RET DAU Model Solutions
Fall 2024

1. **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:

(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.

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

Sources:

Fundamentals of Retiree Group Benefits, Yamamoto, Dale H., 2nd Edition, 2015
Ch. 9 (pp.308-339 & 350-357)

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

DA-136-17: Selection of Actuarial Assumptions, Consultant Resource Manual, SOA Version, Mercer, pp. 5-69

Commentary on Question:

This question was intended to test candidates' knowledge of assumption setting practices for retiree medical plans, as well as where it differs from assumption setting for pension plans. 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.

1. **Continued**

Solution:

(a) Describe how assumption setting differs between pension plans and retiree health plans for the following assumptions:

(i) Retirement

(ii) Termination

(iii) Mortality

(iv) Discount rate

(v) Marital assumption

Commentary on Question:
Candidates generally did well on part a. Candidates who did well on this part described multiple differences in assumption setting practices between pension and retiree health plans for each assumption, or at least one difference and multiple considerations that applied to both pension and retiree health plans.

Retirement

- Assumptions for both plans should consider pension plan design (early retirement subsidies, Social Security supplements) and retiree health plan eligibility
- The retirement assumption is more material for retiree health plans than pension plans because employees retiring earlier (pre-65) will have a greater total retiree benefit in retiree health plans than in pension plans
- A table of retirement rates is preferred for both plans over a single retirement age (but will more drastically understate the liability of a retiree medical plan.)

Termination

- Assumptions for both plans should consider employer-specific or job related factors such as occupation, work environment, hazardous conditions, etc.
- Termination is more material to retiree health plans because employees terminating are likely vested in their pension benefits but will not receive retiree health benefits.
- Terminations based on liability weighted experience analysis for a pension plan should be separately assessed for a retiree health plan (i.e. if using an age related table, higher turnover rates used for a pension plan may not be applicable to a retiree health plan due to pension liability weighting).

1. Continued

Mortality

- Assumptions for both plans should consider different tables before and after retirement, future mortality improvements and different assumptions for disabled lives.
- Postretirement mortality is more material to retiree health plans if the benefits are not capped (health care costs tend to rise after retirement). Capped retiree health plans will be more similar to pension plans in this case.
- An amounts-weighted mortality assumption used for a pension plan may not be suitable for a retiree health plan.

Discount Rate

- Assumptions for both plans should generally be developed using high quality fixed-income securities.
- Assumptions for both plans should be developed using plan-specific cash flows or duration adjustments.
- Assumption should generally be developed similarly for both plans.

Marital Assumption

- Assumptions for both plans should generally consider historical data on coverage rates or % married
- Retiree health benefits eligibility conditions may differ for dependents and surviving dependents compared to the pension plan.
- Consider plan provisions of the retiree health plan that could affect the % of retirees that are assumed to have dependent spouses who participate/receive coverage.

(b) Describe considerations for setting the retiree health plan per capita claims cost assumption.

Commentary on Question:
Candidates had a mixed performance on part b. The question tested candidates' knowledge of setting the per capita claims cost assumption. Candidates who performed well described several considerations (historical experience, multiple periods, outlier claims, etc.) Some candidates provided information related to health care cost trend rates; no credit was given for these items.

- In developing the per capita health care claims cost assumption, health plan experience is generally considered the best predictor of future claims experience
- Absent credible health plan experience, the actuary may use other methods such as using health premiums or normative databases

1. **Continued**

- It may be appropriate to use different initial per capita health care costs for different categories of services because different services have experienced different claim rates/trends over time (e.g. drugs, hospital, dental)
- Segmenting the exposure data by demographics may be appropriate – e.g., healthy vs. disabled, retired participant vs. dependent
- The actuary should consider using multiple claims experience periods (e.g., 3 years of data) and adjust the experience of the various periods to comparable bases

(c) Describe considerations for use of roll-forward techniques for retiree health plan valuations under Actuarial Standard of Practice No. 6, Measuring Retiree Group Benefits Obligations and Determining Retiree Group Benefits Program Periodic Costs or Actuarially Determined Contributions.

Commentary on Question:
Candidates had a mixed performance on part c. This part was intended to test candidates' knowledge of when a roll-forward valuation may or may not be appropriate. Candidates who performed well noted that prior results should not be rolled forward for three or more years and noted additional considerations. Some candidates provided specifics of how to roll-forward prior results; credit was not given for those answers.

