CSP-RU Model Solutions
Spring 2013

1. **Learning Objectives**:

8. The candidate will be able to analyze the regulatory environment as it affects retirement plans.

9. The candidate will be able to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations on the actuarial issues

Learning Outcomes:

(8c) Where regulations for tax-assisted retirement plans conflict with sponsor's and shareholders' goals, the candidate will be able to describe and recommend alternatives.

(8d) Explain the moral hazard that arises from the existence of outside (government) guarantees on the plan benefits.

(9b) Distinguish the various ways that retirement fund assets are managed.

(9e) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.

(9h) Identify the sources of investment risk and assess risk facing retirement funds.

Sources:

R-C151-12 Guaranteed Trouble: the Economic Effect of the PBGC

R-C107-07 Equities in DB Plans

Commentary on Question:

Successful candidates accompanied answers with a coherent explanation of relevance. Credit was provided for commenting on insufficiency of premiums and requirement to increase them. Credit was provided for commenting on reducing or capping benefits on plan termination. Credit was provided under "moral hazard" item for commenting that insurance program is similar to a put option and treated as such by plan sponsors.

Question Wording:

A country has an insurance program to protect members of defined benefit pension plans against plan sponsor insolvency with provisions similar to the Pension Benefit Guaranty Corporation (PBGC) in the US. The program is currently significantly underfunded.

1. Continued

(a) Explain why the program may be significantly underfunded.
(b) Recommend changes that may improve the program's funded status. Justify your response.

Answer
Part (a):

- Low interest rate environment increases liabilities and size of claims;
- Market downturn reduces assets and causes higher deficits when claims occur;
- Premiums do not reflect risk being transferred (doesn't take into account sponsor risk) and premiums are not set by the insurance program;
- Declining number of DB plans therefore less premiums coming in;
- Bankruptcies or specials rules allowed for sponsors in certain industries;
- Funding rules did not promote adequate funding of plans or disclosure to market participants of funding on a timely basis;
- Moral Hazard - companies always have PBGC as a backup, so can provide generous benefits and increases even if they are unfunded. They may be able to cover the benefits if market does well, but in down times causes many to turn over liabilities to insurance program.

Part (b):

- Change to mandatory private insurance market which would be priced to handle risk appropriately;
- Increase premiums and implement risk based premiums that take into account sponsor risk profile;
- Convert insurance program from self-sufficient to social program that is also backed by tax revenue;
- Improve funding rules (100% funding, assumptions dictated, no smoothing, no credit balances);
- Allow insurance program to close/terminate plans that are not in best interests of workers, plan or the insurance program to cap liability at current level;
- Require timely notification of funding to all stakeholders;
- Allow insurance program to reduce exposure by reinsuring in private market or setting some liabilities with private market.

2. **Learning Objectives**:

1. The candidate will be able to evaluate sponsor's goals for the retirement plan.

2. The candidate will be able to analyze the risks faced by retirees and the participants of a defined benefit or defined contribution retirement plan, as well as retiree health plans.

3. The candidate will be able to evaluate risks faced by sponsors of retirement plans.

4. The candidate will be able to evaluate and recommend a plan design appropriate for the sponsor's goals.

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

Learning Outcomes:

(1c) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.

(1d) Given a context, assess the feasibility of achieving the sponsor's goals for their retirement plan.

(1e) Given a context, assess the tradeoffs between different goals and prioritize them.

(1f) State relationship or recognize contradictions between management's and shareholders' goals and the retirement risks faced by retirees.

(2a) Identify risks faced by retirees and the elderly.

(2d) Describe the risks faced by participants of single employer sponsored retirement plans.

(3a) Identify how plan features, temporary or permanent, can adversely affect the plan sponsor. For example – an early retirement window offering or a lump sum payment option.

(3e) Compare the economic value of different plan designs for different stakeholders.

(4c) Given a context and sponsor objectives, recommend an appropriate plan type for providing retirement benefits and defend the recommendations.

(6a) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

2. Continued

Sources:
R-C102-07: Turner & Watanabe, chap 5, "Pension Risk and Insurance," pp. 65-81

Morneau, Handbook of Canadian Pension and Benefit Plans, Fourteenth Edition, 2008, Chapter 2

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

McGill – Fundamentals of Private Pensions, Ninth Edition, 2010, Chapter 4

R-C618-12: CICA Handbook 3461

Commentary on Question:
Successful candidates included NOC's perspective on accounting, cash cost and HR issues and also discussed the employees' perspective.

Question Wording:
The CFO of NOC has mandated that NOC must reduce the size of all of its pension plans. The CFO has proposed the following:
Option 1: Add a permanent lump sum option for active members who retire
Option 2: Add a lump sum window for existing retirees and beneficiaries

Analyze these options from the perspectives of both NOC and NOC's employees.

Solution:

<u>NOC's Perspective</u>
Accounting/Expense

- Exposure to immediate recognition in expense due to settlement accounting
- Option 1 will have settlement accounting risk each year
- Option 2 will have a one-time risk of settlement accounting
- A settlement threshold issue will occur if the amount of lump sums paid is greater than the sum of service cost plus interest cost
- Loss due to settlement will be recognized immediately. Additionally, a prorated portion of unrecognized loss/gain, along with a prorated portion of unrecognized prior service cost, will be recognized
- Future cost and volatility could decline if plan size is significantly reduced

Cash Cost

- NOC may have higher liquidity needs by offering these lump sum options/windows
- SRP plan would require immediate cash from NOC to pay lump sums since the plan is unfunded

2. Continued

- Exposure to year-to-year volatility depending on size and number of lump sums taken each year
- Interest rate conversion risk - If interest rates are low, the actuarial equivalent in lump sum form costs more than the lump sum equivalent when interest rates are not as low
- Could result in actuarial losses which could increase cash requirements to the plan

Consequences

- NOC could be seen as less paternalistic
- Anti-selection – healthy participants may choose annuities and unhealthy participants may choose lump sums.
- NOC will need to implement a communication program to effectively implement a permanent lump sum or lump sum window – there is cost and risk associated with this.
- Under Option 2, NOC may have to deal with perceived inequity due to active population not having access to the lump sum option
- Future administration costs could decline if a significant number of participants take a lump sum (and therefore are no longer in the plan)
- By offering a lump sum option to active members and a lump sum window to existing inactive participants, NOC is likely decreasing the duration of the plan. Therefore, a one-percent change in interest rates will have a less significant impact on its liabilities.
- Mortality risk – transferred to employees who take lump sum payments
- Investment risk – transferred to employees who take lump sum payments

<u>NOC's Employees' Perspective</u>

- More choice as to timing and form of benefit
- Benefit becomes more portable
- Option 2 could generate resentment among active population since they won't have access to the lump sum option
- Interest rate levels may have significant impact on participant decision whether to take lump sum and when they should retire
- Employees who take the lump sum option will now need to manage their own assets - More flexibility with investment options and increased investment risk because investment returns/losses will now be borne by the employees
- Increased longevity risk (risk of outliving the assets) because there is no guarantee on a monthly benefit after retirement

3. **Learning Objectives**:

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

8. The candidate will be able to analyze the regulatory environment as it affects retirement plans.

Learning Outcomes:

(6a) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

(6b) Recommend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals. The candidate will be able to defend the recommendation.

