Canadian Institute of Actuaries
Institut canadien des actuaires

Educational Note Supplement

Guidance for Assumptions for Hypothetical Wind Up and Solvency Valuations Update – Effective June 30, 2017, and Applicable to Valuations with Effective Dates Between June 30, 2017 and December 30, 2017

Document 217084

MEMORANDUM

To: All Pension Actuaries

From: Faisal Siddiqi, Chair
Practice Council

Mark Mervyn, Chair
Committee on Pension Plan Financial Reporting

Date: August 9, 2017

Subject: **Educational Note Supplement: Guidance for Assumptions for Hypothetical Wind-Up and Solvency Valuations Update – Effective June 30, 2017, and Applicable to Valuations with Effective Dates Between June 30, 2017 and December 30, 2017**

Document 217084

The most recent guidance from the Committee on Pension Plan Financial Reporting (PPFRC) regarding assumptions for hypothetical wind-up and solvency valuations was provided in the educational note supplement dated May 7, 2017. This guidance applied for valuations with effective dates on and after March 31, 2017 (but no later than December 30, 2017).

The PPFRC has conducted its quarterly review of group annuity pricing conditions as at June 30, 2017 and has determined that a revision to its previous guidance regarding assumptions for hypothetical wind-up and solvency valuations is appropriate for valuations with effective dates on or after June 30, 2017 (but no later than December 30, 2017).

Additional information is contained in this educational note supplement. The guidance contained in this educational note supplement is consistent with the preliminary communication dated July 21, 2017.

Due Process

The Policy on Due Process for the Approval of Guidance Material Other than Standards of Practice and Research Documents was followed in the development of these revisions.

Contact Information

Questions should be addressed to Mark Mervyn, Chair of the PPFRC, at mark.mervyn@aonhewitt.com.

FS, MM

Non-indexed Annuity Proxy

Previous Guidance

The most recent guidance from the Committee on Pension Plan Financial Reporting (PPFRC) concluded that for valuations with effective dates on or after March 31, 2017 (but no later than December 30, 2017), an appropriate discount rate for estimating the cost of purchasing a non-indexed group annuity, prior to any adjustment for sub- or super-standard mortality, would be determined as the unadjusted average yield on Government of Canada (GoC) marketable bonds with maturities over 10 years (CANSIM series V39062) increased arithmetically by between 70 to 110 basis points (bps), in conjunction with the 2014 Canadian Pensioners' Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B) with no adjustments for sub- or super-standard mortality (CPM2014Proj). The spread above the CANSIM series V39062 would be determined based on the duration of the liabilities expected to be settled through the purchase of a group annuity.

This guidance was based on hypothetical quotes provided by six insurance companies on illustrative blocks of business using pricing conditions as at March 31, 2017, supplemented by data from certain actuarial consulting firms on actual group annuity purchases and bona fide quotations during the first quarter of 2017. Furthermore, this guidance applied to both immediate and deferred pensions, and also applied regardless of the overall size of the group annuity purchase.

Analysis

The PPFRC obtained hypothetical quotes as at June 30, 2017 from seven insurance companies on the same illustrative blocks of business used to develop the previous guidance. The characteristics of the three illustrative blocks are as follows:

Duration	Low	Medium	High
Duration at June 30, 2017	8.6	11.2	13.8
Approximate premium as at June 30, 2017	$18 million	$24 million	$26 million
Average monthly pension	$897	$897	$897
Proportion of liability for deferred members	0%	4%	12%

For the purpose of this guidance, the durations of the illustrative blocks shown above were determined by calculating the impact of a 0.01% change in the discount rate, and using the following formula:

$$[(\text{Estimated Purchase Price at } 2.87\% \,/\, \text{Estimated Purchase Price at } 2.88\%) - 1] \,/\, 0.01\%$$

where 2.87% is equal to the CANSIM V39062 yield of 2.07% at June 30, 2017 plus 80 bps and where the estimated purchase price is calculated using mortality rates equal to the 2014 Canadian Pensioners' Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B) with no adjustments for sub- or super-standard mortality

(CPM2014Proj), being the guidance for the illustrative block with medium duration (as described below). Note that the durations of the three illustrative blocks will change over time as discount rates change.

The PPFRC also obtained data from certain actuarial consulting firms on actual group annuity purchases and bona fide quotations in cases where the transaction did not proceed during the second quarter of 2017.

The hypothetical quotations at March 31, 2017 and June 30, 2017 may be summarized as follows:

Average of the Three Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)						
	March 31, 2017			**June 30, 2017**		
	Low duration	**Medium duration**	**High duration**	**Low duration**	**Medium duration**	**High duration**
Discount rate	2.87%	3.13%	3.24%	2.65%	2.82%	2.84%
Spread over CANSIM V39062	+ 70 bps	+ 96 bps	+ 107 bps	+ 58 bps	+ 75 bps	+ 77 bps

The spread over CANSIM V39062 based on the average of the three most competitive hypothetical quotes decreased at all durations most significantly at the higher durations. As of June 30, 2017, the variability between the most competitive hypothetical quotes was small, decreasing since the previous quarter. In addition, the average spreads for actual purchases and bona fide quotations during the quarter were generally more favourable than the averages quoted above at all durations, particularly at the higher durations.

