

RET DAC Model Solutions

Spring 2020

1. Learning Objectives:

6. The candidate will be able to analyze, synthesize and evaluate plans designed for executives or the highly paid.

Learning Outcomes:

- (6a) Given a specific context, synthesize, evaluate and apply principles and features of executive deferred compensation retirement plans.
- (6b) Given a specific context, apply principles and features of supplemental retirement plans.

Sources:

Canadian Pensions and Retirement Income Planning, Willis Towers Watson, 6th Edition, 2017 – Chapter 23

DA-626-20: Tax Retirement & Estate Planning Services – Tax Topics – Retirement Compensation Arrangements

Commentary on Question:

While candidates demonstrated a strong knowledge in part (a) of the impacts of funding a SERP, some struggled in part (b) when asked more specifically about the taxation of funding vehicles.

Solution:

- (a) Critique funded versus unfunded supplemental executive retirement plans (SERP) from the following perspectives:
 - (i) Employer
 - (ii) Executive

Commentary on Question:

Candidates did well on this section. For full marks they were required to critique from both the employer and executive perspective. While most candidates had many critiques from the employer perspective, some struggled to critique from the executive's perspective.

1. Continued

(i) Employer

Funded SERP

- Opportunity cost of not using funds for growth of corporation
- If funded to a retirement compensation arrangement (RCA), can benefit from the immediate tax deduction

Unfunded SERP

- More potential volatility in funding
- Generally easier to administer versus funded plans

(ii) Executive

Funded SERP

- Provides more benefit security and protection on change of control
- Generally more portability options

Unfunded SERP

- Less benefit security
- Cannot support employee contributions

(b) Describe the tax implications of the following SERP funding options:

(i) Funded Retirement Compensation Arrangement (RCA)

(ii) Letter of Credit

(iii) Life Insurance

(iv) Annuity

Commentary on Question:

Overall candidates did not perform as well on this part. For full credit, the candidate needed to describe the taxation impacts from both the perspective of the employer and executive. Some candidates only focused on one element of the taxation.

(i) Retirement Compensation Arrangement (RCA)

- All contributions to the RCA require an equal contribution made to CRA as refundable tax.
- Contributions tax deductible to employer when made
- Executive is only taxed on receipt of benefit payments in retirement

1. Continued

- (ii) Letter of Credit (LOC)
 - Generally held in an RCA trust and therefore requires the matching refundable tax remittance to CRA for LOC costs
 - LOC must be unsecured – if secured then face value of LOC subject to matching refundable tax remittance
 - Executive is only taxed on receipt of benefit payments in retirement
- (iii) Life Insurance
 - It is treated like an RCA by CRA; plan sponsor must pay an equal amount to CRA as refundable tax for all annual premiums
 - Cost of life insurance and refundable tax deductible to employer when made
 - Benefits payable at retirement generally from general cash flow or a loan against the policy and taxed on receipt
- (iv) Annuities
 - Cost of annuity premium immediately deductible by the employer when paid to insurer
 - Annuity premium fully taxable to retiring executive when paid to insurer
 - A portion of the annuity income received by the executive is taxed each year as interest income

2. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
3. Candidate will understand how to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

Learning Outcomes:

Given a plan type, explain the relevance, risks and range of plan features including the following:

- (a) Plan eligibility requirements
 - (b) Benefit eligibility requirements, accrual, vesting
 - (c) Benefit/contribution formula, including the methods of integration with government-provided benefits
 - (d) Payment options and associated adjustments to the amount of benefit
 - (e) Ancillary benefits
 - (f) Benefit subsidies and their value, vest or non-vested
 - (g) Participant investment options
 - (h) Required and optional employee contributions
 - (i) Phased retirement and DROP plans
 - (j) Risk-sharing provisions
- (3a) Identify risks face by retirees and the elderly.
- (3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature

Sources:

- DA-102-13: Evaluating the Design of Private Pension Plans: Costs and Benefits of Risk Sharing
- DA-103-13: Risk Allocation in Retirement Plans: A Better Solution
- DA-115-13: Private Pensions: Alternative Approaches Could Address Retirement Risks Faced by Workers but Pose Tradeoffs, pp.1-35, GAO
- [Managing Post-Retirement Risks, A Guide to Retirement Planning](#)

2. Continued

- DA-164-17 Defined Contribution Plan Success Factors
- [The Next Evolution in Defined Contribution Retirement Plan Design: A Guide for DC Plan Sponsors to Implementing Retirement Income Programs \(after pg. 61, background only\)](#)

Commentary on Question:

This question was intended to test a candidate's ability to apply their knowledge of three specific risks to a real-life scenario. A candidate that did well provided more than surface level commentary and provided a response that encompassed the big picture. Candidates that provided surface level analysis only received minimal credit.

Solution:

(a) Describe how the following risks differ between the two plan formulas:

- (i) Inflation risk
- (ii) Intergenerational risk
- (iii) Risk that participants will not retire when expected

Commentary on Question:

Most candidates were able to recognize the main differences between the final average pay (FAP) and career average benefit (CAB) for inflation and retirement risks. The candidates that did well were able to provide responses beyond who (employer or employee) retained the risk such as if the plan is underfunded, the CAB participants are unlikely to receive a COLA adjustment for many years.

The main point that many candidates missed when discussing intergenerational risk was that the CAB participants bore the risk of underfunding from FAP participants. It was not uncommon to see responses that inferred the formulas were for two separate plans. Additionally, only one candidate mentioned the role decision makers play when it comes to this risk.

Inflation risk - Risk that inflation will decrease the value of the benefit

Final average pay (FAP) formula

- Retirees have inflation protection
- Vested Terms do not have inflation protection until retirement – value of benefit decreases every year inflation is greater than 0%
- Actives – protected from inflation risk while active as salary increases will increase benefit
- Company – the employer bears inflation risk since pre- and post-retirement increases are pre-funded, and shortfalls between projected and actual inflation must be funded. Overfunded position provides contribution holiday.

2. Continued

Career Average Benefit (CAB) Formula

- Retirees have inflation protection, depending on funded status
 - If plan well-funded, return on assets and other demographic gains/losses will determine inflation protection
 - If plan under-funded then no inflation protection and unlikely to provide any inflation protection for many years without employer contributions or large positive asset returns/demographic gains in consecutive years
- Actives – no pre-retirement inflation protection while active
- Employer bears little inflation risk since COLA based on funded status and specific threshold

Intergenerational risk - Risk that benefits paid for by one generation will benefit another generation

FAP formula

- Participant's intergeneration risk is mostly mitigated due to the new CAB formula. Some risk if benefits are/were underfunded

CAB Formula

- Participants bear more intergenerational risk if FAP benefits were underfunded
- Conditional indexation of CAB mitigates this risk of other people paying for it
- CAB actives and retirees bear the risk of poor demographic or investment experience while FAP retirees bear none – therefore CAB bear more intergenerational risk

Both Plan formulas

- Current decision makers bear the risk of past decision makers (good or bad) and pass risk to future decision makers

Retirement risk - Risk that participants will not retire when expected

- Certainty of COLA in FAP means less retirement risk as compared to uncertain (conditional) COLA in CAB. CAB participants are more likely to delay retirement since they have more inflation risk.
- The FAP benefit accruals increase exponentially as a participant approaches retirement. If participants understand this impact, they may stay longer than expected to earn that higher benefit.
- CAB multiplier not known but in general FAP benefits usually more generous which may result in more delayed retirements for the CAB participants
- Under both FAP & CAB - When markets decline, participants may delay retirement at the same time companies need to trim staff.

