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EDUCATIONAL NOTE

Determination of Best Estimate Discount Rates for Going Concern Funding Valuations

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Determination of Best Estimate Discount Rates for Going Concern Funding Valuations

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The actuary should be familiar with relevant educational notes. Educational notes are not binding; rather they are intended to illustrate the application of the standards of practice. A practice that an educational note describes for a situation is not necessarily the only accepted practice for that situation nor is it necessarily accepted practice for a different situation. Responsibility for ensuring that work is in accordance with accepted actuarial practice lies with the actuary. As accepted actuarial practice evolves, an educational note may no longer appropriately illustrate the application of standards. To assist the actuary, the CIA website contains a reference of pending changes to educational notes.

Contents

Preamble 4

1. Introduction 4

Preamble

This educational note is intended to assist actuaries in the selection of an appropriate best estimate discount rate for a going concern funding valuation of a pension plan.

Educational notes on the same subject were originally issued on December 21, 2010, and December 7, 2015. This educational note has been updated to reflect the changes to Part 3000 effective December 1, 2022.

Process

The creation of this cover letter and educational note has followed the Actuarial Guidance Council's (AGC's) protocol for the adoption of educational notes. In accordance with the Institute's *Policy on Due Process for the Approval of Guidance Material other than Standards of Practice and Research Documents*, this educational note has been prepared by the Committee on Pension Plan Financial Reporting (PPFRC) and has received final approval for distribution by the AGC on April 11, 2023.

Responsibility of the actuary

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Your feedback

Questions or comments regarding this educational note may be directed to the [chair of the PPFRC](#).

1. Introduction

The *Standards of Practice* (as effective December 1, 2022) related to pension plans include the following paragraphs pertinent to setting assumptions for a going concern funding valuation.

- 3230.01 For a going concern valuation the actuary should: . . .
- select either best estimate assumptions or best estimate assumptions modified to incorporate margins for adverse deviations to the extent, if any, required by law or by the terms of an appropriate engagement; and . . .
- 3230.02 For pension plans that are funded, in selecting the best estimate assumption for the discount rate, considering the circumstances affecting the work, the actuary may either:
- take into account the expected investment return on the assets of the pension plan based on the target asset mix specified in the investment policy of the pension plan at the calculation date and may reflect expected changes in the target asset mix after that date; or
 - reflect the yields on fixed income investments, considering the expected future benefit payments of the pension plan.
- 3230.03 In establishing the discount rate assumption, the actuary would assume that there will be no additional returns achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy except to the

extent that the actuary has reason to believe, based on relevant supporting analysis, that such additional returns will be consistently and reliably earned over the long term.

3260.02 For each going concern valuation undertaken by the actuary, the external user report should:

- describe the rationale for any assumed additional returns, net of investment management expenses, from an active investment management strategy as compared to a passive investment management strategy, included in the discount rate assumption; . . .
- if there is no provision for adverse deviations, include a statement to that effect.

The general *Standards of Practice* also include the following paragraph (effective February 1, 2018):

1710.01 In an external user report, the actuary should . . .

- Describe each assumption used for the work that is material to the results of the work, including the extent of any margin for adverse deviations included with respect to each such assumption;
- Provide the rationale for each such assumption that is material to the results of the work...

This educational note is intended to illustrate approaches for actuaries to select a best estimate discount rate assumption for a going concern funding valuation of a defined benefit pension plan.

Best estimate assumptions necessarily deal with future uncertainty and, therefore, are generally not uniquely determinable. There is generally a range of reasonable best estimate assumptions. Accordingly, the selection of best estimate assumptions involves professional judgment. That said, there are principles that would be followed in establishing an appropriate best estimate discount rate assumption.

Approaches to selection of best estimate discount rates

A best estimate discount rate is determined with reference to unbiased measurements and other information and without a margin for adverse deviations.

Two distinct approaches may be taken to the selection of best estimate discount rates for a going concern funding valuation, a discount rate may be based on the:

- expected future investment return on the assets of the pension plan; or
- yields of investment grade debt securities which would reasonably match projected benefit cash flows, with an appropriately low level of risk, regardless of the plan's assets.

Basing the best estimate discount rate on expected future investment returns

If the actuary sets a discount rate that is based on a best estimate of the expected future investment return on the plan's assets over a relevant time frame, then the discount rate assumption is unbiased. When determining a best estimate discount rate for a going concern valuation, considering the nature of a going concern funding target, the actuary may wish to consider how investment returns may be affected by the life expectancy of the plan.

