CSP-RC Model Solutions Fall 2012

1. **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.

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
McGill, Fundamentals of Private Pensions Ch 22

Commentary on Question:

For section (a), candidates should discuss that the projection shows the relationship between investments, contributions and payments and that the projection can be used to make decisions based on the Value-at-Risk approach.

For section (b), candidates should discuss that actual experience in setting withdrawal rates can be used and that there can be an assumption for taking lump sum versus pension in a stochastic projection. The candidate should demonstrate that they understand that rates vary from year to year.

Solution:

(a) Describe the advantages and disadvantages of stochastic projections versus deterministic projections.

<u>Deterministic Projections</u>

Advantages

- Simpler, may require fewer resources and less time
- Can choose to model specific scenarios

Disadvantages

- Deterministic projection uses only one set of assumptions
- The assumptions may be fixed throughout the forecast period
- Deterministic forecasts are best if chance that assumptions will be met is high

<u>Stochastic Projections</u>

Advantages

- Produces a range of results
- Allows results to be ranked
- Allows assumptions to be variable
- Can observe variance of results under different asset allocation scenarios
- Results can be shown in terms of confidence intervals

1. Continued

- Assumptions are determined stochastically rather than subjectively
- Allows assumptions to interact with each other
- Represents future outcomes by probabilities
- Sensitivity analysis can be done
- Can observe the "tails" of the outcomes to understand best and worst case scenarios
- Stochastic simulation makes the plan sponsor aware of the potential range of outcomes, while indicating the probabilities and volatility involved
- Less likely to produce results that sponsors views as "cast in stone"
- Facilitates communication of variability of results of different asset mixes & strategies with investment managers
- More realistic

Disadvantages

- Requires more investment return assumptions than a deterministic process
- Tends to be more costly and take more time
- Level of sophistication needed

(b) Describe the differences in setting assumptions for a stochastic liability projection versus a funding valuation for each of the following:

i. Discount rate
ii. Expected Return on Assets
iii. Mortality
iv. Withdrawal

i. <u>Discount rate</u>

- Normal funding valuation assumptions are long term assumptions and do not change year to year
- Projection assumptions are more explicit and meant to reflect real world experience
- Discount rate varies each projection year to reflect economic conditions in the future

<u>ii. Expected return on assets</u>

- Projected investment return normally varies from year to year to reflect economic conditions in future and expected change in portfolio composition
- Funding valuation return normally held constant - long term best estimate
- Economic return assumptions for projection valuations need to be more explicit
- Real return will vary for projection since it is made up of an inflation component that changes year to year

1. Continued

- Each asset class is individually modeled and combined to develop a portfolio return in the projection
- Wish to model impact of future economic conditions in projection valuations
- Need to decide on correlation between inflation an various asset classes for projection

iii. Mortality

- Very little justification for mortality assumptions to differ between the 2 types of valuations
- Variance from expected mortality has little impact on the actual cost of a pension plan
- Demographic assumptions usually the same except may be different if some special event needs to be modeled

iv. Withdrawal

- Withdrawal assumptions may be more realistic for projection vs. funding valuation
- Need to vary withdrawal assumptions for special cases e.g. if future layoff expected
- Assumptions used for funding are long term assumptions, care must be taken if using for projection
- Val may use withdrawal varying by age; projection assumption may use age and length of service to be realistic
- Realistic assumptions are important for cash flow modeling

2. 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.

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

Learning Outcomes:

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

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

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

Sources:

Morneau Sobeco Handbook of Canadian Pension and Benefit Plans (ch.13 and ch.17)
Fundamentals of Retiree Group Benefits, Yamamoto (ch.4)

Commentary on Question:

The question tested candidates' understanding of the risks associated with different post-retirement benefit plan designs. Beyond listing the risks, it was important that candidates explained why these risks applied to one or both of the plan designs.

In part (a), successful candidates were able to list the risks associated with both plan designs, and showed evidence of a full understanding of those risks from NOC's perspective.
In part (b), successful candidates were able to identify some of the impacts of the proposed plan on NOC's employees and identify the advantages and/or disadvantages of each.

Solution:

(a) Compare and contrast the risks associated with the current and proposed retiree health programs from the perspective of NOC.

Risk #1 – Medical Inflation Risk

- Current program exposes NOC to the rising cost of health care
- Medical inflation has been rising more quickly than general inflation
- The proposed program would cap NOC's exposure at $20,000 per year per family
- No incentive in current program for members to be wise consumers of health care since the entire cost is covered by NOC with no co-pay or deductible

2. Continued

Risk #2 – Longevity Risk
- In both programs, the benefits are paid for life, so NOC is exposed to the risk that members live longer than expected
- Proposed program has no lifetime maximum, meaning there is unlimited dollar exposure

Risk #3 – Catastrophic Claims Risk
- Risk of large and unexpected claims in the current program
- Current program has no cost containment measures, such as pooling or annual maximums

Risk #4 – Claims Volatility Risk
- NOC is exposed to the risk of large swings in claims from year to year
- Lack of insurance and/or annual maximums

Risk #5 – Cashflow/Operation Risk
- Claims volatility in the current program makes budgeting difficult

Risk #6 – Accounting Risk
- Current program is susceptible to balance sheet and income statement volatility
- Proposed plan design mitigates these risks

Risk #7 – Workforce Management/HR risks
- Current program allows employees to retire at 55/10
- Proposed plan does not have 55/10 retirement option and this may cause difficulties for attracting, retaining, and recruiting employees (change might make plan uncompetitive)

Risk #8 – Communication Risk
- Under the proposed plan, NOC needs to educate employees about making health care decisions

(b) Describe the advantages and disadvantages of the proposed retiree health program from the perspective of the active employees.

Advantage #1 - Flexibility in health care spending
- Coverage for ALL health related expenses, including those not covered under current program

Advantage #2 – Promote and maintain healthy lifestyle
- Consumer awareness to help members make wise health care decisions

Advantage #3 – Can use money for other purchases in retirement
- Cash out features means funds can be used for trips, housing expenses, etc.
- Allowing retirees to choose how they spend the money makes the benefit more valuable to them

2. Continued

Disadvantage #1 – Not protected from health care inflation

- Purchasing power will erode if NOC does not periodically increase the benefit from $20,000

Disadvantage #2 – Not protected from catastrophic health expenses

Disadvantage #3 – Members with spouses and/or dependent children will have to stretch their balance further

Disadvantage #4 – May have to postpone retirement due to inadequate benefits

3. 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 sponsors' financial goals and risk management with respect to their plan.

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

Learning Outcomes:

(1a) Describe the agency relationship between management of the sponsor and its shareholders or taxpayers.

(1b) Compare the, sometimes conflicting, interests of management, employees, shareholders or taxpayers (in the case of public sector).

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

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

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

(8e) Describe and recommend proper plan governance practices and the sponsor's fiduciary responsibility.

Sources:

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

Guaranteed Trouble: The Economic Effects of the Pension Benefit Guaranty Corporation, Journal of Economic Perspectives

R-C126-07 Recent Trends in Canadian Defined Benefit Pension Sector Investment and Risk Management

132-07 20 Questions Directors Should ask About their Role in Pension Governance

Commentary on Question:

Successful candidates recognized that premiums should not only be based on underfunded status alone and identified attributes that the program does not adjust for. In some cases, points could apply towards either parts (a) or (b) - points were given regardless of where they appeared in the solution.

3. Continued

Solution:

(a) Describe the potential shortcomings of the proposed program.

By setting up an insolvency program, the government is sharing in the financial market risk. The revenue to the program is variable based on the underfunded status of the pension plan and there is no minimum premium in place. If there is a booming market and well-funded plans, no premiums are paid and then if there is a market downturn and bankruptcies, the program could be in financial distress.