2. Continued

(b) Compare and contrast the proposed plan design with respect to the risks from part (a) for the following at retirement:

- (i) A 25 year old employee hired after January 1, 2021
- (ii) An employee hired prior to January 1, 2010 within 10 years of retirement

Commentary on Question:

Many candidates that were successful in part (a) were also successful in part (b).

Most candidates were able to identify the key points for inflation and retirement risks, however, most candidates said the retirement risk for a 25-year-old is high. The long time period between today and retirement makes their risk low.

The most successful candidates were able to point out that the 25-year-old still retains some intergenerational risk from the FAP participants. Candidates who pointed out the DC plan bears no intergenerational risk only received partial credit.

	Inflation Risk	Intergenerational Risk	Retirement Risk
A 25 year old employee hired after January 1, 2021	<p>Entire benefit is under DC Plan, which will reflect pre-retirement inflation as long as pay increases with inflation</p> <p>Post-retirement inflation based on investment choices and market performance.</p>	<p>Pre-retirement bears most risk since future of plan may be jeopardized if company decision makers determine this is an expense that can be cut, if for example ABC decides the overall retirement program (DB+DC) is too expensive. This could occur if DB plan is unfunded, has poor returns or liability losses.</p> <p>Little risk to contributions once made to employee's DC account. Their contribution choices and ability to save may pass risk to younger generations when they want to retire if they have not saved enough to sustain their standard of living.</p>	<p>Low retirement risk due to long time horizon to make up for any poor asset performance</p>

<p>Employee hired prior to January 1, 2010 within 10 years of retirement</p> <p>(Benefit earned pre-2021 is FAP with post-ret COLA; Benefit earned after 2021 is DC plan for 10 years)</p>	<p>Pre-retirement - Loss of inflation protection on FAP portion for remaining 10 years of employment, where accruals become exponentially more valuable . Also, COLA still provided but on a smaller benefit as compared to if no changes were made.</p> <p>Inflation protection on DC accruals based on investment choices, with some provided from pay increases (though impact smaller as shorter time until retirement).</p> <p>Post-retirement inflation based on investment choices and market performance.</p>	<p>Employee is within 10 years of retirement so therefore less subject to future intergenerational risk. Less years to retirement means less likely benefit will change to pay for potential DB underfunded. However, employee has experienced this risk as DB plan benefit was frozen so employee is paying for past benefits earned with reduced future accruals</p> <p>Little risk to contributions once made to employee's DC account.</p>	<p>Medium to high risk change in market conditions could change employee's plan if not adequately prepared as only ten years until retirement.</p> <p>However, guaranteed DB benefit would be a majority of employee's retirement benefit whereas DC probably would not have a substantial impact on decision.</p>
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- (c) Propose defined contribution pension plan features to improve employees' retirement income adequacy.

Justify your response.

Commentary on Question:

This part of the question was testing more than memorization of features. In order to earn full credit a candidate had to provide features along with commentary on how they improved income adequacy. Candidates who listed features with no justification received minimal credit.

- Immediate eligibility - Allow participants to enroll immediately or soon after employment; the earlier contributions can go in, the more time the benefit can accumulate.
- Automatic enrollment - this ensures employees are saving for retirement; results in a higher participation rate as some employees who would normally not actively participate will participate by default and not opt out.
- Automatic contribution escalation - This helps employees save more than they may otherwise save as participants may not manually increase their contributions over time.

2. Continued

- Stretch employer match contributions over a larger percentage of compensation. This encourages employees to save more to get the company match and increases the amount being contributed to employees' account balances.
- Discourage early withdrawals and loans (leakage) from retirement savings or set limits on outstanding loan times, waiting periods. Early withdrawals and loans from retirement savings can reduce the benefit at retirement.
- Provide limited menu of investment options (but enough options to cover basic asset classes, e.g. domestic and foreign, life stage and index funds). This will help participants better manage their funds and increase their retirement savings.
- Offer access to online investment advice – helps employees increase their financial knowledge which helps them make better investment decisions.
- Offer lifetime income options – helps mitigate longevity risk where retirees may run out of retirement income.

3. Learning Objectives:

8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (8d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-175-18: Alternatives for Pension Cost Recognition—Implementation Approaches Using Bond Models

DA-180-18: Alternative Approaches to Calculating Service and Interest Cost under FASB ASC Topic 715, KPMG

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Compare and contrast the Traditional and Spot Rate Approaches to calculating the following U.S. Accounting Standard ASC 715 disclosures:
- (i) Net Periodic Pension Cost
 - (ii) Accumulated Other Comprehensive Income
 - (iii) Projected Benefit Obligation

Commentary on Question:

A successful candidate was able to compare and contrast the various design features by reflecting sound knowledge of the various considerations and the ability to evaluate the differences between options.

There was flexibility in awarding credit between parts (i), (ii) and (iii) with many acceptable responses. The sample response below represents only one variation for obtaining full credit to part (a) of this question.

(i) Net Periodic Pension Cost

Service Cost and Interest Cost are components of the Pension Cost.

Under the Traditional Approach:

- Service Cost is calculated by discounting future cash flows associated with the benefit earned, using the single weighted average discount rate.

3. Continued

- Interest Cost is calculated by multiplying the beginning of period benefit obligation by the single weighted average discount rate and making an adjustment for benefit payments during the period.

Under the Spot Rate Approach:

- Service Cost is determined by discounting the expected future cash flows associated with the benefit earned, using the individual spot rates for the respective period in which the future cash flow is expected to occur.
- Interest cost is determined by multiplying the present value of each future cash flow by its respective spot rate for the period.

The Service Cost calculated under Traditional Approach will be greater than the Service Cost calculated using the Spot Rate Approach when the yield curve is upward sloping.

The inverse is also true, Service Cost calculated under Traditional Approach will be less than the Service Cost calculated using the Spot Rate Approach when the yield curve is downward sloping.

Depending on the shape of the yield curve, Service Cost (and Interest Cost) may be higher or lower using Traditional Approach than the result calculated under the Spot Rate Approach.

(ii) Accumulated Other Comprehensive Income

Actuarial gains and losses are reported in the AOCI.

The benefit obligation at the beginning and end of the period is the same under both approaches, so the actuarial gains and losses will have an offsetting effect to changes in the service and interest costs.

Under the Traditional Approach the gains and losses will be smaller and service and interest costs greater when the yield curve is upward sloping.

(iii) Projected Benefit Obligation

Future cash flows are discounted back to the measurement date using the spot rate associated with the respective period in which the future cash flow is expected to occur [Spot Rate Method] or the single weighted average discount rate [Traditional Method].

Calculation of PBO at the beginning and end of the year are the same under both approaches.

3. Continued

- (b) Calculate the annual Interest Cost at the beginning of year 1 using the following approaches:

(i) Traditional Approach

(ii) Spot Rate Approach

Show all work.

Commentary on Question:

This part was generally completed successfully, in particular the first calculation for the Traditional Approach.

