November 20, 2023

Ms. Rachel Hemphill, Chair, Life Actuarial (A) Task Force (LATF)
Mr. Philip Barlow, Chair, Life Risk-Based Capital (E) Working Group (Life RBC)
Mr. Mike Yanacheak, Chair, Generator of Economic Scenarios (E/A) Subgroup (GOES Subgroup)
National Association of Insurance Commissioners (NAIC)

Dear Ms. Hemphill, Mr. Barlow, and Mr. Yanacheak,

On behalf of the Economic Scenario Generator Subcommittee (ESGS) of the American Academy of Actuaries,[1] I appreciate the opportunity to comment on the Generator of Economic Scenarios (GOES) Corporate Model Decision[2] as it relates to the prescribed economic scenario generator for the purpose of determining statutory reserves and capital on long duration life and annuity products.

Summary Comments

The ESGS supports the use of the Academy's Alternative Corporate Model presented to LATF on 10/27/22. The Model is fully and publicly documented and meets the proposed stylized facts and acceptance criteria. Publicly available model documentation enables public analyses and transparent discussion and feedback, which can strengthen model governance. Public documentation also supports small companies with limited resources, as it allows them to leverage the public analyses performed by academia and the broader profession.

The ESGS would not support GEMS™ Corporate Model for this particular purpose because its documentation is intentionally and knowingly largely incomplete due to its proprietary nature. The lack of documentation fails to comply with the NAIC's original request for proposal (RFP) for this project[3] and would require actuaries to deviate from best practice, since the model's internal workings cannot be understood, nor can its results be reasonably reproduced or independently tested. Without adequate documentation, it is impossible to know if the model is appropriate for the intended purpose, as it is unclear if the model's behavior will change as economic conditions evolve. Acceptance criteria alone won't be

[1] The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

[2] Life Actuarial (A) Task Force and Life RBC (E) Working Group Exposure 10/18/23: GOES Corporate Model Decision.

[3] Deliverable I in the NAIC's RFP is "Full documentation on the ESG specifications, calibration, and tools."

enough to evaluate the model and its calibration when so little is known about it.[4]

It is not necessary that model documentation allows knowledgeable actuaries to exactly replicate the model's parameters and scenario sets. However, it should allow actuaries to have sufficient understanding of the model and its behavior under different, initial conditions to recover the essence of the statistical distribution the model is designed to produce (e.g., percentiles and other statistical metrics) and opine on that distribution, its dynamics, and fitness for purpose. [5]

Detailed Comments

Should an assumption be important enough to be prescribed in PBR, it follows that the relevant actuarial standards of practice (ASOPs) and best practices be followed in the assumption's development, documentation, and application. Assumed stochastic returns on corporate bond funds may be prescribed and/or produced with commercially available software, but many PBR actuaries would still consider whether the prescribed assumption is reasonable or has material limitations that could understate reserves. At the risk of losing credibility, the framework for PBR should allow for PBR actuaries to be able to explain to a company's Board, rating agencies, and others exactly how and why the PBR corporate assumptions behave differently from the assumptions the company used in its own economic views, risk management analysis, etc. This is especially true should those assumptions drive materially different results. Both situations require underlying model information beyond what's available for GEMS™.

While we believe the GEMS™ corporate model documentation provided to date is inadequate for evaluating whether the model is fit for the purpose at hand, it does suggest more broadly that the model may be overly complex. Models can require considerable work by actuaries to understand and could complicate future efforts by the NAIC to rationalize and establish consistent treatment of credit spreads and default costs through statutory regulation (e.g., general account vs. separate account, reserves vs. capital vs. asset adequacy testing). Using such a sophisticated model to simulate returns on a few corporate bond funds (e.g., one that models a universe of individual bonds migrating over dozens of credit ratings) is akin to using a multi-state long-term care model to simulate deaths on traditional life insurance policies. As we continue to work towards a solution, it is important to keep in mind that some solutions may lead us towards an answer, but they may not be the most efficient means to get there. A compounding factor in this scenario rests on the idea that the model employs overly sophisticated components to simulate returns for a few corporate bond funds, while those same sophisticated components are also most likely to be considered proprietary and not publicly documented.

---

[4] The documentation provided for GEMS™ Treasury and Equity models, while not enabling exact replication of results, does provide enough information on formulas, parameters, etc., that when combined with other Conning statements gives us enough to understand the model's dynamics, strengths, and limitations so that we can implement an approximate replication and evaluate fit for purpose.

[5] For example, Actuarial Standard of Practice (ASOP) No. 56, Modeling, provides guidance to actuaries when performing actuarial services with respect to using, reviewing, or evaluating models. Section 3.1.2 of ASOP No. 56 states actuaries "evaluating the model … should confirm that, in the actuary's professional judgment, the model reasonably meets the intended purpose." Section 3.1.3 of ASOP No. 56 states that "[w]hen using the model, the actuary should make reasonable efforts to confirm that the model structure, data, assumptions, governance and controls, and model testing and output validation are consistent with the intended purpose."

