

Draft of Educational Note

Determination of Best Estimate Discount Rates for Going Concern Funding Valuations

Committee on Pension Plan Financial Reporting

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Members should be familiar with educational notes. Educational notes describe but do not recommend practice in illustrative situations. They do not constitute Standards of Practice and are, therefore, not binding. They are, however, intended to illustrate the application (but not necessarily the only application) of the Standards of Practice, so there should be no conflict between them. They are intended to assist actuaries in applying Standards of Practice in respect of specific matters. Responsibility for the manner of application of Standards of Practice in specific circumstances remains that of the members in the pension practice area.

Memorandum

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

From: Jacques Tremblay, Chairperson
Practice Council

Michael Banks, Chairperson
Committee on Pension Plan Financial Reporting

Date: June 16, 2009

Subject: **Draft Educational Note – Determination of Best Estimate Discount Rates for Going Concern Funding Valuations**

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This draft 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.

In accordance with the Institute's Policy on Due Process for the Approval of Guidance Material other than Standards of Practice, this draft educational note has been prepared by the Committee on Pension Plan Financial Reporting (PPFRC) and has received final approval for distribution by the Practice Council on June 11, 2009.

As outlined in subsection 1220 of the Standards of Practice, "*The actuary should be familiar with relevant Educational Notes and other designated educational material.*" That subsection explains further that a "practice which the Educational Notes describe for a situation is not necessarily the only accepted practice for that situation and is not necessarily accepted actuarial practice for a different situation." As well, "Educational Notes are intended to illustrate the application (but not necessarily the only application) of the Standards, so there should be no conflict between them."

If you have any questions or comments regarding this draft educational note, please contact Michael Banks at his CIA Online Directory address, michael.banks@mercer.com.

JT, MB

DETERMINATION OF BEST ESTIMATE DISCOUNT RATES FOR GOING CONCERN FUNDING VALUATIONS

The Standards of Practice (as effective Month XX, 2009) include the following paragraphs pertinent to setting assumptions for a going concern funding valuation:

- 3230.01 *For a going concern valuation ...notwithstanding subsection 1740, the actuary should either select best estimate assumptions or should select best estimate assumptions modified to incorporate margins for adverse deviations to the extent, if any, required by the circumstances of the work...*
- 3230.02 For pension plans that are funded, in determining the best estimate assumption for the discount rate, the actuary may take into account the expected investment return on the assets of the pension plan at the calculation date and the expected investment policy after that date.

This draft educational note is intended to assist actuaries in setting best estimate discount rates 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. Indeed, there is generally a range of reasonable best estimate assumptions. Accordingly, the selection of best estimate assumptions and also of margins for adverse deviation (if any) involves professional judgment. That said, there are principles that would be followed in establishing an appropriate 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 investment return on the assets of the pension plan, or

- a discount rate may be based on the yield of investment grade debt securities which would match projected benefit cash flows regardless of the plan's assets with an appropriately low level of risk.

A discount rate that only reflects the expected future investment returns on the plan's assets may not be appropriate where it is not intended that the plan be fully funded.

Basing the best estimate discount rate on expected investment returns

If the actuary sets a discount rate that is based on the expected future investment return on the plan's assets, then the discount rate assumption is unbiased and is, therefore, a best estimate only if it is equal to the actuary's best estimate of future investment returns on the plan's assets over a relevant time frame. The time frame considered would reflect the period over which benefit cash flows are projected, based on the valuation assumptions. Typically, this will be a long-term horizon such as 20-30 years but a shorter term perspective may be needed for very mature plans.

The building block approach

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

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

combining the best estimate long term expected, 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 is usually not appropriate to select the most optimistic (or most pessimistic) point of the range for each component assumption.

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

In determining the actuary's best estimate of the 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 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. Allowance may also be made for reinvestment and the effect of possible changes in interest rates on future investments.

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 justify a best estimate assumption that is larger than one for 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.