Based on the above information, the PPFRC has concluded that a revision to the guidance is appropriate. In establishing the guidance, the PPFRC has given some weight to the hypothetical quotes and to the data collected on actual annuity purchases and bona fide quotations.

Guidance for Non-indexed Pensions

The PPFRC has concluded that effective June 30, 2017, the cost of purchasing non-indexed annuities, prior to any adjustment for sub- or super-standard mortality, would be estimated based on the following process:

1. Determine the duration *of the portion of the liabilities assumed to be settled through the purchase of annuities*, based on a discount rate of 2.87% (CANSIM V39062 plus 80 bps at June 30, 2017) and CPM2014Proj mortality rates.
2. Using the duration obtained in step 1, interpolate using the following table to determine the appropriate spread above unadjusted CANSIM V39062:

Illustrative block	**Duration based on 2.87% discount rate**	**Spread above unadjusted CANSIM V39062**
Low duration	8.6	+ 60 bps
Medium duration	11.2	+ 80 bps
High duration	13.8	+ 90 bps

If the duration of the portion of the liabilities assumed to be settled through the purchase of annuities is lower than 8.6 or higher than 13.8, the actuary would make a reasonable assumption regarding the appropriate spread.

The PPFRC believes that groups with durations higher than 13.8 would likely include a large proportion of deferred vested members. While the higher duration, in isolation, would be expected to result in lower pricing, the PPFRC believes that this impact would be offset by added administrative costs and risks that insurers would incur in assuming these obligations. The PPFRC also believes that it is rare that a group would have a duration materially lower than 8.6. A few actual purchases with lower durations were observed this quarter providing some preliminary indication that the pricing of actual purchases with significantly lower duration than 8.6 may be inconsistent with the pricing information collected for the low duration hypothetical quotes. The PPFRC has concluded that there are insufficient data at this stage to introduce refinements to the guidance for these very low durations. However the PPFRC will continue to monitor actual purchases and bona fide quotes of very low durations and may collect additional data to determine if a refinement to the guidance is warranted in the future. As of June 30, 2017, the PPFRC believes that one reasonable approach would be to assume that the spread for durations lower than 8.6 is +60 bps, and the spread for durations higher than 13.8 is +90 bps. Other approaches may also be reasonable.

3. The cost of purchasing annuities would be estimated using an interest rate determined as the unadjusted CANSIM V39062 increased arithmetically by the spread calculated in step 2, in conjunction with CPM2014Proj.

The above guidance applies to valuations with effective dates on and after June 30, 2017, up to December 30, 2017, pending any further guidance or other evidence of change in annuity pricing.

CPI-Indexed Annuity Proxy

Previous Guidance

The most recent guidance from the PPFRC concluded that for valuations with effective dates on or after March 31, 2017 (but no later than December 30, 2017), an appropriate discount rate for estimating the cost of purchasing a group annuity where pensions are fully indexed to the rate of change in the Consumer Price Index (CPI) would be the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) reduced arithmetically by 60 bps, in conjunction with CPM2014Proj.

Analysis

A subset of the contributing insurers also provided hypothetical quotes for the illustrative blocks on a CPI-indexed basis as of June 30, 2017, three of which indicated they may be willing to transact on their hypothetical quotes. The hypothetical quotations as at March 31, 2017 and June 30, 2017, for the medium-duration illustrative block where insurers indicated that they may be willing to transact on their hypothetical quotes may be summarized as follows:

Average of the Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)		
	March 31, 2017	**June 30, 2017**
Number of hypothetical quotes in the average	2	3
Discount rate	0.05%	- 0.29%
Spread over CANSIM V39057	- 63 bps	- 87 bps

Based on the average of the three (two for March 31, 2017) hypothetical quotes, the spreads below the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM V39057) for the medium-duration illustrative block increased during the quarter. The absolute value of the spread on the low and high duration blocks were both higher than for the medium duration block. In addition, significant variation between the hypothetical quotes was observed, but the variability decreased since the previous quarter.

While there is some indication that the pricing of CPI-indexed annuities may also vary by duration, the PPFRC has concluded that there are insufficient data at this stage to introduce this level of refinement. Consequently, the guidance contained herein is applicable to CPI-indexed annuities regardless of their duration.

The PPFRC was provided with a limited amount of quantitative data on actual fully- or partially-indexed annuity purchases and on bona fide quotations in cases where the transaction did not proceed during the second quarter of 2017. The average spreads for actual purchases and bona fide quotations during the quarter were generally more favourable than the average quoted above for the medium duration.

