CSP-RC Complete Illustrative Solutions
Spring 2011

1.

Learning Objectives:

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

3. The candidate will be able to evaluate risks faced by sponsors of a retirement plan by virtue of the plan's design and be aware of methods to mitigate these risks.

Learning Outcomes:

(2a) Describe the agency relationship between management of the sponsor and its shareholders or taxpayers.

(3a) Identify how plan features, temporary or permanent, can adversely affect the plan sponsor.

Sources:

Morneau Sobeco, Handbook of Canadian Pension and Benefit Plans, Fourteenth Edition, 2008, Chapters 1, 5 and 6

R-C108-07: Center for Retirement Research at Boston College – March 2006 Bulletin

R-C102-07: Turner & Watanabe, Private Pension Policies in Industrialized Countries, Chapter 5

Commentary on Question:

The question tests specific knowledge of disability benefits, understanding of the actuarial basis of a retirement plan actuarial valuation, and the ability to work with management on innovative benefit plan ideas.

The points are 5 for part (a), but only 2 for part (b).

The expected answer to part (a) focuses on the business risk for NOC of its relationship to the retirement plan that would add this innovative proposed benefit design. The 5% deemed earnings increase would be a plan provision, not an actuarial assumption. This benefit provision would increase administration cost initially and ongoing. The proposed design would affect recruiting, selection, and retention and might have unintended consequences. The proposed design creates exposure to a new benefit liability.

The expected answer to part (b) is built on understanding the structure of the actuarial assumptions. Due to the low point value of this question, no elaboration is expected.

1. Continued

Solution:

(a) Identify the risks to NOC associated with adding this disability provision to the plan.

The deemed five percent increases may exceed actual average pay increases. The benefit may provide a more than adequate retirement income.

NOC would self-insure this benefit. The main risk faced by the plan is the increase in accrued liabilities which could increase future contributions.

To avoid problems with determination of disability will require careful design, procedures, and training. The benefit must be coordinated with other disability and medical plans. There will be new record-keeping requirements for disabled employees, who may return to work with NOC or another employer.

<u>Generous benefit structures affect the workforce:</u>

- Active workers may resent the value of the benefit for their disabled colleagues.
- The benefit may help attract and retain employees, but may attract those who have a greater expectation of becoming disabled.

<u>The rate at which employees become disabled varies.</u>

- Increases may be experienced in economic slumps.
- Plans that cover members in cyclical business can be at a higher risk.
- Disasters and epidemics happen.

The duration of disability varies. For disabled employees, the deemed five percent increases and service credits may be an incentive to malinger.

(b) Assuming this amendment is adopted, address the impact this would have on NOC's assumptions for funding purposes.

New actuarial assumptions may be needed:

Disability incidence
Disabled life mortality
Recovery and return to work

Old assumptions may need adjustment:

Turnover
Retirement

2. Learning Objectives:

1. 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.

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

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

Learning Outcomes:

(1b) Propose ways in which retirement plans can manage the range of risks faced by retirees.

(1d) Describe the risks faced by participants of single employer sponsored retirement plans.

(2b) Compare the, sometimes conflicting, interest of management, employees, shareholders or taxpayers (in the case of public sector).

(4e) Given a context and plan type, recommend appropriate plan design/features and defend the recommendations.

(4h) Given a context and sponsor objectives, advise a plan sponsor regarding the choice of design elements for their retiree health program.

Sources:

Yamamoto, *Fundamentals of Retiree Group Benefits*, 2006, Chapters 4 and 7

Allen, *Retirement Plans*, Chapter 2

McGill, *Fundamentals of Private Pensions*, Chapter 14

Commentary on Question:

This is a straightforward question on retiree health plan designs and retiree contributions. Candidates needed to assess why the alternatives under part (b) reduced risks to score full marks.

Solution:

(a) Identify the risks to NOC and the future retirees of introducing retiree contributions and compare the proposed approaches in terms of the impact on NOC.

Both NOC and retirees would still be subject to inflation risk. This is the risk of future increases in the cost of healthcare.

2. Continued

The inflation risk is shared by both NOC and the retiree in approach 1, with 80% of the cost being paid by NOC and 20% being paid by the retiree. The inflation risk is capped for NOC under approach 2. The impact of inflation is absorbed by NOC until the per capita claims exceed $15,000 and then the inflation cost is borne by the retirees.

Both NOC and retirees are subject also to volatility risk. This is the risk of healthcare cost fluctuation from year to year. The volatility risk is shared by NOC and the retiree under approach 1 and eliminated for NOC when the per capita claims exceed $15,000 under approach 2.

Introducing contributions could create workforce planning risk for NOC. The additional contributions could make NOC benefits less competitive compared to its competitors and lead to employee attraction and retention problems. The required contributions also effectively reduce retirement income forcing employees to delay retirement in order to maintain target income.

There would be a risk of anti-selection for both NOC and the retirees. Healthy retirees will tend to opt out of the program leaving less healthy retirees in the program leading to an increase in healthcare costs.

In addition, contributions could also see the cost of healthcare reduced as the retirees start to make smarter decisions as they are now affected by cost increases.

Healthcare cost could also increase if retirees defer preventative services leading to more expensive treatment later.

The administration cost for NOC will increase as it now needs to collect contributions from the retirees.

(b) Describe two other methods of introducing retiree cost sharing to the Program and explain how these methods might mitigate risk to the plan sponsor.

(Marks limited to two cost sharing options from list.)

1. Introduce contributions based on age
   Description: required contributions higher or lower subsidies for early retires
   Risk Mitigation: lowers cost for pre-65 population, which is most expensive

2. Continued

2. Redefine retirement eligibility requirements - eliminate some people from plan
   Description: increase eligibility requirements so that employee must have more service to retire and receive benefits from the plan
   Risk Mitigation: lowers total employer cost since less people in the plan

3. Introduce service related benefits
   Description: increase employer subsidy for employees who have more service
   Risk Mitigation: lowers total employer cost since people with lower service will be paying higher premiums

4. Introduce a total expenditure cap
   Description: NOC will only pay a certain amount for all retirees
   Risk Mitigation: lowers total employer cost since total cost capped

5. Introduce an account based plan for future retirees
   Description: employees provided with a dollar amount per year of service, withdrawal options include: annuitization or establish a flex spending account
   Risk Mitigation: lowers total employer cost since cost for each employee is essentially capped

6. Introduce deductibles or co-pays
   Description: only healthcare claims paid if above a determined dollar amount or only a percentage of healthcare claims paid
   Risk Mitigation: lowers total employer cost since lower benefit coverage

3. Learning Objectives:

1. 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.

5. The candidate will be able to synthesize and evaluate deferred compensation and supplemental retirement plans for the highly paid in a given context.

Learning Outcomes:

(1a) Identify risks faced by retirees and the elderly.

(1d) Describe the risks faced by participants of single employer sponsored retirement plans.

(5c) Given a context, assess the plan from an executive's perspective.

(5e) Assess the taxation issues.

Sources:

Post Retirement Risks Chart, SOA

Allen, Chapter 14

Morneau Sobeco, Handbook of Canadian Pension and Benefit Plans, Fourteenth Edition, 2008, Chapter 11

Private Pension Policies in Industrialized Countries, Chapter 5, "Pension Risk and Insurance," pp 65-81

Commentary on Question:

This question was trying to test candidate's ability to assess the two options from the CEO's perspective.

To receive maximum points, it was important to describe the actual risks inherent to these particular two options rather than just "list" all potential risks for any retirement arrangement.

