RET DAU Model Solutions
Spring 2024

1. **Learning Objectives:**

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

7. 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.

8. The candidate will understand how to apply the relevant standards of practice.

Learning Outcomes:

(6a) Evaluate appropriateness of current assumptions.

(6b) Describe and explain the different perspectives on the selection of assumptions.

(6c) Describe and apply the techniques used in the development of economic assumptions.

(6d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

(7e) Demonstrate the sensitivity of financial measures to given changes in plan design.

(8a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.)

(8d) Recognize situations and actions that violate or compromise Standards.

Sources:

DA-140-21: ASOP 27 – Selection of Economic Assumptions for Measuring Pension Obligations

DA-171-21: Selecting Investment Return Assumptions: Considerations When Using Arithmetic and Geometric Averages

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

1. Continued

Commentary on Question:

This question was intended to test candidates' knowledge about the development of the expected return on assets assumption for ASC-715, as well as their knowledge about determining the appropriateness of the same assumption in a practical situation.

Solution:

(a) Describe the factors that should be considered when setting an expected return on assets assumption under U.S. Accounting Standard ASC 715.

Commentary on Question:

Many candidates did not perform well on this part because they did not adequately describe enough unique factors that should be considered.

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

<u>Investment Policy</u>

- What is the current allocation?
- What types of securities eligible to be held?
- Does target allocation differ from the current allocation?

<u>Expenses</u>

- What are they? Transaction, custodian, management fees? How much?
- Are they paid from the plan assets or by the plan sponsor directly?
- If paid by the plan assets, may be able to reflect a reduction in the investment return assumption.

<u>Cash Flow Timing</u>

- What is the timing of expected contributions and benefit payments?
- How does that impact the plan's liquidity needs?
- How does that impact the plan's investment opportunities?

<u>Market Conditions</u>

- How has the plan performed historically?
- What are experts saying about future market conditions?
- What is the expectation for inflation in the future?

1. Continued

(b) You are the actuary for NOC's pension plan. NOC's Chief Financial Officer has asked you to use an expected return on assets assumption of 9.50% for the 2025 Net Periodic Pension Cost.

Propose a course of action as an actuary in response to the request.

Commentary on Question:
Many candidates performed well on this part. Candidates who performed the best were able to utilize the case study and conduct analysis that was specific to NOC. Below is a sample response of an answer that would receive full credit.

This is the course of action that I would propose:

- First, determine the reasonableness of the 9.50% assumption using the information I have at my disposal, including the factors mentioned in part (a).
  - Asset mix for NOC's plan during 2023 was 50% equity, 40% fixed income, 6% real estate, and 4% cash.
  - Use this asset mix to determine what may be a reasonable expected asset return based on current market conditions.
- Second, if I determine that the 9.50% is unreasonable, I would explain my rationale to the CFO at NOC
  - NOC had an EROA assumption in the 6.00%-7.00% range for the past two years. Jumping up to 9.50% seems extremely unlikely without a major shift in investment policy
- If the CFO insists on using the 9.50% assumption without changing investment policy, I have two choices
  - If it is within a reasonable range, and I don't think it's deliberately misleading or dishonest, I can use the 9.50% and add wording to the actuarial communication that the assumption is management's best estimate and does not reflect my view as the Actuary
  - If it is outside the reasonable range, I can refuse the assignment

2. Learning Objectives:

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

8. The candidate will understand how to apply the relevant standards of practice.

Learning Outcomes:

(6b) Describe and explain the different perspectives on the selection of assumptions.

(8a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.)

(8b) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.

(8c) Explain and apply relevant standards of practice related to valuing retirement obligations.

Sources:

DA-146-15: ASOP 6 – Measuring Retiree Group Benefit Obligations and Determining Retiree Group Benefits Program Periodic Costs or Actuarially Determined Contributions

DA-139-21: ASOP 35 – Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe the types of adjustments that may be required to be made to the pension plan data if used for the covered population of a retiree group benefits program under Actuarial Standard of Practice (ASOP) No. 6 – Measuring Retiree Group Benefit Obligations and Determining Retiree Group Benefits Program Periodic Costs or Actuarially Determined Contributions.

Commentary on Question:
The responses for this section varied, and many candidates provided responses that did not pertain to data adjustments.

- Adjustments to the data may be required for any retirees covered by the retiree group benefits program that are NOT receiving pension benefits. For example, former employees who received a lump sum at retirement and dependents/spouses of retired participants may be eligible and receiving retiree group benefits but may not be in the pension plan census data.

