Canadian Institute of Actuaries | Institut canadien des actuaires

EDUCATIONAL NOTE

Guidance on Selection and Disclosure of Plausible Adverse Scenarios

April 2023

Guidance on Selection and Disclosure of Plausible Adverse Scenarios

Document 223063

Ce document est disponible en français.

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.

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Preamble

This educational note provides guidance on the selection and disclosure of plausible adverse scenarios under Subsection 3260 of the *Standards of Practice*.

An educational note on this subject was originally issued on February 21, 2019, when the requirements with respect to plausible adverse scenarios were introduced in the *Standards of Practice*. 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 PPFRC.

Introduction

The PPFRC prepared this document to provide actuaries with guidance on the application of the requirements with respect to the selection and disclosure of plausible adverse scenarios under subsection 3260 of the Standards of Practice for Pension Plans. These requirements were first introduced in the Standards of Practice with an effective date of March 1, 2019, and further revisions to these requirements have been made with an effective date of December 1, 2022. This note provides guidance on the following:

- The situations in which an actuary must include the plausible adverse scenario disclosures within an external user report.
- When to adopt the revised requirements relating to these disclosures.
- The selection of plausible adverse scenarios to be applied in the disclosures
    - on the funded status of the plan; and
    - if applicable, the service cost between the calculation date and the next calculation date as per paragraph 3260.13 of the *Standards of Practice*.

The required disclosures of the change in the funded status of the plan and, if applicable, the service cost between the calculation date and the next calculation date under the selected plausible adverse scenarios are not intended to be a comprehensive study of the risks inherent in the pension plan, but rather an illustration of the sensitivity of the funded status and plan costs to certain key risks facing pension plans.

1. Summary of disclosure requirements for plausible adverse scenarios

To comply with the requirements of paragraph 3260.13 of the Standards of Practice, the actuary would select, in consultation with the plan administrator or plan sponsor as applicable, a plausible adverse scenario for each of the risk assessments under paragraph 3260.11 of the Standards of Practice.

In particular, paragraph 3260.13 of the *Standards of Practice* states the following:

> If an external user report includes one or more going concern, hypothetical wind-up, or solvency valuations, then the external user report should, for at least one such valuation included in the report, report the effects on:
>
> - the funded status of the plan on a market value or smoothed value basis at the calculation date, separating the effects on assets and liabilities, where applicable; and
> - if such valuation is a going concern valuation, the service cost or the rule for calculating the service cost between the calculation date and the next calculation date;
>
> of the plausible adverse scenarios selected by the actuary for the risk assessments under paragraph 3260.11.

2. Application of disclosure requirements for plausible adverse scenarios

Effective December 1, 2022, the Standards of Practice were revised to permit plausible adverse scenarios selected for the required disclosures to be applied to a hypothetical wind-up or solvency valuation, instead of a going concern valuation, and to require that the selection of such plausible adverse scenarios be considered in consultation with the plan administrator or plan sponsor as applicable. In accordance with paragraph 1130.06 of the general *Standards of Practice*, the revised standards must be applied for external user reports with calculation dates on or after December 1, 2022. Early adoption of these revisions is not permitted.

In accordance with paragraph 3260.11, the plausible adverse scenario disclosures are not required to be included within an external user report if

- the pension plan is a “designated plan” which has, as of the calculation date, as members, only persons “connected” with the employer as those terms are defined in the Income Tax Regulations (Canada); or
- the valuation is for a pension plan which is not registered under a pension benefits standards act of a province or the federal government of Canada; or
- the valuation is based on an extrapolation of results disclosed in a previous external user report.

3. Selection and disclosure of plausible adverse scenarios

In accordance with paragraph 3260.10, “A plausible adverse scenario would be a scenario of adverse but plausible assumptions, relative to the best estimate assumptions otherwise selected for the valuation, about matters to which the pension plan’s financial condition is sensitive.” As a result, the selection and application of a plausible adverse scenario is a stress-testing process on various risks to the funded status and, if applicable, service cost of the pension plan, under the valuation selected for this purpose.

Paragraph 3260.11 specifies the risks to be considered in the additional disclosure requirements as the following:

- interest rate risk, the potential that interest rates will be lower than expected;
- deterioration of asset values;
- longevity risk, the potential that pension plan members will live longer than expected; or
- for pension plans where contributions are fixed or restricted by the terms of the plan or other governing documents, the potential that the contribution base will be lower than expected in the going concern valuation;

For the purposes of the additional disclosure requirements, an adverse scenario would be characterized as a plausible adverse scenario if it has a non-trivial probability of occurring within the short term (i.e., immediately to one year). To meet this threshold, the adverse scenario would generally be consistent with the likelihood of between 1 in 10 and 1 in 20, based on the opinion of the actuary. There may be valid reasons to select a more or less plausible adverse scenario. The actuary would also consider that plausible adverse scenarios may vary among different pension plans and may vary over time for a particular pension plan.