Candidates often mentioned a few of the risks but missed others. The risks most often not mentioned were related to benefit adequacy, interest rates and taxation.

3. Continued

Solution:

Compare and contrast the risks to the CEO associated with each option.

Risk	Option 1	Option 2
Benefit Adequacy	• Accrual of benefits is "backloaded" (i.e. increases relative to salary the longer member has been in Plan) • Option doesn't compensate for mid-career hire • Doesn't provide for higher level of benefits than broad-based plan • Earnings definition doesn't recognize incentive pay (could be a large component of compensation)	• Can compensate for mid-career hire • Earnings definition doesn't recognize incentive pay
Inflation Risk	• No post-retirement inflation protection	• No adjustment to lump-sum benefit between termination of employment and pay out
Benefit Security	• On-going lack of protection if employer's inability to pay benefits (e.g. bankruptcy) • On-going lack of protection if employer's unwillingness to pay benefits (implicit contract risk, change of ownership)	• Same as Option 1, but for shorter period (i.e. only until payment of lump sum)
Treatment on Events	• Stringent vesting/early retirement requirements • No benefits on termination, death, etc.	• Benefit payable under all contingencies
Taxation	• If arrangement was funded, member may have to include value of benefit in taxable income	• Large amount of tax payable upon receipt of lump sum benefit
Longevity Risk	• None	• Risk of outliving lump-sum benefits (unless annuitized)
Interest Rate Risk	• None	• The higher the interest rate, the higher the annuitized benefit at retirement/replacement ratio • Annuitized benefit at retirement will depend on pension commencement age and form of benefit at termination of employment
Market Risk	• None	• Stock market risk if payment is invested in equities

4. Learning Objectives:

11. 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:

(11b) Distinguish the various ways that retirement fund assets are managed.

(11c) Given a context, evaluate a Statement of Investment Policy.

Sources:

R-C 112-07 Pension Investment and Corporate Risk Management

R-C 608-07 PPD Investment Policy Guideline

Litterman, *Modern Investment Management*, Chapter 24

Cassidy, "Equities in DB Plans – Is the Traditional 60/40 Mix a Dinosaur?"

Allen, *Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches*, Chapter 24

Commentary on Question:

In part (a), candidates were expected to understand what an index fund is in order to analyze investing in such. Candidates did not do well if they did not recognize that there are a variety of different types of index funds for the different types of asset classes (i.e., stocks, bonds, cash equivalents, etc.).

In part (b), candidates were expected to demonstrate an understanding of the components of an investment policy statement. Candidates were expected to show this comprehension by synthesizing an actual investment policy statement for the NOC Salaried Pension Plan. Candidates who did well on the question connected the components of the IPS to the Salaried Plan itself and the fact that investments were limited to index funds.

Solution:

(a) Describe the advantages and disadvantages of limiting the investments to index funds.

Advantages

- Based on the efficient market hypothesis, active management cannot add value (can't beat the market).
- Investment only in index funds should result in lower investment management fees.

4. Continued

- Index funds offer good diversification.
- Plan liabilities will follow assets if benefits are tied to an index.
- The duration of plan liabilities can be matched to an index.

Disadvantages

- Studies published show a complete efficient market hypothesis does not exist and there are some excess returns.
- Full replication is difficult or expensive particularly within the bond market.

(b) Assuming the pension fund investments are limited to index funds, outline an investment policy statement for the pension fund of the National Oil Full-Time Salaried Pension Plan.

Investment Policy Statement for the National Oil Full-Time Salaried Pension Plan

Purpose
The objective of the IPS is to ensure the benefit promised is secure and provide the retirement benefits at a reasonable cost that is not unacceptably volatile.

Plan Overview and Investment Implications
The Salaried plan is a defined benefit, final average earnings plan. The benefits are not indexed however the final average earnings is tied to a future salary scale. The liabilities are uncertain due to mortality rates and future salary growth. A large portion of the liability is due to actives. The average active age is 48.

The plan is an ongoing plan and overfunded on an accrued liability basis. There is a chance of takeover.

Governance
Relevant parties, such as NOC, the board of trustees, investment committee, actuary, custodian, etc., should be identified along with their duties.

Investment Beliefs
NOCs philosophy is that active management does not add value and index funds provide a cost effective way to get exposure to markets.

Investment Objectives of Fund
The return expectations of the funds should be quantified based on the return of the fund the index is replicating. Risk expectations and tolerance levels should be described. NOC should consider liquidity as they pay lump sums and would need approximately 29 million per year for benefit payments.

4. Continued

Asset Mix and Policy Ranges
The major asset classes and permitted ranges around the mix, based on the index funds, should be identified.

Rebalancing Policy
Less frequent rebalancing because invested in passive funds. Asset classes should be rebalanced to mimic the allocation of assets within the index.

Investment Manager Structure, Selection and Mandates
One investment manager will be hired at little cost to mimic the index fund. It is not worth paying the additional cost for many managers for markets are assumed to reflect all knowledge.

Investment Objectives / Monitoring for Managers
Set benchmarks at the fund level using index funds at policy weights. Describe the review of investment performance and outline reasons that managers may be replaced (i.e., failure to meet target performance).

Permitted Investment Constraints
List of permitted asset classes and individual investment limits. Investments constrained to index funds.

Derivative Policy
Derivatives are permitted for derivative based indexing strategies.

Conflict of Interest Policy
Investment managers shall be governed by professional standards.

Voting Rights Policy
Delegate responsibility of exercising voting rights acquired through the funds' investments.

Securities Lending
Plan sponsor may enter into loan agreement if loaned investments secured by cash or marketable security and losses guaranteed by custodian.

Valuation of Investments
Investments not regularly traded or inactive will be valued at least annually by custodian.

Soft Dollar Policy
Use of soft dollars are permitted by managers if manager discloses how they are allocated.

4. Continued

Policy Review
The IPS shall be reviewed annually or if there is a significant change in legislation, demographics or company structure.

Related Party Transactions
Any related party transaction necessary for the operation of the pension plan shall be exempt.

5. Learning Objectives:

11. 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:

(11a) 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.

(11e) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.

(11g) Describe the regulatory restrictions on retirement plan assets.

(11h) Identify the sources of investment risk and assess risk facing retirement funds.

Sources:

Allen Chapter 29

Morneau Sobeco – Chapter 6

20 Questions Directors should ask about their Role in Pension Governance, CIC

Commentary on Question:

The question was trying to test if a candidate understands the advantages and disadvantages of having employer stock as an investment option in a pension plan and what is the employer's fiduciary responsibility by offering its own stock as an investment option.

For part (a) of the question, most of the candidates could list the advantages and disadvantages of having employer stock as an investment option and this list received most marks.

For part (b) of the question, candidates were required to demonstrate an understanding of the employer's fiduciary obligations in the context of the question rather than simply providing a list of fiduciary obligations in general.

Solution:

(a) Describe the advantages and disadvantages of offering employer stock as an investment option under this plan.

Advantages

- Reduce administrative costs (investment management)
- Strengthens the link between employees
  - Align employer's and employee's interest

5. Continued

- Dividends paid will be tax deductible to employers
- Employee ownership reduces hostile takeover attempt

Disadvantages

- Undiversified option and may be inappropriate from a financial perspective
- Employee relation problems may surface if stock value declines
- Must satisfy the fiduciary requirement for prudence
  - Show that it is for the best interest of the participant
  - Still need to offer alternative options
- Employee may have their livelihood and savings tied to the well being of the company
  - Exposure to business risk
- Should dividends be paid to employees as cash which may be different from the plan objective of providing retirement income

(b) Describe the fiduciary obligations of XYZ Co. with respect to the investment options offered under a qualified defined contribution pension plan.

