

RET DAU Model Solutions

Spring 2019

1. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

DA-137-13: Pension Projections

Commentary on Question:

This question tests candidates' knowledge of different types of projections and how projections are useful to public pension plan stakeholders.

Most candidates did well on this question.

Solution:

- (a) Compare and contrast the following types of projections for a defined benefit pension plan:
 - (i) Deterministic
 - (ii) Stochastic
- For a deterministic projection, a single predetermined set of assumptions is used to project the population and assets; a stochastic projection uses random variables to bring forward the population and assets.
- The results from a deterministic projection provide a single answer for each set of assumptions; the results from a stochastic projection provide confidence intervals.
- A deterministic projection involves one or a few scenarios; a stochastic projection generally entails running of a series of random trials.

1. Continued

- (b) Explain the rationale for performing projections for a public sector pension plan from the perspectives of the following stakeholders:
- (i) Society/Taxpayers
 - (ii) Public Employees
 - (iii) Unions
 - (iv) Public Sector Employers

Society/Taxpayers

- When public plans provide adequate, secure, robust and well-designed retirement income to public employees, it minimizes the role society might need to play to backstop the plan.
- A projection study can help in the long-term decision-making process to help public plans ensure the security of the retirement income provided

Public Employees

- Most public employees make significant contributions to the plans and have a large stake in their benefits.
- A projection study can provide insights on the benefit security.

Unions

- Unions particularly favor benefits that continue unless renegotiated rather than benefits that must be bargained for anew in each round of bargaining.
- A projection study can provide information on sustainability of benefits and potential impact on any anticipated changes in trend (e.g. mortality improvements).

Public Sector Employer

- A public sector employer needs to make budgeting decisions and there are many competing needs for funds.
- A projection study can determine long term budgeting requirements.

2. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (3a) Identify risks face by retirees and the elderly.
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (8e) Advise plan sponsors on accounting costs and disclosures for retirement plans under various standards and interpretations.

Sources:

DA-157-18: PWC IFRS Manual of Accounting Ch. 12 (excluding FAQ 12.113.2 to 12.127.1)

DA-179-19: Introduction (A58), IFRS1 (paragraphs 1-40 & Appendix A), IAS19, IFRIC14

Managing Post-Retirement Risks, A Guide to Retirement Planning

Commentary on Question:

This question tests candidates' knowledge of post-retirement risks faced by retirees and strategies that can be implemented to manage these risks. The question further tests candidates' knowledge of the defined benefit cost for post-employment health plans when a plan sponsor improves benefits under International Accounting Standards IAS 19, Rev. 2011.

Overall Candidates' answered parts (a) and (b); candidates struggled with describing the impact of the plan changes in part (c).

Solution:

- (a) Describe six non-investment risks to which retirees may be exposed.

Commentary on Question:

Candidates received credit for appropriately describing other non-investment risks not described below.

2. Continued

- Longevity – Outliving retirement resources.
- Inflation – Fixed income stream loses purchasing power due to the price increase of goods and services over a period.
- Interest Rate – Low interest rate environment at retirement can result in lower retirement income due to annuities being more expensive.
- Public Policy – Policy risks include increase in taxes, new kinds of taxes, reduction in social security, Medicare, and Medicaid, increase in retiree contributions for Medicare.
- Unexpected health care needs and costs – Unexpected health care costs are a major concern. Employers continue to cut back on post-retirement health care benefits.
- Death of Spouse – Some income may stop at the death of a spouse or former spouse.

(b) Describe a risk management strategy that retirees can apply for each risk identified in part (a).

Commentary on Question:

To receive full credit, candidates had to describe management strategies for each of the 6 risks identified in part (a).

Candidates received credit for appropriately describing other management strategies not described below.

- Longevity – Deferred variable annuities can include guaranteed minimum floor for guaranteed lifetime income. Also available, longevity insurance and managed payout plans.
- Inflation – The retiree can purchase inflation-indexed annuities, which adjust payments for inflation up to a specified annual limit.
- Interest Rate – Investing in long-term bonds, mortgages, and dividend-paying stocks offers protection against lower interest rates, although the value of these investment will fluctuate.
- Public Policy – 401(k)s and RRSPs income grows tax free. Retiree would presumably withdraw income in a lower tax bracket in retirement. Planning for ongoing income should also address retirees' need or desire for liquidity to meet unexpected needs.
- Unexpected health care needs and costs – Federal or state-local programs may assist low-income retirees. Retiree may consider working, at least part-time, to remain covered. Consider “discount benefit plans” for typical non-covered services such as dental or vision care.
- Death of Spouse – Life insurance, survivor income in Social Security, pension plans and annuities, long-term care insurance, and savings.

2. Continued

- (c) Describe the impact of the plan change on the Defined Benefit Cost recognized under International Accounting Standards IAS 19, Rev 2011.

No calculations required.

Commentary on Question:

Candidates struggled to describe the impact of the plan changes to the defined benefit cost for the components recognized in the Profit and Loss (P&L) statement and the components recognized in the Other Comprehensive Income (OCI) statement.

Candidates also struggled to identify that the reduction in retiree contributions results in an increase in future benefit payments. The reduction does not offset the plans service cost, as retirees do not have any service cost. The increase in benefit payments affects the interest cost component of the defined benefit cost recognized in the P&L statement.

Increasing the value of the medical benefit in the post-employment health plan for past service results in a Past Service Cost. The increase in the medical benefit for future service, results in an increase to the plan's Service Cost. Overall, the plan will also experience an increase in benefit payments due to the increased medical benefit.

Eliminating retiree contributions results in an increase in benefit payments.

These changes have the following impact on the Defined Benefit Cost, under International Accounting Standards IAS 19, Rev. 2011.

Past Service Cost

- Increasing the value of the medical benefit for all past service will result in a Past Service Cost due to an immediate increase in the Defined Benefit Obligation.
- The Past Service Cost must be amortized immediately on the P&L statement which results in an increase in the Defined Benefit Cost.

Service Cost

- Increasing the value of the medical benefit for future service will result in an increase in the plan's Service Cost.
- The increase in the Service Cost will result in an increase in the Defined Benefit Cost recognized in the P&L.
- The service cost recognition will include interest to the end of the year.

Interest Cost

- Increasing the value of the medical benefits (Past Service Cost) results in an increase to the Interest Cost.

2. Continued

- An increase in future benefit payments results in a decrease in the Interest Cost component.
- Eliminating retiree contributions results in a decrease in the Interest Cost, as the future benefit payments are expected to further increase by the decrease in retiree contributions.
- All three components of the Interest Cost result in a change in the Defined Benefit Cost recognized in the P&L Statement.

Defined Benefit Cost recognized in the P&L

- The Past Service Cost, the increase in the Service Cost, and the Interest Cost components all result in an impact to the Defined Benefit Cost.
- The Defined Benefit Cost is recognized immediately in the P&L statement.

