Actuarial Review of Investments in Actuarial Modeling–

A Resource & Discussion Guide

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Limitations

This document is not a promulgation of the Actuarial Standards Board, is not an actuarial standard of practice (ASOP), is not binding upon any actuary, and is not a definitive statement as to what constitutes generally accepted practice in the area under discussion. This document should not be treated as guidance, but rather it should be read and utilized as a list of considerations and resources on a particular topic. Events occurring subsequent to the publication of the topic may make the practices described or referred to in this document irrelevant or obsolete.

Introduction

Actuaries often deal with assets as well as liabilities in assumption development and modeling. Decades ago, dealing with assets was relatively straightforward, because virtually all of the assets were investment-grade corporate bonds. However, this is no longer true, as many companies have direct or indirect exposure to complex assets with various risk distributions and sensitivities to market factors.

In many cases, actuaries use these complex assets in cash flow projections of various kinds, such as principle-based reserving (PBR), asset adequacy analysis, pricing, and business modeling. VM-30 states that the actuary is required to evaluate the data, assumptions, projections, or analysis for reasonableness and consistency. These requirements were underscored with the passage of *Actuarial Guideline LIII* (AG 53), which requires the appointed actuary to provide information to regulators on complex assets. This document is not giving instructions on how to comply with this guideline, but it can provide some resources and considerations for the appointed actuary to think about prior to any meetings or discussions one may have with regulators on AG 53.

This resource and discussion guide aims to provide an overview of the subject of assets in actuarial modeling. It is not meant to make all actuaries experts on all types of assets; rather, it aims to provide an overview of common issues, relevant resources to further explore, and a number of considerations that may be relevant when modeling assets in relation to the underlying liabilities being projected.

I. Resources for Actuaries Regarding Assets and Asset Modeling

Significant actuarial guidance and resources exist regarding asset/liability modeling (the following list is not comprehensive):

1. **ASOP No. 11**, *Treatment of Reinsurance or Similar Risk Transfer Programs Involving Life Insurance, Annuities, or Health Benefit Plans in Financial Reports*

2. **ASOP No. 22**, *Statements of Actuarial Opinion Based on Asset Adequacy Analysis for Life Insurance, Annuity, or Health Insurance Reserves and Other Liabilities*

3. **ASOP No. 23**, *Data Quality*

4. **ASOP No. 56**, *Modeling*

5. **ASOP No. 7**, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*

6. **ASOP No. 27**, *Selection of Economic Assumptions for Measuring Pension Obligations* (Although this ASOP is specifically directed to pension actuaries, it covers investment considerations as well.)

7. **NAIC Valuation Manual**—2023 Edition

8. ***Actuarial Guideline LIII* (AG 53)**

9. **NAIC Actuarial Opinion and Memorandum Regulation**

10. **New York Department of Financial Services Regulation 126**, particularly Section 95.10 (b)

11. **New York Department of Financial Services Special Considerations Letter**

12. **Practice Note:** The American Academy of Actuaries' *Asset Adequacy Analysis* practice note covers some asset topics, particularly Section F

12. **CIA Educational Notes:** The CIA has published Educational Notes with respect to assets. Two of interest:

    a. "Investment Return Assumptions for Non-Fixed Income Assets for Life Insurers"

    b. "Investment Assumptions Used in the Valuation of Life and Health Insurance Contract Liabilities"

II. Categories and examples of asset risks[1]

In order to follow the guidance and regulatory requirements referenced in Section I, the actuary should have an understanding of the assets underlying the asset adequacy or PBR testing done. For example, VM-21, Section 1 (C) (2) on risks reflected gives categories and examples of asset risks reflected in the reserve calculations include, but are not necessarily limited to:

1. Credit risks (e.g., default or rating downgrades).

2. Uncertainty in the timing or duration of asset cash flows (e.g., shortening [prepayment risk] and lengthening [extension risk]).

3. Performance of equities, real estate, and Schedule BA assets.

4. Call risk on callable assets.

5. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks and variation in assumptions).

6. Currency risk.

7. Separate account fund volatility.

Additional categories of risks may exist for assets such as complex assets where the timing of and size of the payouts could be dependent on a pool of underlying assets.

1 Source: VM-21, Section 1 (C) (2) of 2023 Valuation Manual, published by the National Association of Insurance Commissioners.