- Responsible for structuring appropriate investment programs
  - Follow regulatory constraints
  - Make sure fees are reasonable
  - Allow timely changes
- Selecting suitable investment managers
- Monitoring investment performance
- Communicating critical investment provisions to employees
  - Educating employees about retirement, investment strategies/income
  - Ensure that employees are able to manage investment decisions
- Discharge its duties solely in the interests of plan participants and their beneficiaries
  - Make decisions that are best for participants
  - Loyalty
- Act honestly and in good faith
- Standard of care
- Exercise care, diligence and skill that a person of ordinary prudence would exercise
- Prudent portfolio rule
- Overall reasonable level of risk the plan should undertake as a whole and the appropriate level of diversification of the entire pension fund
- Ensure investment decisions are based on sufficient information and sound judgment, not necessarily to guarantee a certain level of performance
- Responsible for the proper selection and retention of external fiduciaries (delegating specific investment authority to outside professionals)
- Prudently select and monitor investment advisor services (if offered)

5. Continued

- Identify, disclose, and manage any conflict of interest
- Ensure the SIP&P is in place and well documented
  - "CAP" or "CAPSA" guidelines
- Stay current on developments that have a significant impact on the elements of good governance
  - Continue to ensure investment options remain appropriate
  - Provide ongoing communication to employees on changes relating to the plan
  - Provide sufficient notice if any changes are being made to the investment options

6. Learning Objectives:

1. 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.

Learning Outcomes:

(1f) Evaluate benefit adequacy for members of a particular plan given other sources of retirement income.

(1g) Construct a model for measuring replacement income adequacy under different scenarios.

Sources:

R-C104-09 Replacement Study – A Measurement Tool for Retirement Planning

McGill Chapter 7 pages 232-245

Morneau Sobeco Chapter 1 pages 22-23

Commentary on Question:

Maximum points earned for those who saw shortcoming of analyzing plan replacement based on one individual case and proposing alternatives to make a better analysis.
No marks were given for recommending plan changes.

Solution:

(a) Assuming the new DC provisions are adopted, calculate the income replacement ratio at age 65 for Member A.

Commentary on Question:

Candidates should provide definition, so grader knows what is being calculated; annuity certain approximation accepted as long as it is close to above value; partial credit if only employee contributions used in calculation.

Replacement Ratio = gross income after retirement/gross income before retirement.
Accumulated funds at age 65 in DC Plan:
Employee contributions are 10%, employer contributes 6%
Annual total contribution first year = 50,000 * 16% = 8,000
Annuity certain accumulation factor = 48.06 = ((1+i+ss)^19-1)/ln(1+i+ss)
Accumulated contributions = 8,000 * 48.06 = 384,480

Total Income:
Annuity factor at age 65 = 13
Lifetime indexed income =384,480/13 = 29,575
Frozen DB pension = 10,000
Total retirement income = 39,575

6. Continued

Final salary = 50000 x 1.03 ^ 19 = 87,675
Max contribution will be 16% x 87,675 = 14,028, which is below max of $20,000
Replacement ratio = 39,575 / 87,675 = 45%

(b) Recommend adjustments to the analysis in (a) that could be considered to more accurately assess benefit adequacy.

Calculate replacement ratio using different formulae which incorporate different factors as follows:

Expenditure, tax, and savings model takes into account changes in age-and-work related expenditures after retirement, in addition to taking into account savings patterns and changes in taxes after retirement.

The "Expenditure, Tax, and Savings" Model:
Replacement Ratio = f(Taxes, Savings, Expenditure Changes)
RR = [PrRPG – PrRT – PrRS ± NCCR + PoRT] / PrRPG

Tax and savings model disregards changes in age-and-work related expenditures.

The "Tax and Savings" Model: Replacement Ratio = f(Taxes, Savings)
RR = [PrRPG – PrRT – PrRS + PoRT] / PrRPG

Tax only model disregards both savings and changes in age and work-related expenditures.

The "Tax Only" Model: Replacement Ratio = f(Taxes)
RR = [PrRPG – PrRT + PoRT] / PrRPG

The symbols used in the formulas are defined as follows:
PrRPG: Gross pre-retirement income
PrRT: Pre-retirement taxes
PrRS: Pre-retirement savings
NCCR: Change in age-and-work-related expenditures
PoRT: Post-retirement taxes

Replacement ratios are more precise if they are based on after-tax earnings, so a net replacement ratio may provide better results.

However Gevrey has a flat tax, so it does not matter.

Calculate replacement ratio taking into account the fact that the pension will be non-indexed.

6. Continued

Replacement ratio is for an un-indexed pension, since factor not indexed.

Need to factor in the erosion of pension earnings after age 65.

Calculate replacement ratio using different assumptions.

The calculation is based on one salary scale, expected return on assets, annuity rate assumptions. Using different values will result in a different replacement ratio.

Lower rates may be more conservative.

It is not known if the DB accrued pension is based on future average income.

Calculate replacement ratio at various retirement ages. The retirement age selected is 65. Another age selection would yield different results.

It does not compare the outcome at age 62, when an unreduced pension is payable.

It does not factor the value of the subsidized early retirement reductions before age 62.

Calculate replacement ratio using stochastic methodology. Deterministic calculation (steady state calculation) only shows one possible scenario.

Determine whether calculation can be used to determine if benefits are similar.

This is only one case and cannot be representative of all membership.

We must compare different situations and profiles (income, age, service etc.).

Savings rate may not be representative.

At the very least replacement ratios should be evaluated at various starting age and income levels.

The DB is non-contributory, so we should compare the employer replacement ratio, not the combined ratio.

6. Continued

A person needs less gross income after retiring, primarily due to:

1. Income taxes go down after retirement. This is because extra deductions are available for those over age 65, and taxable income usually decreases at retirement.
2. Saving for retirement is no longer needed.
3. Changes in age-and-work-related expenditures that occur at retirement also influence the amount of income someone needs at retirement. Changes in these expenditures, however, vary from person to person.
4. The mortgage may be paid off.
5. There are no longer child care and education costs.
6. nclude health care costs, personal savings and government plans in replacement ratio.

7. Learning Objectives:

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

Learning Outcomes:

(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:

ASOPs 4, 23, 27, 35

CIA Standards of Practice

Commentary on Question:

This question was trying to test whether candidates would be able to assess whether an actuarial valuation report was prepared in accordance with accepted actuarial practice and pertinent legislative or regulatory requirements.

Candidates received full marks for addressing the appropriateness of each assumption and method applied in the actuarial valuation performed by the actuary in light of the purpose of the valuation.

Marks were given for considering whether each economic and demographic assumption was appropriate and whether each liability and asset valuation method was appropriate for the purpose of the report adequately answered the question. Providing contents of the report, that is, whether or not specific items were disclosed in the report did not address the question and did not receive full marks.

Solution:

Your firm has been retained to review an actuarial valuation prepared by another firm to ensure compliance with the actuarial Standards of Practice in the Canada

Identify specific items you would review and describe the criteria used in your evaluation.