The program does not adjust for the full extent of a plan's underfunding. It does not adjust for the credit worthiness of a company and ability to recover monies in bankruptcy. It does not adjust for the probability a company will experience financial distress and the plan will become insolvent. It also does not account for the mismatch in risk characteristics between plan assets and liabilities. A financially distressed firm with risky investments that are mismatched pays the same as a fully immunized plan, if they have the same amount underfunded.

The program does not identify what assumptions will be used to value liabilities when measuring the funded status. The liability could be based on group annuity prices, such as a spot termination rates. However this would be volatile. Smoothing techniques could be used however this may delay the premium revenue to the program. The program also does not identify what asset value will be used to measure the funded status, for example market or smoothed value of assets.

The program is administratively complex. It does not identify complex characteristics such as the process to allocate premiums to participants, how participants are notified of their share and how the portion is actually paid. The program also does not identify the level of benefits being protected.

(b) Assess the impact of implementing the proposed program on plan sponsors and participants.

<u>Participants</u>

Participants already share in the risk the plan sponsor may discontinue a COLA or terminate the plan without a successor plan. Now participants will share in the premium payments. Participants will be paying money based on investment decisions they did not make. Individuals tent to be more conservative in their portfolio investments than professional money managers and they may not understand the reason behind company investments. This may lead to unhappy participants and lower morale. Participants will want to get more involved in the pension plan, such as being on the pension committee, or expect communication of the funded status. Workers bear the risk of poor financial performance by DB Plans through reduced wages.

3. Continued

The employer may offer smaller wage increases or less generous increases in pension benefits, or may freeze the plan and convert to a DC Plan. Participants will now be sharing in more risk, with risk of the premium level and they will not understand the fluctuations in the premium amounts. Benefits are more likely to increase only when there is a surplus, as otherwise both participants and sponsor will share in the increase of benefits and increase of new unfunded amount. Participants will have added benefit security due to the insolvency program.

Plan Sponsors

Plan sponsors will also have added security that the benefits they are providing are protected. However since the premium is shared and there is protection, the plan sponsor may take on more investment risk because the sponsor only has to pay half the premium. Other plan sponsors may want to fund up the plan and change investments to an LDI strategy to protect against adverse market conditions. Managers at the company will now consider the impact of their pension decisions on their own economic interest as beneficiaries and sharing in the premium rather than purely promoting the interest of the company. The premium will be an additional cost to the company and the company may want to budget by performing an asset/liability volatility study. The plan sponsor should determine if enhanced communication is warranted to inform members of rationale behind plan design and investment decisions, as well as disclose what additional discretionary funding is made. The plan sponsor will also have additional reporting requirements to comply with.

4. 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:

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

Sources:

Reflections on the Efficient Market Hypotheses: 30 Years Later, The Financial Review 40 (2005) pp. 1-9

Modern Investment Management, Litterman, ch.2, 3, 9, 21, 22, 23, 24, 27 (pp. 501-505 only), ch.28 (pp. 516-520 only)

Commentary on Question:

Note that points were given to other solutions outside what is included in the illustrative solution.

Solution:

(a) Define the Efficient Market Hypothesis.

- No arbitrage opportunities
- Market adjusts to information quickly and rationally, making it pointless to look for undervalued stocks
- Market movements are random
- Historical data supports the efficient market theory, and in particular, index returns appear to exceed actively managed funds

(b) Assess the CFO's proposal.

- Passive strategy features: Replication of index, lower returns, lower risk, lower cost offset by rebalancing costs
- Active strategy features: Seek to outperform index, higher fees, higher returns
- Passive portfolio should look to reflect the duration of the NOC Salaried Plan, which is long (about 20 years)
- CFO should assess the current funding policy in relation to the proposed strategy
- Risk tolerance should be considered
- Optimum strategy should maximize return per unit of risk, rather than minimizing risk or maximizing return alone

4. Continued

- CFO will need to consider how the change in strategy will impact assumptions
  - Expected return on asset assumption may change
  - Long-term return based on target asset return would impact going-concern discount rate
- NOC may want to accelerate funding of the plan if moving to a passive investment strategy
- Will need to consider liquidity needs, especially since plan pays LS benefits
- CFO should also assess current managers to see if any have had consistent positive alphas.

(c) Describe how the manager selection process would change under a passive investment strategy.

- Plan sponsor will need to identify appropriate benchmark to support plan liabilities
- Strategic portfolio would be a replication of appropriate index
- Asset allocation should focus on maximizing return for a given level of risk
- Manager selection would focus on past record of replicating index
- Would need to rebalance the asset mix if it drifts from the target index, which would lead to rebalancing costs
- Would want to monitor performance of passive manager based on variance of returns and volatility against index
- Some asset classes can't have a passive exposure.

5. 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.

7. The candidate will be able to synthesize plan design and funding/accounting/economic value.

Learning Outcomes:

(6d) 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).

(6f) Perform valuations for the following special purposes and advise plan sponsors on their financial implications:
- (i) Plan Mergers and Acquisitions
- (ii) Spin-Offs
- (iii) Conversions from one plan type to another

(7a) Explain the interplay between plan design and plan funding/accounting/economic value.

Sources:

Allen, Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Tenth Edition, 2008 Ch. 18, 24

Morneau Sobeco, *Handbook of Canadian Pension and Benefit* Plans, Fourteenth Edition, 2008, Ch. 4, 5

R-C118-07:, Paterson "Pension Issues in Corporate Sales, Mergers

R-C140-10: Acquiring a U.S. Operation, Watson Wyatt

R-C144-10: Mergers and Acquisitions: Due Diligence of Retirement Plans, Watson Wyatt

Solution:

(a) Discuss the issues you should address when conducting a due diligence review of the small company's plan.

Commentary on Question:

This part of the question requires candidates to demonstrate a thorough understanding of the due diligence review of a retirement plan in a situation where a company is being purchased. In addition, successful candidates focused on specific issues that should be addressed.

5. Continued

- The objective of the due diligence review is to identify, quantify and obtain coverage for all risks and associated liabilities. The small company sponsors a cash balance plan.
- Information should be gathered in order to perform the due diligence review, including plan documentation, administrative and miscellaneous reports.
- Employee issues should be addressed:
  - Compare small company's plan with NOC pension plans
  - Address communications issues
- Address any "Accrued benefit issues"
  - One example of accrued benefit issues: when it is unclear if future salary increases should be included as accrued benefit in a defined benefit plan
- Address any surplus issues and other issues including pricing issues and procedural issues

(b) Discuss the financial considerations to NOC assuming they choose to bring the new employees into its existing plans.

Commentary on Question:
The part of the question requires candidates to demonstrate an understanding of the financial considerations that need to be considered, including accounting and funding considerations. Successful candidates recognized the distinction between any one-time financial impacts and future ongoing financial impacts.

- Financial consideration - accounting impact
  - Current service cost for next year will change
  - May receive transfer of assets, liability increases at the same time
- Financial consideration upon transfer
  - Determine if past benefit should be provided under old or new plan
  - Consider the associated internal/consulting costs of the two options
  - Determine amount of assets to be transferred - if past benefits are provided under the new plan as well
  - If past benefit stay in small company's plan - may consider reviewing investment/immunization strategy
- Financial consideration - cost/funding impact going forward
  - Small population size in relation to the NOC plan
  - Funding requirements should increase slightly in absolute dollar terms
  - Funding requirements should decrease slightly as percentage of pay due to younger membership

6. 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.

Learning Outcomes:

(1a) Describe the agency relationship between management of the sponsor and its shareholders or taxpayers.

(2c) Describe the risks faced by participants of a government sponsored retirement plan.

Sources:

Managing Post Retirement Risks

Risk Management and Public Plan Retirement Systems, AAA, appendix A and B only
Turner and Wantabee, Ch.5

Commentary on Question:

The candidate was expected to focus on risks that pertain to the various stakeholders. Additional credit was given if the candidate was able to identify which stakeholders were exposed to specific risks. Credit was not given for information about the various stakeholders that did not relate to risks.

