Institute of Actuaries of India

Subject ST4 – Pensions and Other Employee Benefits

May 2008 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

1. The usual main reason to value a scheme (to check the adequacy of funds built up against benefits promised) does not apply, since assets generally equal liabilities under a defined contribution scheme. However, a valuation may be carried out in order to:

   - Set the contribution rate when the scheme is first set up, including checking against initial "target" retirement benefits
   - Check whether any extra reserves needs to be held if the scheme has a defined benefit underpin
   - Check whether any extra reserves needs to be held if the scheme grants interest to the individual accounts that is not in line with the exact returns achieved i.e. when a smoothed return is declared on the individual accounts
   - Assess the target benefits for planning/anticipating the need for changes to the contribution rates
   - Check whether any extra reserves needs to be held if the scheme pays pensions from the fund rather than by securing annuities
   - Check any statutory restrictions, e.g. that contributions will not lead to excessive benefits
   - Extra reserves for death benefits if greater than accumulated fund and not separately insured

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2. (a) Sponsor Covenant can be defined as the combination of
   - The ability, and
   - The willingness

   Of the sponsor to pay (or the ability of the trustees to require the sponsor to pay) sufficient contributions to ensure that the scheme's benefits can be paid as they fall due.

   (b)
   - Reviewing publicly available financial metrics such as the sponsor's published accounts
   - Credit rating from independent agency
   - Implied market default risk, from pricing of equities/bonds issued by company
   - Credit risk models
   - Taking into account any risk-based measure, for example any levies imposed on sponsors
   - Meet regularly with the finance director or management board of the sponsor to discuss its financial position and any plans for the future
   - Imposing conditions on the sponsor for notifying the trustees of circumstances that could materially affect the security of members' benefits
   - Undertake regular reviews of the strength of the sponsor's covenant with reference to qualified professionals e.g. independent business review.

   (c) Possible actions for the trustees include:
   - Changing the scheme's investment strategy to bonds (a less risky and lower return holding). Then, assuming liabilities are valued using a

discount rate based on the yield underlying the asset holding, a higher value will be placed on the liabilities. This gives the trustees a stronger argument for a larger percentage of whatever sponsor assets are available. In addition a move into bonds is likely to provide a better matched position on a buy-out basis if the sponsor fails.

- Investing in assets that pay out in the event of sponsor default, such as derivatives including credit default swaps
- Contingent assets: considering alternatives to cash payments if the sponsor is unable to afford them, such as a charge on the sponsor's fixed assets, parent company guarantee
- Including ratchets in contributions so that if the sponsor's financial position improves then the scheme shares in this improvement
- Set up contingent contributions so the sponsor has to make up the deficit more quickly if the scheme's financial position deteriorates.

[9]

3.

- Eligibility conditions
- Funded or not;
- Demographic factors: longevity, birth rate, population projections, retired vs. working population
- Cost to the government/macroeconomic sustainability
- Defined benefit or money purchase
- If defined benefit, flat rate or earnings related?
- Objective of pension
- Interaction with private provision/other state benefits
- Potential to disincentivise existing private savings
- One pension age or a range and attaching conditions
- Increases to pension, flat, inflation adjusted. Should pensioners share in economic growth of country
- Should include dependents benefits?
- If money purchase, private or state-owned providers?
- If money purchases, investment options and constraints
- Investment mediums available and impact on Stock markets, Bonds etc.,
- Determination of contribution rates for the member
- Conditions related to "not to participate in State provision
- Tax treatment
- Possibility of cash commutation option
- Means testing of ultimate benefits
- Extent, if any, to which past service credits could be given
- Ability to transfer to other State savings arrangements, or to non-state schemes
- Ability to finance loans against accumulated capital value of benefits for specific purposes (e.g. property purchase)
- How to communicate to people

[10]

4.

- Tax treatment of lump sum payment
- Maximum limits on cash as per law
- Flexible benefit to members
- Schemes offer the commutation option because it is the norm and therefore competitors will do so
- For most schemes part of the pension can be commuted
- Spouse's or dependent's pension is usually left undisturbed
- Most members exercise the commutation option
- However there is generally little evidence of selection
- Serious ill health – generous commutation value
- Commutation may be on actuarially equivalent terms, if not an allowance is needed in valuation
- May use different commutation factors for different categories of members if benefit levels differ between categories
- Theoretically calculated commutation factors are often smoothed to determine a practical table
- However individual calculation by the actuary for members is allowed
- Guaranteed pension increases are usually allowed for but probably no allowance for discretionary increases to pensions in payment?
- Commutation factors are often based on valuation assumptions for mortality and interest and often remain unaltered for long periods of time
- Commutation factors are rarely varied with market conditions, although theoretically probably should.

