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Educational Note

Pension Commuted Values

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Seeing Beyond Risk Canadian Institute of Actuaries Institut canadien des actuaires Voir au-delà du risque

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Committee on Pension Plan Financial Reporting

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Ce document est disponible en français

Educational Notes do not constitute standards of practice. They are intended to assist actuaries in applying standards of practice in respect of specific matters. Responsibility for the manner of application of standards in specific circumstances remains that of the practitioner.

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Memorandum

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

From: Stephen Butterfield, Chairperson
Committee on Pension Plan Financial Reporting

Date: April 5, 2006

Subject: **Educational Note: Pension Commuted Values**

The Committee on Pension Plan Financial Reporting (PPFRC) has developed this Educational Note on Pension Commuted Values to provide actuaries with additional guidance in applying section 3800 of the Standards of Practice.

In accordance with the Institute's policy for Due Process, this Educational Note has been approved by the PPFRC, and has received final approval for distribution by the Practice Standards Council on April 5, 2006, as designated educational material.

Subsection 1220 of the Standards of Practice prescribes that "*the actuary should be familiar with relevant educational notes and other designated educational material.*" It further explains that "*a practice which the 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.*"

Questions should be addressed to me at my CIA online directory address or mailing address.

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PENSION COMMUTED VALUES

The standards in section 3800 of the Practice Specific Standards for Pension Plans apply to an actuary's advice on the computation of commuted values, including commuted values to be paid from a pension plan that is registered under an Act when the method of settlement is a lump sum payment in lieu of an immediate or deferred pension resulting from death or individual termination of plan membership except for the specific circumstances which are described in paragraph 3810.03.

This educational note is intended to assist actuaries with respect to the appropriate calculation methods that should be used in the application of certain parts of this standard.

Calculation of unisex mortality rates

In the event that

> the actuary is required to calculate commuted values that do not vary according to the sex of the member,
>
> the actuary has developed a mortality table for the member based on a combination of male and female mortality rates, and
>
> the plan provides a contingent benefit to the member's spouse,

the approach for combining male and female mortality rates for the spouse would be consistent with the approach used for combining male and female mortality rates for the member. The preferred approach involves blending q's, but other reasonable approaches may be used including blending l's or annuity factors.

This may be illustrated by an example.

> Suppose that the actuary has adopted a mortality table for the plan member that is based on a combination of 80% male mortality rates and 20% female mortality rates, and that the actuary is valuing a joint and survivor pension,
>
> the actuary would then adopt a mortality table for the spouse that is based on a combination of 20% male mortality rates and 80% female mortality rates.

If the actuary assumes that male spouses are three years older than their female spouses on average, the assumed spouse's age would be 1.8 years younger than the member, regardless of the sex of the member (that is, 80% times -3 plus 20% times +3).

If applicable, an adjustment would be made to the mortality rates for the spouse in respect of same sex spouses (e.g., If 50% of the males in the plan are assumed to have same sex spouses, the mortality rates for the spouses would be 60% male and 40% female in the above example).

Indexing

The index from which pension increases are calculated may be the Consumer Price Index (CPI), a wage index, an index based on an excess interest method, or a modification or a mixture of these indices. If the plan uses some other index, then the actuary should ensure that the commuted value is determined using a methodology based on the applicable index which is not inconsistent with the methodology described in the standard and this educational note.

Alternatively, the actuary could use the explicit approach using the non-indexed interest rates and the applicable index. The explicit approach can be used regardless of how the plan is indexed. What follows is guidance on using the implicit approach for various types of indexing.

Interest rates

The actuary would calculate from the CANSIM series the following three factors:

CANSIM Series	Description	Factor
B14070 (V122542)	7-year Government of Canada benchmark bond yield, annualized	i_7
B14072 (V122544)	Long-term Government of Canada benchmark bond yield, annualized	i_L
B14081 (V122553)	Long-term real return Government of Canada bond yield, annualized	r_L

Note that the factors provided do not reflect the reported CANSIM series, but the annualized value of the reported figure which is a compounded semi-annual rate. Note also that the applicable CANSIM rates are those from the second month prior to the month in which the calculation date falls.

The actuary would also calculate a fourth factor, as follows:

$$r_7 = r_L * (i_7 / i_L)$$

The actuary would calculate the unrounded interest rates applicable to non-indexed and fully-indexed benefits as follows:

	Non-Indexed	Indexed
First 10 Years	$i_{1\text{-}10} = i_7 + 0.005$	$r_{1\text{-}10} = r_7 + 0.005$
After 10 Years	$i_{10+} = i_L + 0.5 * (i_L - i_7) + 0.005$	$r_{10+} = r_L + 0.5 * (r_L - r_7) + 0.005$

For non-indexed plans and fully-indexed plans, these interest rates would be rounded to the nearest ¼ of 1% for use in determining the commuted values.

Pension which is non-indexed

The actuary would calculate the commuted value of a non-indexed pension using a two tier interest rate of $[i_{1\text{-}10}]$ for the first ten years and $[i_{10+}]$ thereafter.