The actuary may determine it is appropriate for purpose of the measurement to use prior measurement results and a roll-forward technique rather than conduct a new full measurement.

The actuary should not roll-forward prior measurement results if the measurement date of those results is three or more years earlier than the current measurement date.

Actuary should not use full roll-forward techniques when the covered population, plan design, or other key components have changed significantly since the last full measurement.

2. Learning Objectives:

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:

(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

(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.

(5e) Identify the ways that regulation impacts the sponsor's plan design goals.

Sources:

DA-826-24: The Impact of the Secure Act on Multiple Employer Plans

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

- Ch. 3, Ch. 8, Ch. 17, Ch. 31 (pp. 593-606)

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) List challenges that many small employers face in offering a retirement plan to their employees.

Commentary on Question:
Most candidates did very well in identifying plausible challenges and received full credit.

- Plan costs associated with offering an employee retirement plan
- Fiduciary duties, responsibilities, obligations and liabilities
- Limited resources to manage the plan on a daily basis
- Cost volatility

2. Continued

(b) Describe the advantages and disadvantages of this potential change from the perspectives of the following:

(i) Company ABC

(ii) Plan participants

Commentary on Question:
Candidates had to describe (not only list) the advantages and disadvantages from the perspective of both the company and plan participants to get full credit. Only a few candidates provided enough information. Some candidates didn't know that a PEP was a DC type plan and were unable to comment appropriately on the pros and cons.

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.

Company ABC Advantages of PEP
- Fiduciary Risk Mitigation: Transfer fiduciary responsibility to the Pooled Plan Provider (PPP): PPP takes on the investment & administrative fiduciary liability
- Operational Outsourcing: Reduced administrative burden to Company ABC employees since the PPP will manage a lot of the day-to-day tasks of providing the DC benefit

Company ABC Disadvantages of PEP
- PEP must be defined contribution plan, so Company ABC would need to switch from DB to DC. This can be administratively difficult and may not be received well by employees.
- ABC will still need to monitor PPP and other fiduciaries (even though it is no longer the administrator or responsible for investment choices)

Participant advantages of PEP
- Investment control
  - Get to control the investments, may be able to outperform the DB plan if they invest well
- May be able to contribute pre-tax money which will accumulate in a tax shelter
- Easier to understand than multiple employer DB plan
- Flexibility of more portable benefit: Younger mobile employees appreciate portable benefits that can easily be transferred from one employer to another

2. Continued

Participants disadvantages of PEP

- Greater risk for participant since bears investment risk as they control the investments
- Greater risk for participant since bears longevity risk and would need to develop a drawdown strategy in retirement to mitigate the risk of outliving their assets
- More difficult to target a replacement income as DC plans are based on account balances and are not as easy to convert to annuities
- Limitations on investment choices – the PEP may offer limited or no flexibility with respect to investment menu

3. **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.

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) 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.

(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.

3. **Continued**

(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

(4d) 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.

(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.

(5l) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend recommendations.

Sources:

DA-189-22: The Hybrid Handbook: Not All Hybrids are Created Equal

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018 , Chapters 2 and 17 (pp. 314-323)

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

Morneau Shepell, Handbook of Canadian Pension and Benefit Plans, 17th Edition, 2020, Chapters 1, 3

3. **Continued**

Commentary on Question:
This question sought to utilize knowledge acquired in the syllabus by asking the candidate to design a pension arrangement that met conflicting objectives between the employer and the participants.

A variety of approaches were proposed by candidates, and most were valid and received significant credit.

To receive full credit, candidates needed to provide:

a) details on each feature
b) how each feature met the union and/or the sponsor's objectives, and
c) where union and employer objectives could not be fully met, a suitable compromise

Candidates who provided more details on each proposed plan feature received more points, while candidates who omitted features and justifications earned fewer points. Candidates who proposed a defined contribution plan received lower credit as this type of arrangement was less suitable.

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:
An employer is negotiating a defined benefit pension arrangement for the first time with the union representing its employees.

The union workforce has the following characteristics:
- Mix of full-time and part-time members
- High turnover in low service employees

The employer has the following objectives for the arrangement:
- Encourage workforce to stay to age 65
- Minimize administrative burden
- Share cost with employees
- Limit the employer’s inflation risk

3. Continued

The union has the following objectives for the arrangement:

- Cover all employees and be easy to understand
- Provide protection if a retiree dies shortly after retirement
- Preserve benefit value for members who terminate or die before retirement
- Minimize investment risk for employees
- Allow employees to retire starting at age 55

Recommend plan features that will balance the employer's and union's objectives.

