

RET DAC Model Solutions

Spring 2014

1. 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.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
- (b) Hybrid plans
- (c) Defined contribution plans
- (d) Retiree Health plans

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

- (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

1. Continued

- (3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (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.
- (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.

Sources:

DA 123-13: Replacement Ratio Study – A Measurement Tool for Retirement Planning

Key Findings and Issues: Understanding and Managing the Risk of Retirement

DA 108-13: Increasing Annuitization in 401(k) Plans with Automatic Trial Income

New Retirement Plan Designs for the 21st Century

An Annuity that People May Buy

DA 109-13: Seven Steps Toward Creating a Standout Retirement Savings Plan

Commentary on Question:

Successful candidates in parts (a) and (b) correctly used final average five years of earnings, accumulated the account balance and compared the maximum to the DB benefit. Successful candidates in part (c) identified changes that could be made to the DC plan design and provided supporting detail for the changes.

Solution:

- (a) Calculate the employer-provided retirement income replacement ratio at age 65 for an employee under both the Salaried Plan and DC Plan given the following information:

Age at hire	30 years
Salary at hire	\$50,000
Salary scale	3% per year
Assumed return on DC Plan investments	6% per year
Assumed age 65 annuitization factor	11.25

1. Continued

Show all work.

(note, numbers have been rounded for display in solution whereas unrounded numbers were carried throughout the calculation)

Replacement ratio = income in retirement / salary just before retirement

Salary just before retirement = $\$50,000 \times 1.03^{34} = \$136,595$

DB Plan Replacement Ratio

Final average earnings (last five years) = $(50,000 \times 1.03^{34} + 50,000 \times 1.03^{33} + 50,000 \times 1.03^{32} + 50,000 \times 1.03^{31} + 50,000 \times 1.03^{30}) / 5 =$
 $(121,363 + 235,044) = \$128,867$

Years of Service at Retirement = 35 years

DB Benefit = $2\% \times \text{Final average earnings} \times \text{years of service} = 2\% \times \$128,867 \times 35 = 90,207$ per year

Maximum benefit = $3000 \times \text{years of service} = \$105,000$

Replacement Ratio = DB Benefit / Age 64 salary = $90,207 / 136,595 = 66\%$

DC Plan Replacement Ratio

Employer contribution of 3% per year, assuming end of year contribution

Salary Scale of 3% per year

Interest on account balance of 6% per year

Projected DB Account Balance:

$= 50,000 * [3\% \times 1.06^{34} + 3\% \times 1.03 \times 1.06^{33} + 3\% \times 1.03^2 \times 1.06^{32} + \dots$
 $+ 3\% \times 1.03^{33} \times 1.06^1 + 3\% \times 1.03^{34} \times 1.06^0]$

Reduces to accumulation of $50,000 \times 3\% = 1,500$ at an interest rate of
 $(1.06/1.03 - 1) = 2.91262\% = 243,611$

Equivalent Annuity from DC Plan = Projected DC account balance / age 65
annuitization factor = $243,611 / 11.25 = 21,654$

DC Plan replacement ratio = $21,654 / 136,595 = 16\%$

DC Plan replacement ratio = $21,654 / 136,595 = 16\%$

- (b) Describe the reasons an employee may not require an income replacement ratio of 100% after retirement.

1. Continued

An employee may not need a 100% replacement ratio because of the following reasons:

- Income taxes may go down after retirement, if taxable income decreases at retirement.
- Social security taxes end at retirement.
- Social security benefits are partially or fully tax free.
- Savings for retirement is no longer needed.
- There is a change in age or work related expenditures. For example, a home mortgage or a child's education may be paid off by retirement, Medicare in US covers certain medical expenses at age 65, and commuting expense to work no longer apply.

(c) NOC is considering opening the DC Plan to Salaried Plan members and providing future new hires with a choice between the Salaried Plan and DC Plan.

Recommend changes that could be made to the DC Plan to make it more attractive to new hires.

- The DC Plan would be more attractive if employer contributions provided in the plan were increased.
- A transition via an opening account balance or increased contribution would also make it more attractive for current employees.
- NOC could allow for loans in the DC plan, which would provide a lifeline to employees in need.
- NOC could also allow for hardship withdrawals.
- The DC plan would be more attractive if the investment risk was shared:
 - NOC could guarantee a real rate of return during the working accumulating years and then provide an inflation adjusted annuity at retirement. However this is a trade off to the employee between accepting fluctuations in stock/bond returns versus the guarantee of a lower return.
 - Shared investment risk could also be done as follows: NOC guarantees a return of x% and if the return is greater than x%, half of the excess is credited. The difference allows NOC to keep a reserve for years when the return is less than x%. If the reserve is not sufficient, an employer contribution is made.
- Add annuitization to the DC Plan, thereby protecting employees against longevity, for example:
 - Offer a two year trial of monthly payments to give the retiree the experience of a monthly retirement income. After two years the retiree can opt out, however many may not due to keeping with the status quo.
 - Make advanced life deferred annuity (ADLA) a default payment option. ADLA is an annuity that is purchased at retirement however the payments are not made until an advanced age.
 - Increasing annuities not only shares in longevity risk, it also addresses failures in the annuity market; increased demand for annuities will decrease the price of annuities.

2. 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.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.
- (9e) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.

Sources:

Fundamentals of Retiree Group Benefits

Accounting Discount Rate Assumption for Pension and Post-Employment Benefit Plans
2009 Selection of Actuarial Assumptions

CIA Standards of Practice for Post-Employment Benefit Plans
ASOP 6, Measuring Retiree Group Benefit Obligations

Commentary on Question:

Successful candidates evaluated the current assumptions and recommended alternatives, when necessary. Some examples of these responses are provided below.

Solution:

- (a) Describe the considerations when setting assumptions for the December 31, 2013 accounting valuation.

Current Discount Rate

- Looks high relative to recent experience
- A yield curve could be developed based on AA-rated corporate bond data or alternatively obtaining such a curve from a third party provider.
- Calculating the present value of the pension plan's expected benefit payments using the spot rates developed in the immediately preceding step.
- The actuary recommending the discount rate assumption that would be the unique discount rate that, when applied to the plan's expected benefit payments, provides for an equivalent present value as calculated in the immediately preceding step.
- Should be best estimate assumption

2. Continued

Medical Trend

- Typically influence inflation, utilization, advancement in technology, plan design effects, cost shifting
- Assumption should be based on long term trends, there should be no rush to adjust the medical rate to 20% because of one year medical trend of 20%.
- Health care cost inflation trend should represent the underlying trends of the services provided by the plan.
- Consideration should be given to the relationship of health care expenditures to the gross domestic product (GDP).

Per Capita Claims Cost

- Consider retirement age, younger retiree have high costs as retirees over 65 may have coverage under other plans.
- Consider available claims experience with regard to claimant age, member status, coverage category and benefit type, and credibility and relevancy to future periods and future benefit provisions.
- Historical claims data should be adjusted to reflect inflation.
- Must look at the current plan costs and retiree contributions and project them into the future.

General Inflation

- Represents general inflation into the future
- Should consult current and historical inflation rates when developing assumption

Retirement Age

- A retiree group benefit valuation should not use an implicit assumption that everyone retires at age 65.
- An employee retiring earlier than 65 receives a larger benefit than someone retiring at age 65.
- Associated company pension plan's early retirement incentives should be considered when developing a retirement scale, a higher portion of members should be expected to retire at age 60 because of the pension plan EURD.

