Assessment of Proposed Revisions to the RBC C1 Bond Factors

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Agenda

1. Project Overview
2. Key Findings
3. Recommended Next Steps

Appendix I. Detailed Phase 1 Scope
Appendix II. Detailed Significant Areas of Review and Recommendations

1 | Project Overview

Background

Timeline

» On October 22, 2020, the ACLI, in conjunction with the NAIC, put forth a public RFP to assess the proposed RBC C1 Bond Factors.

» On December 4, 2020 Moody's Analytics was awarded the RFP.

» Moody's Analytics delivered the final report and recommendations for public comment on February 1, 2021.

Why Moody's Analytics?

» Objective reputation

» Credit portfolio risk thought leader;
RiskFrontier used by 9 of 12 largest North American life insurers for tail risk

» Comprehensive and granular asset correlations, built using decades of data and default risk experience

» Proprietary default datasets, across multiple asset classes, that can be used to inform our analysis

» Fixed income market data, sourced from multiple authorities, including Moody's Investors Service, with access to underlying data across asset classes, including Corporates, Municipals, Structured, and CRE

» Decades of experience with regulatory initiatives, including IFRS 17, CECL, IFRS 9, Basel, CCAR.

» Experience directly supporting regulators in defining capital guidelines

RFP Requirements

Assess the proposed required capital factors for the default risk on bonds.
Review the proposed revisions to the RBC C-1 bond capital factors, including supporting documentation of the development of assumptions and modeling process, and stakeholder feedback on the proposed revisions, focused on concerns with the modeling process, the development of assumptions from underlying experience, and the adjustments to reflect diversification of individual company portfolios.

Moody's Analytics objective opinion based on access to supporting documentation and stakeholder feedback, including the NAIC, ACLI and its members

Practical recommendations

» Quantifying identified risks intended to be captured by C1 factors

» Using data and modeling approaches recognized as best practice and that meet financial industry standards (documentation, model validation, back-testing, performance benchmarking…)

» Acknowledging impact on business decisions through regulatory capital arbitrage incentives, shifting asset holdings, effecting solvency, macroprudential resiliency, and capital markets

Proposed C1 Factors: Context

The Academy's Defined Scope was dictated by the NAIC RBC Working Group and limited to:

» Updated data

» Expansion to 20 designations

» Maintaining the modeling structure designed ~30 years ago
(cutting edge for the early 90s)

The report is not limited to the Defined Scope, rather it takes a broader view, recognizing:

» Modeling techniques and data availability have evolved with capital markets
(e.g., structured assets)

» Life insurance asset holdings have changed along with capital markets

2 | Key Findings

Proposed C1 Factors: Areas of Concern

Not using best practice with data and modeling choices

» This includes items within the Defined Scope, as well as items outside of the Defined Scope, that Moody's feels are relevant and material.

Model documentation, does not generally meet financial industry standards. Critical for ongoing model monitoring and model updates. With limited articulation of model limitations, the potential for distorted business use has implications for solvency.

» Incomplete documentation

» Incomplete model validation, back-testing, and performance benchmarking

» Incomplete articulation of model limitations

Modeling and Data Concerns Within Defined Scope

Methodologies used in estimating default rates and recovery rates
do not lend themselves to statistical properties of the data, including:

» Appropriately capturing the risks across ratings when applying the methodology across the granular 20 designations, considering limited data availability and the statistical properties of ratings and default.

» Calibration of the portfolio adjustment function to accurately capture the benefits of diversification. The current proposal may be overly punitive to holdings of smaller life insurance companies. The rational for doubling of C1 factors of the 10 largest issuers is also unclear.

Overly conservative assumption for the risk premium

» Inputs for which accurate proxies are available, as is the case with the risk premium, should be directly used to facilitate transparency and avoid inadvertent risk shifting across categories. Conservatism can be added in the final stage (i.e., when setting percentile loss).