In reviewing the actuarial valuation, the following should be considered:

- The purpose and nature of the measurement
- The plan provisions and benefits or factors that will affect the timing and value of any potential benefit payments
- The characteristics of the obligation to be measured (e.g. measurement period, future cash flows, open or closed group, volatility)
- The assumptions and methods given the purpose of the measurement
- The characteristics / demographic profile of the covered group

7. Continued

Consider whether any assumptions that are prescribed by legislation have been determined accordingly.
Review the combined effect of the demographic and economic assumptions for consistency (reasonable independently and in aggregate).

Consider whether the demographic assumptions reflect any contingencies that will cause increase/decrease in liabilities.

- Consider whether the demographic assumptions are appropriate given demographic profile of the covered group

Review the appropriateness of the retirement assumption.

- Consider the demographic profile of the plan

Termination Assumption

Mortality Assumption:

- Consider whether it would be reasonable to have a separate mortality assumption for pre-retirement versus post-retirement

Disability Assumption

Optional Form Assumption

Administrative Expenses

Inflation Assumption - Does it reflect appropriate indices, forecasts, and yields on government securities?

Discount Rate

Compensation scale if the pension plan benefits are salary based:

- Compensation increases and practices of other sponsors in the same industry or geographic area

Consider whether the methods to allocate costs or contributions to past and future periods are appropriate.

Consider whether the measurement of the accrued/vested benefits reflects:

- Whether the plan provisions regarding accrued benefits provide an appropriate attribution pattern for the purposes of the measurement
- The impact of a special event e.g. plant shutdown, change in investment policy

Review whether the asset valuation method is acceptable for the terms of engagement.
Review the report to ensure that all relevant disclosures are communicated.

8. Learning Objectives:

3. The candidate will be able to evaluate risks faced by sponsors of a retirement plan by virtue of the plan's design and be aware of methods to mitigate these risks.

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

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

11. 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:

(3a) Identify how plan features, temporary or permanent, can adversely affect the plan sponsor.

(3b) Recommend ways to mitigate the risks identified with particular plan feature.

(4a) Given a context, design retirement programs that manage retirement risk and are consistent with sponsor objectives.

(4b) Given a context, design retirement programs that promote employee behavior consistent with sponsor objectives.

(7b) Compare the, sometimes conflicting, interests of management, employees, shareholders or taxpayers (in the case of public sector).

(7c) Define the retirement plan risks (financial and design) in a way that integrates with the sponsor's risk management strategy.

(11a) 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.

Sources:

Critique of "Pension Deficits: An Unnecessary Evil"

Record - V31, #2 -- Addressing the financial risks from retirement systems seminar: Plan Design - overview, general, limited specifics

8. Continued

Full Circle: purchasing insurance annuities in a defined-benefit plan
Recent trends in Canadian DB pension sector investment and risk management

RC-108: Why are Healthy Employers Freezing Their Pensions

CICA 3461/FASB materials

Morneau Sobeco - chapter on financial mgmt - acct'g section (C5)

Equities in DB plans - Is the Traditional 60/40 mix a dinosaur

Morneau Sobeco - Chapters 1 and 2

RC-112: Pension investing and corporate Risk Management - overview coverage generics

Jim Moore's LDI Strategies and concepts
Plan Sponsor guide to LDI

Mind the gap: using derivative overlays to hedge pension duration

Intro and Overview of Ret Plan Investments - background on investments

Litterman - Modern Inv Management

Commentary on Question:
Part (a) was testing investment related strategies for risk mitigation.

Part (b) was to focus on plan design changes that could be used to mitigate financial risks. Candidates were given points for listing and describing the features of a proposed plan design. They were then also given points for explaining how this design either reduced or didn't reduce the volatility of the funded status on an accounting basis.

Solution:

(a) Describe the advantages and disadvantages of each of the following risk-mitigating pension fund investment strategies:
- Cash Flow Matching
- Duration Matching
- Derivatives Overlay Strategy - Interest Rate

8. Continued

Cash Flow matching:
A bond portfolio is set up to match future asset cash flows with anticipated future liability payments.

Advantages:
Relatively easy to understand. Matching bonds provide a good fit to liability movements and can reduce volatility.

Disadvantages:
Liability payments are unknown, especially more so for less mature plans. As such, it is difficult to keep the matched cash flows out in the future. Rebalancing is often required. Can be difficult to implement due to bond availability and uncertainty regarding cash flow timing. Bonds may earn less over the long term than equities.

Duration Matching
Set up an investment portfolio to match the duration of the asset portfolio to the liabilities.

Advantages:
Interest rate risk minimized (reduce funded status volatility) due to values of assets and liabilities moving in same directions/amounts as interest rates change. Relatively easy to understand and implement.

Disadvantages:
Are there enough investments available to match up with longer duration liability payments? Not as effective for non-parallel yield curve shifts or for larger changes in interest rates. Duration is only an estimate of liability movements. Bonds may earn less than equities over the long-term.

Derivative Overlay Strategy
Without changing current asset mix, use derivatives to increase asset duration to close gap to the generally longer duration liabilities.

Advantages:
Do not have to disinvest from equities to add duration. Can reduce volatility in funded status while not impacting current expected fund rates of return.

Disadvantages:
Introduces other risks like counter party risks and trading. Complicated and needs knowledgeable people to implement and monitor.

8. Continued

(b) Describe plan design strategies that can assist in mitigating pension plan financial risks and comment on how effective each strategy is in reducing the volatility of the funded status on an accounting basis.

Sample Answer:

Change the cost-sharing of the plan design: For instance increase or implement member contributions. This strategy reduces the expected employer contributions provided the other elements of the plan design remain the same. However absent some other change to the plan design or asset allocation – in general this strategy would not have a material impact on balance sheet volatility.

Change the plan design to a cash balance design. A cash balance design is a design that promises a notional account balance to members rather than a formulaic benefit based on final average pay. Additionally, typically the cash balance is paid as a lump sum of the notional account rather than as an annuity. A cash balance design therefore generally has a smaller liability duration than does a final average pay annuity type design. This would materially reduce the volatility of the sponsor's balance sheet.

Change the plan design to a defined contribution design. A defined contribution design is a design that provides an account balance to members rather than a formulaic benefit based on final average pay. The account balance belongs to the participant along with any investment gains or losses. The investment discretion may be given to the member. A defined contribution design therefore has less risk than a defined benefit plan for the plan sponsor. Also, since financial reporting for a defined contribution plan is not done on an accrual basis the volatility of the sponsor's balance sheet would be materially smaller (assuming that the defined benefit plan was frozen or even closed).

Additional Commentary on Question:

Points were awarded based on (1) describing the method/strategy that would mitigate financial risk – and which risks it mitigates, and further (2) describing the impact of the method/strategy on balance sheet volatility. Other valid method/strategies include:

- Reducing ancillary benefits
- Moderating the current design somehow (e.g., reduce the benefit multiplier)
- Purchasing annuities for a group of plan participants
- Adding portability features to the plan (e.g., a lump sum option)

Many candidates did not answer how a particular strategy impacted volatility of funded status. Among those candidates who did answer this part of the question some candidates referred to the absolute balance sheet risk, while others referred to the relative balance sheet risk. As long as the candidate adequately and appropriately explained the impact of the change either path was acceptable.

9. Learning Objectives:

1. 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 a retirement plan by virtue of the plan's design and be aware of methods to mitigate these risks.

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

Learning Outcomes:

(1e) Describe the risks faced by participants of a multiemployer retirement plan.

(3f) In a given context, assess the effect that changes in plan design might have on collective bargaining agreements.

(7h) Describe how a plan's funded status can impact union negotiations and multiemployer plans.