Traditional Approach:

$$\begin{aligned} &10,000 * 1.0191^{-1} * 1.91\% \\ &+ 10,000 * 1.0191^{-2} * 1.91\% \\ &+ 8,000 * 1.0191^{-3} * 1.91\% \\ &+ 4,000 * 1.0191^{-4} * 1.91\% \\ &+ 2,000 * 1.0191^{-5} * 1.91\% \\ &= 187.42 + 183.91 + 144.37 + 70.83 + 34.75 \\ &= 621.28 \end{aligned}$$

Spot Rate Approach:

$$\begin{aligned} &10,000 * 1.021^{-1} * 2.10\% \\ &+ 10,000 * 1.020^{-2} * 2.00\% \\ &+ 8,000 * 1.019^{-3} * 1.90\% \\ &+ 4,000 * 1.018^{-4} * 1.80\% \\ &+ 2,000 * 1.017^{-5} * 1.70\% \\ &= 205.68 + 192.23 + 143.66 + 67.04 + 31.25 \\ &= 639.86 \end{aligned}$$

- (c) Critique adopting the Spot Rate Approach in an inverted yield curve environment.

No calculations required.

Commentary on Question:

Full credit was awarded to candidates who provided an opinion and rationale for adopting or not adopting the Spot Rate Approach in an inverted yield curve environment. Candidates who indicated only the impact on the net periodic pension cost without providing an opinion received partial credit.

3. Continued

The Service Cost and Interest Cost for a typical pension arrangement will be greater when calculated using the Spot Rate Approach in an inverted yield curve environment

If the goal is to reduce the Service Cost and Interest Cost and increase reported gains and losses, then the Spot Rate Approach should not be adopted in a downward sloping yield curve environment

4. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.
8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
 - (b) Defined contribution and savings plans
 - (c) Hybrid Plans
 - (d) Retiree Health plans
 - (e) Other alternative retirement plans such as share risk plans, target benefit plans, etc.
- (3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
- (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.
- (8g) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

- Morneau Shepell Handbook of Canadian Pension and Benefit Plans, Shepell, Morneau, Whiston, Bethune and Clooney, J. Gregory, 16th Edition, 2016 – Chapter 1
- CIA Ed Note: Financial Risks Inherent in Multi-Employer Pension Plans and Target Benefit Pension Plans, CIA TF on MEPP/TBPP Funding, May 2011
- DA-137-13 - Pension Projections
- Morneau 16th Ed. Ch 11 - Multi-Employer Pension Plans

4. Continued

Commentary on Question:

This question tests candidates' knowledge on the governance framework, risk sharing structure, and plan design of Multi-Employer Pension Plans (MEPPs). The question requires candidates to utilize their knowledge and apply it from the perspective of the actuary performing analysis and from the perspective of the Administrator, the Board of Trustees.

Solution:

(a) Describe Multi-Employer Pension Plans (MEPPs) with respect to the following:

- (i) Governance framework
- (ii) Risk sharing structure

Commentary on Question:

Successful candidates received full credit for describing the plan design of MEPPs, as it applies to both their governance framework and risk sharing structure.

(i) Governance Framework

- Trust agreement formally designates a Board of Trustees (Board) to administer the plan and establish the plan design.
- The Board is typically constructed of half employer representatives and half employee representatives (union).
- The Board delegates tasks to professionals (such as actuaries, accountants, investment consultants) and the professionals report back to the Board.
- The Board determines the plan design based on the contributions determined by the collectively bargained agreements.

(ii) Risk Sharing Structure

- The risks are borne by the members as the benefits can be reduced (retroactive and prospective) if the benefits are not supportable or mismanaged.
- Known cost for participating employers (limited risk).
- The employers' risk is limited to the collectively bargained contribution rate.
- The risks borne by the members are spread across the membership and not assumed by each member. (i.e. investment risk, mortality risk, contribution risk, retirement risk, etc. are pooled among the active, deferred and pensioner populations.)

4. Continued

- (b) Explain four risks inherent in MEPPs that the actuary should consider when performing the projection.

Commentary on Question:

Successful candidates described risks that are inherent to MEPPs that an actuary could analyze when performing a projection valuation. Risks that are inherent to MEPPs, such as intergenerational inequity, but are not analyzed through a projection valuation, were not given credit.

Candidates were also given credit for relevant risks not mentioned below.

Risk from the difference between contribution rates and cost of accruals

- If the difference between the contribution rate and the normal actuarial cost is small, then the plan has only a limited ability to absorb experience losses.
- An increase in the average age of the membership may result in an increase in the average cost of accruals such that the contribution rate becomes insufficient to fund ongoing accruals.
- The risk can be measured by looking at the present value of future expected contributions that is in excess of the cost of expected future accruals. This would represent the maximum experience loss that can be absorbed by the plan.

Risk of a decline in hours

- Where a portion of the contribution is used to cover a deficit, a reduction in the hours worked leads to lower contributions to finance that deficit.
- A reduction in hours worked, or hours of work available, may influence part of the workforce to retire earlier, leading to an experience loss when subsidized early retirement is offered.
- An increase in retirements, together with increased lump sum termination benefits, can result in (or increase) negative cash flows for mature plans, increasing their liquidity needs and limiting investment alternatives.

Inflation risk:

- The value of the plan's benefit will decrease over time, even if inflation is low.
- For final pay-based plans, risk is reflected in the experience gains/losses that arise from the difference between assumed (or desired rate of ad hoc increase) and actual increases in earnings.
- The actuary should be cognizant to past/future inflation rates when measuring/consulting on the cost of benefit improvements.

4. Continued

Mortality/Longevity risk:

- This risk manifests itself when the longevity improvements reflected in the liabilities are not sufficient for either or both plan members and their spouses.
- When liabilities are based on plan-specific mortality, members' longevity may improve more rapidly than the average population, increasing the risk that longevity improvements reflected in the valuation of the liabilities may not be sufficient.
- For joint and survivor pensions, spouses' longevity may be unrelated to plan members' mortality experience.

- (c) Describe factors the Board of Trustees should consider when evaluating each potential benefit improvement.

Commentary on Question:

Candidates struggled to identify and fully describe factors that the Board would consider when evaluating the potential benefit improvement. In many cases, candidates suggested factors that an actuary would consider when performing their analysis, such as specific assumptions or risks identified in part (b). Points were only given for items that the Board would be expected to consider rather than what an actuary would consider.