[7]

5. (a) Beneficiaries. Any six sensible distinct points (some of the following overlap)

- Benefit entitlements
- Employee contribution obligations
- Any additional expense charges
- Risks involved
- Treatment of entitlements in the event of corporate insolvency
- Security of funded benefits
- Degree of funding
- Investment mismatching
- Disputes procedures (e.g. contact at company or any industry-wide or state-sponsored body)
- Any right to opt out or requirement to opt in
- How beneficiaries of contingent benefits will be determined (e.g. specified by employee or left to trustee discretion)
- Tax implications
- Implications for state benefits
- Who administers the scheme
- Contact point for further information/queries
- Asset choice
- Investment policy
- Benefit options
- Discretionary benefits

(b) Owners of capital. Any six sensible distinct points including:

- Description of the nature of the benefits being granted
- Measure of the cost of
- Benefit liability accrued (net of assigned assets)
- Future (e.g. one year's) benefit accrual
- Method used to determine the cost
- Financial and demographic assumptions used in determining the cost
- How the cost would vary if previous year's assumptions were used (i.e. comparative information)
- How the cost would vary if various assumptions were varied (i.e. sensitivity analysis)
- Legislative constraints e.g. minimum funding requirements
- Ability to amend (reduce) benefits both past and future
- Degree of risk taken e.g. investment mismatching or options against company

[6]

6. (i) **Continuation of the scheme [without any further accrual of benefits] as a closed scheme**

- Benefits may continued to be linked to (future) final salary or
- May increase in line with average price or earnings inflation or
- May increase in line with other statutory basis

Transfer of liabilities to another pension scheme operated by the same (or another) employer on an individual or bulk basis

Transfer of funds to the scheme members and other beneficiaries

- As a cash sum
- With a requirement to invest to provide retirement benefits

Transfer of funds to an insurance company to invest and provide benefits

Transfer of liabilities to an insurance company to guarantee some or all of the benefits

Transfer of the liabilities to a central discontinuance fund to guarantee some or all of the benefits

Legislation or order of scheme may restrict/determine options

(ii) **Continuation**

Avoid, reduce, and postpone the costs associated with disinvesting and transferring assets
But continuing running expenses
No guarantee that benefits will be met

- Depend on future investment and demographic experience

- o And on whether the company is able/prepared to pay more to the scheme if necessary

Future beneficial experience may result in surpluses

- o Only likely to benefit those still alive when the surplus arises

Transferring the liabilities to another scheme: same employer

Will only be an option if there is such a scheme available.
The situation is similar to temporary continuation except that any surplus or deficit may belong to a larger group of individuals.
Because of the risk that the funds will be used for the benefit of others or will be supported by funds that should be providing benefits for others, this option may not be available.

Transferring the liabilities to another scheme: other employer

Will only be an option if there is such a scheme available
Benefits provided will depend on what the scheme offers, covenant of the other employer

- o Could be better or worse than the accrued benefits
- o Could be of a very different form to the accrued benefits

Transfer of funds to the scheme members

In many countries it will not be possible to pay the capital value of benefits to a beneficiary so this option may not exist

If it is allowed then the benefits are likely to be very different from the discontinuance benefits and the funds could be used for a different purpose entirely.

It would normally be very difficult to ensure that the funds are used to provide retirement benefits.

Transfer of funds to an insurance company to invest and provide benefits

Legislation may permit funds for an individual to be placed with a benefit provider chosen by the beneficiary
Benefits will depend on the terms and conditions of the new provider and the experience of the individual

The ultimate benefits may depend on future investment experience and assumptions used to capitalize benefits and may be different from the discontinuance benefit.

Transfer of liabilities to an insurance company to guarantee some or all of the benefits

May be desirable to protect the members from the adverse investment or there may be legislation requiring this.

Necessary to transfer the liabilities to a provider who will accept the risk of future experience and guarantee a benefit. May be lack of providers willing to accept this risk. Those willing to do so will probably invest cautiously and build contingency margins into the price. This may mean the funds are not sufficient to cover the cost of the accrued benefits

Transfer of the liabilities to a central discontinuance fund

May be able to guarantee the benefits at a lower price.

This is only likely to be the case if there is a guarantor of last resort or if there is a requirement for levies to be imposed on employers or scheme to meet any deficit.