Sources:

R-C123-07 Funding Risks for Multiemployer Plans

Commentary on Question:

The question tests how well candidates understand multiemployer plans, including the unique risks they face.

The question requires candidates to go beyond a list of points to explain the issues facing multiemployer plans.

Candidates had trouble identifying many of the risks facing multiemployer plans. While most understood basic funding considerations for multiemployer plans, few discussed plan governance structure, difference in risk appetite, and accounting and union considerations.

Solution:

(a) As NOC's consulting actuary, describe the considerations that NOC should address when assessing the contribution levels of these two plans.

- Contribution levels for a MEPP are usually negotiated and set by collective bargaining agreements.
- Therefore, NOC has little control over contribution levels.
- Though contribution levels are currently lower than that of NOC, future contribution levels are subject to change with future collective bargaining agreements and may increase.

9. Continued

- Review historical contribution levels - the current contribution levels may be artificially low (not enough to cover the cost of additional accruals and amortization of the unfunded liability) if they are based on an old collective agreement that does not reflect recent actuarial losses.
- In a MEPP, any funding excess (surplus) cannot revert back to the employer.
- The demographic profile of the MEPP would also impact the level of contributions. Older populations will create higher costs.
- NOC should consider the assumptions and methods chosen by the MEPP. For example, if the MEPP uses asset smoothing, the contributions could be temporarily low due to losses not fully recognized yet. (COMMENT: another valid example would be if the MEPP and NOC used different discount rates in their valuations.)
- NOC should consider the current funded status of the MEPP.
  If the MEPP's funded status is less than 100% or less than NOC Hourly Plan's funded status the plan could be at risk if events occur that lower future contribution levels. (For example, declines in employment.)
  - Contributing employers have no unilateral ability to decide how to resolve funding shortfalls.
- NOC should also consider the possibility of a key employer withdrawing from the plan in the future. This would leave NOC and remaining employers with a larger cost burden.

(b) Assuming that NOC chooses to join the multiemployer plan, assess the risks to NOC and additional considerations that should be taken into account when making this decision.

- MEPPs have different governance structure than single employer plans.
  - A board of trustees serves as the plan administrator and is responsible for defining plan provisions, setting benefit levels, and keeping the plan in compliance with the law. Therefore, NOC would relinquish control of plan administration responsibilities.
  - The board is responsible for setting risk tolerances when considering funding and investment policies. NOC should consider the possibility that the MEPP risk tolerance could be different than that of NOC and its employees.
  - NOC may have a different view of the appropriate investment strategy (asset allocation) for the plan than the MEPP
- MEPPs are common in industries where employees move around from employer to employer. This allows participants to change employers without a disruption in benefits.

9. Continued

- If NOC decides to join the MEPP, their assets and administration will be pooled with other employers, which could be a cost savings for NOC.
- NOC should consider the possibility of future changes in legislation that could increase cost for MEPPs and NOC.
- Accounting for MEPPs is different than for single employer pension plans and similar to DC plans (expense based on actual contributions). It is possible that NOC could lower their expense by joining the MEPP.
- There may be union considerations. NOC needs to consider whether the union representing its current employees is willing to join the MEPP.

10. Learning Objectives:

8. 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.

Learning Outcomes:

(8d) Advise plan sponsors on accounting costs and disclosures for their retirement plans. This would include restrictions imposed by applicable accounting authorities (FASB, CICA, IASC, FRS17).

Sources:

Handbook of Canadian Pension and Benefit Plans – Ch. 5

Employee *Future Benefits – Additional Disclosures, Background Information and Basis for Conclusion*, Includes Section 3461 from the CICA Handbook

Commentary on Question:

This is a pension accounting question with a curtailment first and then a negative plan amendment on July 1, 2010.
The candidates need to be able to identify the accounting treatment of these two changes and determine the impact of each change on the pension expense.
The candidates also need to identify the unrecognized loss is amortized over the adjusted future working lifetime to retirement and the unrecognized past service cost is amortized over the adjusted future working lifetime to full eligibility age and how each of them is calculated.

Solution:

Determine NOC's 2010 accounting expense under CICA 3461 including the effects of the plan changes.

- **Change 1: Termination of 1,250 Actives is a curtailment due to FWL reduction**

  Expense for the first 6-month of the year
  = service cost for the first 6-month + interest cost for the first 6-month – EROA for the first 6-month + amortization of (gains)/losses + amortization of prior service cost/(credit)
  = 63,425 * 0.5 + 100,340 * 0.5 – 0 + 10,130 * 0.5 + 2,682 * 0.5
  = 31,713 + 50,170 – 0 + 5,065 + 1,341
  = 88,289

  Re-measurement at 6/30/2010 (date of event) of liability before curtailment:
  Expected PBO at 6/30/2010
  = PBO at 1/1/2010 + SC for the first 6-month + interest cost for the first 6-month – benefit payment for the first 6-month
  = 1,776,933 + 31,713 + 50,170 – 32,000 * 0.5
  = 1,842,816

10. Continued

Actual PBO = expected PBO because no change in discount rate and there is no other source of actuarial gains or losses since January 1, 2010

Unrecognized loss after re-measurement, but before curtailment
= Unrecognized loss at 1/1/2010 – amortization of loss for the first 6-month of the year + additional losses/(gains)
= 283,624 – 5,065 + 0
= 278,559

Unrecognized PSC after re-measurement, but before curtailment
= Unrecognized PSC at 1/1/2010 – amortization of PSC for the first 6-month of the year
= 20,000 – 1,341
= 18,659

Curtailment impact
Post-curtailment PBO
= pre-curtailment PBO – curtailment gain
= 1,842,816 – 100,000
= 1,742,816

Unrecognized loss
= max (pre-curtailment loss – curtailment gain, 0)
= max (278,559 – 100,000, 0)
= 178,559

Curtailment charge
= (pre-curtailment PSC * % reduction in total future working lifetime to retirement age
= 18,659 * 25%
= 4,665

Unrecognized PSC
= pre-curtailment PSC – curtailment charge
= 18,659 – 4,665
= 13,994

10. Continued

- **Change 2: Elimination of spousal coverage is a negative plan amendment**

Negative plan amendment impact
Post-amendment PBO
= Pre-amendment PBO – reduction in PBO due to amendment
= 1,742,816 – (1,742,816 * 0.2)
= 1,742,816 – 348,563
= 1,394,253

Unrecognized loss = 178,559 (no impact of amendment on net loss)

Unrecognized PSC
= pre-amendment PSC + plan amendment impact
= 13,994 – 348,563
= -334,569

Calculation of average future working lifetime to FEA and retirement age after changes
Total number of Actives in plan prior to changes
= number of Actives in Salaried plan + number of Actives in Hourly plan
= 4,067 + 6,285
= 10,352

Calculation of average future working lifetime to retirement age
= [average of FWL before curtailment * number of Actives prior to curtailment * (1 – 25%)] / (number of Actives before curtailment – number of Actives being curtailed)
= [10.46 * 10,352 * (1 – 25%)] / (10,352 – 1,250)
= [108,281.92 – 27,070.48] / 9,102
= 8.92

Number of Actives prior to curtailment who are already eligible for retirement (55 & 10)
= Salaried 55 & 10 + Hourly 55 & 10(pull from individual age and service charts)
= (50 + 90 + 410 + 5 + 10 + 4) + (95 + 177 + 802 + 13 + 9 + 7)
= 569 + 1,103
= 1,672