Historical data regarding the return on a broad Canadian stock market index and long-term government of Canada bonds is available from the annual Canadian Institute of Actuaries publication, "Report on Canadian Economic Statistics". For example, over the longest reported period, the April 2009 preliminary release indicates an average annual equity premium of 3.23% from 1924 to 2008 (based on geometric returns of 9.65% for stocks and 6.22% for long-term Government of Canada bonds combined on a geometric basis). The June 2008 report indicates an average annual equity premium of 3.92% from 1924 to 2007 based on geometric returns of 10.29% for stocks and 6.13% for long-term

Government of Canada bonds combined on a geometric basis). These data show considerable variation for shorter time periods.

While historical data support the inclusion of a substantial assumed equity premium, there is no certainty that similar relationships will hold in the future. Indeed, there are wide variances of view in financial literature as to the extent of future equity premiums. Typically, for publicly-traded equity investments, the assumed future long-term expected return¹ includes a 'risk premium' in the range of two to four percent per annum over the yield on long-term Government bonds.

If other categories of asset classes are part of the plan's assets, the 'risk premiums' should be determined in a consistent manner from class to class. Consideration may also be given to data regarding the correlation of returns between different asset classes.

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. In this circumstance, the actuary would judge how to deal with the conflicting or contradictory information.

Investment policy

Where the actuary has been provided with the pension plan's investment policy (whether it is formal or informal), the actuary may assume that the investment of the pension plan's assets will be guided by that policy indefinitely unless the actuary has information to suggest that the plan's investment policy will change after the calculation date. It is often assumed that plan assets are sufficiently diversified and rebalanced with some regularity among asset classes to maintain a 'target' asset mix. Models typically indicate that the expected return¹ of a regularly rebalanced portfolio is higher than a weighted average of expected returns¹ of each asset class, weighted by the portfolio asset class target percentages.

An allowance for rebalancing and diversification typically falls in the range of a 0.0% to 0.50% per annum addition to the weighted average of expected returns of each asset class, weighted by the portfolio target percentages.

Value added returns from active management

Consideration may be given to assuming added value for the effects of active investment management compared to passive management (investing in market index instruments). Generally, plan administrators would employ active management policies in the expectation of achieving higher returns (or reducing risk). The actuary may consider the possible benefits of active management when selecting a best estimate discount rate for a valuation of a particular pension plan that employs active management.

¹ In this context, "expected return" refers to the geometric mean or the median of a probability distribution of annualized long-term rates of return. Generally, this will be lower than the mean return based on the same probability distribution.

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 consider

the extent to which the average returns achieved by active managers exceed market index returns,

the extent to which particular investment managers can be assumed to outperform other investment managers, and/or

the extent to which a plan administrator can be assumed to add value by selection of superior investment managers.

Market data indicate that the past average returns achieved by active investment managers of Canadian pension funds in excess of market index returns vary considerably by asset class and by time period considered. Generally, little or no added value for active management has been achieved over the average of investment managers for fixed income investments. Significant value added returns have been achieved for some equity markets for some time periods but much smaller value added has been observed for other equity markets and other time periods.

The actuary would use caution in assuming any benefit for superior performance of a particular plan administrator or particular investment managers based on past performance records. Over any observed past time period, some managers will have outperformed others. Past performance may give some indication of superior (or inferior) skill but does not guarantee future performance at the same level. Logically, an actuary who adjusts assumptions for superior past performance for one plan would need to reflect the implications of inferior past performance in another case.

Overall, assumptions regarding the benefits of active management are highly subjective. As a result, it is atypical to include more than a modest allowance for active management such as an overall addition of 0.5% for a typical Canadian pension plan that employs an approach where 60% of the portfolio is invested in actively-managed equities.

Expenses

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. The member is referred to the CIA Educational Note, "Expenses in Funding Valuations for Pension Plans", for details on setting appropriate provisions for future expenses (www.actuaries.ca/members/publications/2007/207010e.pdf).