2. Continued

- Adjustments to the data may also be required for participants eligible for pension benefits but NOT covered by the retiree group benefits program. For example, terminated employees with vested pension benefits may not be eligible for retiree group benefits, and retirees who waived (or opted out of) coverage for some or all of the retiree group benefits should not be valued.

(b) Describe the considerations in determining whether the demographic and economic assumptions developed for pension benefit obligations are appropriate for retiree group benefits obligations under ASOP No. 6.

Commentary on Question:
Successful candidates provided sufficient detail on different demographic and economic assumptions where the considerations may vary between determining assumptions for pension versus retiree group benefits.
The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

- Some of the **demographic** assumptions that should be reviewed for different characteristics between pension benefit obligations and retiree group benefit obligations are:
  - **Retirement assumption**
    - This assumption is very important in retiree health plan measurement because of higher level of coverage received prior to becoming eligible for social security benefits (Eg Medicare)
    - A single average retirement age is generally not appropriate for retiree group obligations
  - **Mortality assumption:**
    - Medical trends typically increase leading to higher health care costs over time and over projection period, so results likely sensitive to mortality assumption used

- Some of the **economic** assumptions that should be reviewed for different characteristics between pension benefit obligations and retiree group benefit obligations are:
  - **Discount rate assumption:**
    - The discount rate selected for measuring pension benefit obligations may not be appropriate for measuring retiree group benefits obligations because the payment patterns may be different

2. Continued

- **Health Care Cost Trend Rates**:
  - This assumption is not used for pension benefit obligations but is key for retiree group benefit obligations
  - Health care cost trend rates are used to reflect the change in per capita health costs over time due to factors such as inflation, medical inflation, technology improvements, etc

- The actuary should comply with the relevant ASOP when selecting demographic & economic assumptions used in measuring retiree group benefit obligations (i.e. ASOP no. 35 & 27) but should determine whether the assumptions used in a related pension plan valuation are appropriate for retiree group benefits program and, if not, modify the assumptions appropriately per ASOP No. 6

(c) Explain the effects of the trend on the following for the National Oil Retiree Health Benefit Program:

(i) Liabilities

(ii) Service cost

(iii) Claims cost

Commentary on Question:
This question was generally well understood with many candidates receiving full marks for this section. Other responses also received full credit when justified accordingly.

- Liabilities:
  - If participants are living longer than compared to current assumption this will mean the life insurance benefit will be paid at a later date (discounted for longer / lower present value / actuarial gain)
  - Retiree benefits are payable both on the life of the employee and the spouse (if applicable) which will mean a longer period of coverage with improved life expectancy – increases liability/actuarial loss
  - The life insurance benefit provided by NOC is small ($50,000) compared to the health care benefits (largely 100% employer-paid health care, with no maximums, deductibles or copays), so the overall impact on the health care costs will outweigh the impact on the life insurance costs
- Service Cost:
  - No immediate effect on service cost. However, future service cost could be higher if the longer lifespan of employees results in participants working longer than before

2. Continued

- Claims Cost:
    - Longer longevity typically contributes to higher medical costs over time. This may lead to actuarial losses if increased cost trends aren't factored into valuation

3. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified 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:
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

(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

Sources:
DA-165-17: Phased Retirement – An Important Part of the Evolving Retirement Scene

Commentary on Question:
The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

Solution:
(a) Describe the advantages and disadvantages of offering a phased retirement program from NOC's perspective.

Commentary on Question:
Candidates generally performed well on part a. To receive full credit, candidates needed to specifically relate the impact of a potential phased retirement to the case study and list both advantages and disadvantages. No credit was given for statements that were not consistent with the laws of Gevrey listed in the case study or for age-related statements about employees struggling with new technology.

3. Continued

Advantages

- NOC has seen lots of employee turnover the past few years. A phased retirement program may allow for a stabilization of NOC's workforce.
- A phased retirement program may allow for transfer of knowledge between longer service and shorter service employees
- A phased retirement program may increase employee satisfaction by providing options to employees close to retirement age

Disadvantages

- A phased retirement program may increase administrative and legal complexity to NOC
- NOC may face some anti-selection risk if the program is poorly designed

(b) Compare and contrast the potential impacts of the following phased retirement schedules from NOC's perspective:

(i) 75% of full time during phased retirement

(ii) 25% of full time during phased retirement

Commentary on Question:
Candidates had a mixed performance on part b. Many candidates correctly identified that the 75% schedule employees would likely continue to accrue benefit service in the National Oil Pension Plan while the 25% employees would not. Candidates struggled to consider that NOC would need to clarify the health care options that would be available to employees adopting either phased retirement schedule. To receive full credit, candidates needed to describe both similarities and differences between the impacts of the two phased retirement schedules.

