Institute of Actuaries of India

Subject ST4 – Pensions and Other Employee Benefits

September 2017 Examination

INDICATIVE SOLUTION

Solution 1:

i)

- Primary duty is to protect the rights and benefits of the beneficiaries of the scheme
- With the utmost good faith
- Manage the scheme in accordance with the trust deed and rules
- Follow general principles of trust law.

(2)

ii)

- Understand details of Trust Deed and Rules
- And ensure provisions are observed
- Ensure compliance with regulations
- Act impartially
- And not confer an advantage on one or more beneficiaries at the expense of others
- Ensure proper accounts are kept
- And relevant information is provided to interested parties as required
- Monitor sponsor covenant

(2)

iii)

- Power to set employer contribution levels
- Power to augment benefits
- Power to wind up the scheme
- Power to set investment strategy
- Distribution of death benefits to dependants
- Power to delegate duties

(2)

[6 marks]

Solution 2:

Option 1: Traditional DB Plan

- Longevity risk is entirely born by the employer.
- Investment risk is entirely born by the employer
- Interest rate risk is entirely born by the employer
- Inflation risk is entirely born by the employer (since final pay)
- Employer has a risk that contributions may be volatile/rise beyond expectations
- If the plan does not provide for postretirement indexation, employees will be exposed to that risk whereas if the plan provides such a protection, the employer will bear the risk.
- More of the risk is borne by the employer, not the employees
- The employee is subject to the risk of the employer not being able to pay sufficient money into the scheme to fund benefits.Option 2: Combination of DB and DC where the DB plan if offered on earnings up to an inflation-linked threshold
- Risks are shared between the employee and employer.

- The amount of risk an employee takes on is related to the income level of the employee, and the risk distribution favors lower-income earners.
- Investment risk is shared between the employee and employer - the EE bears investment risk for the DC portion, and the ER bears investment risk for the DB portion.
- Low & Middle Income Earners take little to no investment risk, while high income earners take on more investment risk
- Post-retirement investment risk for the DC plan is passed on to the employer if the benefit is annuitized
- Longevity risk is shared between the employee and employer: The employer bears longevity risk for the DB portion; the employee bears longevity risk for the DC portion if a cashout is chosen.
- Employers risk that additional longevity risk may all be passed to them if the DC benefit is annuitized
- Preretirement inflation risk is taken on by the employers since the covered pay is indexed
- Interest rate risk is borne by the employer for the DB portion of the benefit only
- Employer has stable contributions for DC portion, but is still subject to the risk of volatility in contributions for the DB portion. (incl. asset liability mismatch)

Option 3: Fixed employer contribution to DB and benefit that changes based on funded status

- Risks are shared between the employee and employer.
- Risks of contribution variability from the employer are eliminated.
- Employers take on the investment risk but will have the opportunity to pass some of this risk to employees since if markets are not favorable, the benefit may decrease.
- Employers take on Interest rate risk but will have the opportunity to pass some of this risk to employees since if markets are not favorable, the benefit may decrease.
- Employees bear a risk that their retirement income may be volatile if benefits can change for retirees / standard of living may change
- Less risk for retirees in a plan design which preserves benefit levels for in payment participant, however this passes on more investment and interest rate risk to the employer.
- Longevity risk is shared;
- Employers take on the longevity of benefit payout
- Significant longevity changes may be passed to the employee by way of benefit decreases
- Longevity and investment risks are managed because of pooling
- Pre-and post-retirement inflation risk is shared since benefits may be decreased.