Dated discount rate and tax assumptions

Modeling and Data Concerns Outside the Defined Scope

Lack of differentiation across asset classes (e.g., corporate, structured, municipal credit), maturity, and investment income offsets

» Rating agencies recognize that the fundamental risk drivers differ across asset classes.

» The report finds material differences in observed default, migration, and recovery dynamics across asset classes.

The use of multiple NRSROs given their potential lack of comparability

» NRSROs have unique differences in credit rating methodologies and do not provide correspondence, because they base their credit ratings on a range of qualitative, as well as quantitative, factors.

The economic state modeling framework does not lend itself to statistical properties of default and recovery dynamics

Lack of consideration for climate hazards or emerging risks (e.g., pandemic or cyber)

» These risks may not be explicitly incorporated into NRSRO ratings and may not be reflected in the historical data used in estimating the C1 factors.

3 | Recommended Next Steps

A Phased-In Approach is Recommended

Phase 1: **Moody's to Propose C1 Factors**

> Delivered to the LRBCWG and exposed on or before April 30 for comment
>
> Final factors to be approved by both LRBCWG and CADTF by June 30

Model development within Defined Scope and aligning with current Official NAIC Annual Statement Blank. Consensus-driven approach on methodologies and data across the NAIC, ACLI and its members. Documentation includes model validation and limitations that meet financial industry standards.

Phase 2: **Long-term partnership through 2022+**

Modeling and data updates outside the Defined Scope, providing NAIC data and tools to better understand and articulate life insurance companies' credit portfolio risks, recognizing range of holdings have changed materially since C1 factors were introduced.

» **Broader model development,** including cross-asset class differentiation, prioritized with stakeholders, with methodologies and data that meet financial industry standards.

» **Overall model documentation,** that meets financial industry standards, in particular covering elements of the model not modified in Phase 1.

» **Data consortium**, covering private placements and possibly other asset classes.

Phase 1 Timeline

Scope defined jointly with stakeholders while recognizing timeline constraints

By March 31

» V1 proposed factors, iterating with NAIC and ACLI

  – Consensus on methodology, data, and performance criteria

  – Consensus on target probability

» V1 light documentation

» V1 initial industry impact analysis

By April 30

» Delivered to the LRBCWG and exposed for comment

» Initial documentation and validation

» Impact analysis, iterating with NAIC and ACLI

  – Consensus on methodology, data, and limitations

  – Consensus on target probability

» Initial focus group discussions and training

By June 30 (Iterating with NAIC/ACLI as needed)

» Final factors to be approved by both LRBCWG and CADTF

» Final documentation and validation of factors that meet financial industry standards

» Final focus group discussions and training

Phase 2 Broader Model Development

Approached in conjunction with stakeholders iteratively

Obtain clarity on the desired level of:

» Model complexity (e.g., issuer concentration)

» Granularity (e.g., differentiating across asset risks)

Assess cost implications

» Resources, including personnel, to develop and implement models

» Data collection

» Articulate governance — potentially impacting organizational structure at insurance companies and NAIC

Propose redesigned C1 factors

» Assess and agree on performance criteria, along with possible data sources and methodologies

» Propose updated model, and C1 factors that meet financial industry standards

» Assess implications for solvency across the life insurance industry

Appendix I

Detailed Phase 1 Scope

Phase 1: Final scope to be agreed on by stakeholders

Base factors

» Risk Premium: Use 1 standard deviation loss (rather than mean)

» Updated discount and tax rate assumptions

» PD and LGDs

– Use Idealized Default Rates

– Re-estimate LGD with date errors fixed

– Fix LGD error in economic state model

– Limitation - economic state scalar would remain unchanged

» Obtain a representative set of corporate bond holdings and ratings across life insurance companies

» OPTIONAL - Portfolio construction requires an additional [uncertainty has no guarantee of delivery for Phase 1, but will be usable for Phase 2]

– Explore alternative portfolio construction methods

» Iterate with NAIC on target probability to ensure "average" level, in-line with NAIC risk tolerance

» Iterate with industry on slope and impact

Portfolio adjustment Function

» Integrate the doubling of 10 largest holdings requirement with portfolio adjustment function