Going Concern Funded Ratio

- The increase in the liability for the increase in the monthly pension unit and the addition of post-retirement indexing (effect on funded status)
- The Board of Trustees must determine the funded ratio range at which a benefit improvement will be considered.
- Funded ratio target after the benefit improvement is implemented. As an example, the Board of Trustees may consider improving benefits once the funded ratio is above 125% and target a funded ratio of 110% to 115% after the benefit improvement.
- The Board of Trustees may consider using margin techniques to protect the plan from the risks inherent to a MEPP and offset future negative experience.
- Margin techniques would include:
 - i. margin in the actuarial assumptions
 - ii. establish a non-specific liability, or reserve, and
 - iii. Provision for Adverse Deviation (PfAD) – e.g. PfAD as a percentage of the liability

4. Continued

Going Concern Normal Cost

- Increase in the normal cost for an increase in the monthly pension unit prospectively and the addition of post-retirement indexing
- Evaluate the plan's future expected contributions in comparison to the plan's future normal cost at each projection year
- Evaluate the present value of future expected contributions to the plan's present value of future benefits for both improvements.
- The Board of Trustees must specify an acceptable range for the relationship between the contractual contribution rate and the best estimate normal actuarial cost or total actuarial cost.
- Determine the targeted contribution margin

Solvency Ratio

- Evaluate the plan's future expected solvency ratio before and after the plan improvement, even though the plan may not be required to fund on a "marked-to-market" basis.
- A target level for the solvency ratio should be set

Future Trends

- The Board of Trustees should consider significant plan trends such as the maturity of the plan, the trend in the average age, other demographic trends, and the trend in the metrics discussed above.
- The trend in the plan's future cash flows. Is the plan cash flow negative (contributions less than benefit payments and expenses) or cash flow positive (contributions greater than benefit payments and expenses) over the projection period?

Regulatory

- The Board of Trustees must consider legislation and regulations that govern the MEPP.
- Based on the governing regulations, is the MEPP in a position to improve benefits both retroactively and prospectively? Perhaps constrained by either the funded ratio (retroactive improvement) or the contribution margin (prospective improvement)?

5. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

Learning Outcomes:

- (3a) Identify risks faced by retirees and the elderly.
- (3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

Sources:

DA-173-18: How Accurately does 70% Final Employment Earnings Replacement Measure Retirement Income (In)Adequacy? Introducing the Living Standards Replacement Rate (LSRR) – (sections 3.1, 3.2, 3.4, 4 & 5 and Appendices background only)

Commentary on Question:

Overall, most candidates did not provide enough information and examples for part (a) to receive full credit. Candidates did well on part (b) if they knew what the LSRR was and could use the case study to pull data and calculate an estimated retirement benefit.

Solution:

- (a) Describe the disadvantages of using the conventional earnings replacement ratio to measure retirement income adequacy.

Commentary on Question:

Candidates who did not receive full credit did not provide enough examples of the disadvantages and needed to provide more detail in their answer. The list of disadvantages shown below is not exhaustive; other relevant disadvantages which were adequately described by candidates also received credit.

There are many shortcomings of the conventional earnings replacement ratio. These shortcomings include:

- It relies on an inadequate measurement period, i.e. just takes into account one year of earnings. Because of this it doesn't take into account earnings volatility or the fact that some participants may have decreased income during their final year of employment because of working part time.
- It doesn't reflect other sources of retirement income from home equity or a spouse or a 2nd job. It also ignores other government support someone might be receiving such as child benefits.
- The ratio ignores the household size, specifically if there are children that the participant is supporting.
- It ignores the fact that there could be differences in expenses over the future lifetime of an individual, such as increased health care costs.
- It ignores tax differences that may occur between someone's working lifetime and through their retirement.

5. Continued

- The ratio doesn't account for the amount of debt an individual may have and the time in which they will be paying down that debt.
- (b) Calculate the living standards replacement rate (LSRR) using the average demographic information as of January 1, 2020 for an active National Oil Full-Time Pension Plan participant at their Normal Retirement Date.

Show all work.

Commentary on Question:

One model solution is shown below. Credit was provided for other solutions when candidates adjusted the benefit formula appropriately. For example, if candidates interpreted the case study data to assume an early retirement date an ERF should have been applied appropriately as needed. Commonly missed steps in the calculation include not confirming the benefit was under the maximum benefit and not applying the tax rate.

- Current Age = 47.2
- Current Service = 10.9
- Pay \$83,600
- 40% tax rate
- Salary scale = 3.00%

Living Standards Replacement Rate (LSRR) = average annual retirement living standards / average annual working-life living standards

Projected years left = Age of 47.2, so $65 - 47.2 = 17.8$ years so will assume 18 years left

Projected service = $10.9 + 17.8$ years left = 28.7 years so will assume 29 years of service

Final average pay = $[83,600 \cdot (1.03^{18}) + 83,600 \cdot (1.03^{17}) + 83,600 \cdot (1.03^{16}) + 83,600 \cdot (1.03^{15}) + 83,600 \cdot (1.03^{14})] / 5$
 $= 671,354 / 5 = 134,271$

Retirement benefit: Final average pay * projected service * 2% = $134,271 \cdot 29 \cdot .02 = 77,877$

Check benefit versus maximum = $3000 \cdot \text{service} = 3000 \cdot 29 = \$87,000$, so calculated benefit stands

5. Continued

Money available to spend in retirement = Projected benefit * (1-tax rate) = 77,877
* 0.6 = 46,726

LSRR = money available to spend in retirement / money available to spend while
working = 46,726 / 60,000 = **78%**

6. Learning Objectives:

- 7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
- 9. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7c) Describe and apply the techniques used in the development of economic assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.
- (9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors etc.).
- (9c) Explain and apply relevant qualification standards.

Sources:

DA-140-15: ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations

DA-142-15: ASOP 4 - Measuring Pension Obligations

DA-183-20: Forecasting Investment Returns and Expected Return Assumptions for Pension Actuaries

Commentary on Question:

Question was the practical application of evaluating the expected return on asset assumption; however, many candidates provided lists from the study material as opposed to applying the material to a real life situation

Solution:

- (a) Describe the relationship between the arithmetic and geometric methods for determining the expected return assumption.

Commentary on Question:

This part was very poorly answered; candidates got confused between asset return methodology versus simple and compound interest rate

6. Continued

- The expected arithmetic return for a portfolio is calculated as **the asset-allocation-weighted-average expected arithmetic return** for each of the asset classes

There are two basic approaches to calculating the expected geometric return for a portfolio are:

One

- The expected geometric return over a long-time horizon is calculated based on the arithmetic return and the standard deviation of the portfolio.

Two

- Construct a stochastic model that incorporates different distributions for investment returns with serial and dynamic correlations between investment returns in one year and subsequent years reflecting changes in capital market assumptions over time

Relationship:

- The portfolio's expected geometric return will be lower than the expected arithmetic return due to the impact of volatility. Specifically, geometric average return = arithmetic average return – $\frac{1}{2}$ variance of the portfolio
- The higher the volatility of a portfolio, the bigger the difference between the expected geometric return and the expected arithmetic return.

- (b) Summarize the additional information required by the actuary to determine if this expected return assumption is reasonable under Actuarial Standard of Practice No. 27.

Commentary on Question:

Part (b) was answered better than part (a), however most candidates did not give the exhaustive items that were needed to receive full credit. Partial answers received partial credit. The list shown below is not exhaustive; other relevant answers could also receive credit.

The information required to evaluate the reasonability of the expected return assumption is as follows:

- The anticipated returns on the plan's current and future assets.
- Any broad range of data and other inputs used, including the judgment of investment professionals
- Current yields to maturity of fixed income securities such as government securities and corporate bonds
- Forecasts of **inflation**
- Total returns for each asset class

6. Continued

- Any stochastic simulation models/tools or other analyses that may have been used to develop expected investment returns from this statistical data.
 - Plan's Investment Policy, stating:
 - (i) the current allocation of the plan's assets;
 - (ii) types of securities eligible to be held (diversification, marketability, social investing philosophy, etc.);
 - (iii) a stationary or dynamic target allocation of plan assets among different classes of securities; and
 - (iv) permissible ranges for each asset class within which the investment manager is authorized to make investment decisions.
 - whether the current investment policy is expected to change during the **measurement period**.
- (c) Describe the statements that must be disclosed by the actuary in the year end accounting report when using management's expected return assumption of 7.50%.

