RET DAU Model Solutions
Fall 2014

1.

Learning Objectives:

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

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

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

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

Learning Outcomes:
Describe the structure of the following plans:
(a) Traditional defined benefit plans
(b) Hybrid plans
(c) Defined contribution plans
(d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:
(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

(3a) Identify risks face by retirees and the elderly.

1. Continued

(3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

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

(4b) Assess the risk from options offered, including:
- (i) Phased retirement
- (ii) Postponed retirement
- (iii) Early Retirement
- (iv) Option factors
- (v) Embedded options
- (vi) Portability options

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

(4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.

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

(7a) Evaluate appropriateness of current assumptions.

(7b) Describe and explain the different perspectives on the selection of assumptions.

(7c) Describe and apply the techniques used in the development of economic assumptions.

(7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

(7e) Select demographic and economic assumptions appropriate for a projection valuation.

1. **Continued**

Sources:
DA-126-13 Constructing New Retirement Systems: Choosing Between Insurance and Investment, Choice and Default

DA-136-13 Selection of Actuarial Assumptions

DA-139-13 ASOP 35 Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

DA-115-13 Private Pensions Alternative Appoaches Could Address Retirement Risks Faced by Workers but Pose Trade-offs

Commentary on Question:

Solution:

(a) Describe anti-selection and how it may affect the cost implications of NOC's decision.

Anti-selection occurs when people elect their option based on their own individual understanding of their risk. For this benefit election, people who anticipate their health costs will be lower than $200,000 (including their 10% contributions) will elect option 1, and sicker people who anticipate their health costs will be higher than $200,000 will election option 2. While options 1 and 2 may be cost neutral to NOC based on the average participant, since all participants will elect what is best for them, the total cost to NOC will likely be higher than it currently is.

(b) If NOC makes this offer to participants,

(i) Describe how the assumptions used to determine the Benefit Obligation and Service Cost would be affected, and

(ii) Propose reasonable changes to each assumption.

(i) **Current retirement assumption** is age 62 with 10 years of service. If health care coverage for active employees is more than 90% covered by NOC, some employees may now opt to work longer to avoid having to pay 10% premium for health coverage. Some employees may retire earlier (at 55), take the $200,000 lump sum, and seek employment elsewhere to try to get other retiree medical coverage

1. Continued

Discount rate is dependent on expected cash flows from the program and how they match with high quality bonds. The duration of the plan is expected to decrease due to some participants electing to take an immediate lump sum; a lower duration will lead to a lower discount rate.
Turnover assumption is based on NOC experience from 86-88. Possibilty of $200,000 lump sum may lead to lower turnover in ages immediately preceding 55/10 eligibility. Turnover could increase as active participants look to find other job which provides full retiree medical benefits with $0 retiree premium.
Mortality assumption is 83 GAM for all participants, an outdated table which should be updated to reflect more recent mortality studies and trends. A less healthy population may be more inclined to choose Option 2 and stay in plan, meaning actual mortality experience of plan could be higher than NOC's past experience.
Per capita claims cost may need to be adjusted due to change in covered population. If less healthy population more inclined to stay in plan, actual per capita costs will likely increase, leading to higher PBO and SC. Could also see differences in per capita costs of participants who opted to stay in plan versus older participants who were already in plan and didn't have a choice to opt out.

(ii) **Current retirement assumption** should be updated to reflect possible retirements starting at age 55 and trending up to at least 65 (normal pension retirement age) since retiring at earlier ages increases number of years benefits are paid and directly releated to total employer liability. NOC should look at recent retirement experience for salaried and union employees to determine what is expected behavior
Discount rate should be updated based matching on new expected benefit payments with high quality bond yields. The new payments are based on updated assumptions and incorporating the assumption that some participants will elect to receive the immediate lump sum.
Turnover assumption needs to be updated based on more recent NOC experience than what happened over 20 years ago. They should use select and ultimate table varying turnover rates based on service at NOC.
NOC may consider using different **mortality assumptions** for its current versus future retirees in the plan to reflect the anti-selection of future retirees, and it should apply some type of mortality improvement projection to its base assumption.
Per capita claims should likely vary based on age since there are no caps and older people tend to have higher medical expenses than younger. May want to consider developing different expected claims for retirees who did not have option to opt out, versus all new retirees who opt in (and are expected to have higher costs).

1. Continued

(c) Describe the risks of these two options from the perspectives of both NOC and the retirees.

Option 1 Risks for NOC: Liquidity risk: NOC must have enough liquid assets to be able to pay out $200,000 lump sum benefits
Accounting risk: large numbers of lump sum payments could trigger settlement accounting

Option1 Risks for Retirees: Longevity risk: Retirees run risk of outliving their resources and then not being able to afford medical care
Investment risk: retirees in charge of investing lump sum to make it last

Option 2 Risks for NOC: Longevity risk: benefits still guaranteed for the lifetime of the participants who elect coverage
Inflation risk: Healthcare costs assumed to increase over time, probably at higher rate than general inflation and NOC will have to continue to pay for coverage

Option 2 Risks for Retirees: Inflation risk: retirees still have to pay 10% of medical benefits, and due to inflation, these costs will likely continually go up, possibly more than regular inflation
Plan sponsor risk: If NOC goes bankrupt or changes the plan to increase cost sharing participants may have gotten more benefit by taking option 1.

2. Learning Objectives:

2. The candidate will understand the impact of the regulatory environment on plan design.

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

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

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:

(2e) Understand conflicts between regulation and design objectives and recommend alternatives.

(3a) Identify risks face by retirees and the elderly.

(3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

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

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

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

Sources:

DA-113-13: Multi- Employer Plans

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

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

2. Continued

Commentary on Question:
The candidate will be able to analyze the risks faced by retirees and the participants of a multiemployer retirement plan. The candidate will also be able to analyze the risks faced by companies participating in a multiemployer retirement plan.

Given a context, the candidate is expected to design retirement programs that manage retirement risk and are consistent with sponsor objectives.

The candidate will be able to evaluate the sponsor's financial goals and risk management with respect to their plan.

Solution:
(a) Describe the advantages and disadvantages of allowing XYZ to participate in the ABC Pension Plan from the perspectives of:

(i) ABC Pension Plan active and inactive plan participants

(ii) XYZ active employees

(iii) XYZ

ABC Current Plan Members Advantages
1. Portability of benefits if members change employment to XYZ.
2. XYZ has younger group so may subsidize ABC Plan - lowers overall average age of plan means lower per
capita cost requirements.
3. ABC Plan's membership size becomes larger - larger plan means more economies of scale.
Larger contribution base will lower per capita funding cost of any unfunded liability of the ABC Plan
(i.e., if leveraged).

ABC Current Plan Members Disadvantages
1. Granting past service benefits could weaken the funding position of ABC Pension Plan.
2. Lowers the funding percentage of ABC Plan unless a lump sum is paid to pay the additional liability from the
past service benefits.
3. Increases the funding cost requirements of ABC Plan unless certain provisions are made to make XYZ pay
for the additional cost.

2. Continued

XYZ Active Employees Advantages
1. Portability of benefits if changes employment to any employer participating in the ABC Pension Plan.
2. Able to get pension benefits (better retirement security).
3. Able to get past service benefits
4. ABC Plan's Board is composed of half management and half labor representatives. Since ABC Plan's Board has the responsibility of defining plan provisions and setting the benefit levels, XYZ does not have the unilateral ability to change the plan provisions.