(6c) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals. This would be consistent with government regulation.

(8a) Evaluate the effect of regulatory policies and restrictions, for all retirement plans, associated with:

- Plan design
- Plan establishment
- Plan amendment
- Plan termination/windup
- Plan merger or spin-off
- Reporting requirements
- Members' rights
- Plan funding
- Contributions and benefits
- Individual savings plans
- Coordination of individual and employer sponsored retirement plans
- Economic value to shareholders

Sources:

R-C105-07: "Pension Actuaries' Guide to Financial Economics"

R-C130-07: "Reinventing Pension Actuarial Science" (Bader & Gold) – including discussion

Day, "Financial Economics and Actuarial Practice"

"What's Wrong with ASOP 27? Bad Measures, Bad Decisions" (Bader and Gold)

"Can Pension Be Valued as Marketed Securities?" (Bader)

3. Continued

Morneau Sobeco, *Handbook of Canadian and Benefit Plans*, Ch 5 (pp. 110-111)

R-C130-07: "Reinventing Pension Actuarial Science (Bader & Gold) – including discussion"

Allen, Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Chapter 19, Budgeting Pension Costs, pp. 335-341

Morneau Sobeco, Handbook of Canadian Pension and Benefit Plans, Fourteenth Edition, 2008, Ch. 5

McGill, Fundamentals of Private Pensions Ninth Edition, 2010, Ch.17

Bader "Pension Deficits - Unnecessary Evil" Pension Forum, 2005

Commentary on Question:
Part (a):

- Items repeated count only once;
- If key words are listed but with no commentary, no points were awarded.

Part (b):

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- Items repeated count only once;
- If key words are listed but with no commentary, no points were awarded.

Part (c):

- Grading points were awarded for a specific recommendation (e.g. "mandate the use of RP-2000 mortality table to determine liabilities") and more general recommendation (e.g. "mandate the use of a mortality table to determine liabilities");
- No points were awarded for restating items from parts a and b or for regulation ideas that have no clear relation to funded status (e.g. nondiscrimination testing, coverage, benefit administration, etc.) or for regulation ideas that would almost certainly not increase funded status (e.g. contribution limits, higher valuation discount rates, funding waivers, etc.).
- Successful candidates provided commentary for all points (e.g. listing "assumptions" with no further explanation received no points).

3. Continued

Question Wording:
A country with no funding regulations is concerned that many corporate defined benefit pension plans within the country are poorly funded on a plan termination basis. The Government has proposed implementing new defined benefit funding regulations that would include the following:

(i) Funding liability interest rates to be based on corporate bond yields.
(ii) Plan sponsors to be permitted to use a three-year smoothed actuarial value of assets for funding purposes.

The regulations would be effective for plan years beginning in 2013.

(a) Describe the advantages and disadvantages of using corporate bond yields to determine the funding liabilities versus the expected rate of return on plan assets.

(b) Describe the advantages and disadvantages of using a smoothed actuarial value of assets versus the market value of assets for funding purposes.

(c) Recommend additional regulations that would help the Government meet its goal of increasing the funded status of pension plans within the country.

Solution:
Part (a):
Advantages:

- Pension cash flows are similar to debt and should therefore be priced similarly (law of one price)
- Equity risk premiums (or expected return on assets) are irrelevant to valuing pension liabilities and should not be used to discount liability cash flows
- Allows sponsor to be aware of the risk they carry – does not ignore risk
- Eliminates price distortions and improves economy's efficiency
- Takes advantage of financial economic principles by measuring the liability by using a market-based discount rate curve
- Prevents "gaming" of assumptions by employers
- Promotes intergenerational equality by valuing current benefits based on market discount rates
- Avoids underpricing in compensation decisions
- Avoids bias in investment decisions
- Increases contributions, funded status and benefit security
- Greater transparency for other stakeholders; investors, participants
- Maximizes shareholder value; they can reflect equity risk premium in their own portfolio
- Reduces agency issues

3. Continued

Disadvantages:

- Pension payments are not exactly like debt obligations (duration, dynamics, cash flows not precisely known, etc.)
- May further the decline of defined benefit plans
- Plan sponsors care about costs, not liabilities
- The fund plays a key role in risk reduction – allows flexibility
- Valuing liabilities based on expected return on assets supports stable long-term plan contributions
- Overemphasizes current values rather than focusing on long-term objectives and views
- Equity risk premium does exist

Part (b):

Advantages:

- May smooth the effects of short-term volatility in the market value
- Appropriate if liabilities are being valued on a smoothing basis as well
- Falls in line with the long-term approach to funding pension obligations
- Better for budgeting purposes

Disadvantages:

- May not be appropriate if liability measures use mark-to-market approach of liability discount rates
- If purpose is to smooth contributions, then apply smoothing on contribution calculations rather than market values
- Does not conform to financial economics principles by avoiding the smoothing of volatility
- Conceals the true asset value and funded status
- Method may be hard to understand
- Provides short-term relief only; more contributions will be needed later
- May result in underfunding during market downturns or vice versa

Part (c):

- Mandate assumptions used in the calculation of funding liabilities (such as mortality tables or interest rates)
- Require funding a portion of the unfunded liability each year
- Allow for tax deductibility of contributions when funded in advance
- Mandate asset valuation method
- Mandate actuarial cost method used in the calculation of funding liabilities, such as unit credit, projected unit credit, entry age normal, etc.
- Require advance funding through a trust
- Require immediate funding of new benefit earned during the year (normal cost)
- Implement benefit restrictions if funded status falls below a certain measure
- Institute PBGC like institution and require insurance premiums

3. **Continued**

- Allow or encourage employee contributions
- Require Risk Based Funding requirements; includes the creditworthiness of the company
- Provide surplus to be returned to employers

4. **Learning Objectives**:

1. The candidate will be able to evaluate sponsor's goals for the retirement plan.

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

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

Learning Outcomes:

(1f) State relationship or recognize contradictions between management's and shareholders' goals and the retirement risks faced by retirees.