Commentary on Question:

This part was answered well; most candidates got the first two points below but only some got the third or part of the third point.

- The actuary's communication should state the source of any prescribed assumptions or methods.
- any prescribed assumption or method set by another party that significantly conflicts with what, in the actuary's professional judgment, would be reasonable for the purpose of the measurement; or
- The actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method set by a party other than the actuary

7. Learning Objectives:

3. Candidate will understand how to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

Learning Outcomes:

- (3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.

Sources:

DA-166-17: Shifting Public Sector DB Plans to DC, p 1-22

Commentary on Question:

The question tests understanding of the risks faced by different stakeholders in the public defined benefit pension plan

Solution:

- (a) Identify the objectives of each public pension plan stakeholder.

Commentary on Question:

Most of the candidates received the maximum number of points for Part (a). Candidates received full credit if they listed and described multiple objectives for four stakeholders. Candidates had to both identify the stakeholder and provide objectives to receive credit. Credit was also provided to candidates who identified relevant objectives for stakeholders not shown in the below model solution.

Employer and plan sponsors

- Want low costs and low volatility
- Use plan to attract and retain employees

Public employee (plan members)

- Want low contribution rates while working
- Want adequate and assured benefits when retire

Taxpayers

- Pay as little taxes as possible
- Ensure public servants won't fall back on tax-supported welfare

7. Continued

Elected officials

- Want to become re-elected
- Would prefer to postpone paying pension contributions in order to lower taxes

(b) Describe the effect this proposal will have on the following stakeholders:

- (i) Taxpayers
- (ii) Plan members
- (iii) Employer

Commentary on Question:

Most of the candidates did well on this section. For full credit, candidates needed to provide multiple effects for each of the three stakeholders.

(i) Taxpayers

- Required employer contributions get passed onto current taxpayers
- Shifting investment risk to employees means that the taxpayers won't have to make up a possible future plan deficit (still will need to make up accrued plan deficits, if any)
- Public employees may be more dependent on tax-supported welfare if do not meet retirement adequacy
- Investment risk shifted to employees means future taxpayers won't have to make up for poor investment performance

(ii) Plan members

- Will now bear all investment risk which they may not be educated to handle
- Have more responsibility in planning for their own retirement
- Will have less certain benefits when retire
- Benefit is portable, which adds in job flexibility

(iii) Employer

- Shifts the investment risk to the employee
- Will reduce the volatility of contributions
- The contributions will no longer be optional which could increase costs
- Lose effective way to manage retirement of workforce

8. Learning Objectives:

8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (8e) Advise plan sponsors on accounting costs and disclosures for retirement plans under various standards and interpretations.
- (8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

DA-179-19: Introduction (A58), IFRS1 (paragraphs 1-40 & Appendix A), IAS19, IFRIC14

DA 137-13 Pension projections

DA 157-18 PWC IFRS manual of accounting Ch 12

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe the challenges when using only the company's financial statements to perform the five-year accounting projection.

Commentary on Question:

Credit was only given for describing the challenges of using the company's financial statements for the purpose of performing a five-year projection. No credit was awarded for listing and/or defining elements of a 5-year projection.

No census data is in financial statements – if an open plan, a new entrant demographic profile cannot be estimated. Would need to discuss with the client how to address new entrants. If actuarial report is available, the new entrant profile could be estimated using an age/service table and looking at members with 1 or 2 years service.

Assets need to be projected and there are no asset return assumptions used in an IFRS accounting disclosure (as only net interest cost is calculated). May be able to roughly estimate based on asset mix in the disclosure.

There are data limitations given that the actuary has access to liabilities, sensitivities and assumptions used but not full data to manipulate or reproduce results.

8. Continued

Given the data limitations, the actuary needs to consider the purpose of the projection to determine whether the accuracy of the result will be acceptable.

The actuary can use either the disclosure of the weighted average duration of the DBO, or the sensitivity to the discount rate, to estimate liabilities under different discount rates during the projection period. However, this only helps for DBO not service cost. Service cost usually has a higher duration. Other assumptions with a significant impact on the DBO may be disclosed – however this may reflect the opinion of the actuary that generated the results and may not include all significant assumptions (for example, life expectancy).

With only a financial disclosure and not a full accounting report, certain assumptions cannot be fully reviewed or assessed whether they should be changed for the projection period. The actuarial gain/loss due to changes in financial assumptions, demographic assumptions and experience can give insight into how material this could be.

- (b) Compare and contrast the assumptions used to perform an accounting valuation versus an accounting projection.

Commentary on Question:

Many candidates struggled with this part, as they were not able to fully identify and articulate the similarities and the differences between how assumptions are set and used in an accounting valuation vs. an accounting projection. Candidate answers suggested that they did not understand the differences between an annual valuation and a projection.

The model solution shown does not include an exhaustive list of all assumptions used in valuations and how they are similar or different in an annual valuation vs. projection. Other relevant assumptions also received credit if the candidates correctly commented on their use.

	Valuation Assumptions	Projection Assumptions
Demographic Assumptions	No new entrant assumption is needed in a valuation as it is performed at a specific point in time	If an open plan, a new entrant profile is needed, including the number of new entrants (or growth in employee population) and assumed demographics (starting salary, gender, age).

	<p>Actual short-term retirement experience deviation from expected of a plan may not have a large impact on the long-term costs (eg. early retirement on an actuarial equivalent reduction plan)</p> <p>Turnover table based on plan specific rates.</p> <p>Mortality table based on standard rates, or plan specific experience if large enough, with current projection scale</p>	<p>Short term retirement experience deviation from expected can be significant over time, specifically on cash flows (earlier than expected retirement, significant benefits paid in advance of an assumption, could affect discount rate developed). A projection should reflect the expected future patterns of retirement in short term, reflecting coming recessions or early retirement windows.</p> <p>If future assumption is expected to equal the past assumption then using projection assumptions equal to valuation assumptions may be justified. However a recession may call for a different projection assumption; could implement a more detailed select and ultimate table.</p> <p>Little justification to use different mortality and disability assumptions. Plan is either large enough to have own experience or using a standard table.</p>
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	Valuation Assumptions	Projection Assumptions
Economic Assumptions	<p>Salary increase assumptions typically vary by age</p> <p>Inflation and investment return assumptions are based on long term assumption.</p>	<p>Salary increase assumptions may also vary by the calendar year (ie, a select and ultimate assumption may be used, as the select period may reflect short term economic expectations)</p> <p>Investment return will typically vary from year to year to reflect the expected economic conditions and expected changes to the portfolio in short term</p>

9. Learning Objectives:

8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (8d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-157-18: PWC IFRS Manual of Accounting Ch. 12 (excluding FAQ 12.113.2 to 12.127.1)

DA-179-19: Introduction (A58), IFRS1 (paragraphs 1-40 & Appendix A), IAS19, IFRIC14

Commentary on Question:

The question tests candidates' understanding of accounting treatment for a plan amendment under IAS 19. Some candidates struggled, as they did not measure the impact of the plan amendment at the date when it became effective. Credit was given for either simple or compound interest calculations. To receive full credit, candidate must state that the SERP is not funded; therefore, interest on assets is zero.