XYZ Active Employees Disadvantages
1. XYZ's contributions to the Pension Plan may put pressure on wages and other benefits (i.e., may get relatively lower future wage increases or other benefits since some of that may have to be allocated to the Pension Plan).
2. If there is a reduction in hours among active employees, plan costs may increase.

XYZ Advantages
1. Having a Pension Plan can be used to attract and retain workers.
2. Pooling of assets and administration provides economies of scale. Permits the implementation of more sophisticated approaches to both administration and investment at more reasonable costs than it would have been if XYZ sponsored its own Pension Plan.
3. By joining ABC Pension Plan, XYZ does not have to worry about the administration of the plan and other fiduciary responsibilities.
4. Contributions to the Plan are tax deductible

XYZ Disadvantages
1. Contribution requirements to the ABC Pension Plan are additional cost to the Company.
2. Contribution requirements are set by collective bargaining agreements (CBA). Although they are set for the duration of the agreement, contribution requirements could increase in future CBAs depending on different factors.
3. If cost gets too high, XYZ could be at a competitive disadvantage to other companies in the Oil Industry.
If other employers withdraw from the plan or active membership decline, contribution requirements could increase especially if ABC Plan has an unfunded liability (i.e., leveraged).

2. **Continued**

4. If XYZ wants to withdraw from the Plan, they may not be able to easily do so if withdrawal liability is too high.
XYZ does not have the ability to change the benefits to suit its own workforce management objectives.

(b) Describe plan design alternatives that may be used to reduce the costs involved in providing benefit accruals for service prior to January 1, 2015.

Provide lower accrual rate for the past service accruals.
Make the vesting of past service accruals depend on service earned on or after XYZ Oil Company's participation.
Provide the granting of past service on a "one-for-one" basis, whereby one year of past service is credited as each year of contributory service (or participation) is earned by the employee.
Allow the forfeiture of past service benefits if XYZ subsequently withdraws from the Plan.
Provide lower accrual rate for future service accruals up to a certain period for which XYZ's contributions to the plan have "paid for" the past service benefits.
Provide a cap on the amount of past service benefits that can be earned (or number of years of past service that can be earned).

3. Learning Objectives:

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

Learning Outcomes:

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

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

(6c) Integrate a plan for executives with the basic benefit plan.

Sources:

DA-144-13: Accounting for Pension Buy-In Arrangements

DA-143-13: Comp of IAS19, Rev. 2011 with FASB ASC 715 Summary of Provisions affecting Accounting for Postretirement

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

DA-612-13: CICA Handbook 3461

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

Commentary on Question:

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

Successful candidates recognized that a re-measurement is not needed for a buy-in.

Solution:

(a) Describe the risks of an annuity buy-in and an annuity buy-out from the perspectives of the plan members and the plan sponsor.

3. Continued

<table>
<tr><th colspan="2">Buy-in</th></tr>
<tr><td>Plan Sponsor:
The plan sponsor is subject to credit risk of insurer
The plan sponsor may want to get out, so could be subject to termination penalty
There could be liquidity issues for buy in amount (unless transferring assets in kind, subject to whether insurance company will accept)
Fiduciary risks</td><td>Plan Members:
Plan sponsor could use the money from buy-in for other purposes under the plan
There is a risk it could become an annuity buy-out</td></tr>
<tr><th colspan="2">Buy-out</th></tr>
<tr><td>Plan Sponsor:
Expensive pricing, risk of overpaying for liability
Risk that retiree will think this signals negative things to come
Settlement accounting (could be large impact if there are large losses)
There could be liquidity issues for buy-out amount
The plan sponsor have no longer control over money as transferred out
It could have negative impact on post buy- out funded status
Fiduciary risks</td><td>Plan Members:
Retirees covered in buy-out are subject to credit risk of insurer
Retirees covered in buy-out are no longer protected by PBGC
Post buy-out funded status can trigger benefit restrictions for remaining members</td></tr>
</table>

(b) Calculate the estimated 2014 Net Periodic Benefit Cost under the following scenarios:

(i) Annuity buy-in for all current retirees as at July 1, 2014.

(ii) Annuity buy-out for all current retirees as at July 1, 2014.

Show all work.

(i) **Estimated 2014 Net Periodic Benefit Cost for Annuity Buy-in**

- With an annuity buy in, there is no mid-year re-measurement.

3. **Continued**

BUY-OUT	
Expense (assuming compound interest)	**1/1/2014 - 06/30/2014**
1. Service Cost	$978,232
2. Interest Cost a. PBO b. Expected benefits payments c. Interest Cost = (a) * ((1+4.5%)^.5-1)-(b)*((1+4.5%)^0.25 – 1)	 $12,000,000 600,000 260,390
3. EROA a. Interest on assets b. Interest on benefit payments c. Interest on contributions d. Expected Return on Assets = (a) – (b) + (c)	 $222,524 6,639 0 $215,885
4. Amortization of (gain)/loss	0
5. Amortization of Prior Service Cost	0
6. Amortization of Transition Obligation	0
7. 2014 Net Periodic Benefit Cost = (1) + (2) – (3) + (4) + (5) + (6)	$1,022,737

3. Continued

Remeasure at 7/1/2014			
PBO 7/1/2014 prior to buy-out	12,638,622		
Loss on PBO		0	(same discount rate)
Expected Assets at 7/1/2014	12,615,885		(includes contribution made at 6/30/2014)
Actual Assets at 7/1/2014	12,615,885		(includes contribution made at 6/30/2014)
Loss on assets	-		(assumed EROA=actual)
Loss due to settlement = cost of contract minus PBO retirees			
PBO retirees at 7/1/2014	3,785,690		
Cost of Annuity Buy Out	5,200,000		
loss due to settlement	1,414,310		
PBO just prior to settlement	14,052,932		
unamortized loss just before settlement	1,414,310		
Portion of liability settled		37.00%	
loss recognized as part of settlement	523,336		
unamortized loss after settlement	890,974		
PBO after settlement	8,852,932		
Assets after settlement	7,415,885		

3. Continued

Settlement at 7/1/2014:

	1/1/2014	7/1/2014			
		Before Settlement	Re-measurement	Effect of Settlement	After Settlement
PBO	(12,000,000)	(12,638,622)	(14,052,932)	5,200,000	(8,852,932)
Assets	10,000,000	12,615,885	12,615,885	(5,200,000)	7,415,885
Unfunded Liability	(2,000,000)	(22,737)	(1,437,047)	0	(1,437,047)
Unrecognized (gain)/loss	0	0	1,414,310	(523,336)	890,974
Unrecognized PSC	0	0	0	0	0
Unrecognized TO	0	0	0	0	0
Balance Sheet Liability	(2,000,000)	(22,737)	(22,737)	(523,336)	(546,073)

Amortization of Loss for the 7/1/2014 – 12/31/2014 expense:

(890,974 – 0.1 *max(8,852,932; 7,415,885))/10 = (890,974 – 885,293)/10 = $568

3. Continued

BUY-OUT	
Expense (assuming compound interest)	**7/1/2014 - 12/31/2014**
8. Service Cost	$1,000,000
9. Interest Cost a. PBO b. Expected benefits payments c. Interest Cost = (a) * ((1+4.5%)^.5-1)-(b)*((1+4.5%)^0.25 – 1)	 8,852,932 300,000 193,680
10. EROA a. Interest on assets b. Interest on benefit payments c. Interest on contributions d. Expected Return on Assets = (a) – (b) + (c)	 $165,021 3,319 0 $161,702
11. Amortization of (gain)/loss	568
12. Amortization of Prior Service Cost	0
13. Amortization of Transition Obligation	0
14. 2014 Net Periodic Benefit Cost = (1) + (2) – (3) + (4) + (5) + (6)	$1,032,546

<u>2014 Estimated Buy-Out Expense:</u>

Total Buy-Out expense	
1/1/2014 - 6/30/2014	1,022,737
Settlement	523,336
7/1/2014 - 12/31/2014	1,032,546
Total Expense	**2,578,619**

4. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified 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) Hybrid plans
(c) Defined contribution plans
(d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:
(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

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

(4b) Assess the risk from options offered, including:
- (i) Phased retirement
- (ii) Postponed retirement
- (iii) Early Retirement
- (iv) Option factors
- (v) Embedded options
- (vi) Portability options

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

4. Continued

(4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.

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

(5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.

(5b) Assess the tradeoffs between different goals.

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

(5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.

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

(5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

(5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.

(5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.

(5i) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.

(5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.

(5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.

(5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.

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

4. Continued

Sources:
DA-110-13: Integration With Social Security
Fundamentals of Retiree Group Benefits, Yamamoto: Ch. 1, Ch. 4 (excluding pp. 68-89)

Commentary on Question:
Successful candidates 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.

Successful candidate will be able to:

- *Recommend a method to integrate government-provided benefits with retirement plan design in order to meeting the plan sponsor's particular goals and defend the recommendation.*
- *Advise a plan sponsor regarding the choice of design elements for their retiree health program.*

Solution:
(a)

(i) Explain the reasons NOC would want to integrate the Salaried Plan with the government-provided pension plan.

(ii) Explain the plan design difficulties NOC may encounter when integrating the Salaried Plan with the government-provided pension plan.

(i) **NOC's Reasons for Integration:**

- The Salaried Pension Plan is designed to produce an adequate income for the retiree after a full career with the employer, before the Social Security system in Gevrey was implemented. The integration with Social Security avoids excessive benefits and potential anti-selection.
- The integration reduces the cost of the plan, offsetting to some extent the Social Security taxes the employer pays for participants.
- The integration of the pension plan with the Social Security benefits equalizes the treatment of employees across all salary ranges.
- Since Social Security programs are at least partially paid for with employer contributions, integration can be a way to recognize the employer's part of the social security benefit as an offset to employer's total cost for retirement benefits.

4. Continued

(ii) **Plan design difficulties:**

- The NOC's pension plan includes only years of service with NOC, while the Social security program uses all years of service in covered employment.
- The definition of covered earnings is different for the Social Security program and NOC's pension plan. The Social Security earning is based on the Social Security taxable wage base for the 35 years while the Salaried pension plan earnings are based on average annual earnings during 60 consecutive months in which earnings were highest.
- The Social Security and Salaried Pension Plan Early retirement age and Normal retirement age differ.
- The early retirement reductions are heavily subsidized in the salaried pension plan, which is not in line with early retirement reduction for the Social Security benefit.
- There may be restrictions on the methods and amount of integration permitted by law since integration favor higher paid employees.
- Integration with government plan increases administrative complexity.

(b) Describe three methods to integrate the Health Plan with the government-provided health care plan.

- There are three basic methods to integrate medical plans with Medicare:
    - Standard coordination of benefits (COB),
    - Exclusion and
    - Carveout.
- <u>*Standard Coordination ot Benefits (COB)*</u>
    - If C = Covered expense (the medical charge that is covered by the plan), M = Medicare payment and % = the application of the employer's benefit provisions (accounting for any copays, deductibles, and coinsurance), the standard COB payment = lesser of (C x %, C - M).
    - Standard coordination of benefits usually results in full payment of the covered medical expense when the benefits of both the primary and secondary coverage are combined.
- <u>*Exclusion Method*</u>
    - The Exclusion method first excludes any benefits paid from the primary plan and then applies the benefit formula of the secondary plan. The following formula describes the exclusion method: (C- M) x %.
    - For the Exclusion method, there is usually a benefit paid because Medicare will pay less than the covered expense.

4. Continued

- *Carveout Method*
  - For the Carveout method, the employer benefit is first determined assuming Medicare did not exist, and then Medicare is subtracted from the result: (C x %) - M.
  - The Carveout method produces the smallest employer benefit.

5. **Learning Objectives:**

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

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

Learning Outcomes:

Given a plan type, explain the relevance, risks and range of plan features including the following:
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(i) Phased retirement and DROP plans

(5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.

(7b) Describe and explain the different perspectives on the selection of assumptions.

(7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

Sources:

LO1-DA-100-13: Issues for Implementing Phased Retirement in Defined Benefit Plans

LO1-DA-128-13: Phased Retirement: Problems and Prospects

LO7-DA-136-13: 2009 Selection of Actuarial Assumptions, Consultant Resource Manual, SOA Version, Mercer

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

DA-139-13: ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

5. Continued

Solution:

(a) Describe three reasonable approaches for calculating final average earnings under a phased retirement program.

- Use actual pay during phased retirement in final average earnings
  - Final average earnings will likely be lower since less hours worked
  - All past service years will be impacted as well
- Annualize pay during phased retirement
  - Service is reduced during phased retirement, but using annualized pay during the phased retirement period assumes pay doesn't decrease during phased retirement and stays in-line with pay prior to phased retirement
- Use actual pay for the highest earning years during the participant's career instead of the final years of the participant's career
  - Likely means the years of earnings during phased retirement are not counted in the final average earnings

(b) Describe the legal, human resources, and financial issues of phased retirement.

Legal Issues

- Effective communication about phased retirement offer is very important
- Spousal consent is required upon commencement of benefit during phased retirement as well as commencement of benefit upon full retirement. Multiple spousal consents may be confusing. Sponsor needs to ensure the spouse understands the first consent is only for phased retirement

HR Issues

- Phased retirement allows a transition from full-time work to something less stressful
- Phased retirement allows the worker to make adjustments for age-related changes in stamina and ability. Allows the worker to feel like they are still useful and boosts morale
- Helps retain workers with specialized knowledge to mentor their sucessors
- Phased retirement is often conditional on the availability of a part-time job, thereby implying employer discretion in who is eligible
- Employees might be assigned to a different job when flexible hours in their current position are not available, which could lead to lost productivity and the need for more training of the phased retirees – not the employer's intent
- Employees participating in phased retirement may not be eligible for health care coverage due to minimal hours worked

5. Continued

Financial Issues

- Financial impact of phased retirement should be actuarially neutral to the employee
- The key to making it actuarially neutral is full reductions for early retirement distributions as well as full actuarial increases for working beyond normal retirement
- Phased retirement may not be actuarially neutral to the employer, particularly if item noted above is not followed

(c) Assess how accounting valuation assumptions may be impacted if a company were to implement a phased retirement program.