Justify your response.

Plan should be a cash balance plan, here is how it should be designed based on each objective:

- Employer (ER) wants: to encourage the workforce to stay to age 65.

The plan should have 65 as the normal retirement age. The plan will have early retirement starting at age 55 (see why below), but benefits will be reduced actuarially so as to not subsidize early retirement (and in a way, promote participants leaving before age 65).

The plan could further de-incentive pre-65 retirements by adding early retirement reduction factors for each month/year before age 65 retirement. However, this may be a determent, considering the union wants the ability for early retirement – and likely wouldn't appreciate significant (and potentially prohibitive) reductions

- ER wants: Minimize administrative burden.

Any DB plan is going to have a certain amount of administrative burden. Cash balance plans are at the lower end. To minimize this burden, I would recommend the plan sponsor offload the administrative responsibilities to a third-party provider.

- ER wants: Share cost with employees.

Require Employee contributions. This will have the added benefit of getting the employees to have a little "skin in the game" by way of their money being tied up in the plan. If the participant were to terminate prior to vesting, they would get their contributions back.

3. Continued

- ER wants: Limit the employer's inflation risk

Most cash balance plans use an inflation measure like the interest crediting rate (ICR), by increasing account balances with an index like CPI. This would leave the employer exposed to years with high inflation. I would recommend that the employer instead use a flat percentage, like 2%. 2% is the overall inflationary goal for the federal reserve and is a (conservative) estimate of inflation in the long term, so employees will be generally protected from inflation in the long term and employers avoid years of high inflation causing undue costs to the plan.

The plan should also avoid providing COLAs in retirement. If they do, they should also be a flat %, and not contingent on an inflationary index.

Note, the employer would be exposed to some inflation risk by way of pay increases. However, this is spread throughout the employees' career and is also subject to many other factors.

- Union wants: Cover all employees and be easy to understand

All participants, regardless of full time or part time status, will immediately start participating in this plan upon employment. Note, the part time employees will get smaller pay credits due to their likely lower salary.

Cash balance plans are linked to an account balance which is the sum of employee contributions, employer pay credits and interest (from ICR) gained over the years. This amount is easily trackable from the employee's perspective and feels a lot like a DC plans account balance (which they likely have a better understanding of).

- Union wants: Provide protection if a retiree dies shortly after retirement

The plan should have various optional forms to protect against this, such as Joint & survivor (where a percentage of the original retirement benefit is still available to the spouse for life after the retiree dies), a Certain and Life (where payments are guaranteed for a certain period of years, regardless of the status of the retiree).

- Union wants: Minimize investment risk for employees

During employment – Pay credits and employee contributions are based on compensation, and then are increased with a flat 2% increase. There is no direct exposure to investment risk for this time

3. Continued

After employment – the participant can take various forms of annuity. If there is no lump sum feature (which are common in cash balance plans), then the employees would not face investment risk in retirement either. The union should avoid asking for a lump sum option, even if their members want it.

- Union wants: Allow employees to retire starting at age 55

Allow early retirement starting at age 55. Benefits would be reduced based on the plans actuarial equivalence assumptions, until normal retirement age at age 65.

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
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(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.

(3b) Describe and contrast the risks face by participants of:

(i) Government sponsored retirement plans
(ii) Single employer sponsored retirement plans
(iii) Multiemployer retirement plans, and
(iv) Social insurance plans

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

4. **Continued**

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

Commentary on Question:
This question was intended to test candidates' knowledge of Target Benefit Plans and the risks faced by the employer and employees in a Target Benefit Plan. Candidates who did well provided enough examples to show a thorough understanding of the topic and related their responses back to the case study.
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 a target benefit plan from the following perspectives:

(i) NOC

(ii) NOC employees

Commentary on Question:
Most candidates did well on this part and were able to identify advantages and disadvantages from both perspectives. Some candidates did not provide enough detail to receive full credit.

(i) NOC:
Advantages:
- NOC's contributions are predefined, providing stability in pension expense and balance sheet impacts and greater ability to plan for their business needs
- NOC can share investment and longevity risks with members while still providing them a stable retirement income

Disadvantages:
- Since NOC is limited in how much they can contribute, this limits the tax advantages of additional contributions to the pension plan if cashflow is available
- Could be more administratively complex and costly

4. Continued

(ii) NOC employees
Advantages:

- Employees could benefit from higher than expected demographic and economic gains by having their benefit increased compared to their current DB plan.
- Members are paid a lifetime pension which eliminates their individual longevity risk.