An actuary may select plausible adverse scenarios using deterministic or stochastic approaches.

In selecting the plausible adverse scenario, the actuary would be aware of, and may utilize, any stress testing reporting included in the pension plan's audited plan financial statements or other work created in connection with the risk of the funded status of the plan to changes in the above noted risks.

As per paragraph 3260.12:

> In considering the plausible adverse scenarios, the actuary may:
>
> - reflect the perspective of the plan administrator or plan sponsor, as applicable, as to which scenarios they perceive as being the greatest threats to the pension plan's future financial condition;
> - make reasonable determinations of the asset classes which are classified as fixed income investments;
> - restrict the impact of interest rate risk to the asset classes deemed to be fixed income investments and to the discount rate to the extent that the discount rate is affected by fixed income investments;
> - assess the impact of the risks individually only, or also in combination;
> - reflect the impact of any compensating adjustments, such as a potential reduction in any margin implicit in the discount rate in response to a lower interest rate scenario; or
> - reference any related work, such as asset-liability modelling work, with which the actuary has been involved or which has otherwise been made available to the actuary.

For purposes of assessing the impact of the plausible adverse scenario on the pension plan's funded status and, if applicable, the service cost, the actuary may consider mitigating factors that are within the plan sponsor's ability to enact within the short term or contemplated under the current documents governing the pension plan (e.g., reduction to margin implicit in the going concern discount rate, re-risking of the plan assets permitted under the applicable adopted statement of investment policies and procedures). Any compensating adjustments that are not readily permitted, requiring a change in plan provisions or policy documents, or could not be expected to be enacted within the short term, would not

be considered within the assessment of the pension plan's funded status and, if applicable, service cost under the selected plausible adverse scenario.

The valuation methods adopted for the purposes of valuing plan assets and liabilities under the selected plausible adverse scenario would be consistent with the methods adopted for the going concern, hypothetical wind-up or solvency valuation, as applicable.

A complete description of the selected plausible adverse scenario would be included by the actuary within the external user report. In particular, it is expected that the actuary would provide:

- a qualitative description of the selected plausible adverse scenario;
- if different, a summary of any changes to the assumptions used in the going concern, hypothetical wind-up or solvency valuation under the selected plausible adverse scenario compared to the baseline assumptions;
- a description of any cross effects due to the reflection of various risks in combination;
- any compensating adjustments available to be utilized by the plan sponsor and incorporated under the plausible adverse scenario; and
- the impact of the selection of the plausible adverse scenario on the funded status of the plan and, if applicable, the service cost, including results before and after any compensating adjustments where appropriate as described below.

If the compensating adjustment reflected by the actuary is a reduction in any margin implicit in the going concern discount rate, the actuary would provide the funded status of the plan and the service cost under the selected plausible adverse scenario after the compensating adjustment. For any other compensating adjustment contemplated in the selected plausible adverse scenario, the actuary would disclose the results both before and after the reflection of the compensating adjustment.

Examples of the application of plausible adverse scenarios are available at the end of this document.

Guidance on selecting appropriate interest rate lower than expected

The purpose of this scenario is to illustrate the sensitivity of the funded status of the pension plan and, if applicable, service cost to an immediate change in market interest rates underlying fixed income investments. Both the plan assets, to the extent that they are sensitive to changes in market interest rates, and the plan liabilities, to the extent that the discount rate is tied to the outlook for market interest rates or actual market interest rates, would be impacted by this plausible adverse scenario.

In selecting the plausible adverse scenario, the actuary would consider historical experience and the outlook for the future in determining a range of possible future experience. The actuary may want to look at historical data published by the CIA, or other economic data, as a guide to help determine the appropriate assumed reduction to market interest rates under the plausible adverse scenario.

In selecting an appropriate discount rate that would be used under the plausible adverse scenario, the actuary would follow a similar methodology used in the determination of the discount rate(s) employed in the going concern, hypothetical wind-up or solvency valuation, as applicable, but now consistent with the interest rates inherent in the selected plausible adverse scenario.

The actuary could review the plan assets as of the calculation date in order to make a reasonable determination of which assets would be classified as fixed income, and to assess their sensitivity to a change in market interest rates. The actuary could then determine an appropriate revised market value of the plan's assets on the calculation date, which would be consistent with a change to interest rates inherent in the selected plausible adverse scenario.