Both schedules would require NOC to clarify health care options. Participants who have not attained ten years of service would not be eligible for the retiree health care plan.
Both schedules would allow flexibility to the employee associated with working less and may allow for a transfer of knowledge to younger workers
75% schedule employees would continue to accrue pension plan benefit service and may continue to accrue pay, potentially increasing costs to NOC; 25% schedule employees would not likely accrue additional benefits in the pension plan. This reduction in benefit accruals could offset any increased costs to NOC as a result of their initial benefit commencement relative to a status of continued employment
75% schedule employees would likely remain more committed to their role, potentially resulting in a more successful transfer of knowledge than with 25% employees

3. Continued

(c) Describe the advantages and disadvantages of incorporating an in-service distribution option in the National Oil Pension Plan.

Commentary on Question:
Candidates had a mixed performance on part c. Many candidates correctly identified that an in-service distribution option would allow employees to take advantage of the early retirement subsidy in the Pension. Most candidates described impacts to both NOC and its employees. Some candidates confused adding an in-service distribution option with adding a lump sum option to the plan. To receive full credit, candidates needed to describe both advantages and disadvantages of the in-service distribution option and describe the impact to both NOC and its employees.

NOC

- An in-service distribution option may better facilitate achievement of NOC's goals as part of the phased retirement program (knowledge transfer and seasonal workforce).
- NOC could see increased costs due to additional early commencements and administrative complexity
- Administrative complexity would likely increase for NOC if participants commence while accruing additional benefits, especially if both lump sum and annuity options are offered

Employees

- Participants at age 62 would be able to take advantage of the early retirement subsidy while still working, making the phased retirement program more attractive to employees concerned with losing the value of the subsidy.
- Participants would still be able to accrue benefits if they continue to work.
- An in-service distribution option could allow employees to receive subsidized early retirement benefits and continue working to obtain eligibility for the retiree medical plan if the employee has less than ten years of service

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.

4. The candidate will be able to evaluate plan design risks faced by sponsors 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.

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 faced by retirees and the elderly.

(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
(vii) Investment options
(viii) Decumulation Features

4. Continued

Sources:
Embedded Options in Pension Plans: Valuation of Guarantees in Cash Balance Plans, Jan 2014, sections 1, 2, 3, 4, 6, 7 & Appendix II

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) Explain the risks associated with cash balance plans from the perspective of the following:

(i) Plan sponsors

(ii) Plan participants

Commentary on Question:
Generally, candidates did well on this part of the question. Candidates needed to elaborate on how the risks impact plan sponsors and/or plan participants and not just list them to receive full credit.
The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

(j) Plan sponsors

- <u>Longevity risk:</u> The risk remains with the employer until the participant has been fully paid out. Most likely not everyone will take a lump sum so the plan sponsor will still have to manage the risk of participants living longer than expected and paying out the annuity payments until their death.

- <u>Investment risk:</u> Plan sponsors are responsible for managing the assets from the time of the participant joining the plan until the benefits are fully distributed. That means they will need to contribute more if the assets don't keep up with the crediting rate. They can mitigate this risk by choosing a crediting rate that is market-based, where the rate varies from year to year. This reduces the sponsor's risk in having to maintain investment returns that exceed the crediting rate.

4. Continued

(ii) Plan participants

<u>Longevity risk:</u>

- Benefits are typically communicated in terms of an account balance, increasing the chances participants will elect a lump sum at retirement. This increases their risk of outliving their pension income.
- If the participant takes a lump sum, the longevity risk transfers to the employee

<u>Investment risk:</u>

- If the participant takes a lump sum, the investment risk is also transferred to them

<u>Inflation risk:</u>

- Participants bear pre-retirement inflation risk since annual contributions are based on salary, like a career average plan.
- Similarly, due to the increased likelihood of electing a lump sum, participants may take on post-retirement inflation risk if their investments are not earning enough to cover inflation.