Investment Return

- The investment return assumption may be affected by phased retirement if the phased retirement program materially alters the plan's cash flows and the plan sponsor attempts to match the cash flows in their asset allocation

Discount Rate

- May affect discount rate if discount rate is based on the plan's cash flows and the cash flows are materially different after implementing phased retirement
- Discount rate is not affected if plan's cash flows are not used to determine the rate, ie if hypothetical cash flows or an index is used instead

Inflation

- No impact. Inflation is based on CPI, forecasts of inflation, and yields on government securities. None of these items are impacted by a phased retirement program

Compensation increase assumption

- Depending on the plan sponsor's definition of final average earnings during phased retirement, the compensation increase assumption for phased retirees may be impacted. Will the phased retirees receive pay increases and bonuses that they received as full-time employees? If not, the salary scale may be lower for phased retirees

Mortality

- It is possible mortality could decrease under a phased retirement program as less healthy employees may see a benefit to their health of working only part-time under a phased retirement program

5. **Continued**

Termination

- Since this assumption typically ends at early retirement, it is unlikely this assumption is affected by a phased retirement program that begins at early retirement age

Retirement

- Will need to review assumption after the phased retirement program is successfully implemented. Phased retirement will affect the retirement assumptions

Percent married and spousal age difference

- Unaffected by a phased retirement program

6. Learning Objectives:

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

Learning Outcomes:

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

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

(6c) Integrate a plan for executives with the basic benefit plan.

Sources:

DA-141-13: An Introduction to Duration for Pension Actuaries

DA-143-13: Comp of IAS 19, Rev. 2011 with FASB ASC 715 Summary of Provisions Affecting Accounting for Postretirement

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

DA-142-13: ASOP 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions

Commentary on Question:

The goal of the question is for the candidate to perform an accounting calculation and outline all of the appropriate disclosures from the relevant standards of practice, which includes:

- *Performing valuations for special purposes, including accounting valuations,*
- *Advising plan sponsors on accounting costs and disclosures for their retirement plans, and*
- *Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.)."*

Note that full points were given for candidates that adjusted results for \$000's and those who did not adjust

Solution:

(a) Calculate the funded status and the Accumulated Other Comprehensive Income recognized in the statement of financial position at December 31, 2014. Show all work.

6. Continued

Funded status and AOCI as of December 31, 2014

A.	**Estimate PBO**			
	a.	PBO at January 1, 2014 (5.00%)	1,265,686	
	b.	Duration	16	
	c.	PBO at January 1, 2014 (4.75%) = (a) x (1 + (b) x (5% - 4.75%))	1,316,313	
B.	**Estimate Service Cost**			
	a.	2014 Service Cost (5.00%)	59,302	
	b.	Duration	16	
	c.	2014 Service Cost (4.75%) = (a) x (1 + (b) x (5% - 4.75%))	61,674	
	d.	Salary increase rate	3.5%	
	e.	2015 Service Cost (4.75%) = (c) x (1 + (d))	63,833	
C.	**PBO Roll-forward**			
	a.	PBO at January 1, 2014 (4.75%)	1,316,313	
	b.	2014 Service Cost (4.75%)	61,674	
	c.	Benefit Payments	(40,000)	
	d.	Interest	64,504	
	e.	PBO at January 1, 2015 (4.75%) = ((a) + (b) – (c)/2) x 4.75%	1,402,491	
D.	**Asset Roll-forward**			
	a.	Fair value of plan assets - Jan 1, 2014	1,261,471	
	b.	Contributions	41,182	
	c.	Actual Benefit Payments	(40,000)	<-- From Question
	d.	Expected return on plan asset	82,164	(assumed in $000's)
	e.	Actuarial (gain)/loss on plan assets	200,000	<-- From Case study
	f.	Fair value of plan assets - Dec 31, 2014 = (a) + (b) + (c) + (d) - (e)	1,144,817	<-- From Question (assumed in $000's)
E.	**Funded Status**			
	a.	PBO Dec 31, 2014	1,402,491 1,144,817 (257,674)	
	b.	Fair value of plan assets - Dec 31, 2014		
	c.	Funded Status - plan (deficit)/surplus = (b) - (a)		
F.	**Actuarial gain (loss) on PBO**			
	a.	PBO Jan 1, 2014	1,265,686	
	b.	2014 Service cost	59,302	
	c.	Interest cost on PBO (from Case Study)	65,349	
	d.	Actual Benefit Payments	(40,000)	
	e.	Expected PBO	1,350,337	
	f.	Actual PBO Jan 1, 2015	1,402,491	
	g.	Actuarial (gain)/loss on PBO = (f) – (e)	52,154	

6. Continued

G.	**Calculate Unamortized net actuarial gain Dec. 31, 2014**		
a.	Unrecognized actuarial (gain)/loss Jan 1, 2014	(171,334)	<-- From Case study
b.	Amortization of net (gain)/loss		<-- From Case study
c.	2014 Actuarial (gain)/loss on PBO	(4,263)	
d.	Actuarial (gain)/loss on plan assets	52,154	<-- From Question
e.	Unrecognized (gain)/loss Dec. 31, 2014 = (a) - (b) + (c) + (d)	200,000 85,083	
H.	**Calculate 2014 AOCI**		
a.	Unamortized transitional obligation	0	
b.	Unamortized past service costs	0	
c.	Unamortized net actuarial (gain)/loss	85,083	
d.	Total amount recognized in AOCI = (a) + (b) + (c)	85,083	

(b) Calculate the estimated 2015 Net Periodic Benefit Cost. Show all work.

Estimated 2015 Net Periodic Benefit Cost

All of the following components shall be included in the net pension cost recognized
for a period by an employer sponsoring a defined benefit pension plan:

a) Service cost
b) Interest cost
c) Actual return on plan assets, if any
d) Amortization of any prior service cost or credit included in accumulated other comprehensive income
e) Amortization of gain or loss (including the effects of changes in assumptions)

Amortization of any net transition asset or obligation

2015 Expected Return on Assets		
1.	Fair value of plan assets - Jan 1, 2015	1,144,817
2.	Contributions(Mid-Year)	20,591
3.	Expected Benefit Payments (Mid-Year)	(20,000)
4.	Total = (1) + (2) + (3)	1,145,408
5.	Expected return on plan asset = (4) * 6.5%	74,452
2015 Interest cost on PBO		
1.	PBO Jan 1, 2015	1,402,491
2.	Service cost	63,833
3.	Benefit Payments (Mid-Year)	(20,000)
4.	Average PBO = (1) + (2) + (3)	1,446,324
5.	Interest cost on PBO = (4) * 4.75%	68,700

6. **Continued**

Calculate Prepaid (accrued) benefit liability		
1. Projected benefit obligation Jan 1, 2015	1,402,491	
2. Fair value of plan assets Jan 1, 2015	1,144,817	
3. 10% of the greater of line (1) and (2)	140,249	
4. Unamortized net actuarial (gain)/loss Jan 1, 2015	85,083	<-- from question (a), part G (e).
5. Amount subject to amortization		
6. Amortization of gain or loss	0	←excess of (4) over (3), if any 0
2015 Net Periodic Pension Cost		
1. Service cost	63,833	
2. Interest cost on projected benefit obligation	68,700	
3. Expected return on plan asset	(74,452)	
4. Amortization of transitional obligation	0	
5. Amortization of past service costs	0	
6. Amortization of net actuarial gain	0	
7. Net Periodic Pension Cost =(1) + (2) + (3) + (4) + (5) + (6)	58,081	

(c) Outline the non-financial items that should be included in your report to NOC.