Mortality Table

- The mortality should represent actual expectation. The post retirement mortality assumption can have a large impact on the obligation.
- Current actuarial standards should be taken into consideration when selecting the table. Upgrade to a generational table

2. Continued

- (b) Compare and contrast three assumptions that are common between accounting valuations for post-employment health programs and pension plans.

Retirement Age

- Pension Plans have reduction factors for employees retiring early so an implicit retirement age may be acceptable.
- An employee retiring earlier than 65 receives a larger benefit than someone retiring at age 65 under a health plan.

Mortality

- Different populations may be covered under each Plan.
- Post Retirement Mortality should represent actual expectation, could have significant impact on health plans as health plans get more expensive as the retiree age because of “cost-of-living” adjustments.

Inflation/Medical Trend

- Post-Employment Health plan valuation should include medical trend.
- Generally less material for pension valuation in the absence of cost-of-living adjustments.

3. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
6. The candidate will be able to analyze, synthesize and evaluate plans designed for executives or the highly paid.

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.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (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.
- (6c) Integrate a plan for executives with the basic benefit plan.

Sources:

DA-116-13: Pension Issues in Corporate Sales, Mergers and Acquisitions

Retirement Plans - Allen 10th Edition Ch. 2

Yamamoto - Ch. 4

Retirement Plans - Allen 10th Edition Ch. 14

Handbook of Executive Benefits - Golden Parachutes

Solution:

Prepare a due diligence report for XYZ management in respect of the pension and compensation issues.

3. Continued

Pension issues:

NOC employee perspective:

1. Will XYZ honor the current accrued benefit in the pension plan?
 - a) Will future pay increases be expected to be included for salaried employees?
 - b) Will future flat dollar increases be anticipated to be included for hourly employees?
2. Whether XYZ will continue DB plan going forward or convert employees to XYZ's benefits.
3. Whether XYZ will cut pension benefits by reducing accrual rate or flat dollar mounts, early retirement subsidies, etc...

XYZ employer perspective:

1. Should NOC DB plan be discontinued, changed or converted to XYZ employees DC plan
 - a) If possible, a decision should be made before or immediately following closing the deal
 - b) Ideally, a communications program is prepared ahead of closing day so that employees can be fully informed when new owners take control
 - c) Reassures employees that new owner took into account any transitional issues and shows quality/competence of owner
2. NOC's pension valuations have been conducted on a frequent basis and follow US GAAP, which seems reasonable with respect to purchase agreements
 - a) An updated valuation reflecting current market rates and asset values should be conducted to get a more accurate funded status estimate
3. Demographic assumptions should be revisited in case they need to be revised given acquisition
 - a) For example, if one section of employees is twice as likely to terminate, the benefit obligations will be different
4. Have a third party actuary independently confirm that pension funded status and expense was calculated accurately
 - a) Actuarial calculations tend to include some degree of conservatism
 - b) May ask that more realistic calculations be done to be incorporated for M&A pricing
5. The purchase price should be adjusted since the plan is underfunded
6. It's best practice to have the following reflected in the purchase agreement:
 - a) Nature of transaction
 - b) whether or not employment relationship continues

3. Continued

- c) intent of purchaser and vendor regarding pension plan and fund, and
 - d) provisions of pension plan and trust agreement
7. Prepare communications to employees to help with employee relations and make sure required employee communications are sent out
 8. Negotiate any changes with NOC's union, if any

Deferred compensation plan issues

NOC employee perspective:

1. Will the current structure of the plan stay in place?
2. Are there any golden handcuffs/parachutes that will be paid out to executives?
 - a) Golden parachutes are often included in change in control agreements
 - b) Can be included in the SERP plan document or in individual employment agreements
 - c) Common elements:
 - Severance pay
 - Deferred compensation
 - Stock options or stock appreciation rights
 - Long-term incentive awards
3. XYZ executives receive enhanced benefits while NOC employees have benefits that only replace tax limits
 - a) NOC executives may feel that XYZ executives are receiving better benefits
 - b) XYZ should look at a comparative analysis to determine how executives will be handled at each organization

XYZ employer perspective:

1. Current plan pays lump sum benefits immediately instead of retirement benefits, which may not help facilitate executive retirements
 - a) Also tied to company profitability so whether executives may delay retirement when the company is struggling
 - b) Executives lose tax deferral provided through a deferred compensation plan
2. XYZ executives receive additional benefits, which helps as a recruiting/retention basis
 - a) Look into whether additional benefits should be offered to NOC executives to help with recruiting/retention efforts
 - b) Also look into whether a traditional deferred compensation arrangement should be put in place instead of lump sum benefits tied to profitability
3. Are XYZ additional benefits for executives necessary anymore since NOC is no longer a competitor?

3. Continued

4. Should an executive transfer plan (an umbrella plan) be put into place to handle transfers between XYZ & NOC?
 - a) Can provide a total benefit target for executives across plan
5. Are there any golden parachute provisions at NOC?
 - a) Could be an issue if not since NOC executives may leave company early due to merger
 - b) Also may cause additional costs of the deal if golden parachute costs are significant

4. Learning Objectives:

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

- (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.
- (6c) Integrate a plan for executives with the basic benefit plan.
- (8a) Perform valuations for special purposes, including:
 - (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.

Sources:

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen 10th Edition, Chapters 3 and 14

DA-804-13: FASB Accounting Standards Codification Topic 715

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Given the changes to the Salaried Plan, changes must be made to the NOC Full-Time Salaried Supplemental Retirement Plan (SRP). Describe two changes that could be made to the SRP to continue to provide some form of future benefits to NOC executives.

4. Continued

Commentary on Question:

Successful candidates provided a detailed description of the proposed changes. Some of the more common proposed changes are below.

1. Change the SERP to a DC top up plan as well. For any contributions that are not eligible under the Salaried plan, they can be made to the SERP. This is administratively easier than some other options. DC accruals will likely be less than what the executive would have received under the prior defined benefit accruals so some candidates offered additional adjustment to increase the contribution percentage go forward.
 2. Keep the SERP formula the same % final average earnings with offset of total new Salaried DB/DC benefit. This will increase the liability in the SERP if the DC accruals are less than the DB accruals – also the DB accruals used frozen FAE at July 1, 2014. Would allow continued retirement coverage to the executives. Little more administratively complex.
 3. Keep the same SERP formula % final average earnings but for the offset assume the member had continued in the Salaried old FAE formula and SERP would only cover the excess. The SERP will pay less than option #2 above and be more complex since would need to calculate what the member would have accrued in order to calculate what the SERP owes. Still allows the executive to be able to calculate his/her SERP benefit in advance; not dependent upon unknown DC future account balance.
- (b) Calculate the revised 2014 defined benefit cost to be included in profit and loss and the charge to Other Comprehensive Income at December 31, 2014 for the Salaried Plan.

Show all work.

Commentary on Question:

Determine expense from 1/1 to 6/30 – successful candidates showed both formulas with written explanation and numerical calculations to show all work. Reasonable approaches that may have differed from below were considered to be correct.