The building block approach

One accepted methodology for establishing a best estimate discount rate that reflects expected future investment returns is a building block approach, consisting of

- determining the best estimate of long-term, expected future investment returns for various asset classes;

- combining the best estimate long-term, expected future investment returns for different asset classes to reflect a plan's investment policy with consideration of the effects of diversification and rebalancing;
- considering inclusion of an allowance for additional return due to active versus passive management, where appropriate; and
- making appropriate provision for expenses.

Generally, when following such an approach, there is a range of reasonable assumptions for each component of the model. In determining an overall best estimate assumption, it would not be appropriate to select the most optimistic (or most pessimistic) point of the range for each component assumption.

Determining the best estimate of expected future investment returns for various asset classes

In determining the best estimate of the expected future investment returns on the plan's assets, the actuary would consider a range of available information.

For a plan where assets are invested in part in treasury bills or bonds, and are expected to be invested that way indefinitely, the best estimate of the long-term investment return on that class of assets may be reasonably viewed as the market yield on the particular investments or the yield on a market index representative of such investments at the calculation date, adjusted to reflect an allowance for reinvestment and the effect of possible changes in interest rates on future investments, if appropriate.

Generally, pension funds have assets that are diversified and invested in a range of asset classes, and this may be attributed to a general belief among investors that higher risk asset classes will likely provide a higher future investment return than "low risk" assets (such as investment grade debt securities) albeit with higher volatility of returns. The actuary may use this premise to provide a rationale for a best estimate assumption that is larger than one based on a "low risk" portfolio. In other words, a "risk premium" equal to the expected return on the plan assets in excess of the expected return on "risk-free" assets may be included in the best estimate assumption. The assumed risk premium may vary for each asset class and would be determined in a consistent manner from class to class. There are wide variances of views in financial literature as to the extent of future risk premiums, and risk premiums may vary over time. Therefore, the actuary would exercise judgment when setting this assumption.

Historic data regarding the return on some broad market indices and long-term Government of Canada bonds are available from the annual CI A publication, *Report on Canadian Economic Statistics*. Other publications of historic asset returns are also available for the actuary to consider.

Considerable judgment by the actuary is often required since information on expected future investment returns can itself be based on the judgment of others. Furthermore, on occasion, similar information from more than one source may conflict with one another.

Investment policy

The actuary would request information from the pension plan's administrator¹ regarding the investment policy at the calculation date (whether this policy is formally documented or is otherwise approved by the pension plan administrator). The actuary may assume that the investment of the pension plan's assets will be guided by the investment policy at the calculation date indefinitely.

¹ This educational note assumes that the pension plan administrator is responsible for setting investment policy. If another body is responsible for setting investment policy, this educational note should be read by substituting pension plan administrator with the name of the responsible body.

The actuary may seek confirmation as to whether the information fully reflects the plan administrator's current intent with respect to investment policy and any changes to the target asset mix that are scheduled to occur, or expected to be triggered, after the calculation date (for example, under a glide-path²).

The actuary may, but is not required to, reflect information for expected changes to the plan's target asset mix after the calculation date. In some cases, the future asset mix changes are to be implemented at particular dates. In other cases, the timing of the changes to the asset mix may be less certain, as they depend on one or more variables (e.g., funded status of the pension plan, interest rate levels, etc.). In both these situations, the actuary may make an adjustment to the best estimate discount rate to reflect the anticipated timing and effect of these asset mix changes on the expected future investment return on the plan's assets.

Where the actuary is making an adjustment to reflect a glide path and the timing of the change is dependent on variables such as the funded status of the pension plan, interest rate levels etc., the actuary would make an assumption as to how these variables will evolve over time. The assumptions would be consistent with the economic basis for setting the expected returns, regulatory funding requirements, and, where applicable, the plan's funding policy.

Rebalancing and diversification

Where plan assets are sufficiently diversified and rebalanced with some regularity among asset classes to avoid deviating too far from the target asset mix, and where the average annual long-term rates of return for individual asset classes are calculated geometrically, i.e., by determining compound average annual rates of return over long periods, the long-term average rate of return for a diversified portfolio (that is regularly rebalanced) will exceed the weighted average of the long-term average rates of return on the individual asset classes. This is called the diversification effect.

Assuming that a balanced portfolio is maintained reasonably closely to the original target asset mix, the allowance for this "diversification effect" would typically be 0% in the situation where the investments are solely in one asset class (e.g., Canadian long-term bonds) and greater than zero depending on the number and type of diversified asset classes used. For portfolios that have some allocation to multiple asset classes, the "diversification effect" would produce a discount rate greater than the weighted average of the annual compound returns on the assets in the portfolio, weighted by the portfolio target percentages.

In determining the diversification effect where changes over time in the target asset allocation are reflected in the determination of the best estimate discount rate, the actuary would be mindful of the impact on the diversification effect of changes to the asset mix that are scheduled to occur, or expected to be triggered, after the calculation date.