» Explore alternative regression approaches such as equal weighted error minimization rather than dollar weighted, to allow for better description for small insurance companies

» Assessment of concentration risk using Moody's Analytics internal benchmarks, which would be made public

» Iterate with NAIC on target probability to ensure "average" level, in-line with NAIC risk tolerance

» Iterate with industry on impact

Appendix II

Detailed Significant Areas of Review and Recommendations

Review of Key Inputs

Summary of significant areas of review and recommendations

Default Rates	The methodologies used by the C1 Factor Proposal to construct default rates across ratings, as well as methodologies used in differentiating default rates across expansion and contraction states, face data limitation challenges. Moody's Analytics recommends updating the methodologies and using additional data referenced in the review that have been demonstrated to better capture credit dynamics.
Recovery Rates	The C1 Factor Proposal's method used to recognize the recovery date does not align with the date of default. This deviation can result in bias with recovery rate levels, as well as their relationships with default rates. Moody's Analytics recommends exploring the use of more accurate data and groups when describing recovery distributions and utilizing more current techniques that link recovery with the credit environment.
Discount Rate	Since the modeling work was conducted by Academy in 2015, the discount rate used in the model is calculated using historic data that does not reflect the current low-interest environment, nor the expected continuation of a low interest rate environment. Moody's Analytics recommends updating the discount rate to include December 31, 2013 − December 31, 2020 data to better reflect the current and expected interest rate environment, in conjunction with updated tax assumptions that reflect the 2017 Tax Act.
Construction of the Representative Portfolio	The segmentation and filtering of the sample portfolios used to construct the representative portfolio lack economic justification or sensitivity analysis. For example, for reasons not explained, only NAIC1 and NAIC2 rated issuers are used to determine the number of bonds in the representative portfolio for all rating categories. In addition, each representative portfolio ultimately used in the simulation contains one rating category, which makes the final C1 factors heavily dependent on portfolio adjustment factors. Given the importance of the representative portfolio, we recommend more comprehensive documentation and robustness tests that can show whether the segmentation and filtering method has material impact on the C1 factors and explore the option of constructing a representative portfolio that contains all rating categories.
Tax Assumptions	The U.S. corporate tax rate was lowered from 35% to 21% in accordance with the 2017 Tax Reconciliation Act (Deloitte, 2018). Net capital gains included in the taxable income are subject to the 21% rule (CCH Group, 2019). While the model was developed based on historical data before the tax cut, the RBC factors, if adopted, will be applied to insurers, which will pay the updated tax rate. It will be worthy to consider updating the assumed 35% tax rate to 21%. Moody's Analytics recommends analysis reflecting the current tax environment.

Review of Model Framework

Summary of significant areas of review and recommendations

Economic State Model	We have three main concerns regarding the economic state model, which are closely related to the discussion in Section 3.1. First, the two-state model does not accurately capture persistency in default and recovery rates across the credit cycle. Second, the economic state of Loss Given Default (LGD) appears to be mistakenly disconnected from that of default rate for ratings Baa-Caa. Third, the scaling factor used in differentiating default rates across expansions and contractions appears to be overly punitive for the investment-grade segment compared with historical patterns. Moody's Analytics recommends a more holistic review of the choice of a framework that can address broader sets of issues, including more precise differentiation across asset classes, as discussed in other sections.
Portfolio Adjustment Factors	The portfolio adjustment factor is one of the most important elements of the model, as it ultimately determines the general RBC level for individual insurers. Unfortunately, documentation is limited, making it difficult to access the materiality of some of the modeling choices. In addition, the limited documentation available suggests a potential material gap between the calculated C1 factor and its target level for individual insurers, especially smaller ones. Moody's Analytics recommends: (1) more detailed documentation of the adjustment factor and the underlying economic justification, in conjunction with the doubling of C1 factors for the top-10 largest issuers; (2) further exploring the data and methods used to estimate the portfolio adjustment factors, to ensure they are effective for corporate as well as non-corporate issuers, (3) design the factors to align incentives with the economic risks, and (4) design a structure that brings together the portfolio adjustment factors along with the doubling of C1 of the 10 largest issuers.
Risk Premium	The current assumption of setting the Risk Premium equal to expected loss appears to be overly conservative. While the C1 Factor Proposal recognizes the inconsistency, they point out that the 1992 guidelines defined the Risk Premium in this way and, in conjunction with other parameters, some of which (e.g., AVR) are beyond the scope of this report. While Moody's Analytics appreciates the desire to incorporate conservativeness into assumptions, inputs for which accurate proxies are available should be directly used, and rather incorporate the conservative overlay into the final steps to facilitate model transparency. Moody's Analytics recommends a broader evaluation of the various interconnected modeling decisions that lead to setting the Risk Premium at the expected loss level, and aligning the models with a general consensus across the actuarial community, including setting the Risk Premium at a one standard deviation loss.