The actuary is expected to determine the funded status of the plan at the calculation date, separating the effects on assets and liabilities under the selected plausible adverse scenario. As noted above, as per paragraph 3260.12, in considering the plausible adverse scenarios, the actuary may

- make reasonable determinations of the asset classes which are classified as fixed income investments;
- restrict the impact of interest rate risk to the asset classes deemed to be fixed income investments and to the discount rate to the extent that the discount rate is affected by fixed income investments;
- reflect the impact of any compensating adjustments, such as a potential reduction in any margin implicit in the discount rate in response to a lower interest rate scenario;.

Guidance on selecting scenario on deterioration of asset values

The purpose of this scenario is to illustrate the sensitivity of the funded status of the pension plan to changes in the asset values only. No change to plan liabilities would need to be considered by the actuary.

The actuary would consider the plan's investment policy, historical return experience and the outlook for the future in determining a range of possible future experience. The actuary may want to consider any analysis used in setting the best estimate going concern discount rate, plan-specific stochastic projection data, historical data published by the CIA and/or other economic data, as a guide to help determine an appropriate reduction to asset values for this plausible adverse scenario.

As an alternative to selecting a plausible adverse scenario which would reduce all plan asset values, the actuary may select a plausible adverse scenario resulting in the reduction in value of non-fixed income assets only.

Guidance on selecting increased longevity

The purpose of this scenario is to provide users of the external user report appropriate information on the sensitivity of the funded status and, if applicable, service cost of a plan to changes in the mortality assumption used in the valuation.

The plausible adverse scenario would include an immediate reflection of a (i) more conservative mortality assumption than currently employed or a (ii) short-term experience shock of fewer deaths than expected. The valuation of this scenario could take the form of an age offset applied to the mortality rates, a percentage decrease in applied mortality rates, the adoption of a more conservative mortality table, the adoption of greater mortality improvement rates, the use of reduced mortality rates for a select period or a combination of any of the above.

In selecting the plausible adverse scenario, the actuary would consider plan-specific factors affecting potential longevity experience. A small plan with only a few individual members may be more likely to experience a higher percentage variation in experience versus assumed in any given year, compared to the percentage variation for a very large plan.

For pension plans with partially or fully credible mortality experience, the selected mortality assumption under the selected plausible adverse scenario would be supported by the pension plan's own mortality experience. The actuary would provide sufficient information within the external report to support the adopted assumption under the selected plausible adverse scenario.

The actuary may consider that the change in the mortality assumption does not apply to the portion, if any, of the plan's benefits assumed to be settled by a commuted value transfer.

Guidance on fixed contributions being too low

A key risk for a pension plan where contributions are fixed or restricted by the terms of the plan or other governing documents is a drop in the contribution base. For these plans, the selected plausible adverse scenario would reflect an immediate reduction in the aggregate expected contributions to be received in the future.

For target pension arrangements, such as certain target benefit plans and multi-employer pension plans, this reduction could be based on actual historical experience for the pension plan, trade or industry, and may result in a lower aggregate contribution due to fewer expected hours worked by all active members, and/or fewer members working, due to an economic downturn. For other pension plans with fixed contributions, the selected plausible adverse scenario would be based on a downturn in the workforce, payroll and expected contributions, which would be consistent with an economic downturn such as would be illustrated with the other economic plausible adverse scenarios.

The degree of reduction of fixed contributions chosen, as well as the period of persistence of the reduction, for the plausible adverse scenario would take into account actual historical volatility of the contribution base as well as known outlook for the future. Where the determination of the plan's assets is based on projected future contributions, the actuary would consider whether it is appropriate to assume the drop in the fixed contribution base is persistent through the projection period, or short term in nature.

Consideration would be given to the demographic profile of the remaining workforce as compared to the best-estimate workforce, in particular if a decline in workforce would not apply evenly to all working members. In this case, the scenario resulting in a reduced fixed contribution could also result in a higher average age and higher average service cost.

The actuary would report on the impacts of the plausible adverse scenario on the funded status of the plan and on the service cost of the plan, as described in paragraph 3260.13. The actuary may also consider whether it would be appropriate to report on the impacts of the plausible adverse scenario on the ability of the expected contributions to meet the plan's funding requirements as described in paragraph 3260.14.

Guidance on reflecting risk in combination

In addition to disclosing the impact of the risks in isolation, the actuary may also disclose the impact of risks in combination, as per paragraph 3260.12, but the actuary would not be required to do so.

If the actuary includes multiple risks in combination in the quantification of the selected plausible adverse scenario on the funded status the plan, the actuary would describe cross-terms effect within the summary of the results.