10. Continued

Calculation of average future working lifetime to FEA
= [average of FWL before curtailment * (number of Actives prior to curtailment – number of Actives who are already eligible for retirement) * (1 – 25%)] / (number of Actives before curtailment – number of Actives who are already eligible for retirement – number of Actives being curtailed)
= [7.46 * (10,352 – 1,672) * (1 – 25%)] / (10,352 – 1,672 – 1,250)
= [64,752.80 – 16,188.20] / 7,430
= 6.54

Expense for the second half of the year:
SC = (annual SC at 1/1/2010) adjustment by curtailment and plan amendment impact at 6/30/2010 * 0.5
= (63,425 * (1 + 0.5 * 0.055) – 8,000) * (1 – 40%) * 0.5
= 34,301 * 0.5
= 17,151

IC = (PBO + SC – benefit payment) * discount rate * half year adjustment
= (1,394,253 + 34,301 – 16,000) * 0.055 * 0.5
= 38,845

EROA = 0

PSC amortization = -334,569 / 6.54 * 0.5 = -25,579

Loss amortization = (178,559 – 0.1 * 1,394,253) / 8.92 * 0.5 = 2,194

Expense for second half of the year
= 17,151 + 38,845 + 0 – 25,579 + 2,194
= 32,611

Total 2010 expense
= expense for first half of the year + curtailment charge + expense for the second half of the year
= 88,289 + 4,665 + 32,611
= 125,565

11. Learning Objectives:

8. 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.

Learning Outcomes:

(8a) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

Sources:

R-C105-07: Pension Actuary's Guide to Financial Economics and Pension Arbitrage Example Worksheet

Commentary on Question:

This was a calculation question testing the financial economics perspective.
Many candidates did not apply the corporate tax to the pension plan assets prior to doing the augmented balance sheet.
Candidates did well when they listed out in detail all of their steps and formulas. If a math error was encountered, they could still achieve many points.
The question asked that a recommendation be provided as to whether the proposed policy supports the CFOs objectives of maximizing shareholder value. This recommendation needed to be supported. Candidates could rely on the financial economics theory along with their supporting calculations to make a recommendation.

Solution:

Using the Augmented Balance Sheet approach, calculate the total after-tax income for the new policy and make a recommendation whether the proposed policy supports the CFO's goal.

The augmented balance sheet takes the view that the shareholders own the assets and owe the liabilities of the company's DB plan.

Below is the completed augmented balance sheet with supporting calculations following:

	Investor Holdings	Pre-tax Income	Personal Tax	After-tax Income
Pension Plan (PP)				
Equity	1,680,000	117,600	(11,760)	105,840
Bonds	420,000	16,800	(1,680)	15,120
Total	2,100,000	134,400	(13,440)	120,960
Direct holdings (DH)				
Equity	8,320,000	582,400	(58,240)	524,160
Bonds	9,580,000	383,200	(114,960)	268,240
Total	17,900,000	965,600	(173,200)	792,400
Total Portfolio	20,000,000	1,100,000	(186,640)	913,360
Increase				3,360

11. Continued

Investors own $3B of the Pension Plan (PP) holdings adjusted for the corporate tax rate. ($3B*(1-.3) = $2.1B). The PP assets are split 80%/20% equity and bonds.

The investor's Direct Holdings (DH) are the remainder of the $20B allocating the total portfolio according to the 50%/50% allocation.
Total direct holdings = ($20B - $2.1B) = $17.9B
Equity direct holdings = ($20B * 50%) - $1.68B = $8.32B

Pre-Tax Income assumes a 7% return on equity investments and a 4% return on bonds.
PP Equity Pre-Tax Income = ($1.68B * .07) = $0.1176B
PP Bonds Pre-Tax Income = ($0.42B * .04) = $0.0168B

The taxes applied to the Pre-Tax Income are 10% for all PP income, 10% for equity direct holdings and 30% for bond direct holdings.
PP Total Tax = ($0.1344 * .1) = $0.01344B
DH Equity Tax = ($0.5824 * .1) = $0.05824B
DH Bonds Tax = ($0.3832 * .3) = $0.11496B

The After Tax Income equals the Pre-Tax Income less the taxes.
PP After Tax Income = ($0.1344 - $0.01344) = $0.12096B
DH After Tax Income = ($1.1 - $0.186640) = $0.913360B

With the new 80%/20% allocation, there was an increase after tax of $3.36M ($0.91336 - $0.910).

To verify that the solution was correct, the tax arbitrage or shortcut formula can be used.
Arbitrage = (PP holdings) * (Bond return) * (1 – Corp tax rate) * (Tax spread)
Arbitrage (20% bonds alloc) = ($3B) * 4% * (1-30%) * [(30%-10%) * 20%] = $3.36M

Financial economics theory suggests that all pension plans should invest in bonds since the tax rate is higher for the direct holdings. To demonstrate the further arbitrage available, utilize the formula above or the full augmented balance sheet.
Arbitrage (100% bonds alloc) = ($3B) * 4% * (1-30%) * [(30%-10%) * 100%] = $16.8M

By investing the pension plan 100% in bonds, the shareholders would receive an additional $13.44M (16.8 – 3.36) over the proposed plan. To maximize shareholder value, it would be recommended to invest the pension plan 100% in bonds. Therefore the CFO's goal is not achieved.

12. Learning Objectives:

1. 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.

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

Learning Outcomes:

(1d) Describe the risks faced by participants of single employer sponsored retirement plans.

(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.

(12d) Demonstrate compliance with legal requirements regarding the actuaries' responsibilities to the participants, plan sponsors, etc.

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

Sources:

Canadian Pensions and Retirement Income Planning, Fourth Edition, 2010

Final Standards - Practice Specific Standards for Pension Plans - Section 3800 - Pension Commuted Values

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

On-Line Reading: Post-Retirement Risks, Changing Needs and Resources

On-Line Reading: Understanding and Managing the Risks of Retirement

Study notes: R-C102-07, R-C128-07, R-C104-09

Commentary on Question:

This question addressed the Commuted Values standard. Important considerations for receiving maximum points were demonstrating an understanding of how the plan provisions determine the methods and assumptions used in the calculation of the commuted value.

12. Continued

Solution:

(a) Describe the plan provisions, assumptions and methods that ABC Company needs to consider when determining commuted values in accordance with the CIA Standard.

The plan administrator of ABC Company should consider the following plan provisions in determining the commuted values:

- Post-retirement indexation
  - The plan provisions provide for post-retirement indexation, so in determining the commuted value for all members, the plan administrator needs to use discount rates that are fully indexed (100% CPI) for period post normal retirement age (age 65 for this plan) or the age that provides the maximum benefit (best age).
- Early retirement
  - The plan provides for an early retirement benefit on or after age 55; so cannot commute and transfer benefit entitlement if age at termination is 55 or older.
- Early reduction factor
  - Early retirement reduction factors are on an actuarially equivalent basis so benefits will be actuarially reduced if best age is before normal retirement age.
- Forms of pension
  - The plan provides for a single life annuity for single members and joint and 60% survivor benefit for married members; so will need an assumption based on plan's experience/membership on the % of members that are married vs. single in preparing commuted values for vested terminated members.

The plan administrator of the ABC Company should consider the following method in determining the commuted values under the CIA Standards:

- The commuted value should be computed independent of the financial position of the pension plan. So the fact that this plan is only 50% funded on a wind-up basis should have no influence on how the commuted value is computed.
- The actuary should establish a period for the commuted value applies before recomputation is required, subject to applicable legislation and plan rules.
- The commuted value should be adjusted for a reasonable rate of interest (subject to applicable pension legislation and plan rules) to be paid on commuted value for period between date of computation and the first day of the month of disbursement.