(1h) Assess how retirement plans features create shareholder value.

(5c) Define the retirement plan risks (financial and design) in a way that integrates with the sponsor's risk management strategy.

(6a) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

Sources:

R-C102-07: Turner/Watanabe, Private Pension Policies in Industrialized Countries, Ch. 5 pp 81-91

R-C105-07: Pension Actuary's Guide to Financial Economics

R-C106-07: The Case Against Stock in Public Pension Plans

R-C107-07: Equities in DB Plans

R-C117-07: Pension Deficits – Unnecessary Evil, Pension Forum Critique of Pension Deficits & Author's response to Critique

Commentary on Question:

Part (a) was looking for candidates to evaluate the degree of risk for Company A and Company B, based on the company and information provided. Successful candidates compared the characteristics of Company A and B to each other and also listed specific risks that may apply. Part (b) asked candidates to evaluate the recommendation for both companies. Therefore the candidate needed to indicate for each company whether or not they agreed with the recommendation. Successful candidates provided support for their evaluation utilizing reasons to or not to invest in fixed income as well as characteristics of Company A and B that lend themselves to these reasons. In some cases, points could apply towards either part (a) or (b) and points were given regardless of where they appeared in the solution.

4. Continued

Successful candidates listed and described specific financial risks and applied the material to the companies. They evaluated the recommendation for each company rather than just the recommendation in general. Additional points were provided for relevant supporting arguments.

Question Wording:

(a) Compare and contrast the financial risks to the following stakeholders of both companies:
  (i) Plan Sponsor
  (ii) Plan members
  (iii) Shareholders

(b) A consultant has recommended that both companies invest 100% of pension fund assets in fixed income. Evaluate this recommendation.

Solution:

Part (a):

Financial Risks that apply to a Plan Sponsor

- Surplus risk – the risk that the company will have trapped surplus in the plan. Analysis of surplus risk: Both companies are underfunded so not a current issue but could become one if market increases or contributions are made to fully fund the plan.
- Investment/market risk - the risk that market will not return the expected value on investments and the plan sponsor will have to contribute more to the plan. Analysis of investment/market risk: Company A has a large surplus of assets that can help cover additional contributions needed. Company B does not have as much excess and a large downturn in market could cause severe financial strain.
- Interest rate risk – interest rates will cause liabilities to vary. Analysis of interest rate risk: Company A is in a better financial position than B to handle.

Financial Risks that Apply to Plan Members:

- Bankruptcy Risk/Benefit Security Risk - risk that company could go bankrupt and members would lose future benefits (or current benefits). Analysis of bankruptcy/benefit security risk: unknown if companies have ongoing plans, but members of both companies could face loss of future benefits due to plan changes, bankruptcy/not being covered by PBGC. Bankruptcy for Company B members more likely due to worse financial situation.
- Wage Risk - risk that wage increases will be lower if company needs to put more into pension plan. Analysis of wage risk: members of company B more likely to experience

4. Continued

- Inflation risk - risk that benefit will not keep up with inflation. Analysis of inflation risk: unknown as to how a member can receive their benefit including if COLAs given, but members under both companies could face this risk

Financial Risks that Apply to Shareholders:

- Bankruptcy Risk - risk that company could go bankrupt and pension assets are protected. Analysis of bankruptcy risk: would impact shareholders of company B likely first due to financial position

  Earnings Quality Risk - risk that earnings may not grow or be as much if poor pension performance. Analysis of earnings quality risk: both companies pension expense is a large percentage of company net income. So increase in expense would decrease earnings.

Part (b):

Reason to invest in bonds

- Less risk of investments borne by employees or insolvency insurance company / increased security for participants
- Increases shareholder value - shareholder can invest in equities themselves and hold lower taxed assets.
- Better tax advantages with bonds as taxed less. Arbitrage amount = plan assets x tax spread x bond return x (1 - corporate tax rate)
- Reduces investment management fees
- Reduces company's financial risk
- Can diversify risk away individually but can't within a company

Reasons not to invest in bonds

- More transaction costs if matching to liabilities
- If everyone invests in bonds, there won't be enough supply. But lower unattractive yields may mean less in demand & supply will meet demand over time.
- Pensions have many non-bond like characteristics (payments contingent on life, term is longer than bond, no balloon payment, liabilities behave different in rapid inflation)
- Equities outperformed bonds and bonds could have high default risk
- Will need to reduce ROA assumption and this will increase expense

Company A characteristics & recommendation

- Pension expense is large part of company's expense
- Pension assets and liabilities are small compared to company's asset and liability

4. Continued

- Company asset value is significantly higher than liability - able to take on more risk and volatility, therefore should consider continuing to invest in stocks and it does not make sense to invest in bonds. I disagree with the recommendation.

Company B characteristics & recommendation

- Pension expense is large part of company's expense
- Pension plan liabilities and assets are a large portion of the companies liabilities and assets

Not much surplus assets in company - should minimize surplus volatility of the plan company can do this by investing in bonds. I agree with the recommendation.

5. **Learning Objectives**:

2. The candidate will be able to analyze the risks faced by retirees and the participants of a defined benefit or defined contribution retirement plan, as well as retiree health plans.

3. The candidate will be able to evaluate risks faced by sponsors of retirement plans.

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

Learning Outcomes:

(2d) Describe the risks faced by participants of single employer sponsored retirement plans.

(3c) Analyze the issues related to plan provisions that cannot be removed.

(6a) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

(6d) Advise plan sponsors on accounting costs and disclosures for their retirement plans. This would include restrictions imposed by applicable accounting authorities (FASB/ASC 715, CICA, IASC, FRS17).

Sources:

Allen, Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Tenth edition, 2008, "Legislative Factors" and "Other [Legislative] Factors", Ch. 17, pp. 313-319

R-C811-13: FASB Accounting Standards Codification Topic 715

Commentary on Question:

- Credit was given for compound interest or simple interest methods.
- Full credit was given if answers were off simply due to rounding.
- Credit was given for alternative calculation methods (e.g. using the prepaid/(accrued) balancing method instead of rolling forward the liability and assets)
- Credit was given if the candidate demonstrated understanding of the calculation without providing all intermediate steps.

Question Wording:

NOC is considering converting the Full-Time Salaried Pension Plan to a cash balance plan with the following provisions:

- Contribution credit of 5% of salary per year
- Interest crediting rate is equal to the yield on on-year U.S. Treasuries, reset annually
- Opening balance is equal to the present value of the accrued benefit as of the conversion date, determined using the current accounting discount rate and mortality assumptions

5. Continued

(a) Describe the impact of the proposed design on the current employees, considering:
  (i) Benefit accrual pattern
  (ii) Vesting

(b) Recommend how NOC could address potential wear-away as a result of the change.