Solution:

Compare and contrast the risks associated with public sector defined benefit plans from the perspectives of the following stakeholders:

(i) The government ("legislature")
(ii) Society/taxpayers
(iii) Employees
(iv) Unions
(v) Public sector employers

Employee Risks:

1. Investment or market risk - Poor investment returns may cause a reduction in benefits or may limit future benefit increases
2. Inflation risk - Inflation erodes the value of participant's benefits
3. Job tenure risk - risk of losing potential benefits if leave job too early - e.g., final average pay plan will not account for future salary increases or may lose vesting status if leave before vesting.
4. Risk of wrongdoing (corruption or mishandling of plan assets)
5. Political risk – laws can change which could result in a reduction of benefits or an increase in employee contributions

6. Continued

6. Replacement ratio risk – benefit not adequate at retirement
7. Implicit contract risk – sponsor will not honor pension payment

Society, Taxpayer and Employer Risks:

1. Investment risk – poor investment returns may cause an increase in taxes
2. Plan design risk – if plan features are not designed appropriately, risk of the system being manipulated and costs increasing
3. Job tenure/demographic risk – if employee works longer than expected, costs increase
4. Political risk – benefits could be increased

Society and Taxpayer Risks:

1. Intergenerational transfer risk – risk that one generation of taxpayers pays more than another
2. Replacement ratio/benefit adequacy risk – insufficient benefits may result in taxpayers supporting participant through other social programs

Public Sector Employer Risks:

1. Employee morale – decrease in benefits affect morale
2. Funding risk – competing needs for funds when making budget decisions
3. Volatility of costs – government entities favor a predictable budget process emphasizing level funding

Union Risks:

1. Loyalty of members – if members do not think they are getting good benefits, union membership may be an issue.

Government/Legislature Risks:

1. Risks associated with issuance of pension obligation bonds
2. Revenue allocation risk – may need to divert funds from other government programs to fund plan costs

7. **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:

(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:

Accounting for Pension Buy-In Arrangements, PwC

CICA 3461

Commentary on Question:

Successful candidates compared buy-ins and buy-outs from the different perspectives requested.

Solution:

(a) Calculate the 2012 expense reflecting the settlement. Show all work.

Expense for the first 6 months of 2012

= 0.5 * Annual Expense for 2012 without buy-out of annuity

= 0.5 * 48,025 = 24,013

Re-measurement at July 1, 2012 (event) before settlement

Expected DBO at 7/1/2012

DBO 1/1/2012 + SC for 6 months + IC for 6-month - BenPay for 6-month + Loss (Gain) on DBO

= 1,023,134 + 0.5 * 41,951 + 0.5 * 52,804 + 0.5 * (18,000)

= 1,023,134 + 20,976 + 26,402 - 9,000 = 1,061,512

Loss on DBO (before settlement) = Actual PBO (@4.75%) - Expected DBO (@5.00%)

= 1,100,000 - 1,061,512 = 38,488

Expected Assets at 7/1/2012 =

Assets at 1/1/2012 + Expected Return on Assets for the first 6-month – benefit payment for the first 6-month + Contribution for the first 6-month

= 838,061 + 0.5 * 48,821 - 0.5 * 18,000 + 0.5 * 40,000

= 838,061 + 24,411 - 9,000 + 20,000 = 873,472

7. Continued

Actual Assets at 7/1/2012 = Expected Asset - $20,000 loss
= 873,472 - 20,000 = 853,472

Loss due to settlement = cost of contract minus DBO retirees
= 275,000 - 250,000 = 25,000

Funded status at 7/1/2012 = Actual Assets at 7/1/2012 – Actual DBO at 7/1/2012 (after settlement)
= 853,472 - 1,125,000 = (271,528)

Unrecognized PSC after re-measurement, but before settlement
= Unrecognized PSC at 1/1/2012 – amortization of PSC for the first 6-month of the year + new psc
= 7,029 - 0.5 * 847 + 0 = 7,029 - 424 + 0 = 6,605

Unrecognized actuarial loss at the settlement date

= Unrecognized loss at 1/1/2012 – amortization of loss for the first 6-month of the year + additional losses/(gains) on assets + loss on DBO + loss due to settlement
= 114,629 - 0.5 * 1,244 + 20,000 + 38,488 = 172,495

Accrued benefit asset/(liability) @ June 30, 2012
= Accrued liability @ 1/1/2012 + Expense–Contribution
= -[-[(185,073) + 7,029 + 114,629] + 24,013 - 0.5 * 40,000] = (67,428)

CHECK: deficit of $67,428 = $6,605 (un. Psc) + 172,495 (un. losses) + (246,528) (b/s Liab) ==>OK

Settlement impact

Gain and loss on settlement shall comprise 1) change in the obligation 2) change in the value of asset and 3) any related actuarial gains and losses and past service cost that had not previously been recognised.

Where only part of an obligation is settled, the gain or loss includes a proportionate share of the previously unrecognised past service cost and actuarial gains and losses
1) change in the obligation = 250,000
2) change in the asset = 275,000 (so 25,000 will be recognized immediately)
Proportion of the obligation being settled : 250,000 / 1,100,000 = 22.73%
Gain and loss and unamot. Psc to recognize: 22.73% x (172,495+6,605)
= 40,705
Settlement impact under IFRS: $25,000 + 40,706 = 65,706

7. Continued

Expense for the 2nd Half of ther Year (after settlement)

Settlement reduce the expected benefit payments for retirees to 0.
PB0 after settlement = 850,000 (actives only) @ 4.75%
Asset after settlement = 853,472 (actual) minus 275,000 = 578,472
Unamort gains/losses = 197,495 - 48,277 = 149,218
Unamort psc = 6,605

Service cost for 6-month = 44,000* .5 = 22,000
IC for 6 months = .5 * (PBO * .0475 + SC * .0475 - BenPay ($0))=
= .0475 * .5 * (850,000 + 44,000 - 0) = 21,232.50
EROA = Assets @ July 1, 2012 * .0575 * .5 + Cont * .5 * .0575 - BenPay (0)
=.5 * (578,472 * .0575 + 40,000 * .0575 - 0)= 17,781
Amort g/l = [149,218 - 10% * Max(850,000 , 578,472)] / 9.9 * .5
= (149,218 - 85,000) / 9.9 * .5 = 3,243
Amort. Psc = .5 * 847 = 424

Expense 2nd half = 22,000 + 21,233 - 17,781 + 3,243 + 424
= 29,119

Total Expense for 2012
= First 6 months + Settlemnet Impact + Last 6 months
= 24,013 + 65,706 + 29,119
=118,838

(b) Compare and contrast a buy-in contract to a buy-out contract from the perspectives of the plan sponsor and the plan participants.

Buy-in
Benefit obligations are **not** transferred to an insurance company
Sponsor remains responsible for the plan and making benefit payments to plan participants

Contract is seen as an investment and it is considered part of the plan asset. Its return is expected to equal all future benefit payments to covered participants
Sponsor is subject to the insurer's credit risk
Sponsor can buy back the contract, so the arrangement is **revocable**
Employer continues to be considered as the plan sponsor under ERISA
Participants are not notified of a buy-in arrangement and cannot look to the insurer for payments directly
Employer/plan trustees could decide to use the money received under the buy-in contract for other purposes under the plan
Sponsor will not trigger settlement accounting

7. Continued

Buy-out
Benefit obligations are transferred to an insurance company
Insurance company becomes responsible for the plan and making benefit payments to plan participants

Contract is not seen as an investment and is not considered part of the plan assets
Participants are subject to the insurer's credit risk

Sponsor cannot buy back the benefit obligations, so the arrangement is **irrevocable**
Employer is not considered as the plan sponsor under ERISA
Participants are notified of a buy-out arrangement and will have look to the insurer for payments directly

Employer/plan trustees have no control over the money paid for the buy-out arrangement
Sponsor will trigger settlement accounting

8. **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.