There was a typo in the question – Expected Benefit Payments of \$620,000 is for 2020 (instead of 2019). Credit was given for either of the following interpretations:

- Candidate assuming 2020 Expected Benefit Payments = 2019 Expected Benefit Payments*
- Candidate assuming 2020 Expected Benefit Payments = \$0*

The model solution below uses simple interest and assumes 2020 expected benefit payments = 2019 expected benefit payments and are made on 6/30/2020. If candidates instead assumed monthly annuities were made evenly throughout the year and did calculations correctly, credit was also provided.

Solution:

Calculate the 2020 Defined Benefit Cost under International Accounting Standard IAS19, Rev. 2011 (IAS 19).

Show all work.

Determination of DBO (gain)/loss for amendment

Actual pre-amendment liability at 6/30/2020 with a DR of 3.00%
= $14,870,000 + 1,180,000 * (1 + 0.03) * (6/12) - 620,000 + 14,870,000 * 0.03 * (6/12)$
= 15,080,750

9. Continued

$$\begin{aligned} &\text{Actual post-amendment liability at 6/30/2020 with a DR of 3.00\%} \\ &= 17,610,000 + 1,350,000 * (1 + 0.03) * (6/12) - 620,000 + 17,610,000 * 0.03 * (6/12) \\ &= 17,949,400 \end{aligned}$$

$$\text{Liability loss for amendment} = 17,949,400 - 15,080,750 = 2,868,650$$

Determination of DBC included in P&L from 1/1/2020 – 6/30/2020

$$\text{Current Service Cost} = 1,180,000 * (1 + 0.03) * (6/12) = 607,700$$

$$\text{Past Service Cost} = 2,868,650$$

$$\text{Interest on DBO} = (14,870,000) * 0.03 * (6/12) = 223,050$$

$$\text{Interest on assets} = 0$$

$$\text{DBC}$$

$$= \text{Current Service Cost} + \text{Past Service Cost} + \text{Interest on DBO} - \text{Interest on assets}$$

$$= 607,700 + 2,868,650 + 223,050 - 0$$

$$= 3,699,400$$

Determination of DBC included in P&L from 7/1/2020 – 12/31/2020

$$\text{Current Service Cost} = 1,350,000 * (1 + 0.03) * (6/12) = 695,250$$

$$\text{Interest on DBO} = 17,949,400 * 0.03 * (6/12) = 269,241$$

$$\text{Interest on assets} = 0$$

$$\text{DBC}$$

$$= \text{Current Service Cost} + \text{Interest on DBO} - \text{Interest on assets}$$

$$= 695,250 + 269,241 - 0$$

$$= 964,491$$

$$\text{Total Defined Benefit Cost 2020} = 3,699,400 + 964,491 = 4,663,891$$

10. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
 - (b) Defined contribution and savings plans
 - (c) Hybrid Plans
 - (d) Retiree Health plans
 - (e) Other alternative retirement plans such as share risk plans, target benefit plans, etc.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.

Sources:

Morneau Shepell Handbook of Canadian Pension and Benefit Plans, Shepell, Morneau, Whiston, Bethune and Clooney, J. Gregory, 16th Edition, 2016, Ch. 24

[Managing Post-Retirement Risks, A Guide to Retirement Planning](#)

Commentary on Question:

In this question, candidates had to demonstrate their understanding of risks faced by employers sponsoring post-retirement benefit plans. The second and third parts required candidates to display their understanding of how retirees can manage the risks of unexpected costs as well as alternative ways employers can help them achieve that goal while limiting their own risk exposure.

Solution:

- (a) Describe four risks facing sponsors of post-retirement benefit plans.

Commentary on Question:

In part (a), most candidates focused mostly on the risk of increasing costs and several clearly described the Regulatory/Legislative risk. To get full marks in this section, candidates had to show their understanding of four different risk categories.

1. Risk #1: Risk of increasing cost

- Contributing factors to cost escalation include higher utilization as well as new technologies, drugs, and services that are more expensive.
- For many employers the number of retirees is growing, increasing cost.

10. Continued

- Layoffs and early retirements mean more people are receiving post-retirement benefits sooner.
- Use/cost of medical benefits increase with age (on average).
- Life expectancy continues to increase with progress in medicine.
- As people are not retiring at later ages, the number of years in retirement increase, and thus the duration of future benefit cash flows.
- Health care benefits are tax-effective but employers do not receive a full “credit” for providing the benefit because of the hidden costs of their subsidy to the plans

2. Risk #2: Regulatory / legislative risk

- The employer’s role in the health care delivery system has an uncertain future
- Government-sponsored benefits continue to be reduced (for example, restrictions on certain services)
- Benefits removed from government plans may automatically be covered by private employer sponsored plans unless plan language specifically excludes them
- Risk that accounting requirements could change, impacting the plan sponsor’s financial statement expense and balance sheet liability.

3. Risk #3: Legal risk

- Retiree group benefits have been the subject of several court cases involving both collectively bargained contracts and salaried employees.
- Employers include language in their communication of retiree group benefit plans that they have the right to amend or terminate the plans in the future.

4. Risk #4: Interest rate risk

- Since most post-retirement benefit plans are unfunded, the liability on the balance sheet may be larger than for pension where there are assets backing the benefits.
- The sustained low interest rate environment has resulted in a reduction of discount rates which led to an increased cost of providing these benefits.
- Lower discount rates lead to higher accounting liabilities.

- (b) Explain how future retirees can manage the risk of unexpected healthcare costs.

Commentary on Question:

Most candidates did well in part (b) and were able to explain multiple ways retirees could manage their risk of unexpected healthcare costs. Four examples were needed to receive full credit. Relevant answers not provided below also received credit.

10. Continued

- Rely on provincial health care as the primary source of coverage for post-65 retirees.
 - Instead of retiring from a job with health benefits, employees may choose to keep working, at least part-time, in a job that will allow them to remain covered.
 - Wide varieties of “discount benefit plans” are available for typical non-covered services such as dental or vision care.
 - Medical travel or even migration to other countries has gained popularity as a way for consumers to reduce their cost for care.
- (c) Propose two ways that Company ABC can help future retirees manage their future healthcare expenses.

Justify your response.

Commentary on Question:

Most candidates identified access to unsubsidized group health plans and access to individual coverage through a marketplace as ways for employers to help future retirees manage their future healthcare expenses.

Partial points were awarded when the candidate listed an alternative way but did not further explain it. In order to get full points, candidates had to propose, with justification, two ways to help future retirees. Candidates were also given credit if they proposed, with justification, a solution not shown below.

1. Provide access to unsubsidized group plan.

- Retirees will pay for the insurance coverage but will benefit from group premiums as opposed to individual coverage rates.

2. Provide access to individual health coverages

- Employer provides a fixed contribution but also arranges access to a retiree marketplace that allows retirees to purchase individual insurance coverage at a discount and generally without providing medical evidence.

11. Learning Objectives:

5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
- (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.