Based on the above information, the PPFRC has concluded that a revision to the guidance is appropriate. In establishing the guidance, the PPFRC has given some weight to the hypothetical quotes and to the data collected on actual annuity purchases and bona fide quotations.

Guidance for Fully CPI-Indexed Pensions

The PPFRC has concluded that effective June 30, 2017, an appropriate proxy for estimating the cost of purchasing a group annuity where pensions are fully indexed to the rate of change in the CPI, prior to any adjustment for sub- or super-standard mortality, would be determined using an interest rate equal to the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) reduced arithmetically by 70 bps, in conjunction with CPM2014Proj.

The above guidance applies to valuations with effective dates on and after June 30, 2017, up to December 30, 2017, pending any further guidance or other evidence of change in annuity pricing.

Example

As at June 30, 2017, the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) was 0.58%. Therefore, an applicable underlying discount rate would be determined as 0.58% - 0.70% = -0.12%.

Partially-Indexed Annuities

In situations where pensions are partially indexed, indexed to a measure other than the CPI, or contain a deferred component, the actuary would make appropriate provisions for such situations consistent with the guidance provided in the annual educational note dated March 1, 2017, modified to reflect the revised guidance contained in this memo.

Validity of March 1, 2017 Educational Note

Except as noted above, actuaries would continue to reference the March 1, 2017 educational note for guidance with respect to the selection of assumptions for hypothetical wind-up and solvency valuations with effective dates between December 31, 2016 and December 30, 2017. In particular, the educational note continues to apply with respect to the following:

- Rounding of the interest rate resulting from following the guidance;
- Application to both immediate and deferred pensions and the overall size of the group annuity purchase;
- Mortality basis, which remains the 2014 Combined Canadian Pensioners' Mortality Table (CPM2014) in conjunction with the CPM Improvement Scale B (CPM-B) with no mortality adjustments (CPM2014Proj); and
- Mortality adjustments, where there is demonstrated substandard or super-standard mortality or where an insurer might be expected to assume significantly shorter- or longer-than-average pension plan longevity.

Actual Annuity Pricing

The purpose of this educational note supplement is to provide actuaries with guidance related to establishing assumptions for hypothetical wind-up and solvency valuations. The pricing for an actual group annuity purchase depends on many factors, with the result that the actual price may differ from the guidance provided herein. In addition to the duration of the purchase and the factors outlined in the section of the March 1, 2017 educational note titled "Mortality Adjustments", some of the other factors that may affect pricing of a particular purchase include, but are not limited to, the following:

- The overall size of the purchase;
- The proportion of deferred vested members included in the group being purchased;
- Broad capital market conditions at the time of the purchase; and
- Competitive pressures in the group annuity market at the time of the purchase.

Retroactive Application

If an actuary has already prepared a funding valuation report with an effective date on or after June 30, 2017, before the publication of this guidance, the actuary would consider paragraphs 1820.30 through 1820.36 of the Standards of Practice to determine whether it is necessary to withdraw or amend the report.

Additional Comments

The PPFRC intends to continue monitoring group annuity pricing on a quarterly basis. Actuaries may use the spreads indicated above for valuations with effective dates on and after June 30, 2017, up to December 30, 2017, pending any future guidance or other evidence of change in annuity pricing.

As part of this quarterly review, the PPFRC requested information from insurers as to whether an illustrative block of business that is half the size or five times the size, but keeping the same average pension and profile as the current illustrative block, would have a significant impact on price. Based on the information collected, the PPFRC does not currently believe that the guidance should be revised to reflect differing pricing for these modified blocks.

It may be noted that the spreads versus GoC long-term bonds for group annuity pricing have been volatile during the past three to four years. Actuaries may wish to be mindful of this volatility when communicating advice related to future hypothetical wind-up and solvency valuations.

Appendix A – Summary and Links for Historical Guidance

The following is a summary of the historical guidance issued by the PPFRC. The summary is provided for reference, and actuaries are directed to refer to the respective published educational note or educational note supplement.