(10)
[10 marks]

Solution 3:

i)

- Society/Taxpayers
- Public Sector Employees
- Unions
- Public Sector Employers
- Retirement System Governing Body
- Politicians

(3)

ii)

Society/Taxpayers:

- Want predictable costs of providing public services without sacrificing other public services;
- opposed to taxes being raised for the purpose of over-compensating public servants

Public Employees:

- Want secure retirement benefits,
- looking for an adequate replacement ratio at retirement that is competitive with the private sector,
- plans may not be integrated with social security so are often looking for retirement benefits to make up the difference

Unions:

- Want competitive benefits for their members;
- will be negotiating for benefit increases or best benefits possible for their members;
- want to keep current members happy with union provided support

Public Sector Employers:

- Want to be able to attract and retain high achieving workers that provide general services and safety for the public;
- want to encourage timely exit from the workforce as the employee population ages

Retirement System Governing Body:

- Want to meet the fiduciary responsibilities to ensure the security and stability of the retirement system;
- want to provide adequate benefits on a cost-efficient basis

Politicians:

- Want to provide services that tax-payers expect at the lowest possible cost;
- often have a short time horizon as these officials are looking to be re-elected at the end of their term;
- can sometimes lead to overpromising benefit increases to make supporters happy now

(4)

iii)

Public Sector Employers:

- Allows employees to better compete with private sector increasing attraction to employees
- Benefits for executives are expensive, need to consider who should pay for those benefits?
- Could bring negative publicity to employers if public does not approve of the changes.
- Will executives decide to take their benefits early and leave the workforce earlier than they otherwise would?

Society/Taxpayers:

- Will taxpayers benefit from attracting high-priced executives?
- Do the taxpayers have a say in whether these benefits are provided?
- Will this encourage top performers to exit the workforce earlier impacting public sector services?
- How will these benefits be paid for: increased taxes or redistributing money from other public services?

Public Sector Employees:

- Who will receive the benefits and where will the line be drawn?
- There will be a perceived unfairness to non-executive employees who do not receive the benefit.
- Could provide incentive for high-level workers to seek promotion to executive positions.
- Could decrease employees morale if they do not receive the additional benefit and may cause them to look elsewhere for employment

Unions:

- Will be happy that executives are benefitting from the change, especially if unions represent executive workforce
- However, since most unions represent non-executive workforce, this move may be extremely unpopular and will demand similar benefit enhancements for the workforce they represent

Retirement System Governing Body:

- Will be concerned about the financial impact of this move and the financial security of the retirement system
- May question the basis of this change, especially the equity between members and the perceived unfairness to non-executive employees who do not receive the additional benefit

Politicians:

- May be worried about possible increase in taxes to pay for the enhanced benefits
- Will be happy that there are benefit increases;
- However, this will depend on whether the executives getting benefited by this change represent a target vote bank
- May demand similar enhancements for all employees to make supporters happy

(3)

[10 marks]

Solution 4:

i)

Population ageing:

Population ageing happens through both increased longevity rates and lower fertility rates.

a) Pay-as-you-go public pension systems:

- Pay-as-you-go public pension systems are funded through resources generated by the working population. Lower fertility and thus a shrinking workforce will result in fewer workers per retired person to fund the benefits paid by these plans.
- Increased longevity (higher life expectancy) means that retirees collect benefits for longer periods of time which results in increasing the cost of the plan.
- Increased life expectancy increases the cost of indexing provisions that are common in public pension systems.
- As benefits under public pension systems are generous with their indexation, their large retirement benefits to compensate for the lower pay and lack of other compensation, and the fact that many public employees are not covered by Social Security, the cost associated with longevity risk is much more significant for pay-as-you-go public pension systems.

b) Funded private pension systems:

- As opposed to Pay-as-you-go public pension systems, funded private pension systems are not as impacted by lower fertility rates. If the plan is properly funded, the decrease in the workforce should not directly have an impact on the plan.
- Increased longevity (higher life expectancy) means that retirees collect benefits for longer periods of time which results in increasing the cost of the plan.
- Financial instruments are needed to facilitate the management of longevity risk which funded private pension systems are exposed to.
- Increased life expectancy increases the cost of indexing provisions that can be offered in funded private pension systems.
- Increased longevity also increases calculated liabilities for funded DB plans as new mortality tables are published, which impacts the cash cost of the plan

Poor financial market returns
a) Pay-as-you-go public pension systems:

- As the plans are not pre-funded and hence, there are no assets invested as part of the plans, poor financial market returns should not really impact pay-as-you-go public pension systems.
- At times of financial stress, government tax revenues are reduced, which directly impacts these plans as taxes are their main source of funding.

b) Funded private pension systems:

- Poor financial market returns affect pre-funded plans by reducing asset returns and thus deteriorating the funded position of the plan. In addition, for privately sponsored plans, it affects the employer’s ability to make contributions.

