (e.g., 92nd percentile)
  - Consistency among asset classes, RBC formulas

- Decide on the degree of consistency between Life, Fraternal, Health, and P&C Blanks and RBC formulas

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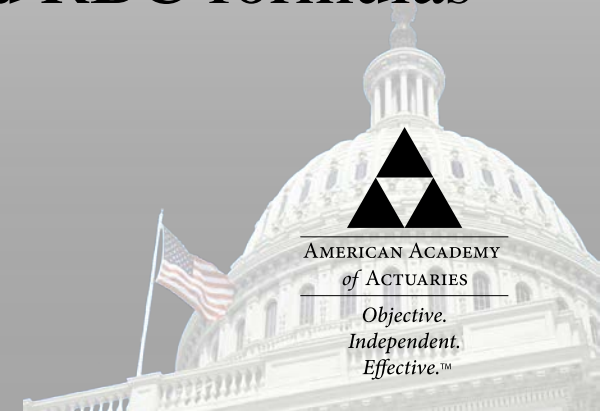
Questions

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