(b) Critique the use of the following assumptions in a cash balance plan:

(i) 100% of participants take a lump sum immediately upon termination or retirement

(ii) Age 62 single point retirement age

(iii) An interest crediting rate 50 basis points lower than the discount rate

Commentary on Question:
Candidates who did well on this question provided ample details in their critique of the assumptions. They also provided a suggestion on how the assumptions can be refined.

(i) Using a 100% lump sum at termination assumption will not capture the impact of post-retirement mortality since everyone is assumed to take a lump sum once they leave employment. It will also not reflect the true duration of the plan and could skew projected cash flow needs. This assumption should be based on actual experience from recent years in the plan.

4. Continued

(ii) A single point retirement age assumption will likely result in liabilities being undervalued if members retire later than expected. Depending on plan experience, it could also cause expected cashflows to deviate significantly making investments more difficult to hedge. This assumption should better align with actual plan experience, and depending on materiality, can be refined to use an age/service table.

(iii) This assumption could result in less accurate projections of the liability (depending on the actual interest crediting rate (ICR)) since the cash balances are projected forward with the ICR and discounted back with the discount rate. The assumption will need to be monitored and compared to the actual interest crediting rate to make sure it aligns.

(c) Calculate the replacement ratio assuming an asset return of -15% in year 1 and 4% in year 2.

Commentary on Question:
Most candidates received full credit for this question. The most common error was capping the member's balance at the end of the first year and not at retirement.

The model solution for this part is in the Excel spreadsheet

5. Learning Objectives:

7. 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:

(7a) Perform valuations for special purposes, including:
- (i) Plan termination/windup
- (ii) Accounting valuations
- (iii) Plan mergers, acquisitions and spinoffs

(7d) 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-185-20: Plan Curtailments & Settlements Under FASB ASC Topic 715 Relating to Plan Terminations, Part 1

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

Commentary on Question:

The model solution for this question is in the Excel spreadsheet. While simple interest approach is used in the model solution, calculations using compound interest approach are also acceptable.

Solution:

(a) Calculate the 2024 Net Periodic Pension Cost under ASC 715.

Show all work.

Commentary on Question:

This numerical question was answered well. Successful candidates showed calculations for all components of the 2024 Net Periodic Pension Cost. Candidates who included Prior Service Cost when determining amount of gains/losses to be amortized outside of the 10% corridor only received partial credit.

The model solution for this part is in the Excel spreadsheet.

(b) Calculate the Accumulated Other Comprehensive Income as of December 31, 2024.

Show all work.

5. **Continued**

Commentary on Question:
Candidates who performed well understood how to roll forward the plan’s obligations/assets and provided all their calculations in detail. Candidates who failed to include Unrecognized Prior Service Cost as part of AOCI only received partial credit.

The model solution for this part is in the Excel spreadsheet.

(c) Calculate the following:

(i) Revised 2024 Net Periodic Pension Cost

(ii) Funded status at December 31, 2024

(iii) Accumulated Other Comprehensive Income at December 31, 2024

Show all work.

Commentary on Question:
This part was the most difficult for candidates to answer. To receive full credit, candidates were required to:

- *Identify that lump sums are considered settlements and perform the SC + IC test to check if immediate recognition of gains/losses is required*
- *Demonstrate their understanding of the accounting treatment of settlements (i.e., determine the settlement loss and calculate the amount of gains/losses immediately recognized due to settlement) by properly reflecting its impact on the 2024 Net Periodic Pension Cost*
- *Show calculations of funded status and AOCI after the settlement at December 31, 2014*

The model solution for this part is in the Excel spreadsheet.

6. **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.

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.

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 faced by retirees and the elderly.

(4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.

Sources:

CIA Report of the Task Force on Target Benefit Plans, Jun 2015, (excluding sections 4, 5 & Appendices)

CIA Educational Note: Financial Risks Inherent in Multi-Employer Pension Plans and Target Benefit Pension Plans, May 2011

6. Continued

DA-114-13: Risk Management and Public Plan Retirement Systems - Appendices only (pp. 1-33 background only)

Commentary on Question:
This question requires candidates to demonstrate their ability to analyze the Target Benefit Pension Plan (TBPP) design and explain the relevant risks associated with TBPPs.

Successful candidates were able to identify and articulate that the benefit levels in TBPP will depend on the asset mix, discount rate, and the predefined triggers and actions (i.e. "no action range") set by the plan.

Generally, answers for parts (a) and (c) were decent. Candidates seemed less familiar with the concept of a "no action range" and thus Part (b) was the weakest. A number of candidates completely skipped this question.