12. Continued

- The commuted value should reflect the full value of the deferred vested or immediate retirement benefit to which the plan member is entitled, e.g., death benefit.
- The actuary should not use alternative actuarial assumptions or methods that would result in a smaller commuted value compared to the commuted value prepared in accordance to the CIA standards.
- The date of calculation or valuation date is usually the date of termination or some other date determined by applicable laws or provisions of the plan or by the plan administrator.
- The commuted value should be prepared using the age ("best age") that provides the maximum benefit.
- Pension legislation that limits the full payment of the commuted value from the plan in the event that the plan is not fully funded. In the case of this plan, the plan has a transfer ratio of 50%, so in the province of Ontario where the plan is registered, the plan administrator needs to comply with certain rules before the full commuted value can be disbursed in its entirety.
- The plan administrator needs to comply with the Income Tax Act limits

The plan administrator of the ABC Company should consider the following actuarial assumptions in determining the commuted values under the CIA Standards:

The demographic assumptions are:

- Actuarial assumption on age difference between member and spouse if date of birth of spouse is not known but required for calculations.
- Actuarial assumption on % of male-female split if using unisex mortality tables. For Ontario members, will require unisex assumption in computing commuted values. For Quebec Members, will not require assumption because provincial laws require the use sex-distinct tables.
- Actuarial assumption on % of member assumed to be married vs. being single. There should be no adjustment to reflect the health or smoker status of the member.
- Mortality Tables - if date of computation is on or before January 31, 2011, then need to use UP1994 projected to 2020, using scale AA; otherwise, if date of computation on or after February 1, 2011, then need to use UP1994 tables with generational projections using scale AA.
- In determining the commuted value of a deferred pension, the normal retirement age (age 65 for this plan) or the age ("best age") that provides the maximum benefit should be used in the calculation.

12. Continued

The economic assumptions are:

- Should select discount rates based on whether the benefit is fully, partially or not indexed post-retirement.
- If date of calculation is on or after January 31, 2011, then need to select CANSIM rates that are two months prior to the month in which the date of calculation falls. Otherwise, if date of calculation is on or after February 1, 2011, then need to select CANSIM rates that are one month prior to the month in which the calculation date falls.

- Discount Rates - Given that the plan provides post-retirement indexation, the plan administrator should use fully indexed discount rates for determining commuted value of benefit entitlement.
  - Ontario Members only: The plan administrator should use non-indexed rates for period from current age to best age; and use fully indexed rates for period post-retirement.
  - Quebec Members only: The plan administrator should use partially (50% of CPI) indexed rates for period from date of termination to age 55; non-indexed rates from age 55 to best age; and fully indexed rates for period post-retirement.
- The plan administrator should calculate the commuted value using two interest rates, one applicable to the first 10 years after the valuation date and the second applicable to all years thereafter.
- Additional benefit (Bill 102)- Quebec members only: Terminating members are entitled to an additional benefit, where applicable, for service after 12/31/2000, based on the value of the deferred pension which would otherwise be indexed from the termination date up to 10 years within the normal retirement age (for this plan, this age is 55). This indexation is at the rate of 50% of the CPI (max of 2%, min of 0%). So will also need to determine the commuted value of terminated vested members using partially indexed discount rates for period between the date of termination and age 55.

(b) Assess the risks that the members are exposed to as a result of the future transfer of the commuted value of pension benefits from the plan.

Risks to which Members are exposed:

- Longevity risk – member may outlive the benefit transferred out of the plan
- Inflationary risk – the value of the benefit may decline over the years between date of termination and retirement, if the benefits are not invested such that it keeps up with the rate of inflation.
- Interest rate risk – the value of the benefits may decline between date of termination and retirement if the benefits are not invested such that it at least earns the rate of interest used to determine the commuted value of the benefits.

12. Continued

- Public policy risk/risk of political change – member may have to pay significant taxes on the portion of benefits that exceeds the ITA benefit limit - thus facing the risk of reduced benefits; The ITA benefit limit may result in more benefits being unlocked.
- Replacement ratio risk – if the commuted value of the benefit does not keep up with inflation or invested such that it earns at least the rate of return equivalent to the interest rate used to commute the benefit.
- Stock Market risk – risk that stock market losses reduces retirement savings.
- Investment risk – given the transfer ratio, and depending on the size of the commuted value to be transferred from the plan, the transfer could negatively impact the security of the benefits remaining in the plan.

13. Learning Objectives:

8. 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.

Learning Outcomes:

(8d) Advise plan sponsors on accounting costs and disclosures for their retirement plans. This would include restrictions imposed by applicable accounting authorities (FASB, CICA, IASC, FRS17).

Sources:

R-C103-09: Comparison of IAS 19 with FAS 87/88/106/132R/158, CICA 3461 and FRS 17 -Summary of Provisions Affecting for Post Retirement Benefits, Towers Perrin

R-C615-10: Transition from Canadian GAAP to IFRS - Issues for Pension and Other Post-Retirement Benefit Plan Sponsors, Gibson

Employee Future Benefits - Additional Disclosures, Background Information and Basis for Conclusion, Includes Section 3461 from the CICA 3461 Handbook (omit pp. -21, 29-34, 111-115)

International Accounting Standard 19 Employee Benefits (IAS19)

Commentary on Question:

This question addressed the transition from CICA 3461 to IFRS. Candidates needed to understand the difference between the accounting for past service cost under both standards. Candidates also needed to understand the difference between the accounting for curtailment and settlement under both standards.

Solution:

(a) Determine the impact of the unamortized past service costs on ABC's Retained Earnings as at the transition date to IFRS.

Under CICA 3461 Past Service Cost:

The 1/1/2008 amendment will create a layer of unrecognized past service cost of $15,000,000.

The right amortization period is "EARSL to Full Eligibility" of all members. Based on information provided in the question, this is 10 years.

PSC amortization = Unrecognized past service costs as of January 1, 2008 / EARSL to Full Eligibility
= $15,000,000 / 10
= $1,500,000

13. Continued

Unamortized past service cost at 12/31/2009: $15,000,000 - $1,500,000 x 2 (amortized in 2008 and 2009)

= $12,000,000

Under IFRS/ IAS 19 Past Service Cost:

Past service cost are amortized over the period till vesting.

The 1/1/2008 unrecognized past service cost is $10,000,000 because the vested portion of $5,000,000 was recognized immediately in the expense.

For the retiree medical plan, vesting is also the same as Full Eligibility which is 15 years for non-vested active members.

PSC amortization = Unrecognized prior service costs as of January 1, 2008 / EARSL to Full Eligibility

= $10,000,000 / 15
= $666,667

Unamortized prior service cost at 1/1/2009: $10,000,000 - $666,667 * 2 (amortized in 2008 and 2009)
= $8,666,667

The adjustment to retained earnings from the adoption of IFRS/IAS 19 resulted from recognition of unrecognized past service costs related to benefits that were vested at the date of amendment are calculated as follows:

=$12,000,000 (CICA 3461) - $8,666,667 (IFRS)
=$3,333,333

(b) Explain how your answer in (a) would differ in each of the following independent situations:

(i) An event triggering settlement accounting occurred at December 31, 2009 under the plan

If there is a settlement as of December 31, 2009:

13. Continued

Under CICA 3461 (CGAAP), we do not recognize unamortized past service cost on settlement. As a result, there is no impact on unamortized past service cost under CICA 3461.