Non-financial items that should be included in the report

- A statement of the intended purpose of the measurement and a statement to the effect that the measurement may not be applicable for other purposes;
- The measurement date;
- A description of adjustments made for events after the measurement date;
- An outline or summary of the benefits included in the actuarial valuation and of any significant benefits not included in the actuarial valuation;
- The date(s) as of which the participant and financial information were compiled;
- A summary of the participant information;
- If hypothetical data are used, a description of the data;
- A description of the actuarial cost method and the manner in which normal costs are allocated, in sufficient detail to permit another actuary qualified in the same practice area to assess the material characteristics of the method (for example, how the actuarial cost method is applied to multiple benefit formulas, compound benefit formulas, or benefit formula changes, where such plan provisions are significant);
- A description of the cost or contribution allocation procedure, including a description of amortization methods and any pay-as-you-go component;
- If applicable, a statement indicating that the actuarial cost method or amortization method is significantly inconsistent with the plan accumulating adequate assets to make benefit payments when due;

6. Continued

- If the actuary measured the value of accrued or vested benefits, a description of the types of benefits regarded as vested and accrued and, to the extent the attribution pattern of accrued benefits differs from or is not described by the plan provisions, a description of the attribution pattern;
- A statement, appropriate for the intended audience, indicating that future measurements may differ significantly from the current measurement;
- In addition, the actuarial communication should include one of the following:
  - If the scope of the actuary's assignment included an analysis of the range of such future measurements, disclosure of the results of such analysis together with a description of the factors considered in determining such range; or
  - A statement indicating that, due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements;
- A description of known changes in assumptions and methods from those used in the immediately preceding measurement prepared for a similar purpose;
- A description of adjustments of prior measurements;
- If in the actuary's professional judgment, the actuary's use of approximations or estimates could result in a significant margin for error relative to the results if a detailed calculation had been done, a statement to this effect;
- The actuary's communication should state the source of any prescribed assumptions or methods. In addition, with respect to prescribed assumptions or methods selected by the plan sponsor, the actuary's communication should identify the following, if applicable:
- Any prescribed assumption or method that significantly conflicts with what, in the actuary's professional judgment, would be reasonable for the purpose of the measurement; or
- Any prescribed assumption or method that the actuary is unable to evaluate for reasonableness for the purpose of the measurement.
- Deviation—If, in the actuary's professional judgment, the actuary has deviated materially from the guidance set forth elsewhere in this standard, the actuary can still comply with this standard by applying the following sections as appropriate:
  - Material Deviations to Comply with Applicable Law—If compliance with applicable law requires the actuary to deviate materially from the guidance set forth in this standard, the actuary should disclose that the assignment was prepared in compliance with applicable law, and the actuary should disclose the specific purpose of the assignment and indicate that the work product may not be appropriate for other purposes. The actuary should use professional judgment to determine whether additional disclosure would be appropriate in light of the purpose of the assignment and the intended users of the actuarial communication.

6. Continued

- Other Material Deviations—the actuary's communication should disclose any other material deviation from the guidance set forth in this standard. The actuary should consider whether, in the actuary's professional judgment, it would be appropriate and practical to provide the reasons for, or to quantify the expected impact of, such deviation. The actuary should be prepared to explain the deviation to a principal, another actuary, or other intended users of the actuary's communication. The actuary should also be prepared to justify the deviation to the actuarial profession's disciplinary bodies.

7. Learning Objectives:

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

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

Learning Outcomes:

Describe the structure of the following plans:
(a) Traditional defined benefit plans
(b) Hybrid plans
(c) Defined contribution plans
(d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:
(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

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

(4b) Assess the risk from options offered, including:
Phased retirement
(i) Postponed retirement
(ii) Early Retirement
(iii) Option factors
(iv) Embedded options
(v) Portability options

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

7. **Continued**

(4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.

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

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

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

(6c) Integrate a plan for executives with the basic benefit plan.

Sources:
DA-126-13: "Constructing New Retirement Systems..."

Solution:
(a) Describe the risk-sharing features in the industry-wide career pay plans in the Netherlands.

Plans are collective funds covering entire industries/professions. Vast majority of employees participate. Plans operate independently of employers.

Indexation on the fixed career pay benefit is conditional based on fund performance.

- For example, no indexation if funded status <85%; partial indexation if funded status is between 85% and 105%; full indexation if funded status >105%.
- Indexation foregone in the past can be restored if superior funding levels achieved.

Post-retirement indexation is also conditional on fund performance; i.e., retiree COLAs could be reduced or suspended depending on funded level.

Contributions vary based on funding level. Below the target funding level, contributions are gradually increased. Above the target, contributions are reduced.

Benefit formula is based on career average pay.

7. Continued

(b) Describe the potential effect of implementing the risk-sharing features identified in part (a) in the NOC Full-Time Salaried Pension Plan (Salaried Plan).

Potential effects from NOC's perspective:

- Lower risk; more stable cost
- Some loss of control over plan design, funding, and operation
- Less contribution flexibility
- When funded status declines, automatic increase in NOC's contribution leads to greater business stress, potentially at a time when business as a whole is suffering
- Employee morale will improve when funding levels are higher / benefits increased through indexation
- Employee morale will suffer when funding levels are lower / benefit indexation reduced or eliminated; possible retention challenges

Potential effects from participants' perspective:

- More risk borne by employees and retirees
- Less predictable benefit stream; harder to plan for retirement
- Loss of preretirement inflation protection if formula moved to career average
- Increase in postretirement inflation protection due to addition of indexing
- Greater overall benefit security and sustainability (more likely that plan will not be frozen or terminated)
- Greater participant involvement in plan (if changes are made to governance structure)
- Could reduce intergenerational equity and increase intergenerational friction

Note that certain features that could potentially be added, such as employee contributions, would not be available under current Gevrey law.

(c) Describe employer considerations in providing employees with this choice.

Choice is more costly due to antiselection—an employee will generally select the plan that is more valuable to him/her, increasing NOC's overall cost.

Choice is more costly due to additional administration, compliance, and communication.

Choice can potentially aid attraction and retention, not only because participants generally prefer choice but also because a DC plan would be more appealing to some employees. Having a portion of the employee population in the DC plan, however, would reduce NOC's ability to manage its workforce.

7. Continued

NOC must make various decisions related to design and transition, including:

- When will the choice be offered?
- Will participants be given an opportunity to switch their choice?
- Will current DB participants be able to transfer DB benefit value to DC account?
- How will the DC formula be set?

Robust communication/education will be valuable in helping employees make a better decision.

NOC must decide how to structure the choice:

- What will be the default?
- Will one plan or the other be encouraged or discouraged?

While education, structured choices, and strong defaults help, employees do not always act in their best interest:

- Suboptimal decisions lead to reduced retirement income
- Potential source of litigation against NOC
- NOC will need to determine who pays the penalty when an employee makes a poor choice—NOC, the employee, or society.

The greater the DC plan utilization, the less cash contribution flexibility NOC has.