(c) The proposed program is implemented on July 1, 2013. Using the following information, calculate the impact on the 2013 pension expense:

- There are no gains or losses during the first half of the year.
- The change in plan design results in a decrease in the projected benefit obligation of $80 million as of July 1, 2013
- The service cost is $20 million for the second half of the year
- Benefit payments expected to be made during the second half of the year are $1.5 million in annuities and $115 million in lump sums
- Total benefit payments expected to be paid during the year are $133 million.
- In the past, NOC has assumed all lump sums are paid at the end of the year in which settlement accounting is triggered
- The average future service after the change decreases by two years.

Solution:
Part (a):
(i) Accrual pattern
The accrual pattern is typically less back-loaded, because:
-- The benefit is defined based on 2% of the final average earnings per year of service under the current plan, and the benefit is defined as 5% of each year's pay per year of service under the proposed plan. Given the higher accrual rate and the updated pay definition, the accrual pattern will become less back-loaded.
(ii) Vesting
The vesting requirement is typically shorter, because:
-- One of the advantages of a hybrid plan is portability. It is easy to transfer the accrual benefit from one plan to another. Due to its objective regarding flexibility, the vesting requirement is also shorter than a traditional defined benefit ("DB") plan.

Part (b)
Ways to address wear-away issue
Allow all employees to choose between the old plan and the new plan.
Offer employees whose benefits were adversely affected by the conversion the choice to remain in the old plan.
Make an adjustment to initial account balances of the new plan for adversely affected employees

5. Continued

Make additional contributions to other plans sponsored by the employer and within which the adversely affected employees are participating.

Part (c):
Expense for the first half of the year

= Expense before any changes x half year adjustment = $56,235 x 0.5 = $28,118
Rolled-forward balance sheet as of July 1 - before implementation
PBO at 7/1 = PBO at 1/1 + half year of (service cost + interest cost - benefit payment)
= $1,436,463 + $66,869 / 2 + $66,907 / 2 - $33,000 / 2 = $1,486,851

Asset at 7/1 = Asset at 1/1 + half year of (expected return on asset - benefit payment + contribution)
= $1,188,240 + $77,541 / 2 - $33,000 / 2 + $42,391 / 2 = $1,231,706

Prepaid/(accrued) at 7/1 = P/(A) at 1/1 + half year of (contribution - expense)
= -$161,705 + $42,391 / 2 - $56,235 / 2 = -$168,627

Unrecognized losses/(gains) at 7/1 = UGL at 1/1 - Amortization of GL
= $86,518 - $0 = $86,518

Balance sheet as of July 1 - reflecting program amendment
PBO after change = PBO before change - impact on liability due to change
= $1,486,851 - $80,000 = $1,406,851

Funded status after change = asset after change - PBO after change
= asset before change of $1,231,706 - $1,406,851 = -$175,145

Unrecognized prior service cost/(income) after change = UPSC before change - impact on liability = $0 - $80,000 = -$80,000

All other numbers are not impacted by the change and therefore stay the same.

Expense for the second half of the year
Service cost = $20,000
Interest cost = PBO x interest rate + annual SC x interest rate - expected benefit payment x interest rate x half year
= [$1,406,851 x 0.045 + $20,000 x 2 x 0.045 - ($1,500 + $115,000) x 0.045 x 0.5] x 0.5 = $31,244

EROA = [Assets x EROA rate - expected benefit payment x EROA rate x half year] x half year
= [$1,231,706 x 0.065 - ($1,500 + $115,000) x 0.065 x 0.5] x 0.5 = $38,137

5. Continued

Amort PSC = New base in UPSC / average future service after change x half year = -$80,000 / (10.5 - 2) x 0.5 = -$4,706

Amort GL = [(UGL - 0.1 x maximum of PBO or asset) / average future service] x half year = [$86,518 - 0.1 x maximum of ($1,406,851 and $1,231,706)] / (10.5 - 2) * 0.5 = 0

Expense for the second half of the year = SC + IC - EROA + Amort PSC + Amort GL = $20,000 + $31,244 - $38,137 - $4,706 + 0 = $8,401

Settlement accounting check

Settlement accounting triggered if lump sum paid >= sum of service cost and interest cost

Settlement threshold = service cost + interest cost = $66,869 / 2 + $66,907 / 2 + $20,000 + $31,244 = $118,133

PBO at 12/31 = PBO at 7/1 + half year of (service cost + interest cost – benefit payment)
= $1,406,851 + $20,000 + $31,244 – ($1,500 + $115,000) = $1,341,595

PBO at 12/31 before lump sum ("LS") payments = PBO at 12/31 reflecting LS payments + LS payments = $1,341,595 + $15,000 + $115,000 = $1,471,595

Unrecognized losses/(gains) at 12/31 = UGL at 7/1 - Amortization of GL for the second half of the year = $86,518 - $0 = $86,518

UGL recognition due to settlement = UGL * LS payments / PBO before LS payments

Total expense recognition due to settlement = UGL recognition + UPSC recognition = $7,643 + $0 = $7,643

Expense for 2013

= Expense for first half the year + expense for second half of the year + settlement = $28,118 + $8,401 + $7,643 = $44,162

Impact on expense

= Expense reflecting plan change – expense without reflecting plan change = $44,162 - $56,235 = -$12,073

6. Learning Objectives:

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

Learning Outcomes:

(6h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

R-C137-08: Pension Projections

Commentary on Question:

In part (a), candidates were asked to show their knowledge of the projection process. In part (b), candidates were asked to discuss projection issues specifically for non-qualified plans, and discuss how the projection process may be different for these plans.

Question Wording:

(a) Describe the process for performing a stochastic projection.

(b) Your client sponsors a non-qualified pension plan that restores benefits lost due to regulatory limits. The plan is financed through taxable securities. Describe the issues that need to be considered when performing a stochastic projection for this plan versus a qualified pension plan.