Learning Outcomes:

(2f) Evaluate benefit adequacy for members of a particular plan given other sources of retirement income.

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

Sources:

Hutchens paper, Phased Retirement: Problems and Prospects

R-C806-09: IRS Issues Final Regulations Relating to Phased Retirement, U.S. Only
McGill 9th, Ch.7 pp232-245

R-C104-09. Replacement Ratio Study, AON

Commentary on Question:

In part (a), the question tests a candidate's understanding of risks faced by sponsors of retirement plans. Successful candidates listed key advantages and disadvantages of the proposed phased retirement program from the perspective of NOC.

In part (b), the question tests a candidate's ability to analyze the risks faced by retirees and the participants of a defined benefit. Successful candidates calculated the replacement ratio and the net income after taxes.

Solution:

(a) Describe two key advantages and two key disadvantages of the proposed phased retirement program from the perspective of NOC.

Advantages of phases retirement programs from the perspective of NOC (a participant will get full credit if he/she mentioned any two from below):

- Retain experience workers
- Keep older workers known for work ethic and reliability
- Older workers can serve as mentors for younger staff
- Create employment opportunity for new staff by reducing hours of older staff.

- Disadvantages of phase retirement programs from the perspective of NOC (a participant will get full credit if he/she mentioned any two from below):
  - Employer needs to work around part time schedules of various employees (flexible hours problem)

8. Continued

- NOC can encounter possible legal issue:
  - Law may not allow in-service distributions before certain ages
  - Possible lawsuits with informal phased retirement programs taken by many employees.
  - Encourages staff to reduce hours when they might need the extra manpower.
- Problem of selection - target workers may not be the ones taking the program

(b) Compare and contrast the following options from the perspective of the employee:

(i) Phased retirement
(ii) Immediate retirement
(iii) Continue to work full-time until normal retirement at age 65.

Comparing and contrasting different options from the perspective of the employee:

(i) Phased retirement analysis

a. Estimated Pension Benefit at age 60 = 2% x 50,000 x (30) x (1-0.25% x 24) = 28,200
b. Replacement ratio with phased retirement = [20,800 + 28,200]/50,000 = 98.00%
c. Phased retirement net income= 60% x [20,800+ 28,200 -15,600] = $20,040
d. Permits employee to make adjustments to age-related changes in stamina/ability to work
e. May want to try another type of part time employment but have security of some hours at prior employer
f. Cost of medical coverage if not provided by employer could outweigh benefit of phased retirement.

(ii) Immediate retirement analysis

a. Replacement ratio if full retirement at 60 = [28,200]/50,000 = 56.40%
b. Retirement at 60 net income= 60% x [28,200] = $16,920
c. If work-related expenses are taken into account (lunches, commuting, etc.), immediate retirement may be preferable.
d. If employer does not significantly reduce the amount of work when employee reduces work schedule, phased retirement could lead to increased stress and immediate retirement may be preferable.
e. Possible stress reduction could improve quality of life and extend life expectancy

8. Continued

(iii) Full-time until age 65

a. Pension Benefit at age 65 = 2% x 50,000 x 35 = 35,000
b. Replacement ratio if full retirement at 65 = [35,000]/50,000 = 70.0%
c. Retirement at 65 net income= 60% x [35,000] = $21,000
d. Early retirement factors are subsidized so waiting until 65 would miss the advantage of early retirement benefit.
e. Since pension service is not granted for phased retirement period, it may be optimal to retire at 65 instead, to earn additional service.
f. Immediate retirement would result in significantly lower net income than phased retirement or waiting until age 65

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.

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

Sources:

R-C 108-07 "Why are healthy employers…"

Modern Investment Management, Ch 22

Modern Investment Management, Ch 24

R-C 149-10

R-C 148-10

Allen Ch 24

Commentary on Question:

For part (b), credit was also given for other strategies that reduced the funded status (example, if a possible plan change was noted as a reason that duration matching would not work, credit was given).

Solution:

(a) Describe three LDI strategies that may have been implemented.

Provide three of the following:

1) Dedicated bond portfolio – buy bonds that have a cash flow that matches the expected plan payments. The bonds purchased will have coupons and redemption values that provide this cash flow.
2) Duration matching – buy bonds that have the same duration as the liabilities. Duration measures the sensitivity to changes in the discount rate, by buying duration matched bonds, so that when interest rates change, the assets/liabilities will change by the same amount.

9. Continued

3) Horizon matching – combination of dedicated bond portfolio and duration matching. Use dedication bond portfolio for the first few years, followed by duration match for later amounts.
4) Derivative overlay – the underlying portfolio remains intact. Interest rate swaps are added as an overlay to increase the duration of the bond portfolio. One payer is a fixed rate payer, the other payer (pension plan) is a floating rate payer.

(b) For each of the LDI strategies listed in (a), explain possible reasons for the reduction in the funded ratio.

Provide three of the following:

1) Dedicated bond portfolio – cash flows cannot be predicted with certainty, since based on assumptions regarding mortality, termination of employment, salary increases, etc. Bonds are generally available only for 30 years, whereas cash flows extend beyond that period. Bonds can default, with a corresponding mismatch. Plan changes will alter the predicted cash flows.
2) Duration matching – Duration is difficult to estimate, and may be subject to error. Duration match does not necessarily reflect convexity in the yield curve. Can require frequent rebalancing of the portfolio. Duration match does not reflect other fixed income risks, such as sector risk, credit spread risk, and yield curve risk.
3) Horizon matching – this has the risks associated with both the dedicated bond portfolio and the duration matching techniques.
4) Derivative overlays – they typically depend on nominal yields so credit spread risks are not hedged. There is counterparty, tracking, and liquidity risk. Swaps are generally unregulated, and have collateral risks. These types of strategies are administrative complex, and therefore can be costly.

10. Learning Objectives:

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:

(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.

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

Sources:

R-C130-07: Bader/Gold "Reinventing Pension Actuarial Science" with discussion

R-C138-09: The Case for Stock in pension Funds, Contingencies Jan /Feb 08 http://www.contingencies.org/janfeb08/trade.pdf

R-C142-10: Bader and Gold's Rebuttal to The Case for Stock in Pension Funds, Contingencies March/April, 2008, pp. 12 & 13

Can Pensions Be Valued as Marketed Securities, Bader, Pension Section News, June, 2009

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

Commentary on Question:

Successful candidates identified the stakeholders when answering the question. Note that candidates did not need to identify all of the stakeholders identified in the solution to be successful on the question.

Solution:

A country is considering legislation that requires that defined benefit plans:

- Determine their funding valuation liabilities using a discount rate linked to long-term government bond yields; and
- Maintain a fully funded status.

Assess this legislative proposal from the perspectives of all stakeholders.