4. Example of plausible adverse scenarios

This section includes three examples of reported results, which incorporate plausible adverse scenarios. The specific plausible adverse scenarios shown here may not be appropriate for another pension plan and are for illustration only. The examples are not intended to represent comprehensive disclosure requirements, but rather to illustrate possible approaches to applying plausible adverse scenarios. The actuary would provide a detailed description of the plausible adverse scenario chosen. In addition, the actuary would provide sufficient description of any assumptions and methods used for purposes of reporting the results under the plausible adverse scenario.

Example 1

This example shows reported impacts of the plausible adverse scenarios on the going concern funded status of the pension plan and on the service cost of the pension plan, as described in paragraph 3260.13. For purposes of this example, the pension plan is invested in a 60%/40% equity/fixed income portfolio and uses asset smoothing.

At the time of the valuation, the actuary determined the following as plausible adverse scenarios which have been applied and reported on separately:

- Interest rate risk: interest rates on fixed income assets decrease 100 basis points immediately and result in a 100-basis-point decline in the future return expectations on all the asset classes in which the plan is expected to invest, leading to a 100-basis-point decrease in the discount rate.
- Deterioration of asset values: equity values decrease 15% immediately, and no changes to other economic assumptions.
- Longevity risk: life expectancy increases 10% for all ages over current assumptions.

Example 1 (C$ millions)	**Going concern valuation results as at Dec. 31, 20xx**	**Plausible adverse scenario results as at Dec. 31, 20xx**		
		Interest rate risk	*Deterioration of asset values*	*Longevity risk*
Value of assets (not smoothed)	$100	$104	$91	$100
Value of assets (smoothed)	$95	$96	$94	$95
Liabilities	$85	$95	$85	$93
Funded status	$10	$1	$9	$2
Total service cost	$12	$14	$12	$13
Life expectancy (in years) for a retiree age 65	20	20	20	22

Example 2

This multi-employer pension plan example shows reported impacts of the plausible adverse scenarios on the going concern funded status of the plan and on the service cost of the plan, as described in paragraph 3260.13. In this example, the actuary has also chosen to report on the impacts of the plausible adverse scenario on the ability of the expected contributions to meet the plan's funding requirements as described in paragraph 3260.14. For this example, the pension plan is invested in a 60%/40% equity/fixed income portfolio and the pension plan does not apply asset smoothing.

The following plausible adverse scenarios have been applied and reported on separately:

- Interest rate risk: interest rates on fixed income assets decrease 100 basis points immediately and result in a 100-basis-point decline in the future return expectations on all the asset classes in which the plan is expected to invest leading to a 100-basis-point decrease in the discount rate.
- Deterioration of asset values: equity values decrease 15% immediately, and no changes to other economic assumptions.
- Longevity risk: life expectancy increases 10% for all ages over current assumptions.

- Contribution base risk: expected contributions decrease 15% versus current assumptions.

For purposes of this example, no compensating adjustments (e.g., a reduction in benefits) have been applied.

Example 2 **Multi-employer pension plan** (C$ millions)	**Going concern valuation results as at Dec. 31, 20xx**	**Plausible adverse scenario results as at Dec. 31, 20xx**			
		Interest rate risk	*Deterioration of asset values*	*Longevity risk*	*Contribution base risk*
Value of assets	$75	$78	$68	$75	$75
Liabilities	$85	$95	$85	$93	$85
Funded status	($10)	($17)	($17)	($18)	($10)
Total expected contributions	$14	$14	$14	$14	$12
Total service cost	$12	$14	$12	$13	$11
Total deficit funding	$1	$2	$2	$2	$1
Contribution excess	$1	($2)	$0	($1)	$0
Life expectancy (in years) for a retiree age 65	20	20	20	22	20

Example 3

This example shows reported impacts of the plausible adverse scenarios on the solvency funded status of the pension plan, as described in paragraph 3260.13. For purposes of this example, the pension plan is invested in a 60%/40% equity/fixed income portfolio and all benefits in the solvency valuation are assumed to be settled through the purchase of annuities.

At the time of the valuation, the actuary determined the following as plausible adverse scenarios, which have been applied and reported on separately:

- Interest rate risk: interest rates on fixed income assets decrease 100 basis points leading to a 100-basis-point decrease in both the rates used to value benefits settled by commuted value and in the rate used to value benefits settled by annuity purchase.
- Deterioration of asset values: equity values decrease 15% immediately, and no changes to other economic assumptions.
- Longevity risk: life expectancy increases 10% for all ages over current assumptions.

Example 3 (C$ millions)	**Solvency valuation results as at Dec. 31, 20xx**	**Plausible adverse scenario results as at Dec. 31, 20xx**		
		Interest rate risk	*Deterioration of asset values*	*Longevity risk*
Value of assets	$100	$104	$91	$100
Liabilities	$85	$95	$85	$93
Funded status	$15	$9	$6	$7
Life expectancy (in years) for a retiree age 65	20	20	20	22

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