Defined Benefit Cost recognized in the OCI

- None of the impacted values are due to actuarial (gains)/losses arising due to remeasurement or assumption changes.
- Eliminating retiree contributions and increasing the value of the medical benefit have zero impact on the Defined Benefit Cost recognized in the Other Comprehensive Income (OCI) statement.

3. Learning Objectives:

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

Learning Outcomes:

- (9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors etc.).
- (9b) Explain and apply the Guides to Professional Conduct.
- (9c) Explain and apply relevant qualification standards.
- (9d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.
- (9f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.

Sources:

SOA Code of Professional Conduct

DA-139-15: ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

DA-140-15: ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) List the communications and disclosure requirements of the Society of Actuaries Code of Professional Conduct for an actuarial report.

Commentary on Question:

Successful candidates listed specific requirements from the SOA Code of Professional Conduct.

No credit was given for listing requirements from the Standards of Practice.

- Ensure report is clear and appropriate to circumstances
- Ensure report is clear and appropriate to intended audience
- Ensure report satisfies standards of practice
- Report should clearly identify responsible actuary
- Report should indicate extent to which actuary/other sources are available to provide supplementary information and explanation

3. Continued

- Principal for whom report is issued should be clearly identified
 - Report should describe capacity in which actuary serves
 - Actuary shall make appropriate/timely disclosure to Principal of sources of all direct and indirect material compensation actuary has/will receive from another party in relation to work performed for Principal
 - Actuary who is not financially/organizationally independent should disclose to Principal any pertinent relationship that is not apparent
 - Actuary subject to compensation disclosure requirement for work performed for Principal, regardless of office location in which compensation received
- (b) Critique the adequacy of the above assumptions disclosure based on the following Actuarial Standards of Practice:
- (i) No. 27, Selection of Economic Assumptions for Measuring Pension Obligations
 - (ii) No. 35, Selection of Demographic and other Noneconomic Assumptions for Measuring Pension Obligations

Commentary on Question:

Many candidates struggled with this part since they commented on the reasonability of assumptions, instead of critiquing the disclosure of assumptions as the question asked.

ASOP 27 items

- No inflation assumption provided: should be included
- No description of market-related value of assets provided
- Need to provide more information for discount rate (ex. the effective rate used)
- Should disclose rationale (information/analysis) used in selecting each economic assumption that was not prescribed

ASOP 35 items

- Mortality assumption is too vague: cannot be replicated/verified by another actuary
- No mortality projection noted in assumptions: need to include scale or indicate why no provision made for future improvement
- Retirement information is not complete / could not be replicated: should provide full age table
- Termination information is not complete / could not be replicated: should provide full age/service table
- Not clear if retirement assumption relates to just actives or both actives and terminated vested participants

3. Continued

- Need to add conversion assumptions for optional form of payment
- Need to add percentage of participants assumed to elect straight life annuity vs. 10 C&C
- No description of administrative expenses (whether included in service cost or not applicable)

Additional Disclosure Requirements relevant to both ASOPs

- Should disclose any changes in assumptions from prior year
- General effect of any change in assumption should be disclosed
- Should state the source of any prescribed assumptions
- For all prescribed assumptions/methods set by another party, should disclose if assumption significantly conflicts with actuary's judgment of reasonability or if actuary unable to evaluate reasonability
- For each assumption, should indicate whether it represents estimate of future experience, actuary's observation of estimates inherent in market data, or combination thereof
- For each significant assumption, should disclose rationale (information and analysis) used for its selection

4. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
6. The candidate will be able to analyze, synthesize and evaluate plans designed for executives or the highly paid.

Learning Outcomes:

Given a plan type, explain the relevance, risks and range of plan features including the following:

- (a) Plan eligibility requirements
 - (b) Benefit eligibility requirements, accrual, vesting
 - (c) Benefit/contribution formula, including the methods of integration with government-provided benefits
 - (d) Payment options and associated adjustments to the amount of benefit
 - (e) Ancillary benefits
 - (f) Benefit subsidies and their value, vest or non-vested
 - (g) Participant investment options
 - (h) Required and optional employee contributions
 - (i) Phased retirement and DROP plans
- (6a) Given a specific context, synthesize, evaluate and apply principles and features of executive deferred compensation retirement plans.
- (6b) Given a specific context, apply principles and features of supplemental retirement plans.

Sources:

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018, Ch. 14

DA – 156 -15: Moving from a DB Executive Retirement Plan to a DC Executive Retirement Plan, October 2014

Commentary on Question:

This question tests objectives of a non-qualified plan. Candidates also had to demonstrate understanding of a change from a DB plan to DC plan from both the employer's and executive's perspectives.

Solution:

- (a) Describe four employer objectives when establishing a non-qualified retirement plan.

4. Continued

Commentary on Question:

Candidates did well on this part.

Other appropriate objectives not described below received credit.

1. Restoration: The employer is happy with their qualified (or registered) plan, but benefits for highly compensated employees are restricted due to tax limitations. Employer wants to address issues of benefit equity.
 2. Retention (Golden Handcuffs): The employer wishes to address the issue of executive turnover, and retain key employees.
 3. Recruiting: The employer wishes to entice employees who are mid-career and bridge the gap of benefits that may be lost in switching careers
 4. Performance: The employer wants to reward employees for attaining pre-determined performance objectives.
- (b) Critique each of the plan provisions for the defined contribution plan from Company ABC's perspective.

Commentary on Question:

Candidates struggled with this part. Some candidates critiqued the plan provisions from an employee perspective, as opposed to the employer's perspective. Also, many candidates described how a plan provision changed, but did not explain how the change would impact the employer.

Benefit:

- DC plan provides more predictable benefit accrual and more predictable costs for ABC
- Including bonus may provide more incentive to employees but will also increase volatility of benefit accruals and cost for ABC

Early Retirement Benefit:

- ER Subsidy removed which may result in employees working longer and ABC has less incentives if they wish to encourage employees to retire early

Form of Benefit:

- Paid in installments over 10 years contains costs for ABC closer to retirement, costs more predictable as not subject to longevity or inflation risk
- If plan unfunded, may increase cash flow volatility as benefit paid over shorter period, and immediately in situations of death or termination prior to retirement

4. Continued

Vesting:

- Immediate vesting may result in less retention, ABC no longer has any golden handcuff provision
- Immediate vesting may assist ABC in recruiting younger employees who value portability or employees closer to retirement who wouldn't meet the 10-year vesting requirement

General:

- DC is easier to understand and communicate to employees, employees may perceive more value in the plan and in working for ABC
- Lower accounting and administrative cost as benefit accrual and plan provisions less complex

- (c) Describe the advantages and disadvantages of the plan change from the executive's perspective.

Commentary on Question:

Candidates did well on this part.