Under IFRS, we recognized a portion of unamortized past service cost on settlement based on % settled which is equal to the accrued benefit obligation settled/ total accrued obligation under IFRS.

Unamortized past service cost at 1/1/2010 = Unrecognized amount in (a) MINUS effects of settlement under IFRS.

(ii) An event triggering curtailment accounting occurred at December 31, 2009 under the plan.

If there is a curtailment as of December 31, 2009:

Under CICA 3461/ (CGAAP), we recognize a pro rata share (in proportion to reduction in participants' future years of service or reduction in benefit obligation) of unrecognized prior service cost.

Under CICA 3461, timing of recognition depends if we expect a curtailment gain or a curtailment loss.

Under IFRS, a pro rata share (in proportion to change in DBO) of unrecognized prior service cost is recognized on curtailment (unless another approach is more rational).

Amount existing at 1/1/2010 will equal amount in (a) MINUS effects of curtailment 1/1/2010

(c) Determine the 2010 expense under IFRS/IAS19.

DB Expense = Service Cost + Interest Cost - EROA + Amort PSC + Amort (G)/L

Service Cost: Service cost are generally computed at the end of the year under IAS 19. However, if candidates use the current service cost at the beginning of the year, full credit was given.

= Service cost at the beginning of year x (1+ discount rate) or Service cost at the beginning of year

13. Continued

= $5,000,000 x (1.045) or $5,000,000
= 5,225,000 or $5,000,000

IC = interest on DBO and- half a year's interest on benefit payments or interest on DBO and SC - half a year's interest on benefit payments

IC = 96,000,000 x 0.045 - 2,000,000 x.5 x.045 = $4,725,000

or 96,000,000 x 0.045 + 5,000,000 x 0.045 - 2,000,000 x.5 x.045

= $4,500,000

EROA = 0 - (The plan is unfunded)

Annual PSC amortization :
= $8,666,667 /13 at 1/1/2010 [also accept $10,000,000/15]
= $666,667

Actuarial (G)/L amortization = $0 - All recognized in Other Comprehensive Income

2010 DB Expense/ (Income) under IAS 19
= $5,225,000 + $4,275,000-0+$666,667+0 = $10,166,667
OR $5,000,000 + $4,500,000-0+$666,667+0 = $10,166,667

14. Learning Objectives:

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

10. The candidate will be able to analyze the regulatory environment as it effects retirement plans.

Learning Outcomes:

(7c) Define the retirement plan risks (financial and design) in a way that integrates with the sponsor's risk management strategy.

(7d) Analyze how the retirement plan integrates into the sponsor's overall financial position.

(10a) Evaluate the effect of regulatory policies and restrictions, for all retirement plans

Sources:

Study Note: R-C607-07 Filing Requirements and Procedure on Full or partial Wind up of a pension plan, Ontario Guideline

Study Note: R-C108-07: Center for Retirement Research at Boston College – March 2006 Bulletin – Why are Healthy Employers Freezing their Pensions?

Study Note: R-C121-07: "Converting Pension Plans From a Defined Benefit to a Defined Contribution Design – Issues to Consider in Canada,/Genno

Study Note: R-C131-07: "Plan Freezes: The New Ice Age," 2005 EA meeting, first half of session

Study Note: R-C112-07: Pension Investment and Corporate Risk Management

Commentary on Question:

Part (a) of this question required the candidate to describe the process of winding-up an Ontario registered plan. A well- prepared candidate was able to identify the main steps in the process as well as provide additional details on each step.

Part (b) of this question required the candidate to compare and contrast the risks that XYZ Company is exposed to under Option 1 (full wind-up) and Option 2 (freeze the defined benefit accruals under the plan for both service and salary and implement a defined contribution plan for future service). A list of the risks was not sufficient to garner full credit. The majority of points were given for describing the different types of risks XYZ was exposed to under the two options.

14. Continued

Solution:

(a) Describe the process for winding-up an Ontario registered pension plan.

1. The employer decides to wind up the pension plan.
   - No payments or expenses can be paid out of the pension fund until wind up report is approved.
   - Administrator may ask Superintendent to authorize payment of benefits or expenses out of the fund.
   - Retiree pension payments may continue.
   - Notice of Proposal needs to be given to the Superintendent, all members, all former members, union, advisory committees.
2. The administrator files a wind up report and other wind up documentation.
   - The wind up report includes the information on the funded status and methods of distribution of assets.
3. The administrator issues benefit statements.
   - Member has 90 days to make an election.
   - Administrator has 60 days to make payment after election is made.
4. The Superintendent approves the wind up report or approves only the payment of basic benefits.
   - If there is a surplus issue to be addressed, the Superintendent will approve only the payment of basic benefits until the disposition of the surplus has been determined. Once the disposition of surplus has been addressed in accordance with the pension regulations, the Superintendent will approve the wind up report.
   - If there is a funding deficit, annual reports must be filed with the Superintendent until plan is fully funded.
5. The administrator distributes benefits.
   - When the administrator receives the Superintendent's approval of the wind up report or approval of only the payment of basic benefits according to the wind up rules, the distribution of benefits can take place in accordance with the wind up report and the options elected, subject to any restrictions imposed by the Superintendent or prescribed by the wind up rules.
6. The administrator distributes surplus.
   - Wind up is not complete until all assets in the pension fund have been distributed.
   - Administrator must give written notice to the Superintendent that all assets are distributed 30 days after final distribution.

14. Continued

(b) Compare and contrast the risks that XYZ Co. is exposed to under both options.

Risks to XYZ Company under a full plan wind-up situation - Option #1:

- Subject to settlement and curtailment costs that must be recognized immediately; this may have negative impact on share values if XYZ Company were publicly traded, increase cost of borrowing, etc.
- Depending on what part of XYZ Company's business cycle the wind up occurs, XYZ Company may not have available cash to meet any contribution shortfalls regarding benefit settlement
- In a low-discount rate environment, this option could be costly particularly if commuted values and annuities are purchased at a rate lower than the current actuarial valuation discount rate and more conservative (compared to the actuarial valuation) mortality rates.

Risks to XYZ Company's under the plan freeze, i.e., no further service and salary increases under the DB plan subsequent to December 31, 2011 - Option #2

- Subject to curtailment costs that must be recognized immediately; this may impact share values but likely not to the extent had XYZ Company wound up the plan on January 1, 2012.
- Deficits will need to be funded but not immediately as is the case with Option #1.
- Complexity will be increased because XYZ Company now has to manage two plans (e.g., complying with regulations, governance, government filing, etc.) - the DB and the DC plan.
- Complexity of administration may increase plan administration expenses but nothing compared to the cost of winding up the plan.
- Increased member communication so that members do not misunderstand XYZ Company's reasons for freezing the DB plan and moving to a DC plan.
- XYZ Company will need to consider the impact of the DB/DC conversion to their objective of establishing the DB pension plan in the first place, e.g., is the pension plan meant to be a recruiting tool? If the answer is yes, then is the DC formula attractive enough to leave this objective intact?
- On a long-term basis, will the DB/DC conversion affect company finances, recruiting tactics, total rewards program? Will current and future members demand higher salaries to compensate for a less generous pension plan?
- XYZ Company needs to consider how this DB/DC conversion will impact their termination/retirement actuarial assumptions, e.g., will long-tenure members be able to retire as they planned? If not, how will this impact XYZ Company's work-force management goals?