When an active investment management strategy is employed, the actuary would account for the expenses of such a strategy. For example, this might be achieved by defining the 'value added' in the preceding section as net of extra investment management fees above those fees that would be expected from employing a passive management strategy.

Rounding

Given the many uncertainties in establishing a discount rate, the actuary would exercise discretion in rounding the resulting assumption in a reasonable manner. Typically, rounding such a discount rate to the nearest 0.10% or 0.25% would be appropriate.

Illustrative example

This section shows how an actuary could use the building block method considerations described above to establish a best estimate discount rate for a sample plan. In this case:

- the plan's investment policy stipulates that the plan's target asset mix is as follows:

| | |
|-------------------------------|-------|
| Short Term/Cash equivalents | 5.0% |
| Bonds (Universe) | 17.5% |
| Bonds (long-term diversified) | 17.5% |
| Canadian equities | 32.0% |
| U.S. equities | 14.0% |
| International equities | 14.0% |

- provision for the plan's non-investment related administrative expenses are made by other means.

The best estimate discount rate is 6.50% and is set by the actuary as follows:

1. The market yield on long Government of Canada bonds at the valuation date is 4.0% per annum.
2. The estimated long-term risk premia (over long Government of Canada bonds) for each of the plan's asset classes, before allowing for active management, are:

| | |
|-------------------------------|------------|
| Short Term/Cash equivalents | -0.8% p.a. |
| Bonds (Universe) | 0.2% p.a. |
| Bonds (long-term diversified) | 0.8% p.a. |
| Canadian equities | 3.5% p.a. |
| U.S. equities | 3.5% p.a. |
| International equities | 3.5% p.a. |

These are effectively the actuary's estimates of risk premia assuming a passive investment strategy.

3. An addition for active management on the portfolio is set for each asset class as follows:

| | |
|-------------------------------|-----------|
| Short Term/Cash equivalents | 0.0% p.a. |
| Bonds (Universe) | 0.0% p.a. |
| Bonds (long-term diversified) | 0.0% p.a. |
| Canadian equities | 1.0% p.a. |
| U.S. equities | 0.0% p.a. |
| International equities | 1.0% p.a. |

4. The weighted average of the above risk premia plus active management additions is 2.69% per annum. Added to the yield on long-term Government of Canada bonds, the estimated return of the plan's portfolio is 6.69% per annum.
5. The actuary then provides a rationale for an addition of 0.25% per annum for the benefits of rebalancing and diversification to get to 6.94% per annum.

6. The actuary then deducts an allowance of 0.4% per annum (reflecting only passive management costs for asset classes other than Canadian and International equities) for estimated investment expenses on the plan's assets to get to a best estimate investment return of 6.54% per annum.
7. The actuary then rounds his result to the nearest 0.25% and sets the best estimate discount rate to be 6.50% per annum.

For ease of illustration, the above example uses arithmetic averages. In practice, it would normally be appropriate to combine expected return components on a geometric average basis.

Stochastic methodology

A more sophisticated variation of the above methodology 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 on each of the asset classes in that policy (and correlations between the investment returns on different asset classes). Such a model may incorporate directly the effects of diversification and rebalancing. The statistical median of the distribution of long-term investment returns of the portfolio can be used as the best estimate asset return assumption. Use of a statistical percentile that is different from the fiftieth can then be used to set a margin for adverse deviations.

Discount rate based on fixed income yields

A discount rate based on fixed income yields would typically be based on the yields on Government of Canada or other high quality bonds, which would match projected benefit cash flows or have a duration comparable to that of the projected benefit cash flows. Select and ultimate rates such as those stipulated for the calculation of pension commuted values 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 use the yield on the immunized portfolio as the discount rate assumption.

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 (for example 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 would be provided in the report as discussed in paragraph 3260.02 of the Standards of Practice (as effective Month XX, 2009).