Advantages:

- If executive passes away, her beneficiary would receive a benefit under the DC plan as the death benefit is not dependent on marital status. Under the DB plan, the benefit would be surrendered if no surviving spouse.
- Since a significant portion of her salary is bonus, compensation from bonuses being included in DC benefit formula may result in a higher pension benefit and a higher replacement ratio at retirement
- She has more flexibility if she wishes to leave the company in the short term as the DC benefits vest immediately and benefit is more portable

Disadvantages:

- Executive is exposed to market risk as the DC benefit at retirement is dependent on market returns
- No longevity protection in the DC Plan, which exposes her to risk of outliving her retirement savings
- The DC plan does not provide subsidy for early retirement which may limit her options when considering retirement timing
- The DC Plan does not provide protection against inflation throughout retirement which could expose her to risks if the costs of goods/services increases drastically during retirement.

5. Learning Objectives:

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

Learning Outcomes:

- (8a) Perform valuations for special purposes, including:
- (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.
- (8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.
- (8e) Advise plan sponsors on accounting costs and disclosures for retirement plans under various standards and interpretations.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.
- (8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

Pension Risk Transfer: Evaluating Impact and Barriers for De-Risking Strategies

DA-168-19: IFRS and US GAAP: Similarities and Differences, Ch. 5 only

DA-170-17 Accounting for Buy-ins

DA-804-19: FASB Accounting Standards Codification Topic 71

Commentary on Question:

Overall most candidates demonstrated their understanding of the differences between a plan merger and an annuity purchase. Most candidates indicated the impact on the cash funding and the accounting as a result of the recommended option.

5. Continued

Solution:

- (a) Recommend one of the following actions for Company XYZ:
- (i) Take no action
 - (ii) Only merge the plans
 - (iii) Merge the plans and purchase annuities

Justify your response and show all work.

Commentary on Question:

Most candidates provided the calculations for all three options and were able to determine the impact on the cash funding and insurance premiums. Successful candidates recommended “only merge the plans”, as this was the ideal action based on the given goals of Company XYZ.

Cash implications:

- (i) Take no action:
- Plan A funding requirements:
 - Funded status = $\$220\text{M} / (\$60\text{M} + \$230\text{M}) = 75.9\%$
 - Would require cash funding to get up to 80% funded status.
Cash requirement = \$12M:
 - $80\% \times \$290 - \$220\text{M} = \$12\text{M}$
 - Plan A insurance premium for 2019 = $(300 + 1000) \times \$500 = \$650,000$
 - Plan B funded requirements before merger:
 - Funded status = $\$126\text{M} / (\$25\text{M} + \$115\text{M}) = 90.0\%$
 - No funding required since over 80%
 - Plan B insurance premium for 2019 = $(100 + 500) \times \$500 = \$300,000$
 - Total cash outlay in 2019 = $\$12\text{M} + \$950,000 = \$12,950,000$
- (ii) Only merge plans:
- Merged Plans A+B funding requirements:
 - Funded status = $(\$126\text{M} + \$220\text{M}) / (\$60\text{M} + \$230\text{M} + \$25\text{M} + \$115\text{M}) = 80.5\%$
 - No funding required if plans merged since combined funded status $\geq 80\%$

5. Continued

- Merged Plans A+B insurance premium for 2019:
 - $\$300,000 + \$650,000 = \$950,000$
- Cash outlay in 2019 reduces from \$12,950,000 to \$950,000 (only insurance premiums apply since merged plan is funded over 80%)

(iii) Merge plans and purchase annuity buy-out:

- Annuity purchase would be \$230M for 1,000 retirees (retirees of Plan A only)
- Funding requirements after annuity purchase:
 - $\text{Funded status} = (\$126\text{M} + \$220\text{M} - \$230\text{M}) / (\$60\text{M} + \$230\text{M} + \$25\text{M} + \$115\text{M} - \$230\text{M}) = 58\%$
 - Would require cash funding to get up to 80% funded status on a combined basis. Cash requirement = \$44M:
 - $(80\% \times \$200\text{M}) - \$116\text{M} = \$44\text{M}$
- Insurance premium for 2019 = $\$950,000 - (1,000 \times \$500) = \$450,000$
- Merging plans and purchasing annuities increases cash outlay to $\$44\text{M} + \$450,000 = \$44,450,000$

Recommendation:

- Merge the plans but do not purchase buy-out annuities.
 - Not merging the plans results in 2019 cash requirement = \$12,950,000
 - Merging the plans and not purchasing annuities results in 2019 cash requirement = \$950,000
 - Merging the plans and purchasing the annuities results in 2019 cash requirement = \$44,450,000
 - Therefore, merging and not purchasing annuities results in lowest cash requirement of the three options
 - Also, not purchasing annuities will avoid a settlement charge
 - So, while it will not lower government insurance premiums as the CFO was hoping, it will reduce their cash requirements by more than the savings would be if they merged and purchased the buy-out annuities, which is the overall stated goal of the Company.

- (b) Explain the accounting implications of your recommendation in part (a).

Commentary on Question:

Most candidates did well on part (b).

5. Continued

Accounting implications of recommendation in part (a):

- Merging of the plans involves combining all assets/liabilities/amortization bases together of the two separate plans
 - May result in slight change in amortization period once combined, which would have a slight impact on combined expense.
 - Merging the plans would not trigger a settlement as opposed to purchasing annuities of that magnitude that would trigger a settlement charge under ASC 715
 - Merging the plans would not increase the service cost and interest cost as opposed to purchasing annuities where there would most likely be an increase in an annual ASC 715 pension expense due to:
 - EROA is typically higher than the plan discount rate, so removal of assets equal to liabilities would reduce EROA component of pension expense more than it would reduce interest cost.
 - Plan termination liabilities are higher typically than accounting liabilities; therefore, by purchasing annuities there will be a loss that will be added to AOCI. This will increase the gain/loss amortization component of pension cost.
 - May be offset by reduced gain/loss amortization in pension expense since an annuity purchase will accelerate gain/loss recognition in AOCI.
- (c) Describe how your recommendation would change if buy-in annuities were proposed instead of buy-out annuities.

Commentary on Question:

Most candidates did well on part (c).

Purchasing a buy-in vs a buy-out in this situation would:

- A buy-in would not trigger a settlement charge since the annuity contract would be part of the assets
- May reduce the EROA assumption, which would slightly increase pension cost
- It would not reduce the merged plan's combined funded status, so would not increase the funding requirement above that of just simply merging the plans
- Buy-in would require higher government insurance premiums than a buy-out
- However, it would add the benefit of reducing volatility in cash and expense in the future as certain risks are transferred to the insurer / annuity provider
- May have the ability to convert to buy-out annuity sometime in the future if funded status improves and reduce government insurance premiums

5. Continued

- The buy-in option is a good recommendation for the plan sponsor. While it does not address the immediate need to reduce cash/expense in 2019, nor reduce government insurance premiums in the near term, it does reduce future financial volatility, especially considering that the merged plan is barely over 80% funded and dipping below 80% will trigger additional funding.

6. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
- (b) Defined contribution and savings plans
- (c) Hybrid Plans
- (d) Retiree Health plans
- (e) Other alternative retirement plans such as shared risk plans, target benefit plans, etc.

Given a plan type, explain the relevance, risks and range of plan features including the following:

- (a) Plan eligibility requirements
 - (b) Benefit eligibility requirements, accrual, vesting
 - (c) Benefit/contribution formula, including the methods of integration with government-provided benefits
 - (d) Payment options and associated adjustments to the amount of benefit
 - (e) Ancillary benefits
 - (f) Benefit subsidies and their value, vest or non-vested
 - (g) Participant investment options
 - (h) Required and optional employee contributions
 - (i) Phased retirement and DROP plans
 - (j) Risk-sharing provisions
-
- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
 - (5b) Assess the tradeoffs between different goals.
 - (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.
 - (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
 - (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.
 - (5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.

6. Continued

Sources:

DA-159-16: The OECD Roadmap for the Good Design of Defined Contribution Pension Plans

DA-164-17: Defined Contribution Plan Success Factors

Fundamentals of Retiree Group Benefits, Yamamoto, Dale H., 2nd Edition, 2015:
Chapter 5

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018: Chapters 8, 12, 13

Commentary on Question:

This question tests candidates on the different types of capital accumulation plans. It further focuses on the effectiveness of defined contribution plans to provide adequate retirement income and factors to consider when changing the investment offering.

Most candidates did well on parts (a) and (b), but struggled with part (c).

Solution:

- (a) Describe the advantages and disadvantages of the following savings vehicles from a participant's perspective:

Commentary on Question:

Candidates received credit for other described not indicated below.

- (i) 401(k) Plans
- (ii) Traditional IRAs
- (iii) Health Savings Accounts

401k plan

Advantages:

- Generally, pre-tax salary deferrals, though some plans may also include a Roth feature which allows after-tax contributions to be invested.
- Account balances accumulate with investment returns on a pre-tax basis, unless there is a Roth feature (as noted above).
- Catch-up contributions permitted for employees at least age 50
- All employee contributions are fully vested
- Higher annual contribution limit compared to IRA/HSA therefore there is potential for more accumulated savings compared to the other two vehicles
- May be permitted to take loans and/or hardship withdrawals from plan, depending on the circumstances

6. Continued

- Not subject to minimum required distribution rules if continuing to work past age 70-1/2 (unlike IRA)
- Distributions can be rolled into IRA or paid as a lump sum to participant (subject to tax withholding)

Disadvantages:

- Employer contributions subject to vesting rules (which may or may not allow for immediate vesting)
- Benefits are taxed upon withdrawal
- Tax penalties for early withdrawals (before age 59-1/2)
- Subject to IRS annual contribution limits

Traditional IRA

Advantages:

- No restrictions on number of IRAs established (but still subject to contribution limits on a combined basis)
- Rollovers from other qualified plans permitted
- Contributions are tax-deductible (fully deductible if individual does not participate in any other employer-provided qualified retirement plans)
- Account balances earn investment income on pre-tax basis
- Catch-up contributions permitted for employees at least age 50

Disadvantages:

- Must have earned income in order to be eligible to establish an IRA
- Tax-deductibility of contributions minimized if individual participates in another employer-provided qualified retirement plan
- Contributions can't be made after age 70-1/2
- Excise tax on excess contributions
- Benefits are taxed upon withdrawal
- Tax penalties for early withdrawals (before age 59-1/2)
- Subject to IRS annual contribution limits

Health Spending Accounts

Advantages:

- Contributions are tax deductible
- May allow catch-up contributions for individuals at least age 55 not enrolled in Medicare
- Earnings on contributions not subject to taxation
- Benefits not taxed upon withdrawal if used for qualified medical expenses
- Employer may make contributions on behalf of employee
- Funds are completely portable and rollover year to year

6. Continued

- Participants can direct how their contributions are invested
- Post age 70-1/2 contributions can still be made by working employees (as long as they're not enrolled in Medicare)

Disadvantages:

- Must be enrolled in high deductible health plan to qualify for having an HSA (which may not be feasible for everyone)
- Contributions subject to annual limits, and these are the lowest compared to 401k plans and IRAs.
- Cannot use HSA funds to pay retiree health insurance premiums prior to age 65

(b) Describe key metrics Company ABC might use in its evaluation.

- Participation rates: A high participation rate of 90-100% ensures the majority of employees are saving for retirement through ABC's program. If participation is low, ABC could consider auto-enrollment/re-enrollment strategies along with reviewing the education of its program.
- Deferral rates: Optimal range is an average total deferral rate between 10% to 15%, which demonstrates the extent to which participants are saving through ABC's program. If deferral rates are low, ABC could review its employer match and consider auto-escalation strategies, along with the education of its program.
- Asset allocation/diversification: Review the extent to which participants are utilizing different investment options offered. If not diversified enough or over diversified, ABC could consider targeted communications to help them make more effective decisions.
- Plan fees: Review plan fees against peer-based benchmarks or other market-based analyses to assess they are at appropriate levels for ensuring participant benefit security.
- Income Replacement Ratio: Review retirement income offered by current plan design as a percentage of employee compensation to determine appropriateness of plan design.

6. Continued

- Retirement Readiness: Review value of DC plan in the context of other sources of retirement income to determine if current offering is adequate for employees to retire.
- (c) Describe the factors Company ABC should review in proposing changes to its investment offerings.
- Include professionally-managed investment options such as managed accounts, target date funds, and balanced account options.
 - Develop and document the rationale for the DC plan's core investment lineup and QDIA (Qualified Default Investment Alternative)
 - Open architecture that allows plan fiduciaries to designate an investment lineup with multiple underlying investment managers and to offer exposure to diverse investment offerings
 - Offer a low number of core investment options
 - Offer a mix of active and passive investment options
 - Exclude or limit company stock
 - Review different investment vehicles
 - Look at retirement income options (annuity and life insurance products, managed payout funds, and other decumulation strategies)
 - Alternative investment strategies
 - Assess the appropriate balance of 1) offering investment products, 2) providing access to professional advisors, and 3) providing guidance.

7. Learning Objectives:

7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.
9. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.
- (9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors etc.).
- (9d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.
- (9f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.

Sources:

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

DA-140-15: ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations

DA-142-15: ASOP 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions

DA 804-19: FASB Accounting Standards Codification Topic 715

DA-809-13: ASOP 41 - Actuarial Communications

7. Continued

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Critique the following assumptions used in the NOC Full-Time Hourly Union Pension Plan (“Hourly Pension Plan”) accounting disclosures:

- (i) Retirement Age
- (ii) Termination Rates
- (iii) Mortality Rates

Commentary on Question:

Candidates generally answered this question well. Most candidates evaluated the assumptions and identified potential improvements. To receive full credit, candidates needed to identify and explain the strengths or weaknesses of each assumption.