From the perspective of plan sponsors:

10. Continued

Pros:

- Increase transparency for financial reporting and measurement
- Reduce signaling cost
- Better alignment of roles: skills for employer management, the ER can focus on operating their core business
- Reduce the need for specialization
- Reduce the risk of ER insolvency which will reduce the ER's cost of borrowing/decrease cost of capital for the ER
- Correctly valuing DB plan liability in compensation negotiation
- Provide an accurate measure of plan's cost when making financial and HR decisions
- Reduce the influence of actuarial assumption selection process and manipulation of pension plan cost
- No asymmetric surplus risk

Cons:

- This means to value the pension liability based on risk-free rates instead of the expected investment return of the plan's assets;
- As the risk-free rate is lower than the expected investment return, the pension liabilities and contributions will increase significantly
- Increase volatility on balance sheet and contributions
- The requirement of maintaining fully funded status will force financially distressed sponsors to freeze, terminate (wind-up) the DB plan, or to convert DB plans into DC
- The requirement could force financially distressed sponsors into bankruptcy
- The proposed legislation will discourage employers from setting up new DB and this will accelerate the decline in DB ERPs
- Some plan sponsors care about costs not liability

From the perspective of members/participants of DB plan

- Members no longer bear creditor risk which they are unable to evaluate or diversify
- Eliminate intergenerational risk transfers
- Increase the security of the promised benefits for plan members
- Plan participants are not exposed to implicit contract risk

From the perspective of shareholders

- Increase transparency of financial reporting and measurement so investors can make better decisions
- Shareholders will no longer be misled by smoothing which disguises true cost of pension plan

10. Continued

- No longer conceals volatility and risk through pension accounting and anticipated unearned risk premium
- Reduce agency costs by increasing transparency which allows shareholders to focus on company's operating performance without any pension distortions
- Shareholders' value is increased when the pension plan must maintain fully funded status
- It is more tax efficient for individuals to hold equities in their personal portfolio versus pension fund due to dividend tax credit/tax arbitrage gain/shareholders enjoy tax arbitrage
- Reduce the company's pension fund risk so the company can take risk in their operating business
- Reduce transaction costs and the costs and resources spent on the management of the pension plan

From the perspective of taxpayers (or society)

- Reduce the creditor risk which are borne by taxpayers
- Reduce reliance on public security programs when DB plans are fully funded
- Restore intergeneration equity - different generations of taxpayers share fairly the financial burden of public plans when the plan must maintain fully funded status
- Reduce market risk and under-pricing risk

From financial perspective

Pros

- Valuing pension liability using bond provides better measurement and financial reporting
- Respect the principles of financial economics and corporate finance
- Pension risks and volatilities are no longer hidden by smoothing, amortization, pension accounting and the use of anticipated unearned risk premiums

Cons:

- Financial economics do not imply liabilities must be discounted at the risk-free rate (i.e. long-term government bond yield)
- Discounting at risk-free rate is not correct, plan liability should reflect plan sponsor's risk profile (credit, investment policy, assets allocation etc)
- Expected long-term rate of return is more appropriate than the Treasury bond rate which is a risk-free return
- Ongoing pension plans and funds have the flexibility and ability to weather out bad equity markets
- The proposal removes pension plans' flexibility to invest in equity market and to generate better return which will make benefit more secure

10. Continued

Pension legislators

- Increase the security of the promised benefits for plan members
- Pension legislators should be concerned that plan sponsors will wind-up or convert DB plans into DC; hence, less DB plans available

11. Learning Objectives:

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

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

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

11. The candidate will be able to understand the general applicability and design of long-term incentive plans.

Learning Outcomes:

(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.

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

(4d) Given a context and sponsor objectives, evaluate the pros and cons from both a sponsor and employee perspective of introducing options allowing for flexible retirement such as phased retirement, DROPs and flexible pension plans.

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

(4f) Identify the ways that regulation impacts the sponsor's plan design goals.

(4g) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.

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

11. Continued

(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

(8b) Evaluate the tax implications of retirement plan designs and funding alternatives for the plan sponsor, shareholders and the participants.

(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.

(8e) Describe and recommend proper plan governance practices and the sponsor's fiduciary responsibility.

(10a) Differentiate between situation where management and shareholders objectives for executive plans coincide and where they differ.

(10b) Given a context, recommend a plan to meet the sponsor's objectives and defend the recommendation

(10c) Given a context, assess the plan from an executive's perspective.

(10d) Analyze the options for securing the benefit promise.

(10e) Assess the taxation issues.

(10f) Identify and assess the impact of regulatory constraints.

(10g) Describe accounting for these plans and the options available.

11. Continued

(11a) The candidate will be able to identify and describe the design of long-term incentive plans, including:
- Bonus/performance plans
- Stock options

(11b) The candidate will be able to summarize the accounting treatment of these plans.

Sources:
R-C110-07: Towers Perrin, *The Handbook of Executive Benefits*, Chap. 15 pp. 238-244

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

R-C602-07: Funding Supplementary Pension Plans by Theroux

R-C603-07: RCA: Curmudgeonly Excursion by Theroux

Canadian Pensions and Retirement Income Planning, Fourth Edition, Chapter 23

Commentary on Question:
Successful candidates recognized that the question is focused on one event (change-in-control) rather than all events. Thus, for part (b) the candidate should consider any two of the following (credit was only given for two funding vehicles):
1. Funded RCA (Held in Trust
2. Secular Trust
3. Letter of Credit RCA

Successful candidates tailored their responses to the CEO of the XYZ company, i.e., assess the situation from the CEO's perspective.

Note that the question on the exam stated that the question pertained to the case study. This wording was in error. Candidates' solutions were marked taking into account this error.

Solution:
(a) Assess both options from the perspective of the Company XYZ.

Assessment of **Option 1** from perspective of CEO at XYZ's company:

The CEO should consider the following pros and cons:

11. Continued

- Funding Implications
  - None – no additional costs to the XYZ Company.
  - Funding of SRP benefits continue to be deferred but executives will have peace of mind that their benefits are protected in the event of a change-in-control.
- Accounting Implications
  - None – no additional costs to the XYZ Company because funding of benefits continue to be deferred.
- Cash-Flow Implications
  - Business as usual, because funding of benefits continue to be deferred; benefits will continue to be paid on a pay-as-you-go basis.
- Plan Provisions
  - Will need to establish or amend current plan text to avoid misunderstandings and possible legal ramifications:
    - Need to define triggering event - both change-in-control and termination of employment, or just change in control?
    - Definition of change-in-control must not be too narrow that it doesn't provide adequate protection; or
    - Too broad that it will pay unintended benefits, e.g., in the event of a "friendly" takeover;
    - Clearly define termination of employment - whether to include or exclude termination with cause or voluntary terminations.
- HR Implications
  - Help attract and retain senior executives
    - Current executives are less likely to seek employment elsewhere as a pre-emptive move in case of potential control change
    - Provide protection against financial dislocation of an unanticipated termination
      1. Provide accelerated vesting of benefits
      2. Provide immediate lump sum payment of benefits
      3. Coordination with other compensation and benefit programs
- Risk Management
  - Decisions made by senior executives in the event of a change-in-control could impact share prices, credit ratings, etc. Therefore, amending the plan to add a change-in-control provision might be acceptable because:
    - For the right price, could be in the best interest of shareholder since it enables management to weigh takeover proposals independently.

11. Continued

        - Motivates key executives to act in best interest of shareholders in the event of a potential control change
- Tax Consequences to XYZ Company
    - No change; Business as usual as taxes will continue to be withheld at source at the time of disbursement and the XYZ Company claims a tax deduction for the gross benefit after payment.
- Regulatory Implications
    - No impact since funding of benefits continue to be deferred

Assessment of **Option 2** from perspective of CEO at XYZ's company:

- Funding Implications
    - The XYZ Company will have an additional annual cost to consider.
    - Each generation will pay for their own benefits – no intergenerational inequity.
    - Depending on funding vehicles used to secure the benefits, the funding process may be a little more complex vs. funding a registered pension plan.
- Accounting Implications
    - The financial statements of the XYZ Company may be subject to increased volatilities.
    - Pre-funding may reduce expenses due to returns on assets.
    - There may be other accounting implications RE: settlement of benefits.
- Cash-Flow Implications
    - May impact cash-flow requirements in general; The CEO needs to consider in annual budgets, additional cost of pre-funding SRP benefits; this may impact other areas of spending in the XYZ Company.
- Funding Policy
    - May need to establish a funding policy to ensure that the plan is adequately funded but in a manner that minimizes tax consequences.
- Plan Provisions
    - May need to establish or amend current plan text to reflect any pre-funding conditions that might be activated upon change-in-control, in order to avoid misunderstandings and possible legal ramifications.

