Institute of Actuaries of India

Subject SP4 – Pensions & Other Benefits

March 2021 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.

Solution 1:

i)
A final salary scheme may be abused, since companies could increase salaries just before retirement in order to increase their employees' pensions. [1]

There is a risk that the scheme does not meet its aims. By definition a final salary scheme targets those on higher final earnings, it therefore does not focus on the needy (who are often the primary concern of the State). [1]

The costs of this type of scheme can be unpredictable and volatile over time. This is because of the risk of volatile salary increases across the country and, if funded, assumptions not being borne out. [1]

[3 Marks]

ii)
Reasons why cost of pension may be increasing:

Change in demographics:

- Increasing longevity
- Which is worsened with falling birth rate, and
- Birth booms in the past [2]

Issue is exacerbated if working lifetime is shortened due to:

- Lower proportion of working population to retired population
- More time spent in higher education
- Career breaks
- Early retirement [2]

Rise in costs could be due to poor investment returns

Inflation higher than expected

Salary increases higher than expected

[5 Marks]

iii)
Ways in which the government may make changes to the design

Increase the age from which the State pension is payable. [1]

Reduce the starting level of the pension. [1]

Reduce or remove any increases to pensionable salary threshold. [1]

More stringent conditions for receipt of full pension:

- increase the number of years required in order to be entitled to a full pension
- restrict benefit payments to certain individuals, e.g. only permanent residents of the country
- means-test the benefit, taking into account other sources of income

[½ mark per bullet point]

In addition the government may try to encourage private provision. [1]

[5 Marks]

iv)
Issues the Government should consider:

Needs of the Govt.

- How quickly the State wishes to reduce the cost.
- How large a reduction in cost is required.
- How socially and politically acceptable the changes are.
- The impact on administration.
- The impact on other benefit costs, eg social security costs.
- How the changes can be communicated to the public to manage expectations.
- How any changes in eligibility affect other pension provision and savings.
- The State should consider the alternatives to reducing pension outgo, and their implications, e.g. increasing contributions to the pension scheme

[½ mark per bullet point]

Needs of employees:

- What is the desired net replacement ratio? Any reduction in benefit will lead to a lower net replacement ratio being achieved, and this may particularly be the case for the lower paid.
- What is the expectation of benefits especially for those approaching retirement?
- Any changes in eligibility may lead to some individuals not claiming their entitlements.

[½ mark per bullet point]

Needs of employers:

- The impact on working patterns.
- The impact on private and occupational pension provision.
- Will the State need to compel or encourage occupational provision?

[½ mark per bullet point]
[Max. 6 Marks]

v)
Advantages of the proposal

- It can control Government costs
- Government does not bear any long-term risks associated with the scheme
- Certain employees may like the choice of opt-out, as the pension does not really have any value, especially for high earners
- Easily copes with contribution holidays, career breaks, change of employment
- Requiring only modest employer contributions similar to current scheme should not be too onerous a burden on employers
- State operated and therefore expected to be secure
- a funded arrangement so may have positive impact on investment markets, creates demand for investments
- offering investment choice enables individuals to tailor investments to their risk appetite and circumstances
- similar to a savings scheme and therefore transparent and easy to understand
- May allow flexibility over the form and timing of the benefit

Disadvantages of the proposal

- does not cover long-term unemployed, long-term carers, sickness
- not compulsory, and so doesn't ensure employed individuals have pension provision
- may not satisfy the needs of employees, especially future hires and younger employees
- may lead to lower pension and net replacement ratios for future generations
- does not guarantee the pension since DC in nature and the investment risk and longevity risk falls on the individual …for example:
    - there is a risk of poor investment returns over the period to retirement or a fall in value at retirement
    - there is a risk of the conversion terms at retirement being worse than expected due to longevity improvements
- individuals may feel they do not have sufficient knowledge to make investment choice, or may just make inappropriate choices …
- … leading to the need for a default option or individuals paying for investment advice
- contributions made may not be sufficient to provide an adequate pension
- may be unpopular with employers as required to contribute
- there may be a need to offer some guarantee or underpin to the pension, with associated costs
- a significant change to the system with associated costs, eg education will be required and a new administration system
- additional regulation will be needed
- there may not be a large enough market to support the buyout of benefits at retirement
- may not lead to a higher level of savings, just a change of savings vehicle.

[½ mark per point]
[Max. 11 Marks]
[30 Marks]

Solution 2:

i)
Considerations in determining an appropriate investment strategy

Liability profile

- The average term of the liabilities could be long as scheme is unfunded.
- The nature of the benefits is also important in assessing the suitability of the assets. [½]
- The liabilities will mainly be linked to earnings. As the scheme matures, more benefits may be linked to price inflation or may have fixed increases, depending on the nature of the benefits provided. [½]

Fund size

- Early on there will be limited funds available and so some investment classes may not be suitable because of their size, eg direct property investment. In the longer term, new classes may become available as the scheme grows. [1]

Level of risk / security

- The views of the trustees and the sponsor should be sought so as to ascertain their attitude to risk. [½]
- The strength of the sponsor covenant should also be assessed. [½]
- A more aggressive investment strategy could be adopted to try to increase returns and
- hence reduce costs … [½]

- … the downside is that there is a risk of a significant deficit if experience turns out to be worse than expected, resulting in increased costs and a volatile contribution rate. [½]
- The scheme could minimise the probability of deficit by holding assets that closely match the liabilities. However, the cost of doing so may be unacceptably high in terms of lower investment returns … [½]
- ... furthermore, surpluses are less likely to arise and hence members are less likely to be granted benefit improvements. [½]
- The consequences of poor investment performance are less significant for an immature scheme … [½]
- … it may therefore wish to follow a policy of deliberately mismatching, in order to benefit from higher expected returns from assets that do not closely match the liabilities.
- The scheme may consider investing a greater proportion of the scheme in equities, which historically have outperformed government bonds over the long term, but have extra risks associated with them, including default and volatility.

Funding level

- The more healthy the funding position, the greater the level of investment freedom, increasing the scope to mismatch. [1]

Liquidity