Retirement Age

- it may be more appropriate for large plans to use a retirement rate table instead of a single assumed retirement age
- a table of retirement rates produces a more realistic pattern of cash flows
- a more complex granular assumption may not provide material improvements

Termination Rates

- termination rates that vary by service or a combination of age and service are better predictors of turnover
- it is appropriate to evaluate recent Plan experience when setting assumptions
- must have credible historical turnover to develop termination rates

Mortality Rates

- mortality should be projected forward from the measurement date at an appropriate mortality improvement scale to reflect expected future mortality improvements
- it may be appropriate to employ different assumptions for participant sub-groups, beneficiaries and disabled lives

(b) Recommend a course of action to address the CFO’s direction.

Justify your response.

7. Continued

Commentary on Question:

To be awarded full marks the candidate must recommend a course of action and provide support that demonstrates compliance with requirements and standards.

Many candidates did not identify that the actuary should use accounting assumptions chosen by the client and indicate if the assumption conforms with the actuary's understanding of the financial reporting standards.

Candidates who indicated they would not perform the work received limited points.

Course of Action

- explain to client why the actuary has recommended the discount rate assumption
- the actuary should use accounting assumptions chosen by the client
- the actuary should indicate in the external user report if the client selected assumptions conform with the actuary's understanding of the financial reporting standards
- The actuary should also provide a qualified opinion on the assumptions in the external user report

Justification

- actuarial assumptions should reflect the management's best estimate of variables that will determine the ultimate cost of providing post-employment benefits
- the actuary should evaluate whether a prescribed assumption set by another party is reasonable for the purpose of the measurement
- an actuary who performs actuarial services shall take reasonable steps to ensure that such services are not used to mislead other parties
- the actuary should determine whether the prescribed assumption or method significantly conflicts with what, in the actuary's professional judgment, would be reasonable for the purpose of the measurement
- if, in the actuary's professional judgment, there is a significant conflict, the actuary should disclose this conflict
- actuarial assumptions shall be unbiased and mutually compatible
- for purposes of this evaluation, reasonable assumptions are not necessarily limited to those the actuary would have selected for the measurement

8. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
 - (b) Defined contribution and savings plans
 - (c) Hybrid Plans
 - (d) Retiree Health plans
 - (e) Other alternative retirement plans such as shared risk plans, target benefit plans, etc.
- (3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
- (5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.

Sources:

DA-102-13: Evaluating the Design of Private Pension Plans: Costs and Benefits of Risk Sharing

New Retirement Plan Designs for the 21st Century, Pension Forum, December 2008, pp. 41-56 (including commentary and responses)

Hybrid Pensions: Risk Sharing Arrangements for Pension Plan Sponsors and Participants

Embedded Options in Pension Plans: Valuation of Guarantees in Cash Balance Plans, sections 1, 2, 3, 4, 6, 7, and Appendix II

8. Continued

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe why Company ABC might take this approach.

Commentary on Question:

Overall, candidates did well on this part. Candidates who struggled on this question only listed reasons for moving to a cash balance plan, but did not describe how a cash balance plan achieves those reasons.

- Reduce ongoing accounting cost
 - Cash balance accruals occur on career average earnings, rather than final average earnings which lowers benefit obligation, participant accruals and reduces the service cost component of accounting cost
 - Lump sum option lowers plan's duration which lowers discount rate which:
 - Increases obligation and service cost
 - Offset by reduction in interest cost component of accounting cost
- Combined impact above can be variable, though typically cash balance plans have reduced cost due to reduction in benefit obligation from PBO to ABO
 - Plan freeze/change will likely offset any existing Prior Service Cost or create Prior Service Credit which will reduce annual PSC amortization
- Reduce the growth of the pension obligation
 - Cash balance accruals typically lower than final average pay, reducing the rate at which obligation grows
 - Cash balance typically paid as a lump sum
 - Sheds liability as participants leave the company as opposed to accumulating inactive liability that will endure for the lifetime of the participants and their beneficiaries
- Notional account balance is easier for employees to understand and comparable to prevalent DC plans which may attract younger employees
- Lump sum option / portability of benefit is a feature valued by employees
- More predictable costs for employer
- Shift longevity risk to participants when account balance cashed out as opposed to plan sponsor paying lifetime annuities
- Reduction in flat-rate PBGC premiums when participants elect lump sum

8. Continued

(b) Explain how the following risks shift between the employer and the employee as a result of the transition from a final average pay formula to a cash balance formula:

- (i) Portability
- (ii) Longevity
- (iii) Inflation

Commentary on Question:

Most candidates did well on this part.

- Portability risk
 - Reduced for employee
 - Employee can take benefit with them at termination in form of lump sum and value not lost because accrual pattern of cash balance plans are front-loaded
 - Vesting service requirement for a cash balance plan is lower than traditional plan
- Longevity risk
 - Retained by employer for those that elect annuity
 - Shifted from employer to employee for those that elect lump sum payment
- Inflation risk
 - Pre-retirement, shifts from employer to employee
 - Cash balance accrual pattern reduces real value of accrued benefit since formula based on career pay rather than final pay at retirement
 - Post-retirement, if prior plan provided post-retirement COLA, cash balance shifts from employer to employee since lump sum does not provide COLA

(c) Describe three embedded options that can be included in a cash balance plan design to limit the employee's exposure to interest crediting rate fluctuations.

Commentary on Question:

Some candidates struggled with this part, as they did not demonstrate an understanding of embedded options.

8. Continued

- “Money-back guarantee” aka “capital preservation” requirement
 - Participant receive at least the sum of their pay credits at benefit commencement
 - Equivalent to put option owned by participant, underwritten by plan sponsor
- “Enhanced money-back guarantee”
 - Participant receives at least the sum of their pay credits plus a cumulative floor interest crediting rate per year
 - Equivalent to a put option except the strike price is slightly different because the guarantee compounds over time
- Annual minimum interest crediting rate
 - Participant receives the greater of the actual index yield and minimum floor rate
 - Equivalent to series of put options on the interest crediting rate because the participant has downside protection should the interest rate fall below the strike price and that protection is offered every year

9. Learning Objectives:

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

Learning Outcomes:

- (8e) Advise plan sponsors on accounting costs and disclosures for retirement plans under various standards and interpretations.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.

Sources:

168-19 – IFRS and US GAAP: Similarities and Differences, Ch. 5

804-19 – FASB Accounting Standards Codification Topic 715

Commentary on Question:

This question tests candidates' knowledge of ASC 715 and IAS 19.

Solution:

- (a) Compare and contrast each component of Net Periodic Pension Cost under U.S. Accounting Standard ASC 715 (ASC 715) and International Accounting Standard IAS 19, Rev. 2011 (IAS 19).