11. Continued

- HR Implications
  - Help attract and retain senior executives
    - Provides more benefit security from takeover situation
- Risk Management
  - May cost the XYZ Company more to pre-fund than if they were paying the benefits on a pay-as-you-go basis;
    - Need to consider the rate of return on assets used to pre-fund benefits vs. assets that are invested in the business.
      - This may impact share prices, credit ratings, loan covenants, etc.
      - Credit rating may impact the interest rate set by the bank in issuing a letter of credit used to pre-fund the benefits.
- Tax Consequences to XYZ Company
  - Depending on funding vehicle used to pre-fund SRP benefits, pre-funding the benefits may not be the most tax-efficient for the XYZ Company, e.g., only 50% of contributions is productive i.e., grows with interests, under a funded RCA.
  - Depending on the funding vehicle used to pre-fund the SRP benefits the cost to pre-fund the benefits may increase over time and may even become non-refundable, e.g., letter of credit RCA.
- Regulatory Implications
  - Depending on the funding vehicle used to pre-fund the benefits, there may be regulatory implications that the CEO must consider.

(b) Describe two funding vehicles that may be utilized to address the concerns of XYZ Company's executives.

Funded RCA (Held in Trust)

- Assets are held in a Trust separate from company assets
  - Benefit is secure even in the event of XYZ Company's bankruptcy/Assets are protected from XYZ Company's creditors
- Contributions and investment income are subject to 50% refundable tax
  - In effect, only 50% of contribution generate investment income
  - When the benefits become payable, the refundable tax is returned to the fund after the end of the year at the rate of 50% of the benefit actually paid.
- Contributions are tax deductible for XYZ Company
- Executives are taxed on distributions.
- Executives contributions could also be tax deductible

11. Continued

- The cost related to funding through an RCA is greater than for a registered pension plan, because it does not benefit from the same advantageous tax treatment.

Secular Trusts

- XYZ Company pays additional salary on the conditions that the executive will establish a trust to hold the additional amounts
- Trust contains restrictions on withdrawals to ensure funds are used at retirement
- Benefit is secure even in the event of XYZ Company's bankruptcy
- Contributions are taxable income to the executives
- Contributions are tax deductible for XYZ Company
- Executives will pay tax on the income of the Trust
- Can be tax-effective if the top marginal tax rate is less than the 50% rate applicable to RCAs

Letter of Credit (RCA)

- The Letter of Credit (LOC) is an irrevocable promise by a financial institution, usually a bank, to pay a specified amount if certain conditions unfold (such as change in control of the employer).
- The LOC strategy defers the actual funding of the SRP obligations - not an immediate source of funding.
- The LOC cannot be secured; If LOC is secured then CRA will deem the full face amount of the LOC as contributions to the RCA.
- Overall set-up:
  - Under this funding method, XYZ will set up a RCA
  - XYZ will contribution twice the fee charged by the bank issuing the LOC to the RCA; 50% of the contributions will be paid to the Receiver General and 50% pays for bank fees for the LOC and trustees' expense charges.
  - Contributions will be remitted on an annual basis as LOCs are put in place
  - LOC is the only property held in the RCA – there are no earnings inside the RCA subject to the 50% refundable tax
  - Benefits are paid to the executives on a pay-as-you-go basis.
  - In the event that the LOC gets called, the appointed trustee must remit 50% of the face amount as refundable RCA tax to the Receiver General.

12. 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.

Learning Outcomes:

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

Sources:

CICA Handbook Part I and II

Commentary on Question:

Candidates were required to show balance sheet asset/liability values after transition and calculate pension expenses one year out. Since they were to apply both deferred (10% corridor) and immediate recognition methods, they needed to calculate gains/losses for 2 consecutive years. An added complexity was that this was a private enterprise company. Candidates were expected to identify the use of the funding valuation in lieu of the best estimate (accounting valuation).

Solution:

(a) Calculate the balance sheet asset/liability as of the transition date (i.e., January 1, 2010) and December 31, 2010 for the RPP and SRP under the two approaches. Show all work.

Expected ABO at 31/12/2010 =ABO 1/1/2010+ Service Cost+ Interest Cost- 2010 benefit payments

Accrued benefit obligation gain and loss = Accrued benefit obligation at 12/31/2010 – Expected obligation at 12/31/2009

Interest cost = interest on ABO and service cost and- half a year's interest on benefit payments

ABO Gain/Loss in 2010	**RPP**
ABO 1/1/2010	20,000,000
+ Service Cost	500,000
+ Interest Cost	=20,000,000 *0.06 + $500,000* 0.06 - 200,000*.5*.06
2010 Interest cost = interest on ABO and service cost and- half a year's interest on benefit payments	= 1,224,000
- 2010 benefit payments	-200,000
=expected ABO at 31/12/2010	= 21,524,000

12. Continued

Actual ABO	23,500,000
Gain (Loss) on ABO in 2010	= 1,976,000 LOSS

ABO Gain/Loss in 2010	**SRP**
ABO 1/1/2010	12,000,000
+ Service Cost	300,000
+ Interest Cost	=12,000,000 *0.06 + $300,000* 0.06 - 200,000*.5*.06
2010 Interest cost = interest on ABO and service cost and- half a year's interest on benefit payments	= 732,000
- 2010 benefit payments	-200,000
=expected ABO at 31/12/2010	= 12,832,000
Actual ABO	15,000,000
Gain (Loss) on ABO in 2010	2,168,000 LOSS

Gain (Loss) on asset in 2010 = Actual Asset 31/12/2010 - expected MVA 31/12/2010

Market value of asset (MVA) at 12/31/2009 +Expected Return on asset+ 2010 expected employer contributions – 2010 expected benefit payments

Asset Gain/Loss in 2010	**RPP**
Asset 1/1/2010	17,500,000
+ 2010 contributions	800,000
+ Expected Return	=17,500,000 *0.065 + $800,000* 0.5*0.065 - 200,000*.5*0.065
= interest on MVA - half a year's interest on benefit payments + half a year's interest on employer contributions	= 1,157,000
- 2010 benefit payments	-200,000
expected MVA at 31/12/2010	= 19,257,000
Actual Asset 31/12/2010	= 19,500,000
Gain (Loss) on Asset in 2010	=243,000 GAIN

12. Continued

No unamortized transition obligation, past service costs or unamortized actuarial gains/losses as of December 31, 2010 as it is fully recognized as a result of transition to CICA 3461 (Part II) at January 1, 2010

Balance Sheet (Liability)/Asset = MV of assets - ABO + Unamortized gain/loss +Unamortized past service cost + Unamort Transitional asset/obligation

1/1/2010	
MV of assets	17,500,000
ABO	20,000,000
Funded Status	-2,500,000
Unamortized gain/loss	0
Unamortized psc	0
Unamort. Transitional a/o	0
Balance Sheet (Liability)/Asset	**-2,500,000**

1/1/2010	SRP
MV of assets	0
ABO	12,000,000
Funded Status	-12,000,000
Unamortized gain/loss	0
Unamortized psc	0
Unamort. Transitional a/o	0
Balance Sheet (Liability)/Asset	**-12,000,000**

12/31/2010	**RPP**
MV of assets	19,500,000
ABO	23,500,000
Funded Status	-4,000,000
Unamortized gain/loss = Net gain on asset/ABO during 2010	1,976,000 LOSS on ABO +243,000 GAIN on asset =1,733,000 LOSS
Unamortized psc	0
Unamort. Transitional a/o	0
Balance Sheet (Liability)/Asset	**-2,267,000**

12. Continued

12/31/2010	SRP
MV of assets	0
ABO	15,000,000
Funded Status	-15,000,000
Unamortized gain/loss = Net gain on asset/ABO during 2010	2,168,000 LOSS
Unamortized psc	0
Unamort. Transitional a/o	0
Balance Sheet (Liability)/Asset	**-12,832,000**

668000
60727.27273

No valuation allowance as the plan is in deficit as of December 31, 2010

(a)(ii) RPP - Immediate Recognition Approach

ABC would determine the accrued benefit obligation for that RPP based on most recent actuarial valuation prepared for funding purposes with no unamortized amounts

Fair value of assets as of December 31, 2010: 19,500,000

ABO on funding basis as of December 31, 2010	**-23,000,000**
Funding status (deficit) as of December 31, 2010	**-3,500,000**

Balance Sheet Liability at Dec-31-2010: $3,500,000

Balance Sheet Liability at Jan-1-2010: $4,700,000 Asset=$22.2M-Liab=$17.5M)

(a) (ii) SRP- Immediate Recognition Approach

ABC would determine the accrued benefit obligation for SRP based on most recent actuarial valuation prepared for accounting purposes as the plan does not have a going concern funding valuation.

