

Memorandum

To: All Fellows, Affiliates, Associates, and Correspondents of the Canadian Institute of Actuaries and Other Interested Parties

From: James K. Christie, Chair
Actuarial Standards Board

Date: August 21, 2014

Subject: **Final Communication of a Promulgation of Calibration Criteria for Investment Returns Referenced in the Standards of Practice for the Valuation of Insurance Contract Liabilities: Life and Health (Accident and Sickness) Insurance (Subsection 2360)**

Document 214096

INTRODUCTION

According to subsection 2360 of the Standards of Practice:

Model calibration

.01 *It is prescribed that the actuary's calibration of stochastic models used in the valuation of segregated fund guarantees should meet the criteria for investment returns as promulgated from time to time by the Actuarial Standards Board. [Effective January 1, 2011]*

The Actuarial Standards Board (ASB) is promulgating the use of the calibration criteria for fixed income returns described below, effective October 15, 2014. The process being used to implement this is described in section E of the ASB's Policy on Due Process for the Adoption of Standards of Practice.

RATIONALE

The Standards of Practice outline a minimum insurance contract liability basis with respect to the model calibration for segregated fund business, and reference prescribed criteria for investment returns.

Calibration criteria for equity returns for the valuation of segregated fund guarantees have existed since 2002 and updated calibration criteria were promulgated by the ASB in July 2012. Until now, no calibration criteria for fixed income returns for the valuation of

segregated fund guarantees have been established. As fixed income assets were considered less volatile and risky than equity returns, providing calibration criteria for these assets was not a priority when the guidance for the valuation of segregated funds was first developed. However, the growth of the segregated fund business and the trend toward longer-term products and additional reset features increases the need for guidance for the modelling of fixed income assets.

A [research paper](#) released in April 2014 by the Canadian Institute of Actuaries (CIA) Committee on Life Insurance Financial Reporting (CLIFR) provides a rationale for this proposed promulgation for calibration criteria for fixed income returns.

As mentioned in subsection 2360, calibration of investment returns are promulgated from time to time. The calibration criteria promulgated in this document are expected to be reviewed approximately every five years.

Calibration criteria for investment returns applicable when calculating capital requirements for segregated funds with an internal model have been published by Canadian regulators. The actuary is reminded that Canadian regulators' criteria apply to the calculation of capital requirements only, and that the criteria set out in this research paper apply to the calculation of insurance contract liabilities. However, nothing prevents the actuary from satisfying the Canadian regulators' criteria for calculating insurance contract liabilities, when these criteria are more stringent than those set out in this research paper.

ISSUES RAISED

On April 14, 2014, the ASB published an [initial communication](#) regarding this promulgation of calibration criteria for investment returns, in accordance with the policy on due process. No comments were received.

PROMULGATION

To model the investment returns of a specific fund, a proxy for the fund would be constructed. The proxy usually takes the form of a linear combination of market indices. The criteria described below apply to the investment returns generated for fixed income indices that are used in the composition of the proxies. All calibration criteria apply to returns in local currency.

Criteria have been established for the left and right tails of fixed income returns.

Left-Tail Criteria

Two sets of calibration criteria have been established for the left tail of fixed income return distributions: one applicable to Canadian broad-based fixed income indices representative of the bond universe in Canada, and one applicable to U.S. broad-based fixed income indices representative of the bond universe in the U.S.

Calibration criteria are provided for three initial benchmark yield levels. The three initial benchmark yields consist of a combination of government yields and credit spreads. They are presented in the following table.

Initial Benchmark Yields			
Yield Level	Federal Yield	Credit Spread	Benchmark Yield
Low	3.00%	0.95%	3.95%
Medium	5.25%	0.35%	5.60%
High	8.50%	0.30%	8.80%

The tables below provide the maximum values for the 2.5th, 5th, and 10th percentiles of the accumulation factors for the one-, five-, 10-, and 20-year horizons, for the three initial benchmark yield levels.