Pension which is fully indexed to the CPI

The actuary would calculate the commuted value of a pension which is fully indexed to the CPI using a two tier interest rate of $[r_{1\text{-}10}]$ for the first ten years and $[r_{10+}]$ thereafter.

For a fully-indexed pension, the actuary would apply the indexed interest rates [r] from the above table without adjustment only if the frequency of indexing is equal to the payment frequency.

Pension which is partially indexed to the CPI

For pensions that are partially indexed to increases in the Consumer Price Index, the actuary would first calculate the implied rates of increase in the Consumer Price Index using the unrounded interest rates as follows:

First 10 years: $u_{1\text{-}10} = (1 + i_{1\text{-}10}) / (1 + r_{1\text{-}10}) - 1.0$

After 10 years $u_{10+} = (1 + i_{10+}) / (1 + r_{10+}) - 1.0$

The actuary would then determine the adjusted interest rate applicable to partially-indexed pensions by appropriately reducing on a geometric basis the non-indexed rates of interest applicable to reflect the rates of pension escalation. For example, if indexing is at 60% of the Consumer Price Index, then the adjusted interest rates are as follows:

First 10 years $j_{1\text{-}10} = (1 + i_{1\text{-}10}) / (1 + .6 \times u_{1\text{-}10}) - 1.0$

After 10 years $j_{10+} = (1 + i_{10+}) / (1 + .6 \times u_{10+}) - 1.0$

At this point, $j_{1\text{-}10}$ and j_{10+} would be rounded to the nearest ¼ of 1%.

Frequency Adjustment

Reasonable approximations may be used to calculate the adjustment that takes into account the specific circumstances of a case regarding payment frequency, indexing frequency, and time and amount of the first increase. For example, in the case of monthly payments with annual indexing commencing twelve months after payments commence, the resulting commuted value factor would be multiplied by [1 – 11/24 x u], where u is the implied indexing rate. Where indexing is related to the Consumer Price Index, u would be determined from $u_{1\text{-}10}$, u_{10+} or a weighted average of the two with the appropriate adjustment for partial indexing.

The frequency adjustment could also be ignored provided that doing so would result in commuted values no less than those produced by including the adjustment.

Pension which is partially indexed to the AWI

Where increases in pensions are related to increases in the average wage index, the actuary would assume that the average wage index will increase at rates that are one percentage point higher than the implied rates of increase in the Consumer Price Index. The interest rates applicable to non-indexed pensions should be appropriately reduced on a geometric basis to reflect the rates of pension escalation using formulas consistent with those set out above.

Pension which is indexed on an excess interest formula

A pension that is indexed according to an excess interest approach involves increases that are linked to the excess of formula A over formula B, where A is some proportion of the rate of return on the pension fund or on a particular class of assets, and B is a base rate or some proportion of the rate of return on another asset class. The interest rate in each period should be equal to the interest rate applicable to a non-indexed pension reduced geometrically by the excess, if any, of the interest rate under formula A over the interest rate under formula B.

In determining the interest rates under formula A and formula B, the actuary would use the interest rate applicable to a non-indexed pension as a proxy for the rate of return on the pension fund or on any particular asset class for which the rate of return is expected to be equal to or greater than the rate of return on long-term provincial bonds.

If the particular asset class is one for which the rate of return is expected to be less than the rate of return on long-term provincial bonds, the actuary would appropriately reduce the rate of interest to reflect the actuary's expectation of the difference between the rate of return on long-term provincial bonds and the rate of return on the particular asset class. In determining the expected rate of return on a particular asset class for this purpose, the actuary would be guided by the current economic environment as well as long-term historical experience.

Deferred pensions

A deferred pension that is indexed only after the expiry of the deferral period would be valued using the interest rate applicable to a non-indexed pension during the deferral period and the interest rate applicable to the particular type of indexed pension after the commencement date of the pension.

A deferred pension that is indexed only during part or all of the deferral period would be valued using the interest rate applicable to the particular type of indexing in the appropriate portion of the deferral period, and the interest rate applicable to a non-indexed pension thereafter.

Mortality assumption when member has reduced life expectancy

The standard in subsection 3860 applies to an actuary's advice on the computation of commuted values, from a registered pension plan, where the right to receive the lump sum is based on subsection 51.1 of the regulations to the Ontario Pension Benefits Act. This standard may also be applicable in other directly comparable situations for pension plans under other jurisdictions. This standard does not apply where the right to receive a lump sum is not conditional upon medical certification, under legislation or plan provisions, even if the former member is known to be terminally ill.

The mortality assumption for the member with the reduced life expectancy is implied by the method set out in paragraph 3860.08, and varies according to the case. Thus,

> in case (a) the member is assumed to die on the valuation date, and
>
> in case (c) the member is assumed to survive for exactly four months.

A former member's spouse entitled to survivor benefits should be assumed to have normal mortality. Thus,

> in case (c) the lump sum payment for a pension in payment to a former member that includes a surviving spouse pension may be valued as a four month term certain annuity plus the applicable spousal pension with a four month deferred period.