Review of Elements Outside of the Defined Scope

Summary of significant areas of review and recommendations

Applicability of Moody's Rated Corporate Data to Other Asset Classes	C1 RBC base factors were developed using Moody's default rate data on Moody's rated public corporate bonds (this report, as well as references herein, uses public corporate and Moody's rated corporate interchangeably) supplemented with S&P's recovery data. After controlling for ratings, we find material differences in observed default, migration, and recovery dynamics across asset classes. These differences question the effectiveness of using public corporate bond data for all asset classes. Moody's Analytics recommends evaluating the possibility of estimating distinct C1 factors using asset-class specific data. For private placements, in particular, Moody's Analytics recommends exploring a centralized collection of default, migration, and recovery data that can later be used in further estimating distinct C1 factors and for other purposes.
Simulation and Correlation	The current C1 factor model does not account for variation in cross-industry and cross-asset class concentration risks nor diversification that may be different across life companies' portfolios. These variations can be material, and we recommend additional analysis that assesses the materiality of abstracting from cross-industry and cross-asset class differentiation.
Maturity Effect on Capital Factors	The C1 factors do not differentiate risk across maturity. This can create a material distorted incentive to hold longer-dated bonds whose credit risk is more sensitive to the credit environment. Moody's Analytics recommends exploring a maturity adjustment to the C1 factors.
Investment Income Offsets	While investment income can be used to offset loss and support statutory surplus, the C1 factors are modeled with the implicit assumption that all investment profits are fully distributed to policyholders or used to absorb product or operational losses. This introduces a potential bias in differentiating investment income across assets, across rating categories, and across asset classes. Accounting for such heterogeneity in investment income can potentially lead to substantial differences in RBC factors across ratings and asset classes. Moody's Analytics recommends more accurately differentiating investment income across assets in the C1 factors.
Comparability Across NRSROs	The model is developed using Moody's rating only. However, NAIC rating designations are often determined by a set of NRSROs ratings. NRSROs have unique differences in credit rating methodologies and do not provide correspondence because they base their credit ratings on a range of qualitative, as well as quantitative, factors. This creates a challenge when mapping ratings across NRSROs to the various NAIC rating designations. It is plausible that the properties (such as default rate, recovery, etc.) of the NAIC rating in practice are substantially different from those of Moody's rating used in the model development. With this in mind, we recommend an assessment of variation across NRSROs rating migration, default, and recovery rates, and across the credit cycle. If this is not possible because of, say, lack of historical data, Moody's Analytics recommends revisiting the use of the second-lowest NRSROs rating in assigning the NAIC designation.
Climate Hazards and Emerging Risks	The C1 factors do not explicitly consider climate hazards or emerging risks (e.g., pandemic or cyber). These risks may not be explicitly incorporated into NRSRO ratings and may not be reflected in the historical data used in estimating the C1 factors. While climate hazards are particularly relevant for the likes of real estate and municipal credit, growing evidence suggests climate hazards and other emerging risks can be material for corporate credit. Moody's Analytics recommends exploring the potential impact of climate hazards and emerging risks on C1 factors across asset classes.

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