4. Continued

Determine Expected DBO at 6/30/14:

$$\begin{aligned}\text{Expected DBO} &= (1/1/14 \text{ DBO} + 2014 \text{ SC}/2) * (1+(0.05/2)) - (2014 \\ \text{BPs}/2)*(1+(0.05/4)) \\ &= 1,309,495 = (1,265,686 + 59,302/2)*1.025 - (36,000/2)*(1.0125)\end{aligned}$$

Determine DBO at 6/30/14 before freeze - Roll DBO from 1/1 to get expected DBO as at 6/30:

$$\begin{aligned}&= (1/1/14 \text{ DBO} + 1\text{st half of SC given}) * (1+(0.05/2)) - (1\text{st half of BP given}) * \\ &(1+(0.05/4)) \\ &= 1,316,497 = (1,265,686 + 35,000)*(1.025) - (16,500)*(1.0125)\end{aligned}$$

Determine DBO at 6/30/14 after freeze – no liabilities without future salary growth or other information provided. Candidates explained this as part of their answers – assume obligations equal to the actual DBO

Determine Expected MVA at 6/30/14:

$$\begin{aligned}&= (1/1/14 \text{ MVA}) * (1+(0.05/2)) + (\text{Exp cont}/2 - \text{Exp BP}/2) * (1+(0.05/4)) = \\ &1,295,631 = (1,261,471)*(1.025) + (41,182/2 - 36,000/2)*(1.0125)\end{aligned}$$

Determine Actual MVA at 6/30/14:

$$\begin{aligned}&= (1/1/14 \text{ MVA}) * (1+(0.05/2)) + (1\text{st half of Cont given} - 1\text{st half BP given}) * \\ &(1+(0.05/4)) \\ &= 1,297,762 = (1,261,471)*(1.025) + (21,196 - 16,500)*(1.0125)\end{aligned}$$

Determine DBO (Gain)/Loss at 7/1 = (DBO before freeze - Expected DBO) = 6,551

$$= (1,316,497 - 1,309,495)$$

Determine Asset (Gain)/Loss at 7/1 = -(Actual MVA - Expected MVA) = -2,131 =
-(1,297,762 - 1,295,631)

Curtailment Accounting since future benefits frozen. Some candidates referred to it as a plan amendment not curtailment. Needed to recognize that P&L is impacted by the change in DBO not OCI.

Curtailment Charge = (DBO after freeze - DBO before freeze) = assume 0

Determine remeasurement gains/losses at 7/1/14: = (experience loss at 6/30 - asset gain at 6/30) = 4,420 = (6,551 - 2,131)

Determine DB pension cost from 7/1 to 12/31 - after plan freeze

Service Cost at 7/1/14 for remainder of year = 0

Net Interest Cost at 7/1/14 for remainder of year:

$$= ((7/1 \text{ DBO after freeze} - 7/1 \text{ MVA}) + \text{SC}) * i/2 - \text{cont for 2nd half of year}/2 * i/2 = 468$$
$$= (1,316,497 - 1,297,762) * 0.05/2$$

2nd Half of 2014 DB pension cost

$$= (\text{new SC} + \text{new NIC})$$

$$468 = (0 + 468)$$

Total 2014 DB pension cost

$$= \text{1st half DB pension cost} + \text{2nd half DB pension cost} + \text{curtailment DB pension cost charge} = 31,192 = 30,724 + 468 - 0$$

2014 OCI charges: Unrecognized gain/loss during 2014 = (7/1/14 Unrecog gains/Losses + 2nd half of 2014 gain/loss) = 4,871 = 4,871 + Assume 2nd half gain/loss of 0 as stated in question.

5. 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:

- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.

Sources:

An Introduction to Duration for Pension Actuaries

Commentary on Question:

Successful candidates explained duration, recalled the formula for duration and applied the formula to the situation given. Successful candidates also indicated an understanding of plan design impacts on duration and how to lower a plan's duration by changing the plan design.

Solution:

- (a) Describe duration and its importance for pension plan sponsors.
- Average deferral period for all cash flows, weighted by present value
 - Price of two bonds or liabilities with the same duration will react the same way to a given small change in interest rates
 - Change in liability is inversely proportional to the duration times the change in the interest rate
 - Duration is the percentage change in liability for a 1 percent change in discount rate
 - Important for pension plan sponsors looking to minimize the volatility of various financial items, including:
 - Required contributions
 - Pension expense
 - Funded status
 - Sponsors can match duration of pension assets to the duration of liabilities to immunize interest rate risk over short periods
 - Requires periodic rebalancing
- (b) Calculate the impact on the accounting funded status of a 1% increase in interest rates.

Show all work.

5. Continued

Resulting active liability: $(1-0.18)*949,265,000 = 778,397,300$

Resulting inactive liability: $(1-0.10)*316,421,000 = 284,778,900$

Resulting total liability: $778,397,300+284,778,900 = 1,063,176,200$

Resulting market value of assets: $(1-0.06)*1,261,471,000 = 1,185,782,740$

Resulting funded status: $1,185,782,740-1,063,176,200 = 122,606,540$

- (c) Recommend changes to the plan design that would lower the duration of the Salaried Plan.
- Offer a lump sum at retirement
 - Lowers the average period of pension payment
 - Freeze the plan
 - Salaried plan accruals are back-loaded
 - Could incent members to terminate sooner, taking lump sum rather than pension
 - Close plan to new entrants
 - Actives have higher duration than inactives
 - Duration will decrease as population ages

6. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
2. The candidate will understand the impact of the regulatory environment on plan design.
4. The candidate will be able to evaluate plan design risks faced by sponsors 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.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
- (b) Hybrid plans
- (c) Defined contribution plans
- (d) Retiree Health plans

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
-
- (2a) Explain and apply restrictions on plan design features to a proposed plan design.
 - (2b) Explain and test for limits on plan designs and features that protect participation rights.
 - (2c) Test for plan design restrictions intended to control the use of tax incentives.
 - (2d) Describe the process and apply the principles and rules governing the conversion from one type of plan to another.
 - (2e) Understand conflicts between regulation and design objectives and recommend alternatives.

6. Continued

- (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
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature/
- (4d) Analyze the issues related to plan provisions that cannot be removed.
- (4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.
- (4f) Assess the impact of possible changes in plan design due to changes in legislation.
- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
- (5b) Assess the tradeoffs between different goals.
- (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.
- (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
- (5e) Identify the ways that regulation impacts the sponsor's plan design goals.
- (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.
- (5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.
- (5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.
- (5i) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.

6. Continued

- (5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.
- (5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.
- (5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.
- (5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.

Sources:

Towers Watson, Chapter 1, 16, 17, 18, and 23

DA106-13

DA112-13

DA604-13

DA605-13

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Assess the current plan design with respect to the stated retirement benefit objectives.

Commentary on Question:

Part (a) of this question requires candidates to demonstrate an understanding of how different plan provisions relate to the various retirement objectives.

- Shared responsibility: Employer match could be higher to demonstrate shared responsibility, a higher matching rate is proposed.
- Maintain standard of living: a 9% total contribution rate should allow the plan to provide a decent replacement ratio for members.
- Reward long service employees: Employer contributions do not favour long service employees, propose linking contributions to years of service or age plus service.

6. Continued

- Flexibility: Limited investment options reduce flexibility and choice, propose adding more investment options; on the other hand, variable withdrawals provide flexibility.
 - Tie to financial results: Employer contribution not tied to financial results, propose linking contributions to operating income or some other metric.
 - Volatility: Contributions are stable as long salaries are stable given the fixed rate.
- (b) Describe how a Canadian registered pension plan or retirement savings program could be used to deliver the retirement benefit objectives.

Commentary on Question:

Part (b) of this question requires candidates to demonstrate an understanding of how the Canadian legislative environment relate to the various retirement objectives. Successful candidates were able to access the different components in the legislative framework and their limitations.