Solution:
(a) Analyze how the following affect benefit levels in a target benefit plan:

(i) Asset mix

(ii) Using risk-free discount rate to value liability

(iii) Using best estimate discount rate to value liability

Commentary on Question:
In part (a), a lot of candidates were able to grasp that the more aggressive asset mix will contribute to higher volatility and a conservative discount rate would lead to a higher initial liability.

(i) Asset Mix
Choice of investment mix has a greater impact on the size of benefit adjustments than on the frequency of the adjustment.
Asset mix with a higher equity allocation does not change the likelihood of funding shortfalls (and benefit adjustments) in the short term.
Asset mix with a higher equity allocation does increase both the likelihood of funding shortfalls and the severity of funding shortfalls occurring in the long term. These shortfalls would lead to benefit level adjustments.

(ii) Risk Free Discount rate to value all benefits:
- Target pension is initially set conservatively
- Less likely to need benefit adjustments (i.e. lower probability of benefit decreases)

6. Continued

- Benefit increases are financed by gains that are primarily due to realized equity risk premium and the rising bond yields.
- there is still a significant probability of falling below the initial pension during a particular member's retirement period due to the long period of retirement years (30-40 years) (i.e. adjustments could be frequent).

(iii) Best-estimate discount rate to value all benefits

- The potential upside risk is lower; and the downside risk is increased
- Increased likelihood of annual benefit reductions
- Increased severity of benefit reductions
- Decreases the likelihood and size of potential annual benefit increases
- The median annualized growth rate of pensions after retirement is near zero (i.e. less potential for a pension benefit increases during the retirement years for a pensioner)

(b) Describe the advantages and disadvantages of a "no-action range" in a target benefit plan where benefit adjustments, positive or negative, are not implemented.

Commentary on Question:
Part (b) was generally poorly done and attempted. Candidates were unfamiliar with a "no action range."

Advantages

"No-action range" reduces the frequency of benefit changes.

Builds up a countercyclical buffer where past positive experience is drawn down with negative experience without having to decrease benefits.

When using a "no-action range," the distribution of the funded ratio tends to revert to the mean

Leads to more stable pension outcomes without added cost for employer

Higher benefit security and stability during the ultimate period.

6. **Continued**

Disadvantages

Single trigger for action would result in benefits that are too volatile.

Intergenerational inequity because “no action ranges” reward the later cohorts of retirees.

Higher risk during the transition period (applicable to earlier cohorts).

(c) Describe the advantages and disadvantages of a public sector target benefit plan from the employer’s perspective.

Commentary on Question:
Part (c) was generally well-done. Candidates were prepared to discuss the advantages and disadvantages of Public Sector Target Benefit Plans (TBPs). Candidates were able to describe the majority of the unique elements that characterize a large Public Sector Target Benefit Plan. The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

Advantages for Employers of Public Sector TBP

Contribution rate:
- stable contribution rate
- employer obligation limited to pre-defined amounts
- contributions vary within a range that provides the plan with an additional lever to control the affordability of benefits

Target benefit level
- higher degree of benefit security and stability
- risk sharing between employers and employees
- benefits may be adjusted up and down frequently in response to market conditions and other plan experience

Investment policy.
- By specifying a certain risk/reward trade-off of how plan assets can be invested, investment policy of TBP directly affects affordability of the target benefit as well as the risk of actual benefits falling short of or exceeding the target.
- Generally, the size of public sector employers allow them to have the advantage of risk pooling, economies of scale, and the ability to use dedicated professional advisors which may not be available to smaller plans.

6. **Continued**

Disadvantages

- Benefits can be reduced which may not be allowed in certain jurisdictions
- Currently, no real regulatory framework exists for TBP
- Intergenerational inequity where the capacity of successive generations to honor the implicit contract is constrained (e.g., because the number of new entrants is declining), or if the willingness of the next generation to participate in the risk transaction wanes, the TBP may collapse.
- Generous benefit subsidies, enhanced early retirement benefits and/or disability benefits can complicate risk management and can endanger sustainability
- Funding is highly sensitive and dependent on the active employee population. Although mass layoffs are rare in the public sector, decreases in the active population could result in decreased funding and thus trigger benefit decreases at an inconvenient time for the pension plan

7. 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.

7. 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 faced by retirees and the elderly.