Solution:

Part (a):

- Three elements needed for any projection study: future normal costs and liabilities, future benefit payments, future asset values
- Probability distributions need to be assigned to the assumptions that will be modeled stochastically
- Stochastic projections use random variables to bring forward liability and asset values (instead of a set of predetermined assumptions), generally economic assumptions.
- Assumptions (distributions) needed: expected inflation, real returns by asset class, standard deviation of returns and inflation
- Correlations between those stochastic modeled assumptions are needed
- Multiple trials are run using a statistical model to determine outcomes for a number of random trials (the reading says 300 trials but typically the number is 2,000 or more)
- Cost and expense calculations are done in the usual manner for each trial and these results can be ranked for each projection year and confidence intervals can be assigned

6. Continued

- Need assumptions about growth rate of the active population and new entrant demographics
- Can model each asset class separately (more sophisticated) or model the portfolio as a whole (less sophisticated)
- If alternative asset allocations are being studied, need to choose alternative mixes
- Projection steps:
    1. Discuss the scope of the project
    2. Collect the data
    3. Produce liability streams
    4. Produce valuation results: cash contributions, expense, and funded ratios
    5. Present deterministic scenarios to the client
    6. Determine assumptions and scenarios for stochastic analysis
    7. Perform stochastic projections

Part (b):

- Taxes paid on the investment return needs to be considered, this would not be a consideration for the qualified plan
- Could mean that other asset classes are appropriate for NQ plan investments that are not appropriate for Q plan investment (e.g., municipal bonds)
- If the securities include company stock, correlation assumptions between company stock and other projection assumptions may be needed
- Demographic assumptions may need to change as this is likely not a broad-based plan and therefore more specialized assumptions may be needed
- This plan is highly leveraged in that it provides for benefits in excess limits, so relatively small increases in pay can lead to large increases in the plan liability. Care needs to be taken in determining the assumptions for pay increases versus comp limits and inflation and the correlation between all of these moving parts
- Need an assumption about the increase of qualified plan limits
- May want to add scenario analysis if there is a relatively small amount of data
- How surpluses are treated may be different than the qualified plan and therefore may impact the employer's risk appetite

7. **Learning Objectives**:

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

9. The candidate will be able to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations on the actuarial issues.

12. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

(5a) Describe ways to work with the sponsor on identifying and prioritizing the goals of management and shareholders related to the financial management of their retirement plan.

(5c) Define the retirement plan risks (financial and design) in a way that integrates with the sponsor's risk management strategy.

(5g) Recommend an appropriate funding policy in line with sponsor goals and professional standards. The candidate will be able to defend the recommendations.

(9a) Assess the different types and combinations of investment vehicles for providing retirement benefits given the particulars of the sponsor's financial circumstances, philosophy, industry, workforce and benefit package.

(9e) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.

(9h) Identify the sources of investment risk and assess risk facing retirement funds.

(12e) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.

(12f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.

Sources:
R-C112-07: Pension Investment and Corporate Risk Management

R-C138-09: The Case for Stock in Pension Funds

R-C142-10: Bader and Gold's Rebuttal to The Case for Stock in Pension Funds

7. Continued

R-C161-12: Intricately Linked: Pensions and Corporate Financial Performance
April 2005 Pension Forum

Financial Economics and Actuarial Practice, Tony Day

Pension Funds: Company Manager's View

Litterman, Modern Investment Management

Jim Moore Discusses Liability Driven Investment Strategies and Concepts

Plan Sponsor Guide to Liability-Driven Investing

R-C119-07: Fiduciary Liability Issues for Selection of Investments

Commentary on Question:
In part (a), candidates were asked to discuss specific risks as they apply to the current asset mix of the Hourly plan. Points were awarded for identifying specific risks and showing how they apply to the Plan. No points were awarded for listing general risks without applying them to the plan in question. Similarly, in part (b), points were awarded for pension and fiduciary implications applying to the proposed asset allocation change.

Question Wording:
(a) Describe the risks associated with the current asset mix of the Full-Time Hourly Union Pension Plan.
Current Asset Mix:
3% domestic large cap equities
94% domestic fixed income
3% cash

(b) The CFO of NOC proposes to move 45% of the current allocation to the following asset classes:
- Equities: 15%
- NOC shares: 15%
- Real estate: 15%

Describe the implications of this proposal as it relates to:
(i) Pension accounting
(ii) Fiduciary considerations

7. Continued

Solution:

Part (a):
The current asset mix is 3% domestic large cap equities, 3% cash, and 94% domestic fixed income. The plan sponsor appears to be employing a liability-driven investment approach as the duration of the liabilities is approximately equal to the duration of the assets. However, the following risks are associated with this allocation.

Risk of higher future employer contributions (plan has locked in current underfunded status).

Liability/asset mismatch risk: even though duration of fixed income liabilities and assets are approximately equal, yield curve twists or non-parallel changes in yield curve could affect liabilities and assets differently due to the convexity of the bonds.

Domestic/diversification risk: all assets are invested in domestic funds with no diversification into international funds. Could lead to higher contributions if US economy lagged behind other economies.

Reinvestment/prepayment risk: as current bonds in trust mature, investors may have trouble finding comparable new investments.

Liquidity risk: Fixed income holdings may not provide as much liquidity as plan needs to pay lump sums to vested terminated participants.

Inflation risk: if fixed income not inflation-indexed, then assets may lag behind liabilities (plan has a COLA for retirees).

Part (b)(i):
Pension accounting implications of moving to the proposed asset allocation are as follows:

All three new classes are expected to provide higher return than fixed income so this should allow a higher expected return assumption to be used, and therefore the plan's expense will be lower.

Funded status of plan (liability on books) is expected to improve more quickly if invest in equities, NOC shares, and real estate since anticipate greater asset returns.

Duration of liabilities would no longer match duration of assets - move away from immunized portfolio means funding shortfall is no longer locked in. Therefore, asset returns or losses and interest rate movements will now have greater impact on funding shortfall.

7. Continued

Greater variance in annual asset movements will lead to more volatile (less predictable) accounting expense.

If investing in company shares, then poor company performance could lead to worse funded status and higher accounting expense.

Must disclose changes in asset allocations in annual disclosure – these changes could negatively impact view of company held by investors, analysts, and auditors as they question why the plan is moving away from a liability matched investment strategy.

Part (b)(ii):
Fiduciaries should consider their following duties before changing to this asset allocation:

Duty of Loyalty to plan participants and beneficiaries: Fixed income investments are less risky so change in strategy could be viewed as putting benefits at more risk. Investing in company stock could also be viewed as a company conflict of interest and not in the best interest of the plan participants.

Duty to diversify plan assets, be prudent and minimize risk of large losses: Since plan currently underfunded, converting some fixed income to equities, NOC shares, and real estate would provide better diversification and is expected to lead to higher expected returns.

Duty of Impartiality: Investment committee may be concerned that current retirees are better protected than future retirees due to current fixed income allocation and plan's underfunded status. Change to more diversification could be perceived as providing more impartiality.