- Shared responsibility: Employee contributions, employer contributions, as well as additional voluntary employee contributions are permitted.
 - Maintain standard of living: Combined employer and employee contributions up to the PA limit are permitted; PA limit is minimum of 18% of compensation and the money purchase limit in the year, which enables pension plans to provide a good replacement ratio.
 - Reward long service employees: A plan can be structured to have accruals or contributions based on years of service.
 - Flexibility: Additional voluntary employee contributions are permitted, ancillary benefit can be purchased in a flex plan
 - Tie to financial results: Employer contribution can be tied to financial results, one option is to allocate a portion of operating income to retirement plan contributions, then allocate that pool based on salary
 - Volatility: Defined contribution plans have less volatile contributions; minimizing or removing contractual ancillary benefits (COLA, etc) reduce volatility; volatility can also be managed through conservative investment strategy.
- (c) Assess how Canadian regulations and practices may impact the key features of the proposed plan design.

Commentary on Question:

Part (c) of this question requires candidates to demonstrate an understanding of how the Canadian legislative environment relate to the various plan provisions. Successful candidates were able to assess how the plan provisions might be impacted due to the potential limitations imposed by the ITA and CAP guidelines.

6. Continued

- PA limit is 18% of pensionable earnings (total contributions made by both employee and employer)
- Unknown forfeiture amount creates problems when trying to determine pension credit (Pension credit must be determinable at the end of each year), not met since forfeitures are allocated post retirement
- Alternatively forfeitures could be used to pay plan expenses
- CAP guidelines recommend at least 3 investment choices (met)
- An annuity would not allow for withdrawals to vary from year to year
- Educate employees about need to save for later retirement years when health care costs may rise
- Employer contributions must be at least 1% of pensionable earnings (met)

7. 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.
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.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
- (b) Hybrid plans
- (c) Defined contribution plans
- (d) Retiree Health plans

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

(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.

(3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.

7. Continued

- (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
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature/
- (4d) Analyze the issues related to plan provisions that cannot be removed.
- (4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.
- (4f) Assess the impact of possible changes in plan design due to changes in legislation.
- (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.
- (7e) Select demographic and economic assumptions appropriate for a projection valuation.

Sources:

DA-800-13: State and Local Government Pension Plans, Current Structure and Funded Status

DA-114-13: Risk Management and Public Plan Retirement Systems – Appendix only (pages 1-33 background only)

DA-119-13: State and Local Pension Plans Are Different From Private Plans

DA-127-13: The Economics of State and Local Plans

7. Continued

DA-149-13: The Funding of State and Local Pensions: 2011-2015, Boston Centre for Research (Appendices for background only)

Commentary on Question:

Commentary listed underneath question component.

Solution:

The average funded status of public sector pension plans is lower than the average funded status of company-sponsored pension plans. Explain why public sector pension plans may be poorly funded.

Commentary on Question:

Successful candidates demonstrated knowledge of the issues facing public sector plans, and also discussed how public sector plans face different challenges than private sector plans.

Public pension plans tend to have more generous plan provisions and ancillary benefits than private pension plans which makes the liability higher. For example:

- Public plans are mostly DB still, whereas many private sector pension plans have already moved to DC
- Majority of public plans are final average earnings plans with high accrual percentage
- Provide regular or guaranteed cost of living adjustments (COLAs)
- Many public sector employees are not covered by Social Security so pension plans must make up the difference

Public plans use a typically higher discount rate equal to the expected return on assets. As a result, discount rates are much higher than those used by private plans.

- Leads to lower liabilities than a similar private sector plan
- Funded status is higher than if a risk-free rate was used

Public plans have a tendency to increase benefits during good times or with surplus, but then they cannot lower benefits during bad times.

- Constitutional guarantees
- Some states have constitutional protection against reducing benefits, even prospectively

Higher allocation to equities. Typical asset allocation for public plans is heavily weighted to equity and equity like asset classes (and only 25% allocated to fixed income).

- The financial crisis caused equity values to decline, which led to lower funded status
- This was made worse because governments are also dealing with a declining tax base
- Government has many other areas that require funding and may focus on other services (education, etc.) rather than fund pension plan

8. Learning Objectives:

3. The candidate will be able to evaluate risks faced by sponsors of retirement plans.
6. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting in line with the sponsor's goals, given constraints.
12. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

(12b) Explain and apply the guides to Professional Conduct.

(12c) Explain and apply relevant qualification standards.

Sources:

CIA Rules of Professional Conduct

Commentary on Question:

Part a: Successful candidates were able to identify Precepts of the Code of Professional Conduct, provide relevant examples, and recommend courses of action to address the breaches.

Part b: Successful candidates were able to identify potential sources of violations of the Code of Professional Conduct in the relationship and suggest remedies.

Solution:

(a) For each of four Rules of Professional Conduct of the Canadian Institute of Actuaries:

- Describe the Rule
- Provide an example of a breach of the Rule
- Recommend a course of action to address the breach.

1. A member shall act honestly, with integrity and competence, and in a manner to fulfil the profession's responsibility to the public and to uphold the reputation of the actuarial profession.

Breach: Client making false or misleading statements

Recommendation: State disagreement publicly and disassociate from client

2. A member shall perform professional services only when the member is qualified to do so and meets applicable qualification standards.

Breach: Request to carry out work outside area of expertise

Recommendation: Resign from the assignment

3. A member shall ensure that professional services performed by or under the direction of the member meet applicable standards of practice.

Breach: Use a high rate to value actuarial liabilities

8. Continued

Recommendation: Ensure rate selection meet standard

4. A member shall make full and timely disclosure to a client or employer of the sources of all direct and indirect compensation that the member or the member's firm has received or may receive in relation to an assignment for which the member provides professional services to that client or employer.

Breach: Non-disclosure of group annuity purchase commission

Recommendation: Ensure client aware of commission received

5. A member shall not perform professional services involving an actual or potential conflict of interest unless:

Breach: Expert witness report for family member

Recommendation: Resign from assignment

6. A member who performs professional services shall take reasonable steps to ensure that such services are not used to mislead other parties or to violate or evade the law.

Breach: Client asked for cost of plan change without providing assumptions in opinion

Recommendation: Request may be used to mislead stakeholders. Ensure reporting comply with standard of practice

7. A member shall not disclose to another party any confidential information obtained through a professional assignment performed for a client or employer unless expressly or implicitly authorized to do so by the client or employer, or required to do so under Rule 13, or required to do so by the Committee on Professional Conduct, an Investigation Team, a Disciplinary Tribunal or an Appeal Tribunal regarding any disciplinary matter arising under Section 20 of the Bylaws, or required to do so by law.

Breach: Spouse requests plan member information directly

Recommendation: Ensure member makes request directly to administrator or grants permission to spouse

8. A member shall perform professional services with courtesy and professional respect, shall avoid unjustifiable or improper criticism of other members, and shall cooperate with others in the client's or employer's interest.

Breach: Criticize actuarial report in a litigation

Recommendation: Ensure any criticism is in breach of a specific standard of practice

9. A member shall not engage in any advertising or business solicitation activities in respect of professional services that the member knows or should know are false or misleading, or that reflects unfavorably on the profession or the competence or integrity of any member thereof.

Breach: Mention dubious reputation of actuary to a prospect

8. Continued

Recommendation: Abstain from derogatory statements in all cases

10. A member shall make use of membership titles and designations of a recognized actuarial organization only in a manner that conforms to the practices authorized by that organization.

Breach: Imprecise use of designation, such as "qualified actuary"

Recommendation: Ensure proper term used, e.g. Associate of the Society of Actuaries, or Fellow of the Canadian Institute of Actuaries.