Disadvantages:

- If plan's economic and demographic assumptions lead to losses, member benefits could be reduced compared to their current DB plan.
- Since employer contributions are fixed, members ultimately bear the plan's risk either by increasing contributions or reducing benefits to cover deficits.

(b) Recommend changes to NOC's defined benefit plan provisions to qualify it as a target benefit plan.

Commentary on Question:
Many candidates did poorly on this part. Candidates who assumed that the Plan needs to be converted into a defined contribution plan to qualify as a Target Benefit Plan did not receive credit. A successful candidate needed to recommend changes to the defined benefit plan provisions outlined in the case study.

- Make the 2% accrual rate variable based on the plan's funded status
- Add conditional post-retirement indexation based on the plan's funded status
- Change pension formula to a career-average plan with conditional pre-retirement indexation
- Make plan reduction variable and dependent on the funding policy
- Change period for final average earnings varying on the funding policy (36 months instead of 60 months if plan is well funded)
- Make unreduced retirement date variable (example ranging from 62 to 65 based the funded status)

(c) Describe the potential uses of stochastic modeling when analyzing a target benefit plan.

Commentary on Question:
Candidates who did well clearly described the benefits of stochastic modelling relating to target benefit plans and not just in general.

4. Continued

- Identifies the likelihood of the plan being able to meet its targets, and the likelihood of benefits being paid at the identified levels in the benefit/policy ladder;
- Understand the effectiveness of various mechanisms designed to make the plan more resilient to emerging experience and assess the residual risk borne by individual members
- Understand how risks and rewards are allocated among different generations of plan members over time.
- Understand the effects of changing certain assumptions based on updated experience

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

(7b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.

Sources:

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

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

DA-142-24: ASOP 4 - Measuring Pension Obligations

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) You are calculating the Net Periodic Pension Cost (NPPC) under U.S. Accounting Standard ASC 715 (ASC 715).

Compare and contrast the following approaches:

(i) Bond Matching

(ii) Traditional Yield Curve

(iii) Spot Rate

No calculations required.

Commentary on Question:

To earn full credit, candidates needed to explain how each approach affects each component of the Net Periodic Pension Cost. While many candidates detailed how the discount rate is determined under each approach, they often failed to address the specific impacts of each approach on all components of the Net Periodic Pension Cost.

5. **Continued**

Contrast

Bond Matching Model

- A portfolio of bonds is identified that is expected to generate cash flows from principal and interest that results in a good *fit* to the estimated benefit payments of the plan. The market value of the identified bonds is viewed as the equivalent to the present value of the benefit obligation.
- Bond matching discount rate expected to differ from the Traditional yield curve.
- Bond matching discount rate used to determine interest cost and service cost.

Traditional Yield Curve Approach

- Projected benefit payment cash flows for each future period over the life of the plan are discounted back to the measurement date using the spot interest rate associated with each period in the high-quality corporate bond yield curve.
- The discount rate is effectively an output of this benefit obligation calculation, rather than a rate that was used to discount the projected cash flows.
- This rate is the discount rate that would be disclosed as the discount rate used to measure the benefit obligation at year end, as well as determine interest cost and service cost

Spot Rate Approach

- Projected benefit payment cash flows for each future period over the life of the plan are discounted back to the measurement date using the spot interest rate associated with each respective period in the high-quality corporate bond yield curve.
- Interest cost under the Spot Rate Approach is determined by multiplying the individual spot rates from the exact same yield curve by each year’s present value of future projected benefit payments. The sum of those products is the interest cost for the period.
- The service cost is the present value of benefits attributed by the benefit formula to services rendered by employees during that period determined using the same yield curve as the PBO and IC

Compare

- Bond Matching Model and Traditional Approach both use the effective PBO discount rate for measuring service and interest cost.
- The Internal Rate of Return from the calculated benefit obligation is the single weighted discount rate.
- No impact on EROA
- No impact on PSC
- PBO is the same under traditional yield curve and spot rate approaches

5. Continued

- Variation in the SC and IC will be offset by a change in the gains and losses. Therefore, the amortization of G/L will also be impacted based on the approach used
- If SC and IC are lower due to the approach, settlement accounting could be triggered more often since settlement accounting is triggered if SC + IC is less than settlement

(b) Compare and contrast the Traditional Yield Curve approach versus the Spot Rate approach in a downward sloping yield curve environment on the following under ASC 715:

(i) NPPC

(ii) Funded Status

Commentary on Question:
To earn full credit, candidates needed to clearly explain how the two approaches in a downward sloping yield curve environment affect each component of the Net Periodic Pension Cost. Many candidates focused only on the Interest Cost and Service Cost component, overlooking other elements. However, most candidates performed well on part (b)(ii).