III. Considerations with regard to assets:

1. **Questions to understand the assets and the risks:** Below is a possible list of questions that may be useful for the actuary to ask their investment professional when delving into the assets to be used in modeling. Of course, not all questions are applicable in all situations—e.g., for Treasury bonds, one does not need to ask about liquidity risks. On the other hand, for complex assets, many of the questions below would be relevant.

    a. What are the various asset types that the company is investing in?

    b. For inforce assets, how has this asset/asset class performed compared to the original expectations regarding this asset?

    c. How does historical experience of asset performance impact assumption development?

    d. Has the company made any additional commitments to the issuer regarding additional funding? If so:
        i. What are the circumstances of the additional funding?
        ii. What are the timing, amounts, and degree of uncertainty of the additional funding?

    e. When are the cash flows expected to be paid?
        i. What can lengthen or shorten this time period?
        ii. Are there any penalties for lengthening or shortening the time period?
        iii. If over/underperformance is assumed on certain complex assets, should this grade off by a certain point in the projection?

    f. What can influence the expected pattern of income from the asset?
        i. Are the payments based on outside indices, such as SOFR?
        ii. Will nonpayment of interest trigger a default? If not, will back interest be paid in future years?

g. Are there various tranches in the deal? If so,
    i. What are the underlying assets and tranche structure?
    ii. Where does the tranche place the company with regard to repayment of principal?
    iii. What could trigger defaults of the underlying assets or deviations from expectations in the underlying assets' cash flows or market values, and where does the tranche place the company with regard to underlying defaults or deviations from expectations in cash flows or market values?

h. How liquid or illiquid is the asset?
    i. Are there any limitations on the sale of the asset at any time, such as restrictions on sale or a limited market for this type of asset?
    ii. If the asset can be sold, what would influence the market value of this asset?
    iii. How much additional return is expected on the asset to accompany the additional liquidity risk?

i. What are the current NAIC and NRSRO ratings for this asset?

j. What is the basis for assumptions (if any) that high-yielding assets will compound forever?

k. If the asset is part of the reinvestment strategy, is it reasonable to assume that reinvestment into structured and potentially "scarce" assets will be available in the future?

l. Are there any significant changes to assumptions on assets from last year?

m. How does the higher expected return of these assets relate to the higher risks of high yield assets?

n. What's the overall company's investment strategy, inforce portfolio composition, and reinvestment strategy?

o. What are the considerations regarding the taxation of this asset?

2. **Questions regarding modeling of these assets:** These questions relate to decisions that can be made by the actuary, in conjunction with the investment professional. This can be influenced by the materiality of the assets.

    a. Should each asset be modeled separately, or are there other assets that could be modeled similarly?

    b. Is there a disconnect between reality and modeling for the assets? If so, should additional margins be applied?

    c. What kinds of economic scenarios should be selected? How do the stochastic results compare to static modeling results?

    d. What kind of sensitivity tests should be performed to test the uncertainty of asset assumptions and the simplification of modeling?

    e. How will changes in the credit and market cycles—e.g., Treasury yields, credit spreads, stock market prices, or building occupancy rates—impact the yearly interest and principal amount paid to the company each year?
        i. What types of stress testing of assumptions should be considered?
        ii. If all risks of an asset are not modeled, what type of margins should be added?

    f. For each asset, what are the material cash flow and market value sensitivities:
        i. to other capital market factors not mentioned above such as Treasury yield curve slope, credit spreads, foreign exchange rates and measures of market volatility?
        ii. to economic factors not mentioned above such as measures of inflation?

        Are there any other factors that could, or any other factors that should, be considered that should be explained by the investment professional?

    g. If the asset is in tranches, for the tranche the company owns, how can the underlying assets and tranche structure be modeled?

h. What risks matter with this asset and how do they need to be modeled (stochastic, deterministic + margin [perhaps informed by margin on the side])? Consider the shape of distribution, as for complex assets, it's usually not a normal distribution.

i. What simplifications can be made?