Curtailment and/or settlement accounting could be triggered if there is significant departure from the DB plan.

8. **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) Hybrid plans
(c) Defined contribution plans
(d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:
(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

(3a) Identify risks face by retirees and the elderly.

(3b) Describe and contrast the risks face by participants of:
 (i) Government sponsored retirement plans
 (ii) Single employer sponsored retirement plans
 (iii) Multiemployer retirement plans, and
 (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

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

8. 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

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

(4e) In a given context, assess the effect that changes in the plan design might have on collective bargaining agreements.

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

Sources:
New Retirement Plan Designs for the 21st Century, Pension Forum, December 2008, pp. 41-56

Solution:
XYZ is considering terminating its cash balance plan and replacing it with one of the following options.

(i) Defined contribution pension plan

(ii) Variable defined benefit pension plan

(iii) One-time salary increase

Describe the advantages and disadvantages of each option from the perspectives of both the employees and the employer.

8. Continued

Defined Contribution Plan	
Employee: • Opportunity to earn excess investment return (advantage) • Possibly loan and hardship withdrawal provisions (advantage) • No PBGC protection (disadvantage) • More risk (investment and longevity) (disadvantage)	**Employer:** • Cash cost is more predictable (advantage) • No accrual accounting required (advantage) • No PBGC premiums (advantage) • Risk (investment and longevity) shifted to the employee (advantage) • More understandable by employee (advantage) • Cannot use the plan as a workforce management tool (early retirement subsidies, windows, etc) (disadvantage)
Variable Defined Benefit Plan	
Employee: • Change of earning excess investment earnings (advantage) • Can produce smaller benefit if investments underperform (disadvantage) • Benefit may change in retirement (disadvantage)	**Employer:** • Investment risk shifted to employee (advantage) • Longevity risk remains with employer (disadvantage) • Uncommon design, which may entail legal risk (disadvantage)
One time salary increase	
Employee: • Has access to cash for whatever purpose they want to use it for (advantage) • Does not provide retirement income (disadvantage) • Immediate taxation of amount (disadvantage)	**Employer:** • Predictable cost (advantage) • No risk (longevity or investment (advantage) • Cannot be used for workforce management (disadvantage) • More valued by younger than older employees (advantage and disadvantage, depending on employer objectives)

9. **Learning Objectives:**

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

Learning Outcomes:

(3a) Identify risks face by retirees and the elderly.

(3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

Sources:

DA-111-13 An Annuity that People Might Actually Buy

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

Solution:

Describe three ways in which members of a defined contribution plan may convert their account balance into a lifetime income payment stream at retirement.

1. Transfer the account to an insurer and purchase an annuity. They can purchase an array of different annuities and are guaranteed not to outlive resources. However, this option tends to be more expense than other options.
2. Withdraw only the interest earned each year and leave the principal intact. This is a simple strategy and those who use it are guaranteed not to outlive resources. However, it may provide meager income unless members have a very large account balance.
3. Systematically drawdown the principal and interest from the account. It may be difficult to implement a drawdown strategy (reference life expectancy tables to determine appropriate withdrawals), and there is no guarantee of not outliving resources while maintaining adequate income.

10. **Learning Objectives:**

2. The candidate will understand the impact of the regulatory environment on plan design.

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

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

Learning Outcomes:

(2a) Explain and apply restrictions on plan design features to a proposed plan design.

(2b) Explain and test for limits on plan designs and features that protect participation rights.

(2c) Test for plan design restrictions intended to control the use of tax incentives.

(2d) Describe the process and apply the principles and rules governing the conversion from one type of plan to another.

(2e) Understand conflicts between regulation and design objectives and recommend alternatives.

(5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.

(5b) Assess the tradeoffs between different goals.

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

(5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.

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

(5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

(5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.

10. Continued

(5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.

(5i) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.

(5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.

(5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.

(5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.

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

(8a) Perform valuations for special purposes, including:
- (i) Plant termination/windup
- (ii) Accounting valuations
- (iii) Open group valuations
- (iv) Plan mergers, acquisitions and spinoffs

(8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.

(8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.

(8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.

(8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.

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

(8g) Describe how a plan's funded status can impact union negotiations and multiemployer plans.

10. **Continued**

(8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:
Morneau Shepell Handbook of Canadian Pension and Benefit Plans, 15th Edition

Intricately Linked: Pensions and Corporate Financial Performance

Evaluating Financial Options for Nonqualified Benefit Plans

Commentary on Question:
Successful candidates 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.
Successful candidates will be able to compare the, sometimes conflicting, interests of management, employees and shareholders.

Solution:
Discuss the advantages and disadvantages of each of these options from the perspectives of the following stakeholders:

(i) Active employees

(ii) Inactive members of both plans

(iii) Shareholders

(iv) XYZ

10. Continued

Option 1: Make large lump sum contribution to the qualified pension plan

<table>
<tr><td colspan="2">Active employees</td></tr>
<tr><td>Advantages:
The active employees may be happy with contribution to the underfunded plan because it improves benefit security of accrued benefits.
It reduces probability of involuntary plan termination or plan freeze of future accruals.
It reduces probability of benefit restrictions - restrictions on lump-sum payments or ceasing future benefit accruals.</td><td>Disadvantages:
Active employees may prefer a one-time cash bonus.
Active employees may prefer a salary increase.</td></tr>
<tr><td colspan="2">Inactive members of both plans</td></tr>
<tr><td>Advantages:
The inactive members may be happy with contribution to the underfunded plan because it improves benefit security and reduces probability of involuntary plan termination or benefit restrictions such as restrictions on lump sum payments.</td><td>Disadvantages:
The inactive members may prefer cost-of-living increases on accrued benefits and benefits currently in in-pay status.</td></tr>
<tr><td colspan="2">Shareholders</td></tr>
<tr><td>Advantages:
Large lump-sum contribution to the qualified plan could result in improved funded status, reduced future contribution levels and pension expense volatility; potentially increasing shareholder equity.</td><td>Disadvantages:
Shareholders might misconstrue contribution to the plan as an imprudent investment by the employer; it may result in a decline in shareholders’ equity.</td></tr>
</table>

10. **Continued**

XYZ	
Advantages: • If contribution does not exceed the maximum deductible contribution limit recommended by the actuary, then the contribution to the plan may be tax effective because contributions to qualified plans are tax deductible. • Large lump-sum contribution to the qualified plan may improve funded status and reduce future contribution volatility. • HR strategy may be to use the qualified plan as a recruiting tool to attract and retain the cream of the crop; large contribution may improve funded status of the plan. • It could reduce PBGC variable rate premiums with large contribution to the plan due to the smaller underfunded liabilities. • Large contribution may improve funded status of plan, reduce volatility on balance sheet; improve credit rating and increase shareholders equity. • It reduces probability of benefit restrictions. • Reduce probability for accelerated funding requirements for "at-risk" plans.	**Disadvantages:** • The employer may have been able to earn a higher rate of return (net of taxes) if invested large contribution in company vs. in trust fund of pension plan, thereby increasing the value of the company and improving credit rating of the company. • The employer could use the extra cash to pay off creditors.