Sources:

DA-181-20: International Pension Plans – Dispelling the Myths

DA-182-20: International Pension Plans: A Good Fit for Mobile Workers

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe advantages and disadvantages of offering globally mobile workers an International Pension Plan instead of participating in various local plans from the perspectives of:
 - (i) Employer
 - (ii) Employee

Commentary on Question:

Candidates had to describe advantages and disadvantages from both the employer and employee perspective to receive full points. Candidates who listed items without describing why they were advantages or disadvantages received no points.

The model solution illustrates an answer that would receive full credit, but it is not an exhaustive list of all advantages and disadvantages; credit was also provided for other valid advantages and disadvantages.

- (i) Employer Perspective

Advantages:

- Security: The International Pension Plan (IPP) is a more secure option than a domestic pension plan because of currency volatility, investment restrictions and economic and political instability in some countries.
- Cost: In recent years, the costs associated with IPPs have fallen greatly and the difference in price between IPPs and domestic plans has narrowed.

11. Continued

- Attraction: IPPs help create a globally attractive and competitive benefits package that can be simpler to administer and monitor than running many disparate plans.
- Retention: IPPs can help retain long-term mobile workers, who are experienced, senior and highly qualified.

Disadvantages:

- Tax: There are no tax advantages to establishing an IPP.
- Cost: Multinational companies with a small number of mobile employees may perceive the cost of setting up and administering the plan as too high.
- Trusts: The most common approach to setting up an IPP is using a trust, which can be expensive to set up and run in some countries.
- Better options: Retention in home plans may be a better option than an IPP.

(ii) Employee Perspective

Advantages:

- Tax: The IPP can offer tax-free growth if benefits are accumulating during periods of work in low-tax countries and no tax is levied by the local office.
- Benefit adequacy: Conventional provisions of domestic plans may not be adequate for employees spending most of their working life overseas.
- One benefit: Domestic plans may provide fragmented benefits, while an IPP offers a benefit from a single source.
- Consistent contributions: An IPP offers a single plan to employees regardless of where they are based, which allows for regular and consistent contributions.

Disadvantages:

- Better options: Multinationals may perceive the IPPs as complicated and lacking in transparency. Further the offshore status may be off-putting to some. As such, some may prefer an allowance or increase in salary in lieu of a separate benefit.
- Limitations: There may be limitations imposed by plan sponsors on the nationality or location of employees allowed to join the plan.
- Security: If the plan is not funded, there is benefit security risk.
- Tax: Recent tax regulation changes in the US have further complicated matters and have implications for the adoption of IPPs. All US citizens must report their worldwide assets and earnings to the IRS, regardless of where they live, how long they have lived there or whether any money is owed.

11. Continued

- (b) Explain how the disadvantages from the employer perspective identified in part (a) can be addressed.

Commentary on Question:

Most candidates failed to provide an adequate response on how the disadvantages can be addressed. Answers such as “the company can consider not providing an IPP if the cost is too high” or “the company can set up the plan in such a way that costs are lower” did not receive credit. At least three disadvantages were required to be addressed to receive full credit.

Disadvantages:

- Tax: There are no tax advantages to establishing an IPP.
 - The IPP can offer tax-free growth if there is no tax levied by the local tax office.
 - With careful timing and withdrawal of benefits, any income tax liability on benefits can be minimized.
- Cost: Multinational companies with a small number of mobile employees may perceive the cost of setting up and administering the plan as too high.
 - In recent years, costs associated with IPPs have fallen greatly due to improved automation of administration and investment processes.
 - Greater use of low-cost passive funds and general competition in the market can drive the cost down.
 - Master trusts offer a low-cost way for employers to provide an IPP for a small number of mobile employees.
- Trusts: The most common approach to setting up an IPP is using a trust, which can be expensive to set up and run in some countries.
 - While a trust may be expensive, they provide the following which are beneficial to both the employee and the employer:
 - They separate the plan funds from the assets of the company, which provides security for plan members.
 - Trusts add an important layer of governance and assist in plan administration.
 - Trustees are responsible for ensuring that funds made available are suitable for members.

12. Learning Objectives:

8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (8d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-168-19: IFRS and US GAAP: Similarities and Differences, Ch. 5 only

DA-170-17: Accounting for buy-ins

DA-186-20: Plan Curtailments & Settlements Under FASB ASC Topic 715 Relating to Plan Terminations (Part 2)

DA-179-19: Introduction (A58), IFRS1 (paragraphs 1-40 & Appendix A), IAS19, IFRIC14

Commentary on Question:

Question 12 was trying to test a candidate's understanding of the similarities and differences between annuity buy-ins and buy-outs. Part (a) focused on features of buy-ins and buy-outs, while part (b) addressed the accounting implications of buy-ins and buy-outs for plan sponsors under the different accounting standards.

Candidates were successful when they expanded on the accounting implications, rather than just stating whether it triggers settlement accounting or not.

Candidates that did not do as well failed to describe the differences between IAS 19 and U.S. Accounting Standards ASC 715 in part (b).

Solution:

- (a) Compare and contrast annuity buy-ins and annuity buy-outs from the following perspectives:
 - (i) Plan sponsor
 - (ii) Plan participants

12. Continued

Commentary on Question:

Candidates had to list features of both buy-ins and buy-outs from both the plan sponsor and participants' perspective to receive full marks. Candidates who did not do as well failed to address buy-ins and buy-outs from both perspectives. The answer shown below is not an exhaustive list of features; candidates also received points for noting other relevant similarities and differences between buy-ins and buy-outs.

(i) Plan sponsor perspective

Annuity buy-in	Annuity buy-out
Mitigates mortality and interest rate risks and transfers them to the insurance company	Mitigates mortality and interest rate risks and transfers them to the insurance company
The buy-in policy remains part of the company's assets	The assets and liabilities are removed from plan assets and liabilities in a buy-out
Are revocable and generally contain a surrender provision	Buy-outs are irrevocable
Plan sponsor is still responsible for making benefit payments but is reimbursed by insurance company	Insurance company makes benefit payments directly to participants
Plan sponsor is still required to pay PBGF premiums for impacted participants	Plan sponsor no longer required to make premiums for impacted participants

(ii) Plan participants' perspective

Annuity buy-in	Annuity buy-out
No change to method of pension payment – still receive pension from plan sponsor	Change in source of pension payments as the payments now come from insurance company
Risk that the buy-in could be converted to a buy-out later (at which time will lose PGBF/protection)	No longer protected by PGBF
If the insurance company is insolvent, then the plan sponsor is still responsible so benefit payments may be more secure	Subject to credit risk of insurer

12. Continued

- (b) Compare and contrast the accounting implications under International Accounting Standards IAS 19, Rev 2011 versus U.S. Accounting Standards ASC 715 of the following transactions:

- (i) Annuity buy-in
- (ii) Annuity buy-out

No calculations required.

Commentary on Question:

Candidates who did not do as well only stated whether or not it was a settlement under each accounting standard. Some candidates also mistakenly stated that curtailment accounting would be triggered.

Candidates who were successful expanded on the accounting implications for the plan sponsor and identified the differences between IAS 19 and U.S. Accounting Standards ASC 715.