Value added returns from active management

Plan administrators often employ active management policies in the expectation of achieving higher returns (or reducing risk). Consideration may be given to assuming added value for the effects of active investment management compared to passive management (investing in market index instruments).

² In this context, "glide-path" refers to an investment strategy whereby the asset mix changes upon particular trigger events, such as specified changes to certain metrics (for example, funded ratios or bond yields) or reaching specific dates. In practice, such strategies are also sometimes referred to as "dynamic". For the purpose of this educational note, the actuary may give consideration to the implications of any investment policy with an asset mix that is expected to evolve over time.

It is generally reasonable to assume that active management will add value (provide returns above index returns) to the extent of the additional investment management fees associated with active management over those for passive management.

Any assumption of value added returns above the level of additional fees would require that the actuary has reason to believe, based on relevant supporting analysis, that such additional returns will be consistently and reliably earned over the long term. For this purpose, both historical and future considerations would be taken into account. Historic outperformance compared to relevant market indices by a particular active investment manager, and historic outperformance by the portion of the pension fund under active management over extensive periods and over different stages of the economic cycle, would be important considerations, but would not generally of themselves be sufficient to justify such an assumption. Further considerations might include detailed analysis of a particular manager's organization, people and investment processes, conducted by a professional with the appropriate expertise and experience, and an assessment of the extent to which past performance and expected future performance can be attributed to these factors. The use of such analysis to justify a long-term added value assumption may be constrained by periodic changes within investment management firms. Further considerations would be the governance processes in place for the plan, as they relate to the hiring, monitoring and replacement of investment managers.

In order to avoid biases in the analysis, the actuary would consider periods of both positive and negative incremental returns due to active management when assessing historical experience and future expectations.

If the actuary determines that an allowance for added value for the effects of active management is warranted for a particular valuation, the actuary would monitor the value added at each future valuation and modify or remove the allowance for value added as appropriate.

Alternative asset classes

For some asset classes, e.g., private equity, hedge funds, infrastructure, and real estate, and for certain investment strategies such as those involving derivatives or combinations of long and short positions in investments, it may not be practical to define a relevant market index or to distinguish active from passive management returns. In such cases, the actuary would make an assumption for the assumed investment return from the particular asset class or investment strategy but, generally, would not assume that a particular investment manager would outperform other managers with a similar mandate.

Use of leverage

The plan administrator's investment strategy may include exposure to assets, and corresponding expected investment returns, beyond what is provided for by the physical assets of the plan, for example through the use of a bond derivative as part of an interest rate hedge. In such circumstances the actuary would establish the discount rate considering the effect of the extra exposure to those asset classes beyond the plan's physical assets and the corresponding expected investment returns and cost of such strategies.

Discount rates that vary by membership group

An actuary may consider the use of multiple discount rates, where different discount rates are used for different groups of members covered by the plan, for example if certain assets are used to support expected benefit payments for different subgroups of plan members. The actuary would be mindful that future changes in membership groups, for example as active plan members terminate and retire, and the assets supporting those groups would not result in systemic gains or losses resulting from the use of different discount rates.

Stochastic methodology

A more sophisticated variation of the building block approach is to use a logically constructed stochastic asset model that calculates a probability distribution of long-term investment returns by asset class. The asset model requires inputs of the assumed investment policy and assumptions about investment returns and standard deviations on each of the asset classes in that policy (and correlations between the investment returns on different asset classes). Such a model directly incorporates the effects of diversification and rebalancing. The best estimate asset return assumption to be used would normally be based on a percentile at or near the median of the distribution of long-term investment returns of the portfolio.

Discount rate based on fixed income yields

A discount rate based on fixed income yields typically would reflect the yields on Government of Canada, or other high-quality bonds, that would reasonably match projected benefit cash flows or have a duration comparable to that of the projected benefit cash flows. Select and ultimate rates may be used to approximate the effect of using a full yield curve.

For a plan where an immunized portfolio of fixed income investments is established to match projected benefit cash flows, it may be appropriate to base the discount rate assumption on the yield on the immunized portfolio. If the fixed income investments mature prior to the expected payment of all projected benefit cash flows, the actuary would consider making an allowance for reinvestment and the effect of possible changes in interest rates on future investments.

Expenses⁽¹⁾

The actuary would take into account, somewhere within the valuation, appropriate allowance for future plan expenses that are expected to be paid from the pension fund. A best estimate discount rate may include a best estimate provision for payment of future expenses.

If an allowance for value added returns due to active management has been utilized in setting the best estimate discount rate, the actuary would make an allowance for the expected active management investment expenses. When an active investment management strategy is employed but no allowance for value added returns has been utilized in setting the best estimate discount rate, the actuary may assume, if appropriate based on the circumstances of a particular plan, that any additional active management fees are fully offset by additional value added returns. Accordingly, in such a case, only an allowance for passive investment management fees would be recognized.