10. Continued

Option 2: Pay a one-time payroll bonus that would be immediately taxable to the employees

Active employees	
Advantages: • Beneficial to employees in the lower income tax bracket as the one-time lump-sum payment may rise standard-of-living (immediately). • May boost employees' morale and result in increased productivity.	**Disadvantages:** • May not be tax advantageous to active employees in the higher income tax bracket. • Some employees may prefer a salary increase rather than a one-time bonus.

Inactive members of both plans	
Advantages: • None	**Disadvantages:** • Inactive members may demand cost-of-living increases on accrued benefits and benefits currently in in-pay status. • Inactive members may prefer that the employer contribute to the qualified pension plan to improve benefit security.
Shareholders	
Advantages: • None	**Disadvantages:** • Payment of bonus maybe misconstrued by shareholders as an imprudent investment by the employer; may result in a decline in shareholders' equity.
XYZ	
Advantages: • The employer may see the one-time bonus disbursement as a reward to employees and a way to help boost morale and increase employees' productivity.	**Disadvantages:** • It may cost the employer more than expected because the employer may have to pay additional payroll taxes on the one-time bonus since it may be considered as additional compensation. • The employer could use the extra cash to pay off creditors.

10. Continued

Option 3: Fund the SERP arrangement

Active employees	
Advantages: • Active members entitled to benefits from this plan will be happy because funding the benefits with a contribution will ensure that the benefits promised will be paid when due.	**Disadvantages:** • Depending on funding vehicle used to fund the nonqualified pension plan, active employees might be subject to immediate taxation of their benefits because of the contributions. • Active employees not entitled to benefits from the nonqualified pension plan, may prefer that the employer make large contribution to the qualified pension plan to improve benefit security.
Inactive members of both plans	
Advantages: • Inactive members entitled to benefits from the nonqualified pension plan will be happy because funding the benefits with a contribution will ensure that the benefits promised will be paid when due.	**Disadvantages:** • Inactive members not entitled to a benefit from the nonqualified pension plan may prefer cost-of-living increases on accrued benefits and benefits currently in in-pay status payable from the qualified pension plan. • Inactive members not entitled to benefits from nonqualified pension plan may prefer that the employer contribute to the qualified pension plan instead to improve benefit security under the qualified pension plan.
Shareholders	
Advantages: • Current shareholders are paying for current benefits.	**Disadvantages:** • Funding nonqualified pension plan may be misconstrued by shareholders as an imprudent investment by the employer may result in a decline in shareholders' equity.

10. **Continued**

XYZ	
Advantages: • Large lump-sum contribution to the nonqualified pension plan could result in lower pension expense; reduce balance sheet volatility and improve shareholders equity. • Large lump-sum contribution to the nonqualified pension plan could improve perception of the value of the benefit and may result in improved morale and productivity.	**Disadvantages:** • It is less tax efficient than if employer were to contribute to the qualified pension plan instead; contribution is not immediately taxable unless benefits are paid immediately. • Depending on the tax status of the company, funding the nonqualified pension plan may not be tax efficient • The employer may have been able to earn a higher rate of return (net of taxes) if invested large contribution in company vs. in trust fund of pension plan, thereby increasing the value of the company and improving credit rating of the company. • The employer could use the extra cash to pay off creditors instead of funding nonqualified pension plan.

11. Learning Objectives:

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

Learning Outcomes:

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

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

(6c) Integrate a plan for executives with the basic benefit plan.

Sources:

DA-802-13: Internal Revenue Code 409A and Non-Qualified Plan Design Consideration

Solution:

(a) Describe the potential violations of IRC Section 409A.

Under IRC Section 409A, elections to change the time or form of payment:

- must be made at least 12 months before the originally scheduled payment,
- may be effective not less than 12 months after it is made, and
- must be delayed at least 5 years from the date of the originally scheduled payment.

In this case the Plan violated IRC Section 409A because it allowed the executive to change form of payment less than 12 months before the original scheduled payment and did not force payment to be delayed five years.

Note that immediate vesting is not a violation of 409A, nor is the timing of the executive’s initial payment timing/form election. Note also that the plan cannot be considered grandfathered (thus exempt from these requirements) as it was established after 1/1/2005.

(b) Describe the implications to the executive of the violations in part (a).

1. The value of plan benefits (deferred compensation) must be included in the executive's taxable income immediately.

2. Interest on the previously deferred compensation will be charged to the executive.
   - Interest is charged from 2008 (when benefits were first deferred and not subject to substantial risk of forfeiture).
   - Interest is charged at the underpayment rate + 1%.

11. Continued

3. Executive must pay an additional penalty tax.
    - The rate is 20% of the compensation required to be included in income.

(c) Describe the restrictions on funding a non-qualified plan subject to IRC Section 409A.

- Contributions to a trust cannot be made if any qualified retirement plan of the employer is not adequately funded (i.e., is in a “restricted period”).
- The plan cannot include a trigger requiring funding (or benefit payout) if the employer is experiencing financial difficulties.
- Benefits cannot be paid from a foreign/offshore trust.

12. Learning Objectives:

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

Learning Outcomes:

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

Sources:

Allen, 10th Edition, Chapters 1& 2

Morneau Sobeco, Chapter 1

R-C104-09, Replacement Ratio Study, Aon Hewitt

Solution:

A U.S. corporation implements a defined benefit pension plan that provides an unreduced benefit of 1% of final average salary per year of service payable at normal retirement age (65), indexed annually in line with the Consumer Price Index.

Assess the benefit adequacy of this plan given the availability of government programs.

- Adequacy is measured as ratio of retirement income from all sources to earnings level just before retirement.
- Goal is to provide adequate level of retirement income at normal retirement age.
- Replacement Ratio is gross income after retirement, divided by gross income before retirement.
- Replacement ratio is usually less than 100% because a participant needs less income during retirement than during working years.
- Norm for retirement income is usually 60% to 70% of pre-retirement income.
- 30% to 40% of pre-retirement income from plan is considered adequate for middle income. If we add public pensions, the total retirement income is 60%-70%.
- Adequacy is relative and must be based on industry standard and competition.
- Social Security replaces a larger portion of pre-retirement income at lower wage levels.
- Total Replacement Ratio required to maintain a person’s pre-retirement standard of living is highest for lowest paid employees.
- Before retirement, lower paid employees save the least and pay the least in taxes.
- Age- and work-related expenditures do not decrease by as much for the lower paid employees.

12. **Continued**

- After reaching an income level of $60,000, the required Replacement Ratio remains fairly constant at 77%–78%.
- At the lowest income levels, pre-retirement taxes are higher for singles than for married couples.
- Low earners will get 30% from plan with long service
- Social security may get replacement ratio of 35%-40% for low earners.
- Total replacement ratio of 65%-70% for low earners may be low to maintain standard of living.
- High earners will get 30% from plan with long service.
- Public pensions may generate another 15%-20% for high earners.
- In order to achieve benefit adequacy, high earners may have to consider personal savings.
- Those with lower service or older at inception will likely not generate a sufficient replacement ratio, but benefit adequacy measured for employees with full career retiring at their normal retirement age.

13. **Learning Objectives:**

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

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

Learning Outcomes:

(3a) Identify risks face by retirees and the elderly.

(3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

(8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.

(8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.

(8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.

(8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.

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

(8g) Describe how a plan's funded status can impact union negotiations and multiemployer plans.