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- The current investment strategy is geared towards high equity investment which can be considered slightly more risky but it might also give a better return overall.
- Over the long term equities have given better returns than fixed interest investments and cash deposits. Over the short term they can go down in value but so can fixed interest investments and inflation linked investments. Values can move quite quickly up or down over a very short period of time.
- Cash deposits do not go down in value but they provide a much poorer return over a long period.
- The tax position for the overseas and domestic investment needs to be assessed. These will include tax treatments of dividend income, capital gains and fixed interest income.
- Scheme has been going a long time so may be mature leading to immediate cashflow requirements e.g. to pay pensions. Avoid forced disinvestment when markets low, so more liquidity may be needed.
- Any investment strategy should take into account: risk, return, matching, diversification, liquidity and marketability of assets. Any regulatory restrictions should also be taken into account e.g. self investment.
- The age-profile of the scheme member needs to be assessed. If there's a substantial group of younger members, the current investment strategy may be continued.
- As the scheme matures, there will be more members nearing retirement, and hence a strategy akin to "Lifestyle switching" can be adopted with gradual shift to fixed interest investment.
- We also need to look at the recent review of the cost of the pension scheme as well as the latest valuation reports, funding plans. If it shows that the fund is in deficit, then a more cautious approach of investing more in domestic government bonds can be adopted to ensure deficit does not widen further.
- Investment strategy will also depend on the future contribution rates. If the rates are calculated on a prudent basis, then a more adventurous investment strategy can be adopted.
- The company can also consider alternatives to direct investment in assets, for example, managed fund, with-profits arrangement, deposit administration, purchase of annuities. Could pledge some contingent assets to the scheme – book reserving, bank guarantees etc.

- Sponsor covenant: a riskier, longer term view can be taken of investments if the sponsor is strong and can ride out the rough times. May depend on how big is the pension scheme in relation to the company.

[10]

8 (a)

- General information:
  - Trust deed & rules
  - Amendments/announcements
  - Scheme booklet
  - Minutes (e.g. otherwise undocumented changes to rules)
  - Details of arrangements for individuals
  - Annual accounts as at valuation date in the three years to the valuation date.
  - Details of invested assets
  - Basis used by previous actuary to determine early retirement benefits
  - Actives - transfer in detail
  - Previous valuation report
  - Managers special terms on early retirement
- Actives and deferreds
  - Member identifier
  - Age
  - Sex
  - Spouse's age
- Actives only
  - Current basic salary
  - Date joined scheme
  - Indicator for managers
- Deferreds only
  - Date of leaving
  - Deferred pension at date of leaving
- Mangers only
  - Date joined company manager grade
  - Information from company as to intentions regarding early retirement of managers

8 (b)

- Reconciliation of total number of members and changes in membership, using previous data and accounts.
- Checks for existence of new members.
- Comparison of average benefit levels or of average values of components of benefit calculations e.g. past service, salary etc with previous accounts and data.
- Consistency between salary related contributions indicated by membership data and corresponding figures in the accounts.
- Consistency between investment income implied by the assets data and the corresponding totals in the accounts.
- Minimum and maximum levels of benefits and their components, ages etc.
- Random spot checks on individual membership data.
- Contributions, contribution rates, salaries consistent.
- Comparison of scheme member totals and company employee totals.
- Comparison with other sources of data e.g. data for group life scheme.
- Value of assets should be consistent with investment manager's performance, contributions and last value of assets.

8 (c)
Financial assumptions: Investment return; dividend growth; earnings growth; inflation rate; expenses, pension increases.
Demographic assumptions: Mortality (pre and post-retirement, spouses); withdrawal rate; % married; spouses' age difference; promotional salary scale, early retirement decrement.

8 (d)

- Investment return: Needed to discount future payments and to determine future value of assets.
- Dividend growth: To place a value of future cashflow from equities, and to assist in derivation of overall investment return.
- Earning growth (general and promotional): To assess value of benefits dependent upon salary and contributions.
- Expenses: These will be incurred for administering the scheme.
- Pension increases: directly impacts upon the benefits paid out.
- Price inflation: Needed as it impacts future benefit levels and also expenses.
- Mortality pre-retirement: Needed since it affects the level, type and timing of benefits.
- Mortality post-retirement: Assesses when member pension stops and spouse's pension starts.
- Spouse's mortality: Needed to determine how long spouses' pension need to be paid for and hence their value.
- Proportion married and age difference with spouse: Impacts on cost of any spouse's pension.
- Withdrawal rates: Needed since deferred members do not accrue future benefits on leaving service.
- Early retirement: needed if the benefit on early retirement is enhanced i.e. not cost neutral vs. the reserve held.