(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
- (vii) Investment options
- (viii) Decumulation Features

(4c) Recommend ways to mitigate the risks identified with a particular plan feature

(7d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-170-17: Accounting for Buy-ins

Pension Risk Transfer: Evaluating Impact and Barriers for De-Risking Strategies, 2014, pp. 16, 17 & 20-27

Commentary on Question:

Commentary listed underneath question component.

7. Continued

Solution:

(a) Describe the advantages and disadvantages of the following pension risk transfer strategies from the perspective of an employer:

(i) Annuity buy-in

(ii) Annuity buy-out

Commentary on Question:
Candidates did very well on part (a) of this question providing many relevant points for each risk transfer strategy.
The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

(i) Annuity buy-in

Advantages	**Disadvantages**
Settlement accounting not triggered	Employer retains administrative responsibilities related to the payment of benefits
May convert to annuity buy-out when employer is better situated to handle settlement costs	could be administratively complex to true up the population each year with the insurance company
Effectively immunizes the pension liability associated with the individuals that form part of the annuity buy-in contract	Employer still required to pay PBGC fees for impacted participants.

(ii) Annuity buy-out

Advantages	**Disadvantages**
Relieves administrative responsibilities which may result in cost reductions	Settlement accounting triggered
Liability completely removed from the balance sheet which reduces the risk the company holds	Premium for annuity buy-out is likely above liability held on balance sheet and may outweigh the unrecognized gains
Employer no longer has to pay PBGC fees	Communication will have to be sent out to participants included in the buy-out, which may create incertitude and questions

7. Continued

(b) Explain why an annuity buy-out premium may exceed the projected benefit obligation (PBO) under U.S. Accounting Standard ASC 715.

Commentary on Question:
Candidates did not do as well on part (b) of this question, as answers were sometimes very short and did not include enough information to explain the reasons why annuity buy-out premiums exceeded the PBO.

- Insurer may use a more conservative discount rate with different credit spreads or default risk adjustments than that used by the plan sponsor to value the PBO.
- Insurer may use a different mortality assumption than the plan sponsor based on the insurer's experience which is quite large and more up to date. Recent longevity improvements are not fully captured in the mortality tables and improvement scales most commonly used by plan sponsors.
- An insurer may add additional premiums for plans that have less retirees and larger proportions of deferreds because of the uncertainty of the payment stream timing in the future.
- Premiums include loads for administration fees, investment fees, profit, etc.
- An insurer may add additional premiums for complicated plan provisions such as COLAs, cash balance provisions with interest crediting rates, lump sum payment forms, or other complex payment forms and may assume that all participants elect the most valuable form of payment.
- Additional liabilities and risks held by the plan sponsor as a result of maintaining the pension plan may not be included in the balance sheet liability.
- An insurer may add additional premiums if the plan is particularly small, where the set up of the ongoing administration of the plan outweighs the appeal of taking on the plan assets.

(c) Describe the advantages and disadvantages of adding a permanent lump sum option at retirement to a defined benefit pension plan from the perspective of the following:

(i) Employer

(ii) Plan participants

Commentary on Question:
To obtain full credit, candidates had to provide advantages and disadvantages from both the employer and plan participant perspective. Candidates did well overall.

7. **Continued**

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

(i) Employer

Advantages	**Disadvantages**
Relieves employer of longevity risk for those who elected the lump sum option	Subject to anti-selection – those who are healthy more likely to take annuity and live longer than expected, while those who are unhealthy will take the lump sum that may be valued at a longer life expectancy
Attracts younger employees due to flexibility with payments at retirement as they may be more mobile	can be tough to manage the investment management when you’re not sure when large distributions will occur from the asset pool - can sometimes lead to larger variances in expected cash flows and actual cash flows

(ii) Plan participants

Advantages	**Disadvantages**
Provides member with individual control over how the lump sum is invested	Risks outliving their assets (i.e., longevity risks) and risk of poor investment decisions in retirement (i.e., investment risks) if they elect a lump sum option
If participant knows they are less healthy and will die sooner than projected, will receive a larger value from their retirement plan with a lump sum since the money is accelerated to an upfront payment	Risks of unfavorable interest rates (i.e., interest rate risks) used for valuing their lump sum entitlement

8. **Learning Objectives:**

7. 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:

(7a) Perform valuations for special purposes, including:
- (i) Plan termination/windup
- (ii) Accounting valuations
- (iii) Plan mergers, acquisitions and spinoffs

(7d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

(7g) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

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

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

DA-185-20: Plan Curtailments & Settlements Under FASB ASC Topic 715 Relating to Plan Terminations, Part 1

Commentary on Question:

This question was a mathematical question that tested knowledge of IAS 19 and ASC 715. The model solution for this question is in the Excel spreadsheet. While simple interest approach is used in the model solution, calculations using compound interest approach are also acceptable. For IAS 19, the model solution reflects interest on SC being a part of the SC component; candidates who instead reflected that interest as part of the IC also received credit.