11. A member shall be subject to the Institute's disciplinary procedures if the member is convicted or found guilty of or pleads guilty to any criminal or similar offence.

Breach: Member criminally convicted for fraud

Recommendation: Don't

12. A member shall respond promptly, truthfully and fully to any request for information by, and shall cooperate fully with, the Committee on Professional Conduct, an Investigation Team, a Disciplinary Tribunal, an Appeal Tribunal, or any member of such bodies regarding any disciplinary matter arising under Section 20 of the Bylaws.

Breach: Ignore requests from a disciplinary action

Recommendation: Respond quickly and provide full disclosure

(b) Your client sponsors a pension plan administered by a committee with employee and management representatives and has asked you to join the committee. Describe how you can comply with the Rules of Professional Conduct if you join the committee.

- Conflict of interest: avoid conflict by being non-voting member or abstaining from commenting on situations where there may be a conflict
- Conflict: consider resigning from advising employer on actuarial matters to eliminate any real conflict
- Honesty and integrity: maintain integrity by providing complete information even if adverse to client
- Qualification and experience: if subject matter expert, ensure qualifications appropriate

Not mislead: do not mislead employees in order to create an advantage for your client

- Compensation: disclose any compensation related to this account, including compensation for committee-related work
- Confidentiality: do not disclose any confidential information, for example member-specific details
- Cooperate with others in the client's interest: if client's interest must be served, make it clear that employee representatives are not client

9. Learning Objectives:

4. The candidate will be able to evaluate and recommend a plan design appropriate for the sponsor's goals.
7. The candidate will be able to synthesize plan design and funding/accounting/economic value.
8. The candidate will be able to analyze the regulatory environment as it effects retirement plans.
9. The candidate will be able to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations on the actuarial issues.

Learning Outcomes:

- (4a) Given a context, design retirement programs that manage retirement risk and are consistent with sponsor objectives.
- (4b) Given a context, design retirement programs that promote employee behavior consistent with sponsor objectives.
- (4c) Given a context and sponsor objectives, recommend an appropriate plan type for providing retirement benefits and defend the recommendations.
- (4d) Given a context and sponsor objectives, evaluate the pros and cons from both a sponsor and employee perspective of introducing options allowing for flexible retirement such as phased retirement, DROPs and flexible pension plans.
- (4e) Given a context and plan type, recommend appropriate plan design/features and defend the recommendations.
- (4f) Identify the ways that regulation impacts the sponsor's plan design goals.
- (4g) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.
- (4h) Given a context and sponsor objectives, advise a plan sponsor regarding the choice of design elements for their retiree health program.
- (7a) Explain the interplay between plan design and plan funding/accounting/economic value.
- (7b) Given the sponsor's goals, recommend an integrated plan (design and funding/accounting/economic value) and defend the recommendation.

9. Continued

- (7c) Demonstrate the sensitivity of cost and economic value to given changes in plan design.
- (8a) Evaluate the effect of regulatory policies and restrictions, for all retirement plans, associated with:
- Plan design
 - Plan establishment
 - Plan amendment
 - Plan termination/windup
 - Plan merger or spin-off
 - Reporting requirements
 - Members' rights
 - Plan funding
 - Contributions and benefits
 - Individual savings plans
 - Coordination of individual and employer sponsored retirement plans
 - Economic value to shareholders
- (8b) Evaluate the tax implications of retirement plan designs and funding alternatives for the plan sponsor, shareholders and the participants.
- (8c) Where regulations for tax-assisted retirement plans conflict with sponsor's and shareholders' goals, the candidate will be able to describe and recommend alternatives.
- (8d) Explain the moral hazard that arises from the existence of outside (government) guarantees on the plan benefits.
- (8e) Describe and recommend proper plan governance practices and the sponsor's fiduciary responsibility.
- (9a) Assess the different types and combinations of investment vehicles for providing retirement benefits given the particulars of the sponsor's financial circumstances, philosophy, industry, workforce and benefit package.
- (9b) Distinguish the various ways that retirement fund assets are managed.
- (9c) Given a context, evaluate a Statement of Investment Policy.
- (9d) Assess the potential effects of various investments and investment policies on plan funding (short and long-range), accounting, design and administration.

9. Continued

- (9e) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.
- (9f) Model the effect on setting investment strategy of factors including, cash flow requirements, various plan designs and various economic environments.
- (9g) Describe the regulatory restrictions on retirement plan assets.
- (9h) Identify the sources of investment risk and assess risk facing retirement funds.
- (9i) Evaluate immunization strategies and other hedging techniques for asset/liability management.

Sources:

Embedded Options and Pension Plans, SOA Pension Section, pp.1-17

DA-140-13: ASOP 27 Selection of Economic Assumptions for Measuring Pension Obligations

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe the advantages and disadvantages to NOC of each of proposed options.

Commentary on Question:

Successful candidates focused the advantages and disadvantages from NOC's point of view.

Advantages for option (i):

This can be more appreciated by employees than the current post-retirement indexing provision since this is an improvement from the lesser of 1% or CPI currently in the Hourly Plan.

Disadvantages for option (i):

NOC assumes a large future liability tied to a government index over which they have no control.

No allowance or cap is made for any rising standard of living.

The CPI may overstate rates of inflation resulting in additional costs necessary to provide inflation protection.

With a 2.5% floor, the plan sponsor assumes additional cost when COLA is smaller than 2.5%.

Early retirement subsidy cost is likely to increase since more employees will retire early given they have some additional protection.

Additional cost and balance sheet liability can be significant.

9. Continued

Advantages for option (ii):

Hourly Plan is mostly invested in fixed income securities and so the likelihood of having a return exceeding 8% is very low.
Therefore, this will likely lower NOC's cost and liability.

Disadvantages for option (ii):

This may hurt or lower employee morale since this can be viewed as a decrease in benefits.

This can produce unnecessary cost for the employer. If excess of market return over the hurdle rate is higher than the actual cost of living increase (inflation), benefits will be greater than may be needed to maintain the original income-replacement ratio.

Employer gets none of the gain of superior investment performance.

The excess investment return will not be available to reduce employer costs, since it was used to increase employees' benefits.

Advantages for option (iii):

NOC does not commit to predetermined method given inflation is unpredictable.

Cost of future indexing is completely under NOC's control

NOC can take into account any relevant circumstances in making the decision - e.g., inflation, the company's financial position.

Disadvantages for option (iii):

This may hurt or lower employee morale since this is essentially taking away the current provision in the Hourly Plan.

- (b) Recommend changes to the accounting valuation assumptions for each of the proposed options.

Commentary on Question:

Successful candidates supported their recommendations.

Option (i)

Since CPI assumption has been 3% for the last 6 years, and a new floor of 2.5% is introduced, a deterministic approach can be used to change the assumption for post-retirement indexing from 1% to 3%.

Per ASOP 27, the actuary needs to establish a balance between refined methodology and cost effectiveness.

Assuming 3% increase in post-retirement indexing may be reasonable but does not take into account the fact that "average" indexing adjustment under this option can be higher than the "average" 3% CPI since there is an indexing floor of 2.5% when the CPI is lower than 2.5%.

The post-retirement indexing could be stochastically modelled with a resulting distribution being constructed and taking into account a 2.5% floor. The plan actuary could then use the mean or median result of the new distribution function as the inflation assumed used to value the indexed annuity.

9. Continued

Option (ii)

For simplicity, the best-estimate deterministic assumption for the rate of return in excess of 8% can be used for post-retirement indexing.