Low interest rates
a) Pay-as-you-go public pension systems:

- Traditional pay-as-you-go pension plans’ liabilities are valued with expected long term returns. As a result, low interest rates have no direct impact on the liabilities. However, low interest rates result in higher lump sum values paid to plan members (if that payment option is offered).

b) Funded private pension systems:

- Low interest rates generally increase funded defined benefit plans’ liabilities. In addition, it will also increase the lump sum values paid to plan members (if that payment option is offered).

(6)

ii)

- Nominal benefit cuts
- Increase taxes on pension income
- Increase contributions to public systems
- Reduce or defer indexation of retirement benefits
- Increase the retirement ages and/or index future retirement ages to increase longevity
- Curb administration costs of the systems
- Incentivize working longer
- Use de-risking strategies such as annuity purchase, LDI, etc.

(3)

iii)

- In general using the rate of return as the discount rate results in a higher discount rate than other methods. This results in lower liabilities and lower required contributions to the plan.

Taxpayers:

- A higher discount rate results in lower liabilities, which results in lower contributions, which results in less taxes for current taxpayers.
- Higher funded ratios as a result of lower liabilities due to a higher discount rate could result in taxpayers agreeing to an increase in benefits
- Generational equity – future taxpayers may have to pay more in taxes to make up for funding shortfalls by current taxpayers as a result of lower contributions because of a higher discount rate
- Taxpayers may not understand the risks of using the rate of return as the discount rate

Public Employee Unions

- Most unions represent current actives, and not retirees. Thus, the current actives may be making fewer contributions due to a higher discount rate to pay for current retiree benefits, but future actives may then need to pay more for the current actives once they retire
- Lower contributions due to a higher discount rate are popular for current union members
- Unions will likely push for benefit increases if funded ratio is high enough as a result of using a higher discount rate

Government

- Government is pressured to decrease current contributions (keep taxes down). This is easier to accomplish by using a high discount rate
- Government is pressured to increase benefits when the plan is well funded as a result of a high discount rate
- Asset mix may be invested in more risky investments in order to achieve a higher rate of return and thereby a higher discount rate
- Benefit increases or decreases may be made without the risks known in the interest of short-term re-election without considering long-term implications on the plan

(5)
[14 marks]

Solution 5:

i)

- Stability of contribution rates
- Security of assets
- Durability (means stability of contributions after some sort of shocks)
- Liquidity
- Realism
- Flexibility
- Opportunity cost

(3)

ii) CUM < PUM = AAM < EAM

(provided the weighted average age of the scheme is greater than the entry age assumption)

(1)

iii)

a) The standard contribution is found by dividing the present value of all benefits which will accrue to active members after the valuation date,

- by reference to service after the valuation date
- and projected final earnings,

By the present value of total projected earnings for all active members throughout their expected future membership.

Standard contribution rate = 500 / (200 ÷ 5%) = 12.5%

(2)

b) The actuarial liability is the present value of all benefits accrued at the valuation date based on projected final earnings

(1)

c) PUC = AA × (*a* 10 / 10) × (1 / *a* 1) where *i* = (1.08 / 1.06 - 1)

12.5 × (9.0360 / 10) × (1 / 0.9815) = 11.50%

(3)

[10 marks]

Solution 6:

i)

• Decision may be constrained by requirements of legislation

• ..or the Scheme rules

• ..or expectations from the past (eg previous benefit improvements such as increases for pensioners)

• The need to be fair between the different parties

• ..to include an appropriate allocation of surplus to the different classes of beneficiary