⁽¹⁾ The actuary would refer to the revised educational note, *Expenses in Funding Valuations for Pension Plans*.

Rounding

Given the many uncertainties in establishing a discount rate, the actuary would exercise discretion in rounding the resulting assumption in a reasonable manner.

Tax-sheltered status of assets

When selecting the discount rate, the actuary would consider the effect of tax payable on the investment returns of the assets, if applicable (e.g., for a plan funded through a retirement compensation arrangement trust fund). Unless the actuary has reason to believe otherwise, the taxable status of the assets may be assumed to remain unchanged indefinitely.

Reporting

Whatever methodology is used to establish a best estimate discount rate used for an external user report on funding, a rationale for the assumption and the rationale for any assumed additional returns that have

been incorporated, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy would be provided in the report pursuant to paragraphs 1710.01 and 3260.02 of the *Standards of Practice*.

The rationale for the best estimate discount rate would include details of any scheduled or expected changes to the asset mix that have been reflected.

If the actuary's discount rate assumption includes a margin for adverse deviations, the actuary would disclose the extent of such margin.

Illustrative example – building block method

This section illustrates how an actuary might use a building block method, as described in the educational note, to establish a best estimate discount rate for a sample plan.

The plan's investment policy stipulates that the plan's target asset mix is:

Short-term/Cash equivalents	5.0%
Canadian bonds (universe)	17.5%
Canadian bonds (long-term diversified)	17.5%
Canadian equities	16.0%
U.S. equities	16.0%
International equities	16.0%
Private equity	12.0%

- The plan's investment policy stipulates that the portfolio will be rebalanced regularly so that the asset mix will be maintained within a reasonable range of the target asset mix.
- The plan employs an active management strategy for public equities, but the actuary assumes no added-value returns from active investment management in excess of the associated additional investment management fees.
- Provision for the plan's non-investment related administrative expenses are made by other means.

The best estimate discount rate is 5.5% per annum and is set by the actuary as follows:

- The expected return on long-term Government of Canada bonds at the valuation date is 2.5% per annum.
- The estimated long-term risk premia on a geometric basis (over the expected return on long-term Government of Canada bonds) for each of the plan's asset classes are:

Short-term/Cash equivalents	-0.8% p.a.
Canadian bonds (universe)	0.2% p.a.
Canadian bonds (long-term diversified)	0.8% p.a.
Canadian equities	4.0% p.a.
U.S. equities	4.0% p.a.
International equities	4.0% p.a.
Private equities ¹	5.0% p.a.

¹ Risk premium is assumed to be net of expenses.

- The weighted average of the above risk premia is 2.655% per annum. Added to the expected return on long-term Government of Canada bonds, the estimated return of the plan's portfolio is 5.155% per annum.
- The actuary concludes that, for this target asset mix, it is appropriate to add 0.60% per annum for the benefits of the "diversification effect" to get to 5.755% per annum.
- The actuary then deducts an allowance of 0.25% per annum for estimated investment expenses (reflecting only passive investment management costs where applicable) to get to a best estimate investment return of 5.505% per annum.
- The actuary then rounds the result to the nearest 0.1% and sets the best estimate discount rate to be 5.5% per annum.

The above approach is an example and other building block methods (e.g., using excess returns over inflation) may also be appropriate.

Illustrative example – reflecting an asset mix glide-path

This section illustrates how an actuary might reflect a glide-path in setting the going-concern discount rate. Consider a pension plan that is currently 80% funded on a solvency basis and has an asset mix of 60% equities, 40% long bonds. The pension plan administrator has approved a glide-path under which the asset mix will be gradually shifted from equities into long bonds, dependent on the solvency funded status of the plan. The final trigger in the approved glide-path is scheduled to occur when the plan is 100% funded on a solvency basis, at which point the asset mix of the plan would become 20% equities, 80% long bonds.

The actuary has determined that the pension plan is projected to be 100% funded on a solvency basis after seven years (taking into account the glide-path, the expected returns on each asset class, the expected growth in solvency liabilities, the regulatory funding requirements and the plan's funding policy). In this situation, an approach for setting the going-concern discount rate would be to assume that the asset mix is gradually shifted from 60% equities, 40% long bonds to 20% equities, 80% long bonds over the first seven years following the valuation date and then remains fixed thereafter.



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Canadian Institute of Actuaries

360 Albert Street, Suite 1740

Ottawa, ON K1R 7X7

613-236-8196

head.office@cia-ica.ca

cia-ica.ca

seeingbeyondrisk.ca



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