- (i) Annuity buy-in

IAS 19	U.S. Accounting Standards ASC 715
Annuity buy-in does not trigger settlement accounting under IAS 19	Annuity buy-in does not trigger settlement accounting under ASC 715
Assets are reduced to reflect the value of the DBO	The buy-in policy is part of market value of assets and measured at either the surrender value or premium that would be paid today
No impact on the DBO	The PBO may be unchanged or may be measured on the same basis as the buy-in policy
Loss on assets would flow through OCI and no immediate impact on the P/L	Remeasurement gain/loss on assets or PBO would flow through AOCI and the portion outside the corridor would be amortized over average remaining service (or lives, if plan is mostly inactive)

12. Continued

(ii) Annuity buy-out

IAS 19	U.S. Accounting Standards ASC 715
Triggers settlement accounting	Triggers settlement accounting if greater than SC + IC
Assets and liabilities are transferred out of the plan, which has an impact on the net interest charge (if cost of buy-out greater than DBO removed)	Assets transferred out of the plan: lower asset value results in lower expected return on assets
	Liabilities transferred out of plan: lower obligation results in lower interest cost
Settlement loss is recognized immediately in the P/L	If only a portion of the liability settled, a pro-rata portion of the maximum gain/loss is recognized in P/L based on % reduction in PBO; the full gain/loss is recognized if the entire obligation is being settled

13. Learning Objectives:

3. Candidate will understand how to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.
7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
9. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

- (3a) Identify risks face by retirees and the elderly.
- (3b) Describe and contrast the risks face by participants of:
 - (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.
- (4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.
- (4b) Assess the risk from options offered, including:
 - (i) Phased retirement
 - (ii) Postponed retirement
 - (iii) Early Retirement
 - (iv) Option factors
 - (v) Embedded options
 - (vi) Portability options
- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7c) Describe and apply the techniques used in the development of economic assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

13. Continued

- (9d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.
- (9e) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.

Sources:

DA-103-13: Risk Allocation in Retirement Plans: A Better Solution

DA-166-17: Shifting Public Sector DB Plans to DC, pp. 1-22

DA-614-19: CIA Practice Specific Standards for Pension Plans 3100-3560

Commentary on Question:

This question tested the candidate's ability to recognize the advantages and disadvantages from multiple perspectives of lump sum payments from a retirement plan, as well as the candidate's ability to assess whether certain commuted value assumptions were appropriate under the Canadian Institute of Actuaries' Standards of Practice.

Candidates generally did well on part (a) but some struggled with part (b).

Solution:

- (a) Describe the advantages and disadvantages of a commuted value compared to a lifetime annuity at retirement from the following perspectives:
 - (i) employee
 - (ii) employer

Commentary on Question:

Most candidates successfully described the advantages and disadvantages of a commuted value option compared to a life annuity from both the employer's and employee's perspective.

To receive full credit, candidates needed to address both the employee and employer perspectives. Credit was also provided for reasonable answers not specifically noted below

Employee advantages:

- Member can invest money based on risk preference
- Can take money out as you need it, and can vary payments

13. Continued

Employee disadvantages

- Member may not have the investment expertise to invest money
- Risk of outliving money

Employer advantages

- Discharge longevity risk
- Reduce PBGF/Admin fees

Employer disadvantages

- May have higher liability if pay out at market rates
- Liquidity risk paying out large commuted values

- (b) Assess whether each of the assumptions Company ABC used to calculate commuted values were acceptable under the Canadian Institute of Actuaries' Standards of Practice assuming there is no overriding pension legislation.

Show all work and justify your response.

Commentary on Question:

Most candidates were able to successfully assess some of the assumptions, but few were able to successfully assess all of the assumptions. Candidates did well on the non-indexed rates and the mortality assumptions, but they struggled with the indexed rates and retirement age.

Candidates were not provided credit for simply stating whether or not the assumption was appropriate if they did not justify their assessment. The model solution provides sample assessments and justification; candidates also received credit if they came to a different conclusion but provided reasonable justification for their answer.

For example, candidates were given credit if they noted that, depending on the plan provision, age 55 could be the age that produces the highest liabilities and therefore may be appropriate.

Candidates were also awarded credit if they referenced the Standards of Practice that are effective December 1, 2020 that require 50% of the commuted value to be calculated at the best age and 50% of the commuted value to be calculated at the earliest unreduced age.

The question labelled the rates as both their CANSIM series number as well as the annualized factors i_7 , i_L and r_L ; therefore, candidates were not penalized if they used the rates provided instead of the annualized rates.

13. Continued

Interest Rates

Commuted value rates should be calculated using the CANSIM rates for the calendar month immediately preceding the month in which the valuation data falls. Therefore the November 2019 rates should be used.

The CANSIM rates should be annualized:

$$i_7 = (1 + 1.84\%/2)^2 - 1 = 1.84846\%$$

$$i_L = (1 + 2.16\%/2)^2 - 1 = 2.17166\%$$

$$r_L = (1 + 0.72\%/2)^2 - 1 = 0.72130\%$$

Non-indexed rates

$$i_{1-10} = i_7 + 0.90\% = 1.84846\% + 0.90\% = 2.74846\%$$

$$i_{10+} = i_L + 0.5 \times (i_L - i_7) + 0.90\% = 2.17166\% + 0.5 \times (2.17166\% - 1.84846\%) + 0.90\% = 3.23326\%$$

Rates should be rounded to the nearest 0.10% so rates are 2.70% for 10 years and 3.20% thereafter

Rates provided would not be acceptable under the Standard of Practice since the rates Company ABC is proposing are higher than the actual rates and would therefore produce liabilities less than the rates calculated under the Standards of Practice.

Indexed rates

$$r_7 = r_L \times (i_7/i_L) = 0.72130\% \times (1.84846\% / 2.17166\%) = 0.61395\%$$

$$r_{1-10} = r_7 + 0.90\% = 0.61395\% + 0.90\% = 1.51395\%$$

$$r_{10+} = r_L + 0.5 \times (r_L - r_7) + 0.90\% = 0.72130\% + 0.5 \times (0.72130\% - 0.61395\%) + 0.90\% = 1.67497\%$$

Rates should be rounded to the nearest 0.10% so rates are 1.50% for 10 years and 1.70% thereafter

Although rates being used are not the rates calculated using the CIA methodology, they would still be acceptable under the standards of practice as they are lower than the calculated rates and would therefore provide a higher commuted value

13. Continued

Mortality

Active mortality assumptions are acceptable as they have both a mortality scale and a mortality improvement scale

The Standards of Practice does not allow different mortality assumptions for active and deferred members

The deferred mortality assumptions are not acceptable under the standards of practice as they do not match the active assumptions and/or do not contain a mortality improvement assumption

Unisex Assumption

The Standard of Practice notes that the actuary should assume separate mortality rates for male and female members.

However, the actuary would calculate commuted values that do not vary according to the sex of the plan member where the actuary is required to do so by applicable legislation, the provisions of the plan or by the plan administrator if the administrator is empowered to do so by the provisions of the plan. In this case, the actuary would adopt a blended or unisex mortality approach.

The unisex assumption may or may not be appropriate depending on the legislation applicable and/or the rules of the plan.

Assumed Retirement Age

Commuted values should be calculated at the age that produced the highest liability.

The assumed retirement age is not appropriate and should be updated to the age that produces the highest liability.