Balance sheet liability at Dec-31-2010: $15,000,000 (ABO = $15,000,000, no asset)

Balance sheet liability at Jan-1-2010: $12,000,000 (ABO = $12,000,000, no asset)

(b) Calculate the 2011 pension expense for the RPP and SRP under the two approaches. Show all work.

12. Continued

(b) (i) Deferral and Amortization Approach

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

2011 Expense	RPP
Service Cost (BOY)	575,000
Interest Cost =AB0 * i + SC*I – BP*i/2	23,500,000*5.25% + 575,000*.0525 – 200,000 * .0525/2
	= 1,258,687.5
- EROA = MV@BOY * eroa% + Cont*eroa@/2 – BP*eroa%/2	19,500,000*.06 + 800,000*.06/2 – 200,000*.06/2 = (1,188,000)
Amort psc	0
Amort act g/l = unamortized amount @BOY in excess of 10% corridor, if any, divided by EARSL	
1,733,000 LOSS (see a) above) – 10%MAX (19,500,000, 23,500,000) divided by 11	
= 0	
2011 Expense	645,687.50

Points were given to candidates who calculated the expense recursively by balance sheet asset/liabilities at beginning and end of periods and contributions and expenses.

12. Continued

2011 Expense	SRP
Service Cost (BOY)	330,000
Interest Cost=AB0 * i + SC*I – BP*i/2	15,000,000*5.25% + 330,000*5.25% - 200,000*.0525/2
	= 799,575
- EROA = MV@BOY * eroa% + Cont*eroa@/2 – BP*eroa%/2	0
Amort psc	0
Amort act g/l = unamortized amount @BOY in excess of 10% corridor, if any, divided by EARSL	
(2,168,000 LOSS – 10%15,000,000) divided by 11	
= 60,727	
2011 Expense	1,190,302

Note: There are other ways to determine it and credit was given for other methods.

(b)(i) RPP Immediate Recognition Approach

DB Expense = Service Cost + Interest Cost **+Actual Return on Asset** + Amort PSC + (G)/L

Service cost at the beginning of year (funding basis) =**575,000**

2011 Interest cost = interest on ABO (funding basis) and service cost and- half a year's interest on benefit payments

IC = 23,000,000 *0.053 + 575,000* 0.053 - 200,000*.5*.053

= 1,244,175

The actual return on assets during 2011:

Market value of asset (MVA) at 12/31/2010 – 2011 expected benefit payments + 2011 expected employer contributions - Market value of asset (MVA) at 12/31/2011

= 19,500,000 – 200,000 + 800,000 – 18,000,000

= (**2,100,000) LOSS**

Amortization amounts are $0 – everything recognized immediately

Accrued benefit obligation gain and loss (to be recognized fully in 2011)

Accrued benefit obligation at 12/31/2011 – Expected obligation at 12/31/2011

Expected obligation at 12/31/2011 = Accrued benefit obligation at 12/31/2010 + 2011 current service cost - 2011 expected benefit payments+ interest cost)

12. Continued

Expected obligation = 23,000,000*1.053 + 575,000*1.053 – 200,000*(1+.053/2) = 24,619,175
Actual obligation@12/31/2011 = 1.1 * 23,000,000 = 25,300,000
Liability Loss = 25,300,000 - 24,619,175
Liability Loss of **680,825**
RPP 2011 Expense = 575,000 + 1,244,175 + 2,100,000 + 680,825 = **4,600,000**
Points were also given to candidates that answered using balance sheet asset/liability with contributions to get expenses.

(b) (ii) SRP Immediate Recognition Approach
ABC would determine the accrued benefit obligation, service cost and discount rate as of December 31, 2011 for SRP based on most recent actuarial valuation prepared for accounting purposes as the plan does not have a going concern valuation.
All gains and losses on assets (nil) and liability recognized immediately in the expense.
Service cost at the beginning of year = 330,000
2011 Interest cost = 799,575
The actual return on assets during 2011= 0 as the plan is unfunded
Accrued benefit obligation gain and loss
Expected at 12/31/2011 = 15,000,000*1.0525+330,000*1.0525 – 200,000*(1+.0525/2)
= 15,929,575
Actual SRP ABO at 12/31/2011 = = 1.1 * 15,000,000 = 16,500,000
Loss on ABO = 16,500,000 – 15,929,575 = 570,425
SERP 2011 Expense = 330,000 + 799,575 + 570,425
=1,700,000
As above, if alternative methods were used, points were awarded.

13. **Learning Objectives**:

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

Learning Outcomes:

(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.

Sources:

Morneau Sobeco Ch. 7

Morneau Sobeco Ch. 12

R-C614-09

Canadian Pensions and Retirement Income Planning Ch. 14

Morneau Sobeco Ch. 3

Commentary on Question:

There are alternative interpretations on how to calculate the interest roll-forward of the RRSP and TSFA so credit was given to multiple solutions.

Solution:

(a) Based on the data above, calculate the amount of after-tax income for this individual when he attains age 65 if he chooses to either invest only in:

(i) a RRSP

(ii) a TFSA

RRSP:

Age	Earnings	Account Balance (Beg. of Year)	Interest on Investments	Contribution	Account Balance (Beg. of Year) + Contrib.	Tax Refund	Account Balance (End of Year)
60	45,000	-	-	5,400	5,400	1,566	6,966
61	46,350	6,966	348	5,562	12,876	1,613	14,489
62	47,741	14,489	724	5,729	20,942	1,661	22,603
63	49,173	22,603	1,130	5,901	29,634	1,711	31,345
64	50,648	31,345	1,567	6,078	38,990	1,763	40,753
65	52,167	40,753	2,038	6,260	49,051	1,815	50,866

13. Continued

Earnings $_t$ = Earnings $_{t-1}$ x (1.03)
Contribution $_t$ = 12% x Earnings $_t$
Interest on Investments $_t$ = 5.0% x Account Balance $_t$
Tax Refund $_t$ = 29.0% x Contribution $_t$

Thus, at Age 65
Salary less contribution = (52,167 - 6,260) x (1- 0.29) = $32,594
Investment/RRSP = Account Balance = 50,866 x (1-0.29) = 36,116
OAS = 400 x 12 x (1-0.29) = 3,408
Net Income = 32,594 + 36,116 + 3,408 = 72,118
OAS Clawback = 3,408 x 0.9 = 3,067
Total Income = 72,118 – 3,067 = 69,051

TFSA:

For all years	cont = Min(5,000,.12* salary) = 5,000
	no inflation impact on TFSA limit
age 60	account balance = 5,000 = 5,000
age 61	account balance = 5,000*1.05 +5,000 = 10,250
age 62	account balance = 10,250*1.05 +5,000 = 15,763
age 63	account balance = 15,763*1.05 +5,000 = 21,551
age 64	account balance = 21,551*1.05 +5,000 = 27, 628
age 65	account balance = 27,628*1.05 +5,000 = 34,009

Thus, at Age 65 Salary less contribution = 52,167 x (1- 0.29) = $37,039
TFSA Account = Account Balance = 34,009
OAS = 400 x 12 x (1-0.29) = 3,408
Net Income = 37,039 + 0 + 3,408 = 40,447
OAS Clawback = 3,408 x 0.3 = 1,022
Total Income = 40,447 – 1,022 = 39,425

(b) Describe situations in which a TFSA would be preferable to a RRSP.