• ..which may take account of how the surplus has arisen

• ..and likelihood of it recurring in future

• ..particularly if improvements are being granted that affect future accrual of benefits or future member contributions

(5)

ii) Examples

- Benefit increases / improvements
- ..to be prioritised by category
- ..or age, length of service
- ..for active members: enhance accrual for past service, for future service, give credit for any non-pensionable past service such as waiting periods, or periods before the scheme began, or service prior to a takeover
- ..for pensions in course of payment: review benefits to take account of inflation
- ..for left service members: review benefits to take account of inflation
- Secure assets by switching into bonds
- Consider impact of buying out/securing some liabilities
- Introduction of new benefits / options
- ..extension of dependant benefits
- ..new options which have a financial value
- ..such as retirement at an earlier age with a lower (or no) reduction for early payment
- Reduction in member contributions over a period
- ..but bear in mind that if this is only for a 3 year period, this needs to be communicated clearly
- ..so as to avoid creating expectations for the future
- Reduction in employer contributions over a period
- Or return of surplus to sponsoring employer
- ..perhaps subject to tax
- Each subject to an appropriate communication to members to justify surplus going to the company
- ..e.g. to explain that the employer bears risks in sponsoring the scheme and meeting benefit promises **(5)**

iii)

Consider the nature of the surpluses. The equity surplus is not realised, at least to the extent that the assets have not been sold, and may be reversed if markets fall. There is no indication that there will be future surpluses from this source. The withdrawal surplus is realised, and is one-off.

Consider the nature of the benefit improvements. The temporary contribution reduction is also a one-off benefit. The improved pension escalation rate is an on-going benefit, as it will apply to future accruals of service (and possibly also salary in a final salary scheme), as well as to past service for both current and former employees.

It is therefore difficult to see how the actuary can state that this improvement can be made without detriment to the scheme's long term financial position. The employer needs to seek further information on this point. It may be that the actuary means that the additional benefit is affordable for the expected future membership of current scheme members, and new members will have to pay more or not be eligible for the benefit.

Consider the employer's contribution requirement. It is accepted that the employees contribute to the scheme, but if the employer fully sponsors the scheme, then he will be agreeing to be responsible for the balance of cost of the scheme benefits over the employee contributions.

In such a scheme, if the employer is required to pay additional contributions when strains arise, then it is highly reasonable for the employer to benefit from surpluses. This is particularly the case when surpluses are unrealised and reversible, such as the equity market surplus.

Whether the employer leaves the surplus in the scheme against future strains, or withdraws it, accepting the need for future additional contributions, is not significant. The former increases members' security should the employer have financial difficulties however bear in mind the three year legislative restriction of eliminating the existing surplus.

Equity investments are a good match for benefits in deferment; particularly for active members with salary increases matching inflation. Thus distributing the equity surplus to pensioners and deferred pensioners is a clear mismatch.

There is an argument, on grounds of fairness, that the withdrawal surplus might be distributed to those members involved in the staff reductions. Although these deferred pensioners would benefit from the pension increases, their benefit would be diluted among all members.

It would be necessary to consider the perceived value of the pension increases. Although the long term inflation proofing guarantee is valuable, it may be that in the short term pension increases may even be expected to be below 3%.

The termination payments in the staff reductions may have been generous, and designed to compensate for the poor scheme early leaver benefits that gave rise to the surplus. The employer may have made these payments in expectation of a partial recovery from the withdrawal surplus that would result. The employer may feel no duty of care to former employees, and reject any proposal to improve their benefits.

Employee representatives may question this proposal. Employees also contribute to the scheme and so may consider it is unfair for there to be no benefit improvements, especially when the actuary has advised that the changes in pension increases together with the contribution reduction are both affordable.

A reduction in the employer's contributions should increase the strength of the company and this should improve employment prospects. This may be an important factor to staff concerned about any further reduction in staff numbers.

Past decisions on distribution of surplus will influence expectations of employees.