Canadian Broad-Based Fixed Income Indices

Initial Yield	1-year			5-year			10-year			20-year		
	2.5 th	5 th	10 th	2.5 th	5 th	10 th	2.5 th	5 th	10 th	2.5 th	5 th	10 th
3.95%	0.99	1.00	1.01	1.11	1.13	1.16	1.32	1.35	1.39	1.82	1.90	1.99
5.60%	0.98	1.00	1.01	1.19	1.21	1.24	1.52	1.57	1.62	2.24	2.35	2.50
8.80%	1.00	1.02	1.04	1.38	1.42	1.46	2.00	2.06	2.15	3.29	3.53	3.86

U.S. Broad-Based Fixed Income Indices

Initial Yield	1-year			5-year			10-year			20-year		
	2.5 th	5 th	10 th	2.5 th	5 th	10 th	2.5 th	5 th	10 th	2.5 th	5 th	10 th
3.95%	1.00	1.01	1.02	1.16	1.17	1.19	1.38	1.41	1.43	1.90	1.95	2.02
5.60%	1.00	1.01	1.02	1.24	1.25	1.27	1.58	1.61	1.64	2.27	2.37	2.49
8.80%	1.02	1.03	1.05	1.44	1.46	1.49	2.03	2.08	2.16	3.21	3.43	3.77

Right-Tail Criteria

The table below provides the minimum values for the 90th, 95th, and 97.5th percentiles of the accumulation factors for the one-year horizon, for the three initial yield levels. These criteria apply to Canadian and U.S. broad-based fixed income indices.

Canadian and U.S. Broad-Based Fixed Income Indices

Initial Yield	1-year		
	90 th	95 th	97.5 th
3.95%	1.07	1.08	1.09
5.60%	1.10	1.11	1.12
8.80%	1.15	1.17	1.18

Application of the Calibration Criteria

Two alternatives are available for the application of the fixed income calibration criteria. Alternative 1 would be used when fixed income returns are *not* modelled by stochastically modelling interest rates (for example, when a regime-switching lognormal model form is used), and alternative 2 would be used when fixed income returns are modelled by stochastically modelling interest rates.

Alternative 1

Under alternative 1, a company would demonstrate that its valuation model meets the calibration criteria for the combination of government yield and spread prevailing at each valuation date. The company would first develop a criteria model that meets the calibration requirements for each of the three initial benchmark yields. A company would demonstrate this by verifying, for each of the three initial benchmark yields, that the left-tail percentiles of the scenarios generated by the criteria model are less than or equal to the left-tail criteria, and that the right-tail percentiles generated by the criteria model are greater than or equal to the right-tail criteria.

At each valuation date, the company would then follow a two-step procedure:

1. Generate scenarios with the calibrated criteria model using the government yield and credit spread prevailing at the valuation date as the initial benchmark yield, and calculate the resulting left- and right-tail percentiles; and
2. Verify that the left-tail percentiles of the scenarios generated by the valuation model are lower than or equal to those derived from the criteria model in step 1, and that the right-tail percentiles of the valuation model are higher than or equal to those of the criteria in step 1.

Under alternative 1, the verification of the calibration for the criteria model is required only when the model parameters are updated. For the valuation model, the verification of the calibration is required at each valuation date.

Alternative 2

Under alternative 2, a company would demonstrate that its valuation model meets the calibration criteria for each of the three initial benchmark yields.

A company would demonstrate this by verifying, for each of the three initial benchmark yields, that the left-tail percentiles of the scenarios generated by the valuation model are less than or equal to the left-tail criteria, and that the right-tail percentiles generated by the valuation model are greater than or equal to the right-tail criteria.

For example, for the low-yield environment, the company would generate scenarios with an initial government yield of 3.00% and an initial average credit spread of 0.95%, for a total initial benchmark yield of 3.95%. Model results would then be used to demonstrate that the calibration criteria have been satisfied for the low-yield environment.

If a company models the government yield but not the credit spread, it would verify that its valuation model meets the calibration criteria using the three initial government yields. For example, for the low-yield environment, the company would generate scenarios with an initial government yield of 3.00%.

Under alternative 2, the verification of the calibration is required only when the valuation model parameters are updated.

CRITERIA FOR THE ADOPTION OF STANDARDS OF PRACTICE

The fixed income return calibration criteria promulgation meets the criteria set out in section B of the ASB's Policy on Due Process for the Adoption of Standards of Practice:

1. It advances the public interest through the use of a consistent basis for establishing fixed income return models for segregated fund business.
2. It provides for the appropriate application of professional judgement within a reasonable range. The proposed calibration criteria allow the actuary to use any model that fits with the promulgated maximum and minimum values for fixed income returns.
3. Use of the proposed tables is practical for actuaries with relevant training. The calibration does not require use of a specific model, only that the scenarios used fit the calibration criteria.

EFFECTIVE DATE

These calibration criteria are to be used for valuations on or after October 15, 2014, and early implementation is permitted.

JKC