Commentary on Question:

To receive full credit, candidates had to describe each component of Net Periodic Pension Cost under both ASC 715 and IAS 19; no credit was awarded for only indicating which components were included in Net Periodic Pension Cost under ASC 715 and IAS 19.

Most candidates received points for describing and identifying service cost, but missed some points for the other components. For example, for gain/loss amortization, many candidates indicated that gain/loss is amortized over some period for ASC 715, but did not mention that gain/loss can be recognized immediately.

Service Cost – expected benefit accruals due to additional year of service. Same under both standards.

Interest Cost – Expected change in PBO/unfunded liability due to passage of time.
ASC 715 - based on PBO and discount rate based on current high quality bond yields.
IAS 19 – based on unfunded liability (DBO – Assets) using discount rate based on current high quality bond yields

9. Continued

EROA – expected return on assets during year
ASC 715 – based on long term expected rate of return based on asset allocation
IAS 19 – nonexistent (reflected in interest cost)

Prior Service Cost (PSC) Amortization – recognition of changes in accrued benefits such as plan amendments
ASC 715 – recognized/amortized over average future working life/average future service to full eligibility age
IAS 19 – recognized immediately (under service cost component)

Gain/Loss Amortization – recognition of gains and losses arising from demographic or assumption changes
ASC 715 – can be recognized immediately or amortized over a period of time in a systematic and rational manner
IAS 19 – recognized immediately

- (b) Compare and contrast each component of Net Periodic Pension Cost under ASC 715 for the following types of plans:
- (i) Defined contribution pension plan
 - (ii) Defined benefit pension plan
 - (iii) Unfunded postretirement medical plan

Commentary on Question:

Most candidates did well in recognizing the similarities and differences between the 3 plans for Service Cost and Interest Cost, but missed some of the differences for the other components.

DC – SC equal to employer contribution for the year and is only non-zero component of expense

DB & PRM

- SC – essentially the same for both. PRM SC is \$0 after a participant reaches full eligibility.
- IC – essentially the same for both.
- EROA – nonzero for pension. PRM is always \$0 since unfunded
- G/L amortization – essentially the same, however, pension excludes asset g/l not yet recognized in MRVA and PRM corridor (if being used) is based on APBO since unfunded.

9. Continued

- PSC amortization – DB based on average future working life (AFWL) while PRM based on average working life to full eligibility age. Both can be amortized over average remaining life expectancy if substantially all participants are inactive.
- (c) Evaluate the impact of changing from a traditional final average pay defined benefit pension plan to a less generous cash balance pension plan on each component of Net Periodic Pension Cost under ASC 715.

Commentary on Question:

Successful candidates indicated how a less generous plan affects expense.

Many candidates suggested there should be curtailment accounting instead of a negative prior service cost. Since the question does not state there was a reduction in future working life, there is no curtailment.

SC – decrease due to less generous benefits. Moving from PBO NC to ABO NC could increase or decrease SC depending on plan's population.

IC – decrease due to decreased benefits (and thus PBO) and changing from PBO to ABO (no future salary increases reflected)

EROA – no change if no change in asset allocation and old plan paid lump sums. If old plan did not pay lump sums, the future EROA may be impacted due to the need for higher cash allocation (and thus lower EROA assumption) and lower assets. The expense may be more volatile due to LS's being paid.

G/L – if using corridor and $PBO > MRVA$, will increase due to corridor being reduced (see IC)

PSC – Change will create a negative plan amendment. Will first offset any outstanding prior service costs and then be amortized over AFWL.

10. Learning Objectives:

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

Learning Outcomes:

- (8a) Perform valuations for special purposes, including:
 - (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8e) Advise plan sponsors on accounting costs and disclosures for retirement plans under various standards and interpretations.

Sources:

DA-170-17: Accounting for Buy-Ins

DA-816-17 Accounting for Pension Buy-In Arrangements

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

Duration and Convexity for Pension Liabilities, Pension Section News Issue #81, Sep 2013

Pension Risk Transfer: Evaluating Impact and Barriers for De-Risking Strategies, Dec 2014, pp. 16, 17 & 20-27

Commentary on Question:

This question tests candidates' understanding of accounting for a settlement under ASC 715. Candidates were also expected to know how to adjust liability by using duration.

Solution:

- (a) Calculate the 2019 Net Periodic Pension Cost under U.S. Accounting Standard ASC 715 (ASC 715).

Show all work.

Commentary on Question:

Most candidates did well on this part. Credit was given for simple or compound interest calculations. To receive full credit, candidates must state that the service cost and amortizations were zero.

10. Continued

- Service cost = \$0 because the plan is frozen
- Interest cost = $PBO * DR - (Exp\ BPs * ((1+DR)^.5)-1) = \$125,000,000 * .05 - (10,000,000 * ((1+.05)^.5)-1) = \$6,003,049$
- Expected Return on Assets = $MVA * EROA - Exp\ BPs * ((1 + EROA)^.5-1) + Exp\ Contributions * ((1+EROA)^.5)-1) = \$100,000,000 * .07 - (10,000,000 * ((1+.07)^.5-1) + (25,000,000 * ((1 + .07)^.5)-1) = \$7,516,121$
- Since there are no unrecognized transition obligations and/or prior service costs, the amortizations associated with these are \$0.
- (gain)/loss amortization = $Net\ (G)/L - 10\% \text{ of the max of } (PBO, MVA) / \text{Average Remaining Service} = [\$50,000,000 - (.1 * \max(125,000,000, 100,000,000))] / 15 = \$2,500,000$
- Net Periodic Pension Cost = $SC + IC - EROA + Amortizations = \$0 + 6,003,049 - 7,516,121 + 2,500,000 = \$986,929$

(b) Identify advantages and disadvantages of implementing this strategy.

No calculations required.

Commentary on Question:

Most candidates did well on this part. Other relevant responses not listed below also received credit.

- An annuity purchase can be used as a risk mitigation technique since the overall size of Company XYZ's pension obligation will be smaller after the annuity purchase.
- An annuity purchase consisting of retirees with small dollar amounts can have additional benefits to Company XYZ, since there are fixed administrative costs associated that are paid as a result of administering the benefits (for example PBGC premiums, trustee expenses) that represent a larger proportion of the underlying benefit obligation for these retirees. As a result, there could be an economic savings since the present value of benefits and expenses associated with a small dollar retiree may be less (or similar to the amount of) than the premium charged by the insurance carrier.
- This contrasts with larger scale annuity purchases, where the annuity purchase premium may represent a larger load on the current obligation than the present value of expected expenses.
- Reduces Company risk of mortality, investment returns and credit default or downgrades for those where annuity is purchased and risk is transferred to insurer
- Company XYZ may trigger a settlement under ASC 715 if the total amount of the annuity purchase exceeds the settlement threshold.

10. Continued

- (c) Calculate the settlement charge under ASC 715 that would result from the annuity buy-out.

Show all work.

Commentary on Question:

Some candidates struggled with this part, as they did not remeasure the liability due to the discount rate change. Credit was given for both simple and compound interest calculations.