However, under this valuation technique, the risk of having the indexing be based on the excess return above 8% will not be taken into consideration since the Hourly Plan's assumed rate of return is currently below 8%.

Taking into account the market rate of return over the last few years, there's only one year in which the return was above 8%.

Stochastic analysis can be used to estimate the mean or median return in excess of 8% based on the Plan's asset allocation and capital market assumptions and then use that to either determine a reasonable load to the liability or a reduction in the discount rate due to gain-sharing.

The options valuation technique could be used by approximating the value of a call option on the underlying investment return rate used for granting pension increases that is held by the pensioner and underwritten by NOC.

Option (iii)

Since the post-retirement indexing is non-automatic, NOC could remove the 1% indexing assumption and then the cost will be directly valued when the COLA is actually granted by NOC in the future.

10. Learning Objectives:

3. Candidate will be able 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.
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:

- (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.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (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
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature/
- (4d) Analyze the issues related to plan provisions that cannot be removed.

10. Continued

- (4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.
- (4f) Assess the impact of possible changes in plan design due to changes in legislation.
- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
- (5b) Assess the tradeoffs between different goals.
- (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.
- (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
- (5e) Identify the ways that regulation impacts the sponsor's plan design goals.
- (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.
- (5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.
- (5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.
- (5i) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.
- (5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.
- (5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.
- (5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.
- (5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.
- (8a) Perform valuations for special purposes, including:

10. Continued

- (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.
- (8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.
- (8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.
- (8g) Describe how a plan's funded status can impact union negotiations and multiemployer plans.
- (8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

DA-113-13: Multiemployer Plans

CIA Education Note: Financial Risks Inherent in Multi-Employer Pension Plans and Target Benefit Pension Plans

DA-124-13: Funding Risks for Multi-employer Pension Plans

Commentary on Question:

Successful candidates demonstrated knowledge of multiemployer plans and how they are different than the Hourly Pension Plan.

Solution:

- (a) Describe the risks of joining a multiemployer plan from the perspectives of NOC and NOC's employees.

10. Continued

- 1) Asset/Liabilities mismatch – could lead to high volatility in asset returns and therefore high volatility in funded position and ultimately future ER costs
- 2) Risk due to differences in incoming contribution income vs. contribution costs (normal costs, admin expenses and past service costs); small margins between the ongoing costs and expected contributions leaves the plan with little room for adverse plan experience that might increase the costs more than the contributions being remitted to the trust
- 3) Risk of decline in hours worked – economic downturns, or ‘down time’ in the industry could lead to reduced number of hours available for EEs to work (could even lead to lay-offs) thereby leading to lower contributions remitted to the trust. Could also lead to EEs retiring early (unreduced early retirement benefits) and taking their benefits in lump-sum disbursements; thus resulting in the negative impact to the financial health of the plan.
- 4) Mortality/Longevity risks – may not be significant to the ABC plan since retirees are allowed to take their benefits in the form of a lump-sum payment. However, NOC also needs to look at the mortality assumptions used to assess the actuarial liabilities for the plan – does it reflect future mortality improvements?
- 5) Retirement risks – given the unreduced early retirement benefits, the ABC plan is highly susceptible to retirement risks – more so than NOC’s Hourly plan because the unreduced benefit is at a later age (55 vs. 62).
- 6) Risk of intergenerational transfers – the greater the amount by which the current contributions differ from the normal actuarial costs, the greater is the wealth transfer amongst past generations
- 7) Regulatory risk – could have changes in legislation governing multiemployer plans; these changes may not be in the best interest of the participating ERs and/or EEs as it could have significant impact on future plan costs, benefits and administration, etc.
- 8) Communication risk – EEs may not understand the “pension deal” they are getting and may result in demands for higher pay or just leave for ‘greener pastures’.
- 9) Aging demographics – aging active population of the ABC plan may result in higher normal costs
- 10) Investment policy – this could impact volatility of asset returns, funded positions of the plan and consequently future ER costs
- 11) Secular market changes – depending on asset allocations of ABC plan’s assets, secular market changes may have more (compared to NOC’s

10. Continued

- 12) Hourly plan assets) impact on the market value of assets, thereby impacting funding requirements (ER costs) and benefit security
 - 13) Plan benefits – generous disability benefits and unreduced early retirement benefits could lead to anti-selection in an economic downturn which would have significant impact on the asset value of the plan at a time when ER contributions being remitted to the trust would dwindle. This could lead to a significantly underfunded plan (more so than the NOC Hourly Plan in the same economic climate); may have to reduce benefits (past and future) to cut back on costs. Lump-sum disbursements can also have a negative impact on the funding requirements of the plan and thus benefit security of future benefits. In low discount rates environment, the value of lump-sum benefit payments could far exceed the accrued benefit liabilities on a going-concern basis.
 - 14) Leverage risk – ABC may have offered ‘generous’ benefits to participating employer as an incentive to enter the plan thereby leading to high past service costs; past service costs may constitute more than 50% of the annual ER costs which would not be ideal if the active population of the ABC plan is significantly older than those of the NOC Hourly plan.
 - 15) Withdrawal of key ER – we don’t know anything about the composition of the participating ERs in the ABC plan; however, if the ABC plan has one or more participating employers that employs a sizeable portion of the active population of the ABC plan, then withdrawal of these ERs could have significant impact to the ABC plan especially if the ABC plan is highly leveraged and the fact that participants are allowed to take lump-sum disbursements from the plan at retirement
- (b) Describe the additional information required in order to fully evaluate the two options.
- Results of the most recent actuarial valuation – want to compare to NOC’s Hourly plan:
 - summary of plan demographics
 - funded status of the plan for current and prior years – on-going, solvency bases
 - contribution income vs. contribution costs
 - total annual ER cost – normal costs and admin. Expenses vs. past service costs
 - any withdrawal liabilities assessed to the plan
 - other provisions of the plan that may have been missed
 - funding method (EAN vs. PUC or UC)

10. Continued

- asset valuation method (smoothed vs. marked-to-market)
 - demographic/economic assumptions – amongst others, NOC should examine any differences in
 - mortality improvements for appropriate collars
 - hours worked (e.g., given industry, is it reasonable to expect participants to work 2,000 hours in order to accrue one year of service?)
 - administrative expenses – explicit and implicit
 - discount rate (net vs. gross of expenses) as selected by actuary
 - Any ‘special deals’ used to entice participating ERs to enter the plan and impact on current employer cost of benefits
 - Delinquent participating ERs
 - Results of any or most recent open projections/study/sensitivity analysis on demographic and economic assumptions
 - Funding policy – look at margins for adverse deviations (margin techniques, PfADS)
 - Investment policy – compare to current asset mix of NOC’s Hourly Plan; examine asset/liability mismatches, if any
 - Maturity of the plan – compare ratio of active to inactive participants
 - Size (number of participants per participating ER) and number of participating employers
 - Industries of participating ER – compared to NOC; want to also look at their peak and down-times compared to NOC
 - List of negotiated contribution rates in effect and others yet to take effect
 - Dates of last CBA, dates of upcoming CBA
 - Current/pending litigations
 - Current/pending regulatory changes that might impact future funding, investment and benefit policies
- (c) Compare and contrast the two options required in order to fully evaluate the two options.