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9 (a)

- A surplus in a pension scheme exists if the value of the assets exceeds the value of the liabilities. The size of the surplus therefore depends on how the assets and liabilities are valued.
- The value of the liabilities depends on assumptions made in relation to both economic items (e.g. salary inflation) and demographic items (e.g. mortality rates). Similarly, assumptions may be required to give a liability value which is consistent with the asset value
- If different assumptions are used, the value placed on the assets and liabilities will be different and therefore the size of the surplus will differ
- It is possible with any single scheme to select assumptions which place a relatively high value on the liabilities relative to the assets and vice versa so that a scheme that is in surplus on one basis may be in deficit on another.

9 (b)

- Any restrictions in the scheme's documentation, rules etc.
- In considering whether or not to spend any surplus, the trustees need to ensure that in so doing they do not reduce the funding position to a level that is lower than required by legislation and they may also wish to check the impact on the surplus on a discontinuance basis. For instance, relating to the cost of securing the liabilities with an insurer.
- The Trustees may also wish to check on the durability of the surplus and whether the actuary believes that the assumptions chosen for salary inflation and mortality, for instance, are conservative or optimistic.

- Trustees would wish to consider equity between classes/generation of member/beneficiary. No past surplus distribution but have historic benefits been reduced due to underfunding – redress?
- Ultimately the Trustees may be interested in seeing an asset liability model which would project the funding position into the future on various different scenarios and possibly on a stochastic basis showing a probability distribution of possibly longer term outcomes and its possible volatility in the short term.
- For instance, they may wish to enquire about the possible impact of a sharp fall in the value of the assets. In this case, if equities fall without any change to the long term fixed interest gilt rate, it is possible that the actuary may advise that the surplus has fallen too 9or been removed altogether), unless a compensating change is made to the assumption for out-performance of the assets in the future.

9 (c)

- In a final salary scheme a surplus may arise as a result of pension increases being lower, in real terms, than expected. In such circumstances it may be decided to use the surplus to increase the benefit entitlements.
- It is probable that some of the surplus could be spent on reducing the employer's contribution rate and it is likely that the employer has had to pay higher rates in the past (since there has never been a surplus in the past). So the employer may have an expectation that the employer's contribution rate may now fall, and may be unhappy if benefit improvements are awarded instead.
- If the surplus is from a source that is liable to particularly volatile experience (stock market volatility), a further possibility would be to retain the surplus in the scheme, as a margin against possibly adverse future experience without awarding benefit improvements or reducing the employer's rate. However, the trustees may be reluctant to do this if the surplus is so high that the scheme attracts unfavourable tax charges depending on the severity of those charges.
- A balance between the three possibilities can also be achieved by transferring part of the excess assets from the scheme. The transfer may be to the sponsor or to the beneficiary as a one-off payment.

9 (d)

- If the Trustees do award benefit improvements, the size of the surplus will fall and the impact of any mismatching of assets and liabilities will be greater.
- If benefit improvements granted now which cannot be removed later, then employer may be reluctant to grant as there is no cushion against bad times if all surplus spent in this way i.e. increase liabilities for ever more.
- The best match to the pensioner liability would be bonds and so a significant proportion of the portfolio would need to be switched from equities to bonds to achieve the match; potentially increasing the cost of the scheme to the employer since equities are expected to out-perform bonds in the long term.

[14]

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- Members expectations e.g. from booklet, announcements
- Usually equal in value to alternative deferred benefits or past service reserve (or simplified scale).
- Appropriate to consider equivalent value to alternative deferred benefits (since redundancy the other likely option).
- What allowance for discretionary benefits in funding calculations and should it be carried forward to the early retirement terms?
- Potential advancement of winding-up priorities for members taking early retirement.

- Need inclusion of expenses in funding calculations at a realistic level.
- Does the trust deed constrain the amount of early retirement pension on redundancy?
- The scheme might be under-funded. If early retirement pensions are reduced for under-funding should cash option be available at a reduced or full level?
- Ability to increase early retirement pensions if funding level improves.
- Remove pensioners at market rate from assets and liabilities, and offer early retirement pensions equal in value of the reduced cash equivalent.
- Liquidity problems if large cash lump sum payments.
- If terms too generous then potentially high take up rate and strain on fund. However strain could be made good over a number of years possibly.
- Not generous – low take up, but could still make people redundant anyway with deferred pension.
- Relative cost of redundancy vs. early retirement
- Past practice on early retirement terms.

[5]

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