Duty to follow Statutory Constraints (must stay within legal guidelines to benefit participants): Need to be aware of legalities around holding company shares in pension plan trust.

Duty to Make Property Productive: Board may view new investment strategy as making property more productive and able to get better returns than current investment policy.

Duty to act in accordance with trust agreement – Investment committee will need to update trust agreement to accommodate new investments.

Duty of Care: Committee needs to manage trust with skill and either act as investor or hire investor with professional training, experience. Before moving out of fixed income, committee may need to hire knowledgeable investment advisor to pick appropriate equity and real estate investments.

8. Learning Objectives:

1. The candidate will be able to evaluate sponsor's goals for the retirement plan.

2. The candidate will be able to analyze the risks faced by retirees and the participants of a defined benefit or defined contribution retirement plan, as well as retiree health plans.

3. The candidate will be able to evaluate risks faced by sponsors of retirement plans.

Learning Outcomes:

(1c) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.

(1d) Given a context, assess the feasibility of achieving the sponsor's goals for their retirement plan.

(1e) Given a context, assess the tradeoffs between different goals and prioritize them.

(2b) Propose ways in which retirement plans can manage the range of risks faced by retirees.

(3a) Identify how plan features, temporary or permanent, can adversely affect the plan sponsor. For example – an early retirement window offering or a lump sum payment option.

(3b) Recommend ways to mitigate the risks identified with particular plan feature (e.g., cap an open-ended COLA).

(3d) Describe plan design features to handle the changes in the demographics of the labor force.

Sources:

Fundamentals of Retiree Group Benefits, Yamamoto

Morneau Sobeco Handbook of Canadian Pension and Benefit Plans

Commentary on Question:

Candidates receive points for 2 of the 3 options shown in the solution.
The actual dollar values in part (a) are not relevant. Any reasonable value will receive points. However no points are given for unreasonable or impractical answers.
(e.g., annual HCSA = $500,000).

Question Wording:

NOC is concerned about the impact of rising health care costs on the sustainability of the Full-Time Salaried and Union Retiree Health Benefit Program. No changes to the retiree life insurance benefit are being contemplated at this time.

8. Continued

a) Propose two plan design approaches that would reduce NOC's exposure to health care cost inflation and explain how each would protect against health care costs.

b) NOC is considering changing the retiree health care benefit program by replacing the current program with a $250,000 lump sum payment at retirement.

Describe the risks with this approach from the perspectives of both NOC and NOC's employees.

Solution:

Part (a):

Option 1: Change the design to a Health Care Spending Account with a fixed annual allocation of $2,000 per retiree. This will cap NOC's annual cost avoiding large claims each year and will also protect against inflation in future years as the amount doesn't have to be increased.

Option 2: Introduce cost sharing options that will encourage retirees to be better consumers of health care. Some options that could be introduced are co-pays, deductibles and an annual maximum. These options would reduce NOC's cost and they could increase amounts in the future to help protect them from inflation.

Option 3: Add a lifetime maximum to the plan. This would cap NOC's cost at the lifetime maximum and would help protect them from future inflation.

Part (b):

Employer Risks:

1. By paying employees a lump sum at retirement, NOC loses control over how the money is spent and therefore there is no guarantee that employees will use the money for retiree health care costs.
2. Paying lump sums could cause a large immediate drain on NOC's cash flow.
3. HR issues could arise
    a. Now difficult to attract & retain employees
    b. Workforce planning could be difficult – could also impact pension plan. This is because somebody who is not healthy could defer retirement to a later age so that they have a better chance of the lump sum covering their health care costs.
4. There could be a lot of volatility between years of how many lump sums the plan would pay out – it could be very hard to predict. In addition it could cause the plan to have settlement charges in years where there are large payouts.
5. The union will have to approve of the change – could mean having separate programs for different groups.

Employee Risks:

1. Lump sum may not be enough for an employee that has a catastrophic claim or serious illness.
2. Retirees will face longevity risk – the retirees could live longer than expected and run out of money for health care costs.

8. Continued

3. Retirees will bear inflation risk – the retirees will have to cover all increases in future health care costs.
4. Retirees will now need to invest the money and deal with market risk. They may need to get education on how to invest the money wisely.
5. Retirees will now need to find health care coverage. There may not be many plans that are accessible to them or the ones that are may be very expensive.
6. If the retiree has a dependent, they will get the same amount as a retiree without a dependent.

9. Learning Objectives:

9. The candidate will be able to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations on the actuarial issues.

Learning Outcomes:

(9a) Assess the different types and combinations of investment vehicles for providing retirement benefits given the particulars of the sponsor's financial circumstances, philosophy, industry, workforce and benefit package.

(9b) Distinguish the various ways that retirement fund assets are managed.

(9d) Assess the potential effects of various investments and investment policies on plan funding (short and long-range), accounting, design and administration.

(9e) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.

(9f) Model the effect on setting investment strategy of factors including, cash flow requirements, various plan designs and various economic environments.

(9h) Identify the sources of investment risk and assess risk facing retirement funds.

Sources:

R-C167-13: Dynamic Approach to Investment Policy for Corporate Pension Plans, *Global Markets Institute*

Commentary on Question:

Candidates were asked to describe and consider the application of a dynamic investment policy. Successful candidates demonstrated their knowledge of dynamic investment policies by describing a specific investment policy in part (c).

Question Wording:

(a) Describe the key elements of a dynamic investment policy.

(b) Describe the factors to be considered in employing a dynamic investment policy.

(c) Describe a dynamic investment policy that NOC could apply to the Full-Time Salaried Pension Plan.

Solution:

Part (a):

In a dynamic policy/approach, the investment of plan assets takes into account factors other than the plan sponsor's view of specific asset classes or characteristics of plan liabilities. The strategy reflects the unique circumstances of the sponsor.

9. Continued

In a dynamic strategy, the allocation of plan assets changes as these circumstances change. In practice, this involves establishing a plan (or "road map") indicating how the allocation should change as predefined milestones are reached. Both the milestones and the allocation shifts are explicitly specified in the policy. A common approach, although not the only one, is to set milestones (or "triggers") based on the funded status of the plan. For example, upon each 5% improvement in funded status, a specified percentage of assets are shifted from return-seeking assets (such as equity) to less risky assets (such as fixed income).

Part (b):
Most important factors:

- **Funded status:** As funded status of the plan improves, risk should be shed through gradual transition from return-seeking assets (e.g., equity) to less risky assets (e.g., fixed income). As funded status improves and exceeds 100%, plan sponsors would likely shift from return generating assets to more of an LDI approach to preserve funded status. The GAAP definition of funded status, PBO versus the fair value of assets, can be used to evaluate this factor.