(i) NPPC
- SC may be higher under Spot Rate Approach
- IC will be higher under Spot Rate Approach
- Amortization of gain/loss will be lower (assuming outside corridor) under Spot Rate Approach
  - Due to higher expected liability when rolling forward with higher SC & IC
- Total NPPC will be higher under Spot Rate approach
- With lower SC & IC, the settlement threshold is lower and may result in settlement accounting in more instances under the Traditional Approach or require remeasurement earlier in the year
- EROA component not affected
- Amortization of PSC not affected

(ii) Funded Status
- There is no difference in PBO under the two approaches since the PBO is a result of discounting the expected cash flows at the yield curve rates

6.

Learning Objectives:

4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

Learning Outcomes:

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

(4d) Assess the impact of possible changes in plan design due to changes in legislation.

Sources:

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

DA-132-13: Turner, Pension Policy: The Search for Better Solutions, 2010, Ch. 1 (pp. 4-11) and Ch. 5

Commentary on Question:

Candidates generally did well on this question overall.

Solution:

(a) Explain how public sector defined benefit pension plans are exposed to risk by the following sources:

(i) Contribution policy

(ii) Governance

(iii) Long time horizon

Commentary on Question:

Candidates did well on this part of the question and had good understanding of the risks for public sector DB plans.

(i) Contribution policy: Taxpayers fund the programs and do not want to overpay or may want to use the money for other purposes. This could lead legislatures to refuse to fund required contributions or take funding holidays which negatively impacts the DB plan.

(ii) Governance: Public sector plans don't have a single governing authority which leads to diffuse governance and lack of accountability. There can be different stakeholders with competing interests such as elected officials, unions, public employees. Elected officials don't always have the expertise to manage the pension programs.

6. Continued

(iii) Long time horizon: Having different stakeholders means that these change over time and obligations may be shifted into the future. This can mean risks to cash flow requirements in the future.

(b) Describe the advantages and disadvantages of the pooling of the following risks inherent in public sector defined benefit pension plans:

(i) Longevity

(ii) Investment

Commentary on Question:
Candidates had more difficulty on this part of the question. Successful candidates were able to provide adequate justification for the advantages or disadvantages of pooling.

Longevity: Most of the benefits of pooling fall directly to the participants, but all stakeholders will benefit because benefits are provided at a lower cost to the plan. It is important to use appropriate mortality assumptions with up-to-date projection scales to ensure any longevity improvements are forecast accurately.

Investment: Investment pooling leads to lower cost access to more sophisticated market instruments with higher returns to benefit taxpayers. Sophisticated managers may achieve higher alpha returns. One disadvantage is that participants may prefer to make their own investment choices.

7. **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-804-19: FASB Accounting Standards Codification Topic 715

Commentary on Question:

This question tests candidates' knowledge on the preparation and calculation of accounting disclosures under U.S. Accounting Standard ASC 715. Specifically, candidates must possess the required knowledge to calculate the Net Periodic Pension Cost while the defined benefit pension plan is a going-concern and under the scenario where the sponsor transfers risk by purchasing annuities through an annuity buy-out contract.

Solution:

(a) Calculate the 2024 Net Periodic Pension Cost.

Show all work.

Commentary on Question:

Generally, candidates successfully calculated the Net Periodic Pension Cost while the defined benefit pension plan is a going-concern.

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

(b) Calculate the 2025 Net Periodic Pension Cost.

Show all work.

7. **Continued**

Commentary on Question:
Candidates struggled to calculate the Net Periodic Pension Cost under this settlement scenario. Specifically, candidates generally failed to calculate the settlement charge to be included in the Net Periodic Pension Cost, which is the immediate recognition of the Unrealized Gain based on the percentage of the Projected Benefit Obligation that is being settled at the settlement date (i.e., March 31, 2025).