Educational Note/ Supplement	Mortality table[1]	**Non-indexed Immediate and Deferred** *Duration: Spread relative to unadjusted CANSIM V39062*			**Fully CPI-Indexed** *Spread relative to unadjusted CANSIM V39057*
		Low duration	**Medium duration**	**High duration**	**All durations**
Jun 30, 2017	CPM2014Proj	8.6: + 60 bps	11.2: + 80 bps	13.8: + 90 bps	- 70 bps
Mar 31, 2017	CPM2014Proj	8.5: + 70 bps	11.0: + 100 bps	13.5: + 110 bps	- 60 bps
Dec 31, 2016	CPM2014Proj	8.5: + 70 bps	11.0: + 90 bps	13.5: + 100 bps	- 60 bps
Sep 30, 2016	CPM2014Proj	8.7: + 80 bps	11.4: + 110 bps	14.[illegible] + 12[illegible] bps	- 70 bps
Jun 30, 2016	CPM2014Proj	8.6: + 90 bps	11.3: + 120 bps	1[illegible]8: + 130 [illegible]s	- 70 bps
Mar 31, 2016	CPM2014Proj	8.5: + 90 bps	11.1: + 120 bps	13.6[illegible] 130 [illegible]s	- 70 bps
Dec 31, 2015	CPM2014Proj	8.5: + 60 bps	11.1: + 100 b[illegible]s	1[illegible].6: + [illegible] bps	- 70 bps
Sep 30, 2015	CPM2014Proj	8.4: + 80 bps	11.0: + 1[illegible]0 b[illegible]	13.4: [illegible]120 bps	- 70 bps
Jun 30, 2015	UP94Proj	8.3: - 20 bps	10.9: + 30 [illegible]ps	13.[illegible]: + 60 bps	- 120 bps
Mar 31, 2015	UP94Proj	8.5: + 0 bps	11.[illegible]: + 30 b[illegible]s	[illegible]4.0: + 60 bps	- 120 bps
Dec 31, 2014	UP94Proj	8.2: + 0 bps	[illegible]0.9: + [illegible] b[illegible]	13.5: + 60 bps	- 120 bps
Sep 30, 2014	UP94Proj	8.1: + 0 bps	10.[illegible] + 30 bps	13.2: + 50 bps	- 120 bps
Jun 30, 2014	UP94Proj	8.0: + 0 bps	[illegible]0.5: [illegible]0 bps	12.9: + 60 bps	- 110 bps
Mar 31, 2014	UP94Proj	7.7: + 50 b[illegible]	10.[illegible] + 80 bps	12.3: + 100 bps	- 100 bps
Dec 31, 2013	UP94Proj	7.6: [illegible] bps	9.9: + 70 bps	12.1: + 80 bps	- 110 bps
Sep 30, 2013	UP94Proj	7.[illegible] + 60 bps	9.9: + 80 bps	12.2: + 90 bps	- 100 bps
Jun 30, 2013	UP94Proj	7.[illegible] + 40 bps	10.2: + 60 bps	12.5: + 70 bps	- 120 bps

Ed. Note / Supplement	Mortality [illegible]ble[1]	**Non-indexed** *Spread relative to unadjusted CANSIM V39062*		**Fully CPI-Indexed** *Spread relative to unadjusted CANSIM V39057*
		Immediate	**Deferred**	**All purchase sizes**
Mar 31, 2013	UP94Pr[illegible]	+ 70 bps		+ 0 bps
Dec 31, 2012	UP94Proj	+ 70 bps		+ 0 bps
Sep 30, 2012	UP94Proj	+ 70 bps		+ 0 bps
Jun 30, 2012	UP94Proj	+ 80 bps		+ 0 bps
Mar 31, 2012	UP94Proj	+ 90 bps		+ 0 bps
Dec 31, 2011	UP94Proj	+ 90 bps		+ 0 bps
Sep 30, 2011	UP94Proj	+ 90 bps		+ 0 bps
Jun 30, 2011	UP94Proj	+ 70 bps		+ 0 bps
Mar 31, 2011	UP94Proj	+ 70 bps		+ 0 bps
Dec 31, 2010	UP94@2020	+ 100 bps		+ 0 bps

[1] "CPM2014Proj": 2014 Canadian Pensioners' Mortality Table (CPM2014), combined with mortality improvement scale CPM Improvement Scale B (CPM-B) with no adjustments for sub- or super-standard mortality; "UP94Proj", "UP94@2020", "UP94@2015": UP94 mortality table, combined with mortality improvement scale AA on fully generational basis or static basis to indicated year.

Sep 30, 2010	UP94@2020	+ 110 bps		+ 0 bps
Jun 30, 2010	UP94@2020	+ 70 bps		+ 0 bps
Mar 31, 2010	UP94@2020	+ 40 bps		+ 0 bps
Dec 31, 2009	UP94@2020	+ 40 bps		+ 0 bps
Jul 31, 2009	UP94@2015	+ 10 bps to + 50 bps[2]		- 40 bps to + 0 bps[2]
Oct 31, 2008	UP94@2015	+ 100 bps to + 140 bps[2]	+ 100 bps	- 40 bps to + 0 bps[2]
Feb 29, 2008	UP94@2015	+ 70 bps to + 110 bps[2]	+ 70 bps	- 40 bps to + 0 bps[2]

[2] Higher (lower) rate applies to purchases with a total premium over $15 (of $0) million at the valuation date. Linear grading of the 40 bps difference applies for purchases with a premium under $15 million.