	1/1/2019	9/30/2019 RF	9/30/2019 Remeasurement	Effects of Settlement
PBO	(125,000,000)	(122,002,287)	(140,507,175)	30,000,000
FVA	100,000,000	123,137,091	110,000,000	(30,000,000)
FS	(25,000,000)	1,134,804	(30,507,175)	-
UTA	0	0	0	0
UPSC	0	0	0	0
UGL	50,000,000	48,125,000	79,766,979	(17,030,250)

Expected liability at 9/30/19 = \$125,000,000 + (6,003,049 x 9/12) – 7,500,000 = 122,002,287

The remeasured liability at 9/30/19 reflecting the discount rate change was not provided, but can be derived using the information given.

Liability associated with the annuity purchase is \$28,500,000. It is implied that this was developed using the 9/30/19 discount rate of 4%. Since the duration for this group is 10, the corresponding liability at 5% is estimated as $28,500,000/1.1 = 25,909,091$.

Liability for participants not part of the annuity purchased at 5% = $122,002,287 - 25,909,091 = 96,093,196$.

The liability for this group at 9/30/19 using a discount rate of 4% and duration of 15 can be estimated as $96,093,196 * 1.15 = \$110,507,175$.

Therefore the total liability at 9/30/19 prior to reflecting settlement is $\$110,507,175 + \$30,000,000 = \$140,507,175$

Note the use of the \$30,000,000 rather than the \$28,500,000. We include the loss from settling \$28,500,000 versus \$30,000,000 in the remeasured liability immediately prior to settlement.

10. Continued

Determination of liability loss

Liability loss for change in discount rate = $(28,500,000 - 25,909,091) + (110,507,175 - 96,093,196) = 17,004,888$

Loss from annuity purchase = $30,000,000 - 28,500,000 = 1,500,000$

Determination of assets loss

Expected assets 9/30/19 prior to the annuity purchase = $100,000,000 + 7,516,121 \times 0.75 - 7,500,000 + 25,000,000 = \$123,137,091$

Loss on assets = $123,137,091 - 110,000,000 = 13,137,091$

Determination of remeasured G/L

Roll-forward of G/L = $50,000,000 - 2,500,000 \times 9/12 + 17,004,888 + 1,500,000 + 13,137,091 = 79,766,979$

Annuity purchase results in settling $30,000,000 / 140,507,175 = 21.35\%$ of the obligation.

We must recognize 21.35% of the unrecognized loss = $21.35\% \times 79,766,979 = 17,030,250$. **This is the settlement charge.**

- (d) Propose an alternative approach that would decrease or eliminate the impact while still achieving the advantages of an annuity buy-out.

Commentary on Question:

Successful candidates identified an approach, described the impact on the settlement charge, and indicated how the approach would achieve the benefits of the buy-out. Other relevant responses that were appropriately supported received credit.

Company XYZ could use an annuity buy-in option. With a buy-in, the company still manages and pays benefits but transfers risk to an insurer. No settlement would be triggered under a buy-in. The advantages of a buy-out are still achieved with a buy-in (other than reduced PBGC premiums since still considered plan participants) as mortality and interest rate risk are transferred to the insurer, rather than remaining with the sponsor.

11. Learning Objectives:

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

Learning Outcomes:

- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7c) Describe and apply the techniques used in the development of economic assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.
- (7e) Select demographic and economic assumptions appropriate for a projection valuation.

Sources:

Credibility Educational Resource for Pension Actuaries, Society of Actuaries

DA-167-16: ASOP 25: Credibility Procedures

DA-139-15: ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

Commentary on Question:

This question tests candidates' understanding of credibility and selecting a mortality assumption.

The SOA Study Note "Credibility Educational Resource for Pension Actuaries" indicates that the variability of the data is an important aspect of assessing the credibility of the mortality assumption. That is to say, if there is a large amount of variation in the subject experience, the data will not be very useful in estimating the mortality assumption and thus be given less weighting.

Most candidates struggled with this question, as they only indicated that a large amount of data is needed which is true, but they did not address the variability of the data.

Solution:

- (a) Describe considerations, including applicable Actuarial Standards of Practice, for determining the credibility factor applied to a pension plan's actual mortality experience.

11. Continued

Consideration should be given to two factors when deciding how much credibility (Z) to assign to the linear estimator formula that combines the relevant and subject experience:

$$E = Z \cdot \hat{m} + (1-Z) \cdot \hat{a}$$

1. The “accuracy” of the relevant experience If the variability in the “ a ” is small then there is a high degree of “accuracy” of relevant experience.

More weight can be assigned to “ a ” and less weight to “ m ” subject experience (i.e. experience from the specific plan’s population).

2. The variability of the subject experience “ m ”. Large amount of variation in “ m ” may indicate that that experience will not be very useful in estimating the expected value of “ m ”.

Small amount of variation in subject experience (m) indicates that we should assign a large amount of credibility to it.

The availability of large amounts of subject experience data (for “ m ”) is also a consideration as it would result in more accurate estimates, less variability and thus higher credibility.

Detailed data on the individual contributions (such as company name or plan) to the standard mortality table is needed to evaluate the variability of the mortality rates for the individual contributions relative to the estimated composite rates of death from the standard mortality table.

Consider if the information on each subgroup is actually available to evaluate the accuracy of “ a ”.

Consider comparing mortality experience between each subgroup to validate whether separate adjustments should be made.

Consider the shape of the subject experience as compared to the standard tables since simply shifting the table would not appropriately reflect the pension plan experience.

In order to either evaluate the subject experience for potential use in setting assumptions without reference to other data and to improve the estimate of the mortality parameter under study, the actuary should consider the following:

11. Continued

- 1) whether the procedure is expected to produce reasonable results;
 - 2) whether the procedure is appropriate for the intended use and purpose;
 - 3) whether the procedure is practical to implement when taking into consideration both the cost and benefit of employing a procedure;
 - 4) whether the procedure appropriately consider the demographic characteristics of both the subject experience and the relevant experience;
 - 5) professional judgment when selecting, developing, or using a credibility procedure since the use of credibility procedures is not always a precise mathematical process;
 - 6) the homogeneity of the data in both the subject plan's experience and the relevant standard mortality table experience;
 - 7) consider using different assumptions as the subgroup's experience may not be representative of the group as a whole; and
 - 8) the predictive value may be enhanced by separate treatment of these subgroups.
- (b) Describe the procedures to modify the plan-specific mortality table to reflect the experience of a single union within the MEPP.

The following procedures using credibility modify the plan's mortality table to reflect the experience of a unionized subgroup within the MEPP.

1) Collect Data - Specific company mortality data provide the experience-based results needed for weighting with the relevant experience.

Isolate data collection to pensioners

Decide if single mortality study can be performed or if separate studies are needed.

Actuarial judgement is necessary to decide whether different mortality adjustments (and, thus, separate mortality studies) are required for different subgroups.