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

8. Learning Objectives:

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:

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

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

Sources:

DA 145-13: Acquiring a U.S. Operation – A Primer

DA 161-16: Pension Issues in Mergers and Acquisitions

DA 814-16: Accounting for Plan Splits & Plan Mergers Under U.S. GAAP

Commentary on Question:

To earn full credits, candidates must recognize that this was an asset-purchase of a division of Company XYZ and not the entire company. Furthermore, candidates were expected to understand the different pension benefit solutions Company ABC could implement with respect to the transferred employees.

Solution:

(a) Identify the information Company ABC should obtain about Company XYZ's pension plan as part of the due diligence process before entering into an asset purchase transaction.

Commentary on Question:

To earn full credit, candidates needed to provide a full range of information Company ABC should obtain as part of the asset-purchase negotiations. Generally, candidates did well on this part.

8. Continued

Information:

- o Obtain Plan Documents including: Plan Text, Amendments, Resolutions, including all historical versions;
- o Obtain Administrative Reports – Actuarial Reports, Financial Statements, Employee Booklets, Other Regulatory Filings (ex. PBGC filings), Annual Pension Statements;
- o What is the funded status of the plan based on the Company ABC's Actuary's opinion and assumptions; and
- o Are there any "Constructive Obligations" under the XYZ Pension Plan that need to be valued under accounting.

(b) Evaluate an arrangement where Company XYZ retains the past service liability from the following perspectives:

(i) Company ABC

(ii) Transferring employees of Company XYZ

Commentary on Question:
Overall, candidates did not perform well on this part. Candidates did not understand how this arrangement would be implemented after the division of Company XYZ is acquired. To receive full credit, candidates were expected to understand the accrued pension benefits from the transferred employees would remain separate, still under the Seller's pension plan, and that employees will begin future accruals under the Buyer's pension plan. Company ABC is not responsible for the previous accrued benefits.

(i) Company ABC:

- Simplest option to administer for Company ABC.
- Company XYZ retains responsibility for past service related to the transferred employees.
- Employees participate in Company ABC's pension plan for future service only. Therefore, no past service liability is created for transferring employees at the purchase date because they accrue benefits for future service.

8. Continued

(ii) Transferring employees of Company XYZ

- Averaging period for the final average earnings formula and service under Company ABC commences upon enrollment in Company ABC's pension plan.
- Compared to their career average formula under Company XYZ, transferred employees receive greater pension benefits for future accruals with Company ABC's pension plan.

(c) Evaluate a wraparound arrangement from the following perspectives:

(i) Company ABC

(ii) Transferring employees of Company XYZ

Commentary on Question:
Overall, candidates did not perform well on this part. Candidates did not understand how a wraparound arrangement within Company ABC's pension plan would be implemented after the asset-purchase transaction. To receive full credit, candidates were expected to recognize transferred employees will receive full benefits in Company ABC's pension plan, offset by their accrued pension entitlement in Company XYZ's pension plan.

(i) Company ABC:

- Company XYZ retains responsibility for past service related to the transferred employees
- Company ABC will provide pension benefits under their plan based on earnings and service over the employee's entire career, offset by the pension benefits under the Seller's plan

(ii) Transferring employees of Company XYZ

- Receive credit for earnings and service over their entire career with the new Company ABC
- Company ABC's plan provides a greater benefit because of the enhanced defined benefit pension formula (final average earnings) and the early retirement subsidies (85 points)
- Transferred employees will receive a pension from two different pension plans at retirement
- Company ABC's Plan is not fully funded so may not feel as secure about benefits

8. **Continued**

(d) Evaluate a carve-out arrangement from the following perspectives:

(i) Company ABC

(ii) Transferring employees of Company XYZ

Commentary on Question:
Overall, candidates did not perform well on this part. Candidates did not understand what a carve-out arrangement was and how it would be implemented after the asset-purchase transaction. To receive full credit, candidates were expected to recognize a portion of the assets and liabilities tied to the transferred employees would be moved into Company ABC's pension plan.

(i) Company ABC:

- This is the most expensive arrangement to implement
- Significant regulatory constraints to overcome
- Complexities in negotiation to overcome such as:
  - What assumptions will be used to determine the transferred liabilities
  - How will assets be invested prior to transfer
- Pro-rata surplus position may be required to be transferred depending on Seller's Plan terms and Trust Agreement

(ii) Transferring employees of Company XYZ

- Prefer the one payee for all their pension benefits
- Previously accrued benefits are now less secure due to Company ABC's pension plan being more unfunded

9. 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.