10. Continued

NOC's Hourly Pension Plan vs. ABC Pension Plan	
Plan Provisions	<p>Generous plan provisions which serves to make pension plan more competitive</p> <ul style="list-style-type: none"> ✓ 3 vs. 5 years of service for 100% vesting ✓ Disability benefit ✓ Unreduced retirement benefit at 55 & 30 vs. NOC's plan provision which offers unreduced benefit at 62 & 30 years of service. <p>Currently, the average age for NOC's active participants is 50 years with average service of 21 years of service.</p>
	<p>Optional form of payment – none vs. 100% lump-sum at retirement; ideal for retirees that are investment savvy (NOC's current workforce is sufficiently educated) and want to take their benefit entitlement away from the plan because they are concerned about future benefit reductions due to plan underfunding implications.</p>
	<p>Disability benefit – none vs. benefit after 10 years of service; provides some level of security for retirees that are concerned about becoming disabled after being vested but do not qualify for early retirement benefits on disability.</p> <p>Currently, the average service for participants under the NOC Hourly plan is 21 years.</p>
	<p>Participants would need to work less than 1,500 hours to earn 1 year of service. This is ideal for NOC's participants when oil prices are low and NOC is not so active.</p>
	<p>Pooling of assets and administration provides economies of scale – can permit implementation of sophisticated approaches to both administration and investments which could benefit NOC's participants – may now have access to sophisticated investments that is only available to plans of a certain size (e.g., ABC Pension Plan); may realize reduced administrative fees and thus higher return on assets, net of expenses. Favourable return on assets translates into lower contribution levels to the ABC plan.</p>
	<p>NOC's annual plan cost will be stable and more predictable under the CBA – easier to budget especially and ideal for NOC since NOC's financial position varies with the price of oil.</p>
Employer Cost	NOC's annual cost will be more stable and predictable compared to current costs under NOC Hourly plan
Benefit Security	Past and future benefits may be subject to reduction if the ABC plan is poorly funded
Withdrawal Liabilities	If NOC decides to withdraw from the ABC pension plan they may be subject to a withdrawal liability that may be significantly higher than unfunded liabilities accrued at the time of withdrawal had they not joined the ABC pension plan.

HR Objectives	Past and future benefits may be subject to reduction if the ABC plan is poorly funded; reduction of past and future benefit accrual could impact retirement pattern and HR objectives of NOC. Plan participants may not be able to retire as early as expected – lower replacement ratio. This could be a potential issue for NOC which requires a highly skilled workforce to meet their business demands.
	Participant’s Perception – NOC’s current Hourly participants may misunderstand motivation to join the ABC plan; may result in low morale and increased turnover rates; current participants may want to move on to competitors or demand higher salary compensation to make up for perceived lower ‘pension deal’.
Actuarial Assumptions	Unlike single-employer pension plans, the actuary has more leeway in selecting justifiable actuarial assumptions; For example, aggressive investment policy can lead to use of higher discount rates used to determine the actuarial liabilities. Over time, lower contribution rates may lead to underfunding the pension plan, perhaps reduction in future accruals, and even elimination of generous ‘bells and whistles’ (such as disability benefits) from the plan to reduce costs. NOC may want to consider the implications of actuarial assumptions and how it might impact their HR objectives, over time.
Governance Structure	<p>ABC’s plan is subject to the terms of a trust agreement and governed by a board of trustees (BOT). The NOC Hourly plan is administered by NOC.</p> <p>Therefore, NOC will be giving up control to the BOT in various aspects of managing and maintaining the pension benefits:</p> <ol style="list-style-type: none"> a. Plan provisions/setting benefit levels – lose control of plan design which may have been used to attract and retain the best and the brightest; thereby losing ability to remain competitive. <ol style="list-style-type: none"> i. This is currently a concern for NOC – turnover amongst the full-time staff has been higher than desired over the past 5 years. b. Investment Policy – the BOT may not have similar investment philosophies, e.g., may take on more risks than NOC would deem prudent; leading to use of higher (than NOC’s 4.75%) discount rate to value actuarial liabilities and consequently underfunding the pension plan. c. Funding Policy – the board of directors for the ABC plan may not have similar funding objectives, e.g., may hold excessively large provisions for adverse deviations thereby creating sometimes significant intergenerational transfer of wealth
Benefit Administration and Costs	May provide administrative ease (though not eliminate all administrative responsibilities for NOC such as certain government filings such PA filings with CRA) to NOC; NOC could benefit from economies of scale where it shares the benefit administration costs for certain administrative processes with other participating ERs in the plan, thereby reducing overall administrative costs to administer the plan.

Financial Reporting	<p>The ABC trust may be subject to financial and disclosure requirements as a separate entity from any of the participating ERs.</p> <p>NOC, if merged with ABC pension plan, would now be simplifying financial reporting requirements – IF there is no delineation of assets and liabilities by participating ERs, pension expense for NOC is determined on the basis of the rules applicable for DC plans.</p>
Benefit Portability	<p>If participating ERs in the ABC Plan are in the same industry as that of NOC and NOC’s participants tend to move around (depending on demands for their skills), then this arrangement is ideal for benefit accrued with NOC but not vested should they decide to move to another participating ER.</p>
Competitive Advantage	<p>Being a part of the union may give NOC more access to qualified EEs; with the same pension benefits can compete with other participating employers for EEs by offering higher pay and/or retiree medical benefits as permitted by regulations.</p>
PBGC/PBGF Premiums	<p>Canada: Multi-employers are not subject to PBGF premiums USA: Multi-employers are subject to a lower flat \$ fee; not subject to a risk-based premium</p>

11. 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:

- (8a) Perform valuations for special purposes, including:
 - (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.
- (8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.
- (8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.
- (8g) Describe how a plan's funded status can impact union negotiations and multiemployer plans.
- (8h) 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 15th edition

DA-611-13: Introduction (A58), IFRS1, paragraphs 1-40, Appendix A, Appendix D, D10 and D11 only, IAS19, IFRIC14

DA-122-13: Turner & Watanabe, Private Pension Policies in Industrialized Countries, chap 5, "Pension Risk and Insurance," pp 65-81

Commentary on Question:

Commentary listed underneath question component.

11. Continued

Solution:

- (a) Describe the future balance sheet and income statement implications if ABC makes this change.

Commentary on Question:

This part of the question requires candidates to assess the impact of the change in funding policy from an accounting perspective. Successful candidates were able to assess, qualitatively, the impact to both the future balance sheet and income statement.

In terms of the income statement (benefit expense) impact:

- By making a change to the funding policy, the current service costs in future years are not impacted
- (net) Interest cost will be higher, as contributions and asset values are lower
- Impact on future gains/losses - could be deemed to be insignificant
- higher pension expenses are to be expected

In terms of the balance sheet impacts

- As future contributions are expected to be lower, future market value assets will be lower given the lower contributions
- Lower funded status after 1st year from expected
- Liability Cashflow not impacted - no effect on discount rates
- Balance sheet Asset will be lower (or Defined benefit liability being higher) due to lower future contributions and higher expense

- (b) ABC is also considering reducing its 2% of final average earnings formula to a 1.5% of final average earnings formula for future service instead of changing the funding policy. Compare and contrast the two options from the perspective of ABC.

Commentary on Question:

Successful candidates were able to assess the pros and cons of the two plan designs from the company's perspective with the following in mind: human resources, accounting, and risk management.

- Lower future benefit means a smaller pension plan, reducing impact of demographic risk, investment rate risk, etc.
- Risk of unhappy employees/retention issues.
- Lower current service costs in pension expense on income statement.
- OCI hits to be smaller absolute values.
- Benefit security -- Contributions stay at 125% of minimum required, hence benefits more secured.