Solution:

(a) Calculate the following:

- (i) 2024 Defined Benefit Cost under IAS 19
- (ii) 2024 Net Periodic Pension Cost (NPPC) under ASC 715

Show all work.

8. **Continued**

Commentary on Question:
Candidates did very well on part (ii) and generally poorly in part (i), demonstrating a good familiarity with the calculations and projections under ASC 715, and a lesser knowledge of IAS 19.

Few candidates were able to calculate the correct end results and earn full credit. However, small calculation or formula errors were minimally penalized. Accordingly, most candidates did fairly well on part (a).

Please refer to the Excel spreadsheet for the calculations.

(b) Company ABC is closing one of its plants, eliminating 30% of their workforce, effective December 1, 2024. Lump sum payments related to this event are not paid in 2024.

Describe how the values in part (a) would change for this scenario.

No calculations required.

Commentary on Question:
Most candidates correctly indicated that the plant close caused a curtailment and not a settlement. The knowledge of ASC715 was far better than IAS19. Many candidates had limited knowledge of IAS19.

Candidates who commented on the increase or decrease of the components of service cost received no credit for those comments. Candidates who answered on how NPCC is recalculated and how gains are accounted for under each standard for the question's scenario received full credit.

<u>General</u>

- the scenario described is a curtailment under both accounting standards since a significant number of employees have been eliminated from accruing future service.
- On curtailment, the impact will be calculated on the effective date under both accounting standards
- the curtailment gain calculated is the difference between the PBO and ABO for the affected group of employees
- the DB cost/NPPC is recalculated/remeasured at the new assumptions on the effective date for periods beyond the effective date (i.e. from December 1, 2024)

8. Continued

- final 2024 expense will be 11/12 of amount previously calculated plus 1/12 of amount based on December 1, 2024 PBO and assets plus one-time curtailment (credit)
- There is no settlement

Under IAS19:

- entire impact/gain goes through P&L in 2024

Under US GAAP:

- since this curtailment results in a net gain, it must be recognized when the event occurs (i.e. Dec 1, 2024)
- if the absolute value of curtailment gain is less than the unrecognized loss, it would reduce the unrecognized loss amount in AOCI (in that case there would be no separate curtailment (gain) included in expense)
- curtailment would lead to immediate recognition of proportionate amount of unrecognized PSC (if that existed). Not applicable for this plan

9. **Learning Objectives:**

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:

(4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.

(4c) Recommend ways to mitigate the risks identified with a particular plan feature

(5b) Assess the tradeoffs between different goals.

(5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan

(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.

Sources:
Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018 - Ch. 14

Commentary on Question:
Commentary listed underneath question component.

Solution:

(a) Propose supplemental executive retirement plan provisions that plan sponsors can consider to address the following goals.

(i) Midcareer recruiting

(ii) Retention

Justify your response.

Commentary on Question:
Candidates generally did well on this question if they provided full justification for their proposed responses.

9. Continued

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

(i) Midcareer recruiting

- Provide additional years of service as part of pension formula – to attract ppts that may be missing out on benefit accruals from past employer so not starting from scratch with their new organization since they could become ineligible for earning a benefit if they leave a prior company to come to the new company

(ii) Retention

- Benefits are available only upon termination after age 62 – this will encourage participants to leave only after they have reached retirement age and will be discourages from looking for other opportunities.
- Benefits subject to forfeiture if an executive works for a competitor after retirement – this will provide a type of non-compete for the individual so that they are not incentivized to look for other similar opportunities; Prospect of losing benefits may deter an executive who is thinking of leaving the organization

(b) Describe the advantages and disadvantages of the options from the perspective of:

(i) Company ABC

(ii) The executive

Commentary on Question:
Candidates generally did well on this question if they thought through the implications of the two potential options from both perspectives. Advantages and disadvantages from both perspectives needed to be provided for candidates to receive full credit.