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

Learning Outcomes:

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

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

Sources:

DA-142-24: ASOP 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions

DA-804-19: FASB Accounting Standards Codification Topic 715

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe considerations when selecting an amortization method under Actuarial Standard of Practice No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions (ASOP 4).

Commentary on Question:

Candidates generally did well on this question if they were able to provide the considerations under the standards.

For purposes of determining a reasonable time period or a reasonable amount, the actuary should take into account factors including, but not limited to, the following, if applicable:

- whether the amortization method is open or closed
- the source of the amortization base
- the anticipated pattern of the amortization payments, including the length of time until amortization payments exceed nominal interest on the outstanding balance
- whether the amortization base is positive or negative
- the duration of the actuarial accrued liability

9. **Continued**

- the average remaining service lifetime of active plan participants
- the funded status of the plan or period to plan insolvency
- The actuary should assess whether the unfunded actuarial accrued liability is expected to be fully amortized.

(b) Explain the implications of each of the following changes on the 2025 Net Periodic Benefit Cost under U.S. Accounting Standard ASC 715:

(i) Freezing the defined benefit pension plan and implementing a new defined contribution plan for all members after January 1, 2025.

(ii) Implementing post-retirement indexation of 50% of inflation per year for all years of service.

(iii) Reducing the normal retirement benefit by 0.25% per month that early retirement precedes age 60 for service earned after January 1, 2025.

No calculations required.

Commentary on Question:
Candidates that did well on this question were able to identify the impact on all aspects of the 2025 net periodic benefit cost.

(i) Freezing the DB plan and implementing a new DC plan for all members after January 1, 2025

DB SC will be eliminated following DB freeze
DC SC will be employer contributions going forward
PBO will decrease to the ABO
Curtailment accounting triggered due to freeze
No prior service cost exists, so nothing to immediately recognize there
Expect curtailment gain to be recognized immediately in expense: equal to gain in PBO (ABO – PBO) if the plan continues to have unrecognized gain in AOCI
Can consider switching amortization base from AFWL to ARLE
Could impact the d-rate since expected future benefits are impacted

(ii) Implementing post-retirement indexation of 50% of inflation per year for all years of service

SC will increase as a result of the increase in benefits
PBO will increase as a result of the increase in benefits to past benefits
IC will increase as PBO has increased
Will introduce a PSC base equal to liability increase associated with change
PSC will be amortized based on AFWL

9. Continued

(iii) Reducing normal retirement benefit by 0.25% per month that early retirement precedes age 60 for service earned after January 1, 2025

PBO will not change as change is only for future service
IC will not change as PBO has not changed
No PSC as change is prospective
Plan currently has 100% retirement at age 62 assumption, so SC will also not be impacted.

NOC should review whether it should change its retirement assumption due to any of these plan changes.

10. Learning Objectives:

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

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.

Sources:

DA-174-18 An Improved Application of the Variable Annuity

DA-188-21 AAA practice note on VARIABLE ANNUITY PLANS, pp. 6-20 & Appendix (pp. 55-58)

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

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

Credibility Educational Resource for Pension Actuaries, Society of Actuaries, Aug 2017

Commentary on Question:

This question requires candidates to demonstrate their understanding of the Actuarial Standards of Practice as applied to assumption setting for the two types of listed plans – Defined Benefit Plan and a Variable Annuity Plan

Generally, candidates did better in part b than in part a. Also, in part a, candidates performed better in comparing and contrasting the economic assumptions than comparing and contrasting the demographic assumptions.

Solution:

(a) Compare and contrast assumption setting for the following types of pension plans:

(i) Defined benefit plan

(ii) Variable Annuity Plan

10. **Continued**

Commentary on Question:
As noted above, candidates generally did not provide enough in their answers to demonstrate that they knew the similarities and differences between the two types of plans especially with the demographic assumptions. Some candidates described the plan features instead of providing information about setting valuation assumptions.