It will also be necessary to consider scheme rules, legislation and regulation requires that the surplus to be eliminated over the next three years and hence this need to be communicated clearly to the employer as the employer has been of the view that the undistributed surplus can be retained in the scheme, and the scheme's investment strategy.

(15)

iv)

Who should be covered / possible restrictions, e.g:

- Spouses
- Partners: opposite sex, same sex
- Children
- age limits, e.g. if in further education or financial dependence.
- Other family members
- e.g. need to be financially dependant.

Benefits

- Integration with state
- Level of benefits on death pre-retirement
- or death post-retirement
- or on other events / circumstances.
- Consistency with benefit basis for members
- e.g. if salary / service related etc.
- How payable: cash, pension, or both.
- Members appreciation
- Any reduction for large age disparity between member and dependant.
- Whether benefits cease on remarriage.
- Option to exchange member's pension for dependants' pension
- or vice versa.
- How to deal with any selection issues, eg if member in poor health.

Admin issues

- Nomination / expression of wish forms
- with regular communication with members to ensure these are kept up to date.
- Methodology for determining who to pay benefits to
- and establishing method for dealing with disputes between different beneficiaries.
- Record keeping
- Consider requesting evidence of health for new scheme members.

Costs

- Likely level of costs and future trends in the cost.
- Split of costs: company / member;

Insurance

- Consider availability of insurance to (re)insure benefits
- especially any large risks
- and so as to get a free cover limit;

*one off (single) premium may be paid out of the surplus emerged or a limited term (say 3 year) policy may be bought to cover the future term to comply with the legislation.

Other

- What equivalent benefits competitors are providing.
- Offer as part of flexible benefits package?
- Legislative requirements that requires the surplus to be eliminated over the next three years
- e.g. maximum level of dependants' benefits
- or a requirement that benefits can only be provided in certain circumstances,
- such as a requirement for financial dependency.

(10)

v)

- Medical evidence for all new members and or 'actively at work' clause
- and / or increments in benefits.
- medical evidence unlikely to be appropriate for existing employees
- (Re)insurance of all or part of the benefits with an insurance company on a non-profit basis
- or a experience rated / profit sharing basis.
- Purchase of an annuity with an insurance company
- to protect against changing financial conditions
- or improvements in longevity.
- Record keeping to avoid disputes over eligibility for benefits.
- Regular benefit statements detailing benefits covered.
- Provision of benefits is at trustees or employer's discretion
- e.g. in respect of non spouses

(4)

[39 marks]

Solution 7:

i)

- Trust deed and Rules
- Scheme booklet
- Any announcement letters
- Breakdown of Scheme assets at valuation date
- Copy of last valuation report
- Scheme accounts for the inter valuation period
- Member data for actives, deferred and pensioners at the valuation date
- And member data for those who have been scheme members at some time
- since the last valuation including reason for leaving

(3)

ii)

- Check current non pensioner ages are less than normal retirement date.
- Age at date of joining is greater than minimum entry age
- Contributions are consistent with salary and service
- Look at maximum and minimum salaries

- Date commenced Pensionable Service consistent with service date
- Date commenced pensionable service before valuation date
- If provided accrued pension consistent with data
- Check transfers in ties up with a benefit

(3)

iii)

- A crude comparison of averages this time and last time will often reveal data problems. Sometimes it will be useful to look at the figures for members common in both valuations e.g.
    - Average salaries consistent
    - Average past service consistent with previous valuation for active members only; to be remain fairly stable for a mature open scheme
- The previous year's total contributions paid should be closely related to the recommended rate multiplied by the pension salary roll.
- Minimum and maximum levels for benefits, their components, ages etc
- Consistent investment income and asset data
- Compare any loadings for insurance costs and/or expenses with those disclosed in the previous valuation report.
- Take account of any benefit changes.
- Take account of any changes in method.
- Random spot checks on data for individual members.
- Approximate checks on the financial position of a scheme are required and reliable summarised data is available.

(5)
[11 marks]