TFSA is preferable over RRSPs:

1) for those over age 71
2) can contribute to TFSA until death
3) RRSP, can contribute only to age 71
4) those over age 71 can continue to accrue additional investment earnings on a tax-free basis
5) member who has **no RRSP cont room**, TFSA is preferable
6) may be preferred savings vehicle for **lower income**
7) withdrawal from TFSA does not affect **means-tested benefits**

13. Continued

8) for those who expect to retire in **higher tax bracket** than they currently are in(i.e. students and part-time workers)
9) Would pay less on contribution to TFSA versus RRSP - tax is paid immediately on TFSA
10) for those that are **married**

a. spousal TFSA contributions are allowed without reducing own TFSA room
b. if spouse withdraws, there is no income attribution to the contributor

11) death benefits to spouse have no consequence under RRSP, death benefit can result in income withdrawals at higher marginal tax rate

14. 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.

5. The candidate will be able to evaluate the sponsors' 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 sponsors' goals, given constraints.

Learning Outcomes:

(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.

(5d) Analyze how the retirement plan integrates into the sponsor's overall financial position.

(6f) Perform valuations for the following special purposes and advise plan sponsors on their financial implications:
(i) Plan Mergers and Acquisitions
(ii) Spin-Offs
(iii)Conversions from one plan type to another

Sources:

RC605-12 FSCO Policy A700-200 Asset Transfer Resulting from Sale of Business

RC102-07 Turner & Watanabe, Private Pension Policies Ch. 5

RC161-12 Intricately Linked: Pensions and Corporate Financial Performance

RC112-07 Pension Investing and Corporate Risk Management

Commentary on Question:

Part (a) of the question asks candidates to calculate the minimum and maximum asset transfer amount in accordance with the Financial Services Commission of Ontario Policy A700-200.

14. Continued

It is important to note that the asset transfer ratio is calculated as the ratio of the market value of investments held by the employer's pension plan plus any cash balances and accrued or receivable income items to the sum of the transfer liabilities and the residual liabilities. The going concern actuarial value of assets should not be used to determine the minimum and maximum transfer amounts.

Part (b) of the question asks candidates to describe the risks if the assets and accrued benefits for the transferred members remain in ABC's pension plan. The question does not ask candidates to only list the risk but describe the risks in the context for which the question is framed (i.e. surplus situation). However, the question does not ask for candidates to list the difficulties of executing and administering an asset transfer.

Solution:

(a) Calculate the minimum and maximum asset transfer amounts. Show all work.

Residual liabilities = max (Residual GC Liabilities, Residual Solvency Liabilities)
Residual liabilities = max(50M,46M) = **$50,000,000**

Transfer liabilities = max (Transfer GC Liabilities, Transfer Solvency Liabilities)
Transfer liabilities = max(30M,29M) = **$30,000,000**

Asset Transfer Ratio = MVA / (Residual liabilities + Transfer liabilities)
Asset Transfer Ratio = 90M / 80M = **112.50%**

Asset Transfer Value = min(Asset Transfer ratio, 1.0) x Transfer Liabilities
Asset Transfer Value = min(112.50%, 1.0) x $30M = **$30,000,000**

Residual Asset Value = min(Asset Transfer ratio, 1.0) x Residual Liabilities
Answer: Residual Asset Value = min(112.5%, 1.0) x $50M = $50,000,000

Calculate permissible minimum Asset Transfer Value
Minimum Asset Transfer Value = Asset Transfer Value calculated in paragraph 3(b)(i) of FSCO Policy A700-200
Minimum Asset Transfer Value = $30,000,000

Calculate permissible minimum to be retained by Residual Members
Minimum amount to be retained by Residual Members = Residual Asset Value calculated in paragraph 3(b)(ii) of FSCO Policy A700-200
Minimum = $50,000,000
Implied Maximum Asset Transfer Value = MVA - Minimum retained by Residual Members
Maximum = $90M - $50M = $40,000,000

14. Continued

Paragraph (13) Ratio = Transfer Liabilities / Residual Liabilities
Paragraph (13) Ratio = $30M / $50M = 0.6

If the ratio of assets transferred to assets retained is greater than 0.6, the transfer shall be treated as a surplus withdrawal subject to additional requirement

(b) Describe the risks if the assets and accrued benefits for the transferred members remain in ABC's pension plan from the perspectives of:
(i) The plan participants
(ii) ABC Company
(iii) DEF Company

Risks to Plan Participants (if assets and liabilities NOT transferred)
Job Tenure / Wage Risk - uncertain if service and salary increases would be recognized in old ABC plan
Implicit Contract Risk - uncertain if ABC would continue to provide ancillary benefits to the transferred members

- DEF transfer members rights in the pension plan would be different if assets and liabilities remained in ABC plan (i.e. transferred members would be treated as in-actives. If the assets and liabilities were transferred to DEF plan, the members' would be considered as actives for their entire benefit and not just for the portion of the benefit that was accruing in the DEF company plan.

Risk of Wrongdoing - misappropriation and misuse of assets remaining with ABC company
Inflation risk - risk that real benefit levels would erode if the benefits are frozen at current salary levels with ABC company
Risk of poor financial performance of ABC company
Firm Risk - risk of default by either ABC company or DEF company
Risk members cannot access surplus which remains with ABC company

- Employees' surplus could be used to pay employer Normal Cost
- Surplus could be used to grant active employees' a contribution holiday (if this is a contributory plan) and thus erode the surplus belonging to the DEF transfer members
- Surplus belonging to the DEF transfer group could be eroded by the demographic experience (demographic risk) of the active members in ABC (and the opposite is true as well i.e. DEF experience could erode the ABC share of surplus)

Risk of ABC bankruptcy

Risks to ABC Company (if assets and liabilities NOT transferred) - Risk of company administering plan for non-mem*bers:*
Early retirement risk - risk of members retiring early would be borne by ABC company

14. Continued

Longevity Risk - risk of members living longer than expected is borne by ABC company
Demographic Risk - risk of increasing old age dependency ratio which would increase cost of proving the retirement benefits for the transferred members
Financial Market Risk - risk that investment performance of pension assets is not adequate

- Results in higher volatility of funded status because more assets and liabilities under management
- Risk of higher contribution requirements

Interest rate risk - value of liabilities would increase if interest rate decreases
Pension liabilities are highly sensitive to short term fluctuations in capital markets and economic environment
Large required contributions in the future may affect ABC company's credit rating and make it more expensive to raise capital
Increased demand for additional cash contributions may affect broader efforts to fund the business and pay for other highly valued benefits programs
Risk ABC company may not be able to access surplus

Risks to DEF Company (if assets and liabilities NOT transferred)
Higher volatility of funded status since no surplus is transferred over
Higher volatility of funded status if assets not transferred (i.e. ABC plan gets surplus)

- Higher contribution volatility because no surplus for cushion
- Less likely to have contribution holidays

Less assets under management

- Dampens ability to achieve higher returns on assets
- Limits ability to justify a higher investment return assumption
- Proportionally higher investment expenses

No control of investment decisions of assets which remain at ABC company
Risk of Political Change - risk that changes in law or court cases would result in DEF company being responsible for benefits remaining with ABC company