Economic assumptions:
Compare:

Consider ASOP 27's requirement for setting reasonable economic assumptions that:

- Are appropriate for the purpose of the measurement
- reflects the actuary's professional judgement
- takes into account historical and current economic data at the measurement date
- reflects the actuary's estimate of future experience, the actuary's observation of the estimate inherent in market data, or a combination thereof

The types of economic assumptions used to measure obligations under both types of plans may include inflation, investment return, discount rate, compensation increases and other economic factors such as Social Security, cost-of-living adjustments, rate of payroll growth, growth of individual account balances, and variable conversion factors.

Contrast:

Variable Annuities Plans have plan provisions that can be difficult to measure The actuary should consider using alternative valuation procedures, such as stochastic modeling, option-pricing techniques, or deterministic procedures in conjunction with assumptions that are adjusted to reflect the impact of variations in experience from year to year.

For pure Variable Annuities Plans, sponsor's obligation is independent of market interest rates and is directly tied to the performance of the portfolio of assets.

For defined benefit plan, changes in market interest rates have an effect on the sponsor's obligation. Best-estimate assumption would apply.

Demographic assumptions

10. Continued

<u>Compare</u>:
Both should consider ASOP 35's guidance in setting a demographic assumption. Consider plan design, events that could impact member decisions (ex. upcoming retirement window), economy, and plan demographics/characteristics of membership.
Under both plans, similar considerations can be given to the use of experience studies or published tables.

<u>Contrast</u>:

The main difference in setting mortality assumptions for VAP is if the variable annuity adjusts pension benefits for mortality experience, benefit adjustments are determined using the member's personal characteristics requiring more scrutiny around selecting an appropriate hurdle mortality assumption.
Adoption of general mortality basis could leave the variable annuity program subject to potential anti-selection by members who have longer expected longevity. To mitigate, the selected mortality basis would be used to determine actual buy-in amounts and reviewed annually.

(b) Propose a process for assessing and potentially updating the following assumptions for the National Oil Pension Plan:

(i) Retirement

(ii) Mortality

(iii) Turnover

(iv) Salary scale

Commentary on Question:
Candidates performed much better in part b and provided answers that indicated they were prepared to critique the actuarial assumptions. Candidates needed to comment on each of the four assumptions 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.

10. **Continued**

(i) Retirement

NOC's actuary should review recent gains/losses in the plan due to its retirement assumption as the current assumption is likely understating pension obligations. Given that NOC members can retire from age 55, with a subsidized early retirement reduction, it would be more prudent to use a retirement assumption table based on age instead of a single retirement age.

Could do a study using recent experience data to evaluate the retirement assumption.

Consider using select-and-ultimate assumptions if believe the effect of these events on employment will continue for the short term.

Retirement assumption should also take into account the different status groups (actives vs. deferred vested)

Consideration should be given to the provisions of the retiree health benefit program as well, since any changes to the retiree health benefit program could have an impact on the retirement of members.

(ii) Mortality

NOC's actuary should review the magnitude of mortality gains or losses in the past few years / valuations to assess if the current assumption is still appropriate. Large gains or losses may mean that the assumption is no longer reasonable.

The actuary can recommend the best estimate mortality assumption by considering the plan's actual mortality experience, the credibility of the plan's actual mortality experience, and the credibility of the similar plans in the industry
.

Given it's a small plan, there will likely be a small number of pre-retirement deaths which means a plan specific study will not be credible enough. For mortality experience study, 3-5 years experience is needed and at least 1100 deaths at each age.

NOC is currently using a standard table with no mortality improvement: need to assess why no improvement is assumed. Seems inappropriate for a plan with a decent number of participants

10. Continued

(iii) Turnover

NOC's current assumption is based on NOC experience from 2000-2005, which is dated and may not be representative of current turnover experience.

NOC's actuary should review the magnitude of termination gains or losses in the past few years / valuations to assess if the current assumption is still appropriate. Large gains or losses may mean that the assumption does not represent recent experience.

It is more favorable to use more recent experience study data when setting the termination assumption, so NOC could conduct a new turnover experience study using more recent data.

Consideration should be given to the provisions of retiree health benefit program as well to determine if the same or a different termination scale/assumption would be appropriate for the retiree health plan.

(iv) Salary scale

NOC uses a flat salary scale assumption which may or may not represent experience.
NOC's actuary should review the magnitude of salary gains or losses in the past few years / valuations to assess if the current assumption reflects their recent experience.
NOC could work with HR to understand the go-forward salary increase expectations. Consider inflation, average industrial wage increases, increases to minimum wage.
Consider the impact of a salary scale vs a single rate. Would that better represent NOC's experience?