(i) Company ABC:
Option 1:

- Company doesn't have to provide retirement dollars, and all of the cash is up front
- there is little incentive provided for the employee to stay with the company for all 8 years of their employment

9. Continued

Option 2:

- Company pays less cash up front for the employee
- If the employee leaves before the 8 years are up, then they will miss out on all retirement dollars, saving the organization money.
- Provides retention protection

(ii) The executive

Option 1: $8.32M is potential salary earned over 8 year period

- less money to be earned if stay for the 8 years
- Money provided is more flexible, and if they decide to leave in the 8 year period, they will have more "guaranteed money" in their pocket
- bonus earnings are not guaranteed like the other contract

Option 2: $8.60M is potential salary (and retirement payment) earned over 8 year period

- executive has the opportunity to earn more "guaranteed" money under this option, assuming they say for the full 8 years
- the benefit in retirement isn't funded, so there is always a risk that the money may not end up being paid
- If they leave the organization before 8 years are up, will receive much less

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.

Learning Outcomes:

(3a) Identify risks faced 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.

(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
- (vii) Investment options
- (viii) Decumulation Features

Sources:

Primer on Retirement Income Strategy Design and Evaluation, Jan 2023, Executive Summary, Sections 1,2,5, 6 & Appendix A

Managing Post-Retirement Risks: Strategies for Secure Retirement, 2020

The Next Evolution in Defined Contribution Retirement Plan Design: A Guide for DC Plan Sponsors to Implementing Retirement Income Programs, Sep 2013 (pp. 61-88 background only)

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)

10. Continued

Commentary on Question:
This question tested candidates' knowledge on risks faced by retirees in capital accumulation plans (CAPs), understanding of both strengths and weaknesses of various withdrawal strategies for CAPs, and finally, replicating a defined benefit through a defined contribution plan.

Solution:
(a) Describe three risks faced by a retiree in a capital accumulation plan.

Commentary on Question:
In general, candidates performed well on this question. The majority of the candidates identified the 3 primary risks faced by retirees: investment risk, inflation risk and mortality risk. To earn full credit, candidates needed to provide 3 supporting details for each of the risks to demonstrate comprehension. Simply listing risks without accompanying supporting information did not merit credit.

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

- **Investment Risk**
  - Retirees continue to be responsible for investing and generating income over a long horizon
  - May incur greater investment risk by investing in higher returning but riskier assets
  - Could incur financial losses due to poor or biased financial advice

- **Longevity Risk**
  - Risk of living longer than expected due to breakthroughs in the field of medicine or increased efforts to maintain one's health
  - Risk of outliving savings for oneself
  - Risk of reducing standard of living or cutting expenditures to make money last a lifetime

- **Inflation Risk**
  - Risk that rising prices may be greater than the increase in retirement income
  - Inflation hedging may come at a cost of lower real returns
  - Value of benefit is reduced if return on investment does not match or exceed inflation

10. Continued

(b) Critique the following decumulation strategies of a capital accumulation plan.

(i) Constant withdrawal amount

(ii) Dynamic withdrawal amount

(iii) Draw-to-target

Commentary on Question:
Candidates did not perform as well in part b. This question asked candidates to provide an analysis covering both strengths and weaknesses of each of the decumulation strategies. Instead, many candidates provided the definition of each decumulation strategy and did not receive credit for that.

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit.

(i) **Constant withdrawal amount**

Pros
- Simple strategy by establishing a fixed withdrawal amount
- Dollar amount can be adjusted periodically to reflect inflation to maintain standard of living

Cons
- If constant withdrawal amount is too low, may reduce standard of living
- If constant withdrawal amount is too high, may outlive savings

(ii) **Dynamic withdrawal amounts**

Pros
- Can easily adjust withdrawals based on retiree's financial situation
- Strategy maximizes retirement income.

Cons
- More complex strategy than constant withdrawal amounts
- Uncertainty and variability in retirement income in market downturns

(iii) **Draw-to-target**

Pros
- More holistic view. Withdrawal amount takes into account all other income streams.
- Aim to maintain a stable income

10. Continued

Cons

- May unnecessarily reduce standard of living if available assets are more than adequate to sustain the target
- Difficult strategy for members to understand and implement

(c) Calculate the required employer contribution rate under the defined contribution plan to provide the member with the same replacement ratio as a percentage of 3-year average earnings under the defined benefit plan.

Show all work.

Commentary on Question:
Candidates performed well in part c.

The model solution for this part is in the Excel spreadsheet