11. Continued

- More orderly cash flow expected (or less volatility) due to more prefunding. Changing funding policy (lower min conts), maintaining a 2% benefit.
- The 2% benefit might be seen as an implicit contract from EE's perspective, hence it might make sense to lower the funding from 125% to 100% before reducing benefits. HR decision.
- Maintaining 2% benefit provides Ees with higher replacement ratio, less HR related risks from company's perspective.
- No change in current service costs in pension expense. Could be impact in net interest cost as noted in part a).
- Balance sheet funded status: whether improved or not depends upon difference in the extra 25% conts over minimum vs the cost of change in benefit formula. If plan is fully funded and company is taking a contribution holiday, no difference between 100% and 125% but difference in 2% vs 1.5% benefit accruals impacts long term cost of the plan, cash funding change impact varies over time.
- Will surplus ownership become problem - overfunded? As plan gets to fully funded and min required contribution drops to \$0, both funding policies require the same amount in contributions. So probability of running into surplus ownership issues may not apply since contribution stop at 100% funded.
Less pre-funding: not as likely to get pressure from employees/unions to improve benefits.

12. 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 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.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.

Sources:

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen, 10thEdition Ch. 2

Fundamentals of Private Pensions, McGill, 9th Edition, Ch. 5

DA-108-13: Increasing Annuitization in 401(k) Plans with Automatic Trial Income, Hamilton Project Policy Brief

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen, 10thEdition Ch. 29

Commentary on Question:

The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.

- *Participant investment options*
- *Required and optional employee contributions*

Solution:

XYZ Company is a large pharmaceutical company in Gevrey that sponsors a voluntary defined contribution plan (DC Plan). The DC Plan covers medical research staff and laboratory technicians. XYZ is concerned that the DC plan has low participation. You have been provided the following information:

12. Continued

Plan Provisions

Eligibility	Voluntary enrollment is available once a year
Vesting	100% of account balance after 5 years of service
Employer contribution	See table below; contributions deposited at the end of the year at the following rates: <ul style="list-style-type: none"> • Medical research staff – 2.5% of pay • Laboratory technicians – 1.5% of pay
Member contribution	5% of pay for plan participants
Plan fund investment options	Money market fund
Account balance	Contributions accumulate in member's individual account earning a money market rate of return.
Benefit on retirement or termination	100% of account balance, payable as a lump sum
Benefit on death	Return of employee contributions with interest

Participant Data as of January 1, 2014

	Average Age	Average Annual Salary
Medical research staff	45	\$90,000
Laboratory technicians	30	\$65,000

Recommend changes to the DC Plan that should increase participation. Justify your response.

Commentary on Question:

Successful candidates were able to explain and justify the recommended changes while referring to the makeup of current group of participants.

Automatic / Mandatory enrollment at date of hire

Decrease the mandatory 5% contribution rate for employee contributions or make plan non-contributory

Increase percentage of Employer matching of employee contributions

Increase frequency of Employer contributions to monthly (as an example) from annual end of year

Establish a minimum % of Employer contribution irrespective of the employee contribution.

Permit employees to elect a variable percentage amount to contribute (e.g. 1%, 2%, 3%, etc.) to encourage higher savings rates

Automatic escalation where the employee's savings rate increases each year

Make the auto escalation option the default option (utilize negative elections)

Establish uniform plan provisions to facilitate employee transfers between divisions

12. Continued

Immediate Vesting of Account Balance

Decrease the mandatory 5% contribution rate for employee contributions or make plan Non-contributory

Permit Additional Voluntary Contributions from employee [AVC]

Apply Employer matching percentage to Employee AVCs

Enhance the Ancillary benefits for pre-retirement death to 100% of the account balance payable as lump sum

Offer different investment choices (e.g. fixed-income, equity funds, employer stock, etc.)

Combine asset classes into predetermined portfolios / include Target Date funds

Permit and set limits on the frequency of change in investment elections

Permit annuitization on retirement

Strengthen Employee communication

Make lifetime income more attractive by:

- post retirement death benefit to spouse, if applicable, as optional Joint and Survivor form, or guaranteed monthly payments for a fixed period of years, or return of contributions less pension payments already made;
- post retirement death benefit to family or estate as minimum return of contributions or 100% of account balance;
- provide the retiree with the option to make withdrawals given certain circumstances;
- provide benefits protected against inflation;
- guarantee a minimum level of monthly benefits; and
- increase monthly payments based on its market value.

13. Learning Objectives:

2. The candidate will understand the impact of the regulatory environment on plan design
3. Candidate will be able 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:

- (2a) Explain and apply restrictions on plan design features to a proposed plan design.
- (2b) Explain and test for limits on plan designs and features that protect participation rights.
- (2c) Test for plan design restrictions intended to control the use of tax incentives.
- (2d) Describe the process and apply the principles and rules governing the conversion from one type of plan to another.
- (2e) Understand conflicts between regulation and design objectives and recommend alternatives.
- (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.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (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

13. Continued

- (v) Embedded options
 - (vi) Portability options
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature/
- (4d) Analyze the issues related to plan provisions that cannot be removed.
- (4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.
- (4f) Assess the impact of possible changes in plan design due to changes in legislation.

Sources:

DA-102-13: Evaluating the Design of Private Pension Plans: Costs and Benefits of Risk Sharing

Fundamentals of Private Pensions, McGill, Chapters 6, 9, and 11

New Retirement Plan Designs for the 21st Century, Pension Forum, December 2008

Commentary on Question:

Successful candidates listed and described the likely effects of four plan provisions. Successful candidates also indicated that a younger workforce would likely result in higher mobility. Successful candidates addressed both the hazardous nature of the work and the young, mobile workforce. For example, two plan provisions that addressed hazardous work and two plan provisions that would appeal to a young, mobile workforce.

Solution:

A new company in a hazardous, labor-intensive industry would like to offer a defined benefit pension plan that caters to a young workforce.

Describe four plan provisions you would recommend in designing this company's pension plan. Justify your response.

1. Disability benefit provision
 - Since the employer operates in a hazardous industry, there is a higher risk of employees becoming disabled, and a disability benefit in the pension plan will protect against this risk
 - May allow for continued pension accruals until normal retirement age if employee is disabled
 - Employer can make contributions on behalf of employee or waive employee contributions during disability

13. Continued

2. Enhanced pre-retirement death benefit
 - Hazardous nature of the work means that the probability of pre-retirement death is higher and employees will want security for their families
 - Provide lump sum equal to value of the accrued benefit at date of death
 - May provide immediate pension to spouse to provide more financial security
3. Offer a lump sum payment option
 - A young, mobile workforce values portability
 - Allow employees to receive benefit in one lump sum at termination so that the benefit is more portable. This allows employees who are going to leave after a few years to take the benefit with them
 - Allow rollovers to IRAs (RRSPs) or other tax sheltered vehicle to continue to save for retirement
4. Vesting
 - Provide shorter vesting than required under legislation, or offer immediate vesting to attract young, mobile workers
 - Pension will be more valuable to employees early in career because they can take benefit with them if they leave. Provides even short service workers with some benefit

An alternate plan provision to address the hazardous, labor-intensive nature of the work is:

- Subsidized early retirement benefits (e.g., unreduced pension prior to normal retirement age, or based on age/service requirements).

Several other plan provisions to address the young, mobile workforce are:

- Look at a cash balance plan which has many characteristics of a DC plan and may be easier to understand for employees
- Allow roll-overs from prior pension plans so employees can transfer assets from a prior pension plan to the DB plan and get credit for past service
- Offer a variable annuity to encourage employees to keep working for the company since the benefit is back-loaded