3. **Documentation of the assets in PBR valuation and asset adequacy testing for regulators:** The following items include types of documentation useful in PBR and asset adequacy testing reports.

a. Describe how the actuary has selected assets to include in the model.

b. Describe any modeling simplification relative to the assets (e.g., excluding mortgages, excluding hedge assets, excluding ABS, assuming bonds are non-callable, etc.).

c. Documentation that any simplification in (a) above does not materially understate or bias the reserve downward (this would need to contemplate any regulatory prescriptions related to asset modeling, not just a straight comparison of yields/returns).

d. A description of the company's actual investment strategy for the block of business (not just vague references to investment policies/goals).

e. A description of the modeled investment strategy (before comparison to a guardrail), and discussion of any simplification relative to item (c). This needs to include discussion of disinvestment/borrowing and needs to discuss reflection of borrowing costs. Note that assuming borrowing costs being not less than the reinvestment rate for positive assets is considered a guardrail, not a safe harbor.

f. For PBR, the final result needs to be compared to the guardrail reinvestment strategy.

g. Document how the fair value is established based on the projected market conditions. What sensitivity tests on the fair value determination have been performed to evaluate the level of anticipated uncertainty?

4. **Reinsurance:** A company may be exposed to various asset risks via reinsurance, both ceded and assumed. The following provides consideration with regard to these assets:

    a. When assessing reinsurance recoverability for ASOP No. 11, an actuary may consider:
        i. The underlying asset portfolio supporting reinsurance ceded;
        ii. Any related contractual protections such as a trust agreement; and
        iii. Other factors that affect financial strength and claims paying ability that may not be directly related to the asset portfolio.

    b. When assessing reinsurance ceded cash flows for ASOP No. 11, an actuary may consider:
        i. The underlying asset portfolio if its performance could affect the timing or amount of one or more reinsurance settlements under the reinsurance; and
        ii. The assets supporting reinsurance assumed that are held by the ceding company under funds withheld or modified coinsurance types of treaties.

    c. Documentation may include:
        i. A paragraph summarizing each significant reinsurance ceded transaction and reasonably known retrocession and the reason for pursuing each transaction.
        ii. Discussion of the ability of the reinsurer to pay claims in moderately adverse conditions (collectability).
        iii. Discussion of the process and metrics used to evaluate the counterparty's financial health, including any relevant ratios.
        iv. Discussion of how the risks and returns pertaining to assets held by the ceding company in support of assumed reinsurance are reflected in projected cash flows.

IV. Additional Sources of Information on Assets

1. **Information from investment professionals:** The company's asset managers could be a good source of information on the literature available on the assets under consideration.

2. **Information from company documents related to assets:** Company documents such as ORSA report, investment policy, and risk appetite could help actuaries understand the risks associated with the company assets.

3. **SOA Research Institute Publication:** In January 2023, the Society of Actuaries (SOA) published a paper specifically aimed at the actuaries who must provide information for *Actuarial Guideline LIII: Practitioner Considerations for Guideline Excess Spread Attribution Methodology under Actuarial Guideline LIII (AG53)*.

4. **CFA Materials:** The CFA has some documents that may be of interest:

   a. *Investing in Hedge Funds: A Survey* is a short literature review on studies of hedge funds returns, risks, and measurement issues.

   b. *Investing in Private Equity Funds: A Survey* is a short literature review on studies of private equity returns, risks, and measurement issues.

   c. This following monograph is a deeper, more technical look at hedge funds—*The Dynamics of the Hedge Fund Industry*.

5. **Books:** Although these books are not online, they are typically in most actuarial libraries.

   a. For basic descriptions of most types of assets: *Handbook of Fixed Income Securities*, Fabozzi, Frank J., 9th Edition, 2021.

   b. *Managing Investment Portfolios,* Maginn, John L. and Tuttle, Donald L., 3rd Edition, 2007.

   c. *Derivatives Markets*, McDonald, 3rd Edition.

   A CFA Research Foundation book that provides high-level information on hedge funds, commodities, real estate, private equity, and CDOs: *Alternative Investments: A Primer for Investment Professionals*.

6. A summary of some of the regulatory concerns can be found in the A.M. Best article: "Best's Special Report: Insurance Companies Remain Prime Targets for Private Equity."

V. Summary

Due to the increasing complexity of the assets that many insurance companies are now buying, the considerations in this resource and discussion guide will help the actuary increase their knowledge of the assets the company may be purchasing and prepare for discussions with various stakeholders.

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For more information on the American Academy of Actuaries and resources available on life-related topics, visit the Life section of the Academy's website. If you have any feedback on this document, please contact the Academy's life policy analyst.

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