Consider splitting plan experience by gender.

Consider the number of years of experience to include in the study. Generally, three to five years is a good rule of thumb to use in an experience study.

Consider the ages of retirees or beneficiaries included in the study. For traditional plans with clearly defined retirement eligibility, the group included in the study will, for the most part, automatically be limited by the age of earliest retirement eligibility (usually 50 to 55 and above).

11. Continued

- 2) build the mortality table - the actuary would need to estimate q_x at each age
- 3) Select the standard valuation mortality table to blend with the subject experience
- 4) Apply generational projections
- 5) Adjust standard table to reflect plan experience - decide whether to use GACT method or LFCT method

In constructing a plan specific mortality table, separate credibility analyses may need to be performed for each subgroup within the plan. That is to say, each union's own subject experience and standard mortality table be used to determine the adjustment factor

12. Learning Objectives:

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

Learning Outcomes:

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

Sources:

DA-169-17: Mergers and Acquisitions: Key Considerations for Retirement Plan Conversion

DA-130-13: International (Offshore) Pension Plans – A growing trend

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe the investment features that must be considered if Company ABC merges the two DC pension plans.

Commentary on Question:

Some candidates struggled with this question, as they described features that are not investment related. Successful candidates described the investment features from the context of a plan merger.

The following investment features should be considered if the two DC plans will be merged:

- The investment lineup
 - Determine whether the Company ABC investment lineup will be sufficient for the Company XYZ population.
 - Are there important differences in the types of investments used by the two populations?
 - Compare the plans for similar investment options. Is there savings to be had from lower cost alternatives or economies of scale?
- Withdrawal fees and early termination fees
 - Will any investments impose a charge for terminating the contract early?
 - If so, who will bear the cost?

12. Continued

- Decision making tools
 - Are participants receiving enough guidance to make informed decisions about their retirement?
 - What default option is best for this population?
 - Are target date funds or managed accounts a good fit for this population?
 - How frequently are participants given the opportunity to reinvest?
- (b) Describe Company ABC's considerations when developing a communication strategy for merging the two DC pension plans.

Commentary on Question:

Successful candidates described considerations of a communication strategy from the context of merging two plans.

In developing a successful communication strategy, Company ABC must:

- Consider the new workforce when developing communications:
 - Consider the work habits of the acquired employees
 - The new workforce may have different expectations of the level and frequency of communications
- Identify the impact of the plan changes on plan participants. If a particular group is impacted differently, consider changing the communications accordingly.
- Plan the timing of key communications mindfully:
 - Don't send important communications over holidays or during peak production season.
 - Ensure a smooth transition for employees that are set to retire in the near future
 - Make employees aware of any "blackout" periods.
- Consider the best means of delivering information:
 - E-mail or letter? Employees may be more likely to read an email, but may be able to give more time to important documents at home.
 - Should Company ABC provide personal statements?
- Consider ways to promote interest and enthusiasm in the changes:
 - Webcasts may be the most effective tool if there are a lot of mobile employees at Company XYZ.
 - Town halls or group meetings can be an effective way to answer questions and address concerns.
- Enlist key employees to champion the changes and ensure participants understand the changes to the plan. Manager endorsement can be key to employee buy-in.

12. Continued

- (c) Explain why Company ABC might consider terminating the international pension plan.

Commentary on Question:

Many candidates commented that Company ABC may wish to terminate the international pension plan because it is unfunded. This received no credit, as the funded status of the plan was not provided and funding the plan is at the employer's discretion.

Company ABC may consider terminating the international pension plan if:

- There are not enough expatriates in the combined workforce to merit keeping the plan
 - The cost-per-head can be expensive if there is not a critical mass to run the program
 - Company ABC does not hire employees on an ex-pat contract
- After the acquisition, there is reduced competition for expatriates and the plan is no longer necessary as an attraction and retention tool
- Home and host country retirement plan provisions are flexible enough to meet the needs of employees moving locations
- Contributing to the plan is not tax effective; there are other ways to deploy capital that would be more cost effective and require less administration
- There is no need to provide top-up provisions

13. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

- (3a) Identify risks face by retirees and the elderly.
- (3b) Describe and contrast the risks face by participants of:
 - (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (5b) Assess the tradeoffs between different goals.
- (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.
- (5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.
- (5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.

Sources:

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

Commentary on Question:

This question test candidates' understanding of variable annuity payout options.

Most candidates did well on this question.

Solution:

- (a) Describe how a variable annuity payout option in a defined benefit pension plan can be used to manage retirees' inflation risk.

13. Continued

- Plan administrator establishes a hurdle rate
 - The hurdle rate is the pension plan fund's targeted real rate of investment return.
 - The difference between the hurdle rate and the plan fund's actual investment return is used to adjust monthly pensioner payments each year
 - Example, if hurdle rate is 4% per annum and actual investment returns for a particular year are 6%, members would receive a 2% increase in their monthly pensions.
 - It is effective if the selected hurdle rate is close to the average real rate of return of the plan's underlying assets over the long-term.
 - In that way, the pension increase average will be close to the average rate of inflation over the long term.
 - With a well selected hurdle rate that approximates the pension plan fund's real rate of return, and well managed investments, variable annuities have performed very well and average annual pension increases have been comparable to inflation over time.
 - The variable annuity can result in volatile adjustments to pensions in pay when investment markets are volatile.
- (b) Describe two approaches to minimize the volatility of variable annuity payouts in a defined benefit pension plan.

Commentary on Question:

Candidates received credit for describing other relevant approaches.

Averaging Mechanism

- Introduce an averaging mechanism to stabilize the year by year pension increases/decreases under the variable annuity
- accomplished by using a five-year recognition of each annual adjustment
- calculate annual adjustment over a five-year period that would change the pensioner liabilities by exactly the difference between the actual investment return and the agreed upon hurdle rate
- Example: if the actual change in the market value of assets was 2% more than the hurdle rate, then there would be an increase scheduled of a little more than 0.4% each year for the next five years. In the following year, the new "adjustment" would be added to the existing adjustment. For example, if the actual change in the market value of assets was 1% less than the hurdle rate, then this year's increase would be 0.2% (i.e. an increase of 0.4% carried forward from last year and a decrease of 0.2% from this year's results).

13. Continued

Longevity Risk Control

- Introduces a longevity risk control mechanism by introducing the concept of a “hurdle annuity”.
- The hurdle annuity for any member would be determined using the “hurdle rate” and the “hurdle mortality assumption” that is established for the pension plan.
- In this way the hurdle annuity would be uniquely defined for any pensioner and the liability for each pensioner would be equal to their “hurdle annuity”
- Determine the ratio of the assets held for each pensioner at the end of the year to the liability
- For example, if the total assets exceed the sum of the “hurdle annuity” for all of the pensioners by 2%, then we would schedule increases equal to 2% in aggregate over the next five years.