The limited documentation provided on the GEMS™ Corporate Model reflects a stochastic spread process that allows for spreads to blow out, correlations between corporate spreads and equity returns, and a stochastic process involving a transition matrix for ratings migration. It also conceptually describes how long-term spread targets are set. What is missing are equations for any of the stochastic processes, including the spread jump process, information on the form or parameters of the statistical distributions, the strength and direction of relationships underlying the spreads and transition probabilities, and a description of how migrations, spreads, defaults, recoveries, transaction costs, and bond returns are calculated. The appendix includes a list of sample documentation components for a corporate bond ESG model, the majority of which are currently not publicly available for the GEMS™ Corporate Model.

The NAIC adopted Actuarial Guideline (AG) 53 last year, which raised expectations for company actuaries and regulators in terms of how they understand asset risk/return relationships in Asset Adequacy Testing (AAT). A limited, one-sided discussion of spreads, without an understanding of corresponding migration/default costs, would be concerning for both AAT and PBR. Without understanding how the model works, including its formulaic relationships and calibration, evaluating the risk/reward relationships as well as the reasonableness and fit for purpose of model/calibration is impossible.

As a liability analogy, a VM-31 PBR report would likely be considered inadequate if it stated a dynamic lapse assumption that varies by in-the-money (ITM) was used and only provided a high-level description of how base at-the-money (ATM) ultimate lapse rates are set, with no information about the form of the dynamic function (e.g., linear vs. S-curve) or its parameters, the definition of ITM used (nominal guarantee amount vs. present value, any rate definition), the other drivers of the assumption (e.g., if it varies by withdrawals or not), and the base ATM rates (and how they're set) prior to the ultimate period.

While we can compare a few excess return statistics between the GEMS™ and Academy corporate models, or between the GEMS™ model and the acceptance criteria, the utility of this is limited without an adequate understanding of the GEMS™ model structure, relationships, and calibration. For example, without such understanding we cannot properly determine (e.g., for risk management and/or pricing purposes) how model performance, scenarios, and reserve and capital levels will change from one period to the next as the market environment changes, e.g., whether differences are due to the model's structure and relationships or its calibration. If under certain market environments the two models produce similar excess returns, there is not enough known to determine if excess returns will remain similar under different market environments, e.g., different equity levels, equity volatilities, interest rate levels, interest rate volatilities, or any other factors that could be part of the undocumented stochastic processes.

From the limited scenario sets and comparisons we have seen, the GEMS™ High Yield excess returns seem overly optimistic. The possibility of spreads blowing out further in adverse, but short of worst-in-history, credit markets appears potentially understated. However, there is no way to determine if this is due to the underlying model or the calibration of the spread jump process, migration probabilities, loss given default assumptions, or something else.[6]

[6] Although some limited information has been provided for the spread component of the model, we cannot analyze the distribution of spreads because only total returns (i.e., not spreads) are provided in the basic data set.

The formulas and relationships in the Academy corporate model for spreads and migration/default/transaction costs are fully documented and all implementation details are available in both a spreadsheet and in Python code. The relatively simple model structure is not overly complex, facilitates understanding, meets the stylized facts proposed for the purpose at hand, and can be calibrated to meet the acceptance criteria. With inadequate model documentation, it is not clear that the GEMS™ corporate model can meet the same threshold. Without such documentation we support the use of the Academy's Alternative Corporate Model.

Closing Remarks

The ESGS appreciates the opportunity to comment on the proposals and looks forward to our continued collaborative efforts with regulators on this important issue. Please direct any questions to Amanda Barry-Moilanen, life policy analyst at barrymoilanen@academy.org.

Sincerely,

Jason Kehrberg
Chair, Economic Scenario Generator Subcommittee

Appendix—Sample documentation components for a corporate bond ESG model

1. Model overview
2. Comparison to other model forms (e.g., trade-offs)
3. Model limitations and risks
4. Stochastic process equations (e.g., stochastic modulator, jump process, information on how volatility decays over time, volatility clustering process under low vs. high spreads, functional definitions, relationships between market variables)
5. Credit migration/transition process
6. Default and recovery rate assumptions/behavior
7. Correlation assumptions (e.g., correlations between spread targets, applicability of non-consistent correlation matrices for producing real-world scenarios)
8. Calibration targets (e.g., benchmarks and time periods used, sources and use of historical data, derivation approach)
9. Calibration process (e.g., for spreads, for defaults, role of judgment)
10. Tail calibration
11. Parameter values, bounds, and estimation process
12. Frequency of parameter updates
13. Fitting/estimation process (e.g., to initial term structure, to time-varying targets)
14. Spread initialization process (e.g., fitted vs. interpolated tenors)
15. Total return calculation (e.g., yield curves/bond universe used, Treasury tenors used, process for which bonds remain in the fund)
16. Validation methodology/results (e.g., performance vs. targets and acceptance criteria)
17. Distribution statistics (e.g., volatility, dispersion, skew)