Memorandum

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

From: Ty Faulds, Chair
Actuarial Standards Board

Tony Williams, Chair
Designated Group

Date: June 6, 2016

Subject: **Notice of Intent to Establish Standards of Practice in respect of Calibration of Stochastic Models used for the Purposes of Certification of Pension Plan Funding Requirements (new Subsection 3270 Stochastic Modelling)**

Comment Deadline: **August 31, 2016**

Document 216060

Introduction

The Actuarial Standards Board (ASB) proposes to establish Standards for the Calibration of Stochastic Funding Models (SFMs) utilized in the actuarial certification of funding of defined benefit (DBPs), target benefit (TBPs), or shared risk pension plans (SRPs), where such stochastic methods are used for the purpose of certification of pension plan funding requirements.

The ASB is seeking input from actuaries regarding proposed standards for calibration. The work of the designated group (DG) established by the ASB is being coordinated with the Committee on Pension Plan Financial Reporting (PPFRC).

In keeping with the ASB's strategic goal of having consistency across practice areas unless there are reasons to support differences, in developing the new subsection of the standards, the DG will consider the relevant sections of part 2000 regarding stochastic modelling for insurance and outline any differences with supporting rationale for their recommendations. This may lead to future refinements to the insurance standards, but any such refinements would be beyond the scope of this initiative.

Background

Stochastic modelling (SM) has been in use for Canadian pension plans since the 1980s for purposes of developing investment policy and for other pension fund risk analysis. Mathematical models are used to project the expected development of plan assets and liabilities over time under alternative scenarios. However, there are no specific standards for such models or for the calibration of the models.

Typically, a large number of independent but plausible scenarios are determined by the model each year over a projection time period which ranges from 10 to 50 years, according to the purpose of the study (shorter periods being used to address the investment policy, while longer periods are used to study plan design, funding policy, etc.). The model is applied to a particular pension plan and the asset allocation to produce simulated results over each scenario and year in the projection period, including asset values, liability values, funded ratios, accounting expenses, contribution requirements, etc.

Target Benefit Plans

The CIA Task Force on Target Benefit Plans released its report on June 15, 2015. In the report the task force stated the following:

> "Stochastic methods can provide valuable insight to trustees in terms of setting and meeting their funding/benefits/investment objectives, understanding how their plan works and the nature of variable outcomes, along with managing/communicating expectations to plan members. The CIA should have technical standards regarding stochastic projections for TBPs."

New Brunswick Shared Risk Plans

Under the legislation introduced in New Brunswick, a number of former DBPs were converted to SRPs. Rather than having a guarantee for funding by the plan sponsor, the SRP is designed to provide a high degree of certainty that benefits will be paid, but includes a process for reducing benefits in certain circumstances. The legislation dictates that stochastic modelling must be used to establish the degree of certainty around the provision of both basic and ancillary benefits, with specific minimum probability thresholds for each. As a result, the left tail calibration of the model for an SRP is of paramount importance.

Insurance Calibration Standards

The calibration standards in place for stochastic methods used for Canadian insurance companies are a starting point for pension model calibration. However, there are differences between pension liabilities and insurance liabilities, as well as regulations and industry practice that could impact the choice of calibration criteria. For example, pension fund regulations encourage a focus on the median expected return less a margin in terms of certification of funding status, whereas insurance regulations encourage a focus on the tail risk within liability and capital requirements.

Differences between pension fund investments and insurance company investments arising from differences in regulatory requirements and industry practice include the following:

- Different regulatory environments that apply to the selection of assets and asset mixes (Insurance Companies Act for insurance versus Prudent Person Investment Rules for pension plans);

- Typically higher allocation to common stocks and other equity investments in pension funds;

- Different regulatory rules that apply to solvency requirements and risk-based capital charges; and

- Different regulatory regimes which give rise to differing asset valuation approaches or patterns of investment income recognition.

The DG intends to consider the insurance calibration standards, in particular the focus on the left tail of the return distributions, but will also consider pension industry practice and regulations in establishing the calibration standards.

The DG is of the opinion that the criteria should consider historical data and relationships, but should also be forward looking, considering future return distribution expectations.

Issues

The more specific issues to resolve with current practices and the standards include the following:

- Acceptable range in input assumptions;

- Disclosure of modelling assumptions, methods, rationale, and results;

- Certification of results;

- Description of the model used and calibration of scenarios; and

- Frequency of model review and revision.

The DG is seeking input from practitioners, regulators, and other interested parties for guidance in establishing the standards.

Questions

1. When SFMs are used for pension plans, would it be important to complement the analysis with stress testing of the assumptions used, as results obtained are usually very sensitive to those assumptions?

2. How should mean reversion assumptions (e.g., built-in up trend in bond returns from initial levels) or initial conditions (such as the point in the business cycle) influence the modelling?

As an example, the SFM assumption set may assume some form of mean reversion of interest rates over time to a higher level than the current one. An asset allocation with lower duration fixed income or lower fixed income allocation may show higher probabilities of funded ratio over 100 percent, due to the effects of the mean reversion. This type of modelling would encourage plan sponsors to adopt asset allocations with a higher degree of asset/liability mismatch. However, the level of future bond yields is subject to a wide range of local and global influences. This suggests stress tests of lower and higher bond yields should be part of the modelling approach.

3. How should standards for return and correlation calibration criteria for alternative asset classes be established?

4. Should either governments that mandate SFMs or the CIA specify the economic scenarios to be used for such modelling? Would that change the need for standards of practice on stochastic models or alter the scope of such standards?

Proposed Calibration Standards

The following standards of practice are proposed:

1. To develop a new subsection 3270 of the Pension Standard regarding stochastic modelling.

2. To incorporate promulgated calibration criteria for stochastic models used for stochastic pension funding.

3. To establish calibration criteria for the return distributions for publicly traded fixed income and equity assets used by pension funds.

4. To establish calibration criteria for the return distributions of alternative pension fund assets including real estate, infrastructure, mortgages, private debt and equity, hedge funds, farmland, derivatives, etc.

Such criteria may include minimum and maximum returns at the median level and in the upper and lower tails of the return distributions for pension assets, or in the frequency distributions for economic variables such as inflation and bond yields. The desired outcome of these changes is to maintain an appropriate range of practice for stochastic models utilized in the actuarial valuation of pension liabilities considering the current interest rate environment and appropriate allowance for anticipated investment returns in excess of risk-free interest rates.

Proposed Timeline and Early Implementation

It is the responsibility of the ASB to make final decisions regarding the revised Standards of Practice. The ASB plans to issue an exposure draft by December 15, 2016 and adopt the final standards in the first half of 2017, with a proposed effective date in 2017.

Issues and Feedback

Comments on this notice of intent (NOI) are invited **by August 31, 2016**. Please send your comments, preferably in an electronic format, to Tony Williams at tony.williams@pbiactuarial.ca with a copy to Chris Fievoli at chris.fievoli@cia-ica.ca.

Due process has been followed in the preparation of this NOI.

The DG responsible for the development of calibration standards is chaired by Tony Williams and includes the following members: Patrick De Roy (Vice-chair), Steven Chen, Mark Simpson, Ken Choi, Jocelyn Guérin, Neil Lamb, Devin Lui, and Mathieu Provost.

TF, TW