- **Size of plan relative to organization (materiality):** The more material the plan, the less risk the sponsor should take. If the plan is very small in relation to the size of the company, volatility in plan funded status may not have a meaningful effect on the financial results of the plan sponsor. Consequently, the sponsor may be willing to take more risk and/or have more duration mismatch if the plan is relatively small and, therefore, a negative change in funded status does not have a meaningful impact on the sponsor. The opposite may be true if the plan is very large in relation to the company. Materiality is commonly measured as the ratio of plan liability to a measure of the size of the sponsor (e.g., PBO to market capitalization for a public company).

Other factors:

- **Open or closed plan:** more risk is tolerable in an open plan because future investment returns can help fund future benefit accruals, less in a closed plan. Sponsors with open DB plans that are still accruing new benefits for employees will be more inclined to seek higher returns in an effort to help fund these new benefits while sponsors with closed plans, especially if they are fully funded, may be more inclined to other (possibly LDI-type) strategies.

- **Extent of smoothing employed in liability and cost determinations:** the greater the extent to which measurements are marked to market, the less risk the sponsor should take (because the volatility produced by risky assets is amplified when smoothing mechanisms are not employed).

9. Continued

- **Health of plan sponsor:** a financially stronger sponsor with greater cash flow can absorb more pension investment risk. Given their financial strength, they may be capable of rectifying funding deficiencies through contributions if pension asset returns are disappointing.

- **Life cycle of plan:** a more mature plan has larger cash outflows in the form of benefit payments to retirees. More mature plans, therefore, will need to focus more on liquidity to face these growing cash needs.

- **Access to surplus:** if surplus assets are largely inaccessible (e.g., due to taxes on assets that revert to the sponsor upon termination), the sponsor should be less willing to invest in risky investments that could result in stranded assets in the future. Increases in underfunding impose many "penalties" on the plan sponsor while increases in overfunding yield incrementally fewer benefits given the restrictions placed on a plan sponsor's ability to access surplus. If a company does have the ability to access surplus for other uses, such as to help pay for retiree medical benefits, then the plan sponsor may be more willing to take risk in the plan despite being in an overfunded position. The ability to access surplus will differ from company to company based on the specific nature of their benefits structures as well as governing law.

- **Private vs. publicly traded company:** private companies may not be as sensitive to the impact of funded status volatility on financial results. A private company not beholden to the public's scrutiny of quarterly and annual results may be willing to take more risk and/or have more duration mismatch if it is less concerned with how short-term funded status volatility affects financial results.

Part (c):
Selected relevant information:

- Current asset allocation: 48% equity, 43% fixed income, 5% cash, 4% real estate
- Current funded status: 83% on PBO basis, 118% on ABO basis
- Duration of plan liabilities: 16.1
- Duration of domestic fixed income portion of assets: 10.0
- Plan status: open
- Materiality of plan to NOC: unknown

NOC could implement a dynamic investment policy with these components:

- An ultimate goal, such as funded status on a defined basis (e.g., ongoing funding, plan termination, or accounting). Examples that might be appropriate for NOC's Salaried Plan are 100% funding on a PBO basis, 110% funding on an ongoing funding basis, or 100% funding on plan termination basis.

9. Continued

- Assets will be reallocated as certain pre-defined thresholds are reached, such as each 5% change in funded status. NOC can make the thresholds wider (e.g., 10% change) or narrower (e.g., 3% change) depending on its desired balance of precision and transaction costs. As funded status improves, assets will be shifted from more risky investments to less risky investments (e.g., from equity to fixed income). Here is one possible "road map" based on a goal of becoming 100% funded on a PBO basis:

PBO Funded Status	Return-Seeking Allocation	Fixed Income and Cash Allocation
85%	45%	55%
90%	35%	65%
95%	25%	75%
100%	15%	85%

- NOC is also subject to interest rate risk due to the asset-liability duration mismatch. The policy may address this mismatch by gradually changing the composition of the fixed income portion of plan assets as predefined targets are met.

- The policy may also account for other facts and circumstances such as the plan becoming frozen, major changes in NOC's market capitalization, new funding legislation or accounting standards, etc., by stipulating how the plan's asset allocation (or the investment policy itself) will be changed.

10. **Learning Objectives**:

9. The candidate will be able to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations on the actuarial issues.

Learning Outcomes:

(9a) Assess the different types and combinations of investment vehicles for providing retirement benefits given the particulars of the sponsor's financial circumstances, philosophy, industry, workforce and benefit package.

(9d) Assess the potential effects of various investments and investment policies on plan funding (short and long-range), accounting, design and administration.

(9g) Describe the regulatory restrictions on retirement plan assets.

(9h) Identify the sources of investment risk and assess risk facing retirement funds.

(9i) Evaluate immunization strategies and other hedging techniques for asset/liability management.

Sources:

Allen Chapter 24 pg 11, 16-18

R-C142-10: Bader and Gold's Rebuttal to The Case for Stock in Pension Funds

R-C148-10: Jim Moore Discusses Liability Driven Investment Strategies and Concepts pg 1-3

R-C149-10: Plan Sponsor Guide to Liability-Driven Investing, BNY Mellon pg 1-5

R-C150-10: Mind the Gap: Using Derivatives Overlays to hedge pension duration

R-C161-12: Intricately Linked: Pensions and Corporate Financial Performance pg 4-11

Commentary on Question:

Successful candidates addressed the CFO's concerns in part c and looked at the funded status of the plan when answering the question.

Question Wording:

The CFO of NOC wants to de-risk the Full-Time Salaried Pension Plan by changing the current asset mix.

(a) Describe techniques to extend the duration of the current fixed income portfolio.

(b) Calculate the duration extension needed to achieve a hedge ratio of 50%.

10. Continued

(c) Given that current bond yields have been historically low, the CFO is concerned that it does not make sense to de-risk at this time.
Explain why adopting an LDI strategy may make sense even in a low bond yield environment.