(8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

13. Continued

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

DA-148-13: Mergers and Acquisitions: Due Diligence of Retirement Plans

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

RC 605-12 Asset Transfer Resulting from Sale of Business

Solution:
(a) Describe the objectives of the due diligence stage in the merger, as they pertain to the benefits and compensation programs only.

Gain a full understanding of the benefits and compensation programs and HR goals and structure.

Use this time to collect certain material pertaining to the benefit programs - registered and non-registered plans

- Plan documents (official plan texts, owner data, amendments, undocumented promises ,etc.)
- Administrative reports (actuarial valuation reports, trust statements, census data, etc.)
- Miscellaneous reports (funding reliefs/solvency moratoriums, litigation history, AIR/AIS/PBGF filings, etc.)

Review material collected above to identify and quantify potential pitfalls in areas such as:

- Non-compliance with CRA/FSCO and other local standards
- Hidden subsidies; Are spousal benefits subsidized? Are there special early retirement benefits with subsidies?
- Benefits and undocumented promises triggered upon the sale (e.g., benefits for executives under the non-registered plan)
- Financial health of the plans (registered and non-registered plans); Are the registered plans funded? Are non-registered plans funded or are benefits funded on a pay-as-you-go basis?
- When is COLA typically granted? How is it determined? Is it written in the official plan text? Who gets the COLA?

13. **Continued**

Due diligence also identifies post M&A activities, e.g., merging benefit programs, eligibility rules for certain benefit features, etc.
Example: currently XYZ offers ad hoc COLA to their retirees & beneficiaries in pay; if ABC does not offer COLA or ad hoc COLA to their retirees and beneficiaries in pay, they may have to consider granting COLA to their retirees and beneficiaries in pay or to no one post M&A.
Example: currently XYZ offers a disability benefit to members regardless if they are vested on the date of disability; if ABC does not offer a disabiliy benefit to their members, they may have to consider amending the provisions of their existing plan to provide for a disability benefit to current members in order to be fair to all employees; otherwise consider removing disability benefits for future members in the XYZ plan, post M&A.

Helps ABC to determine whether integration of benefit programs and HR goals of benefit programs will be a success post M&A.

(b) Describe the integration issues that ABC should consider as they pertain to the benefits and compensation programs only.

Employee issues

- Need to consider HR goals of both companies - benefit programs used to attract and retain the cream of the crop; encourage and reward employees to increase productivity; paternalistic view
- Need to reassure employees that they will not lose accrued benefits or future accruals will not be reduced

Employees of XYZ will be most concerned about:
(1) protection of accrued benefits
  - ABC to consider salary increases in determining the accrued pension liabilities at closing date; likewise XYZ want to consider clauses in the sale agreement that would allow ABC to windup the plan in the future and reap the 'windfall' of the salary projections consideration in the sale price.
  - ABC to consider ad hoc COLA to retirees and beneficiaries in determining the liabilities at closing date.
  - ABC to consider assumptions (prescribed Solvency assumptions) used to determine liabilities at close date.

(2) continuity of benefit accruals under new owner
  - XYZ want to consider clauses in sale agreement that will adversely change benefit formula, e.g., change from defined benefit to a less generous money purchase plan

13. **Continued**

(3) disposition of any pension surplus
- Ultimate goal of ABC post M&A is to be fair to employees from both companies
  - So ABC may want to do a comparative analysis of programs from both companies and decide on post M&A how to equalize benefits on all employees
  - For example, retirees and beneficiaries of ABC may want ad hoc COLA as well; ABC need to consider granting COLA to all EEs or eliminate COLA altogether. ABC need to consider providing for a disability benefit or eliminate for future Ees to the XYZ plan post M&A.

Assets, Liabilities and Surplus issues
- Because the M&A was effected through the acquisition of assets rather than shares, ABC/XYZ need to consider the following in drafting the purchase and sale agreement:
  - should the accrued benefits and liabilities continued to be administered through the trust account of XYZ?
  - should the accrued benefits under the pension plan sponsored by XYZ be wound up and assets distributed?
  - should assets and liabilities be transferred from XYZ to ABC?

Pricing issues
- ABC and XYZ need to review accounting policies; ABC needs to be comfortable with values, method and assumptions used to determine assets and liabilities at closing date.
- ABC may want to negotiate the purchase price to reflect any unfunded liabilities or pension surplus assumed in the acquisition.

Procedural issues
- Both companies should establish a clear and efficient process to follow
- All parties should meet early to allow ample time for discussion of all aspects of the acquisition as it pertains to the benefit programs
- ABC should review all agreements pertaining to the assets or liabilities - e.g., trust agreements; pension administration contracts, etc.
- XYZ may want to include a clause in the purchase and sale agreement that secures ABC's commitment to continued employment, benefits (qualified and non-qualified), and compensation to EEs from XYZ, including any ownerships of plan surplus.

14. 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) Hybrid plans
(c) Defined contribution plans
(d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:
(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

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

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

(5b) Assess the tradeoffs between different goals.

14. Continued

(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.

(5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.

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

Sources:
Morneau Sobeco Chapter 2

Morneau Sobeco Chapter 5

Morneau Sobeco Chapter 14

Canadian Pension Plan Design

Commentary on Question:
Credit given for comments related to:

- *providing disability benefit*
- *previous employer's service recognition*
- *additional long-service benefits*
- *setting up a cash balance plan*
- *enhancing portability*

Acceptable alternatives:

- *reducing early retirement benefits*
- *removing indexing*
- *removing joint and last survivor pension*
- *DROP or delayed retirement enhancements*
- *increasing flat pension benefit, subject to cost constraints*
- *cash balance design*
- *adding portability options*

14. **Continued**

Solution:
Recommend design changes to the NOC Full-Time Hourly Union Pension Plan that will help them achieve the above objectives while maintaining a defined benefit component.

Justify your response.

- Controlling costs means limited flexibility to improve benefits
- Younger employees will be more attracted to a DC type plan
- Experienced employees will tend to stay longer if plan based on final average earnings
- Provide immediate or faster vesting instead of 5 years of service
- Maintain retirement age and early retirement reductions
- If NOC plans to provide future ad hoc increases to the retirement benefit, make it guaranteed so employees know that staying longer will result in a higher pension
- This will have no impact on ultimate plan costs
- Provide a choice between DB and DC for new hires. The formula and terms can be similar to the part-time salaried plan.
- Ensure employer contributions to DC option are not too high so costs remain similar to DB normal cost.
- DC is good to control contribution requirements with no risk of unplanned increase
- DC has no unfunded liabilities
- DC has lower contributions overall relative to DB
- But investment risk is transferred to employees
- Another approach may be to add a flexible component to the plan where employees can purchase enhancements
- Allow this via additional voluntary contributions
- This may have to be negotiated with union in next contract
- Provide actuarially equivalent optional forms of pension for greater flexibility and no added cost.
- Life only option for non-married would improve with guarantee periods options
- These may increase costs slightly because of anti-selection
- Provide phased retirement option, where experienced workers can continue working part-time while collecting pension income and help in knowledge transfer
- Phased retirement option should be actuarially equivalent to value of accrued pension
- Provide delayed retirement option with actuarial increase. Again this has no impact on costs
- If changes cause an increase in costs, cost controls can be achieved with change to funding policy, funding method or asset valuation method
- Consider introducing employee contributions to pay for any cost increases as a result of enriched benefits