Solution:

a. Techniques to extend duration – Response should show understanding of these investments, not just listing alternatives
    a. Information about purchasing long bonds
        i. Increase number of long bonds or switch short bonds with long bonds
        ii. Long bonds can generate a more similar cash flow as liability
        iii. Long bonds have longer maturity but may be difficult to find
        iv. Long corporate bonds, mortgage bonds, debenture
        v. Government bonds can extend duration, but at a cost of lower yields
    b. Information about fixed income derivatives
        i. Derivatives derive value from another asset
        ii. Call and put options, futures, convertible bonds, swaps and forwards
        iii. Overlays add duration without having to sell existing equity or bond positions, but require sufficient liquidity to fund margin requirements
        iv. Calls give option to buy an asset at a specified price until a specified date
        v. Puts give option to sell and asset at a specified price until a specified date.
        vi. Interest rate swaps – One party pays fixed interest and the other pays a floating rate. Differences are exchanged in cash.
    c. For correct formula calculating hedge ratio : Duration of domestic fixed income * Asset allocation % of domestic fixed income * Funded status (Fair value of assets/PBO) / Duration of plan liabilities
        i. PBO: 10.0 * 43% * (1,188,240/1,438,463) / 16.1 = 22.1%
        ii. ABO: 10.0 * 43% * (1,188,240/1,005,524) / 16.1 = 31.6%
    d. For correct formula calculating change in duration: Desired hedge ratio * Duration of plan liabilities / (Asset allocation % of domestic fixed income * Funded status (Fair value of assets/PBO))
        i. PBO: 50% * 16.1 / (43% * (1,188,240/1,438,463)) = 22.7
        ii. ABO: 50% * 16.1 / (43% * (1,188,240/1,005,524)) = 15.8

10. Continued

b. Generic reasons for using LDI
    a. Protects downside risk of plan funded status
    b. Minimizes volatility of contribution requirements
    c. Stabilizes pension expense on income statements
    d. Reduces balance sheet volatility
    e. Aligns asset performance with liability benchmark
    f. Addresses duration mismatch between liabilities and asset movements
    g. Employs investment strategies to extend duration of portfolio
    h. Recognizes un-symmetric risk reward of pension funded status (i.e. pension surplus is inefficient)

    Specific response to CFO's concern about de-risking in low interest rate environment
    i. Liability and asset mismatch exists regardless on economic environment
    j. Market theory suggests current price is correct. Past experience is no predictor of future results
    k. If CFO is sure about rise in interest rate, asset positions (i.e. swaps, futures) can be entered in to maximize profit in the case of a rise in interest rates. If that seems too risky, then point out that a similar bet is being made with regards to the funded status.
    l. De-risking doesn't have to mean selling current positions, but can effect positions going forward.
    m. Hedge ratio of fixed income portfolio can stay low initially
    n. Key is to focus on end point. If end point makes sense, than LDI makes sense. Craft a policy that addresses how to get to the end point.
    o. Concerns about market timing, being smarter than the market, etc.

11. Learning Objectives:

12. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

(12a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.).

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

(12f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.

Sources:

ASOP 2, 4, 23,41 – ASB

ASOP 21, 27, 35 – ASB

Pension Forum January 2005 - A Reevaluation of ASOP 27, Post Enron: is it an Adequate Standard of Professionalism?

What's wrong with ASOP 27

AAA Code of Professional Conduct

SOA Code of Professional Conduct

Commentary on Question:

Successful candidates addressed all three parts (plan provisions, assumptions and data sections) when answering the question.

Question Wording:

(7 points) You are providing services to a new client whose prior actuary recently retired.

You have been provided the following sections of the last funding valuation report:

Plan Provisions:

- Vesting: Immediate on retirement and death
- Benefit formula: $80 per month times pensionable service
- Normal retirement age: First of the month coincident or following age 65
- Early retirement reduction: 5% per year from age 65
- Normal form of pension: Single life annuity if single; joint and survivor annuity if married
- Termination and death benefit: Commuted value of accrued benefits

11. Continued

- Post-retirement indexing: 60% CPI each January 1st for retirements prior to September 1st before each increase

Assumptions:

- Interest rate: 7.5% per annum
- Inflation: 2.5% per annum
- Salary increases: 2.5% per annum (inflation plus merit and
- promotion)
- Retirement age: Plan experience from the last 50 years
- Mortality: GAM83 with full generational mortality projections
- Percent married: 50%
- Spousal age difference: Male spouse 3 years younger than female spouse

Membership Data as of December 31, 2012:

Active Members

- Number: 555
- Average age: 42 years
- Average service: 15 years
- Average annual earnings: $43,000

Deferred Vested Members

- Number: 156
- Average age: 42 Years
- Average service: 9 years
- Average annual earnings at termination: $33,000

Retirees/Surviving Spouses/Beneficiaries

- Number
  - Retirees: 850
  - Surviving spouses: 200
- Average age: 72 years

Critique the plan provisions, assumptions and data sections of the report. Refer to the US Standards of Practice in your response.

Solution:

Plan Provisions

- Form of pension -- Is there a guarantee period on the annuity; is there a joint percentage?
- Is there an early retirement age?

11. Continued

- What is vesting on termination? Ie: is there no termination benefit payable; however question indicates the termination benefit is commuted value
- Missing provisions: disability, eligibility, actuarial equivalent or not, service defined etc. Candidates received points for any correct missing provision but the points awarded were capped.
- References to ASOP's and how all plan provisions and ancillary benefits need to be disclosed. Provide explanations of why not included.

Data

- Average earnings are irrelevant for a flat benefit plan so do not need to be provided
- For active members further details or summary charts for age/service distributions would be desired. Need to know accrued service (to calculate benefit) for various age groupings.
- For deferred vested members and pensions in pay, actual pension amounts in some sort of distribution chart would be beneficial
- Actual forms of payment with actual benefits in pay split into grouping for each of deferreds and those in pay would be beneficial
- Data on sex make-up or unisex percentage missing
- For another actuary to recreate valuation results or determine reasonability of data more detailed information is required than what was given
- Standards: ASOP 23.
    - Valuation report must state source of data; reviewed by actuary or not; did actuary have to make assumptions for missing or incomplete data and if so, were there any limitations on the actuarial calculations due to quality of data

Assumptions

- Were any assumptions prescribed and were any in the question not compliant with prescribed assumptions?
- ASOP 27 and 35 and how they apply
- Are they best estimate assumptions; independently reasonable and in aggregate per Standards?
- Were assumptions consistent? With salary and inflation equal to each other this implied merit and promotion were = 0%. Many candidates referenced this inconsistency. Why was salary increase even provided for flat benefit plan?
- Interest rate seems too high; current funding rules have prescribed rates that this assumption would violate
- Retirement ages – 50 years of historical data is an unnecessarily long time period

11. Continued

- Is there enough credible data from actual plan experience to create retirement age table or should another source be used? Would a single age be simpler and just as accurate?
- Actual retirement scale using the referenced 50 years of history not provided; termination scales not provided either

Percent married and spousal age differences – both assumptions were perhaps not traditional assumptions. Some candidates made references to whether actual plan experience should be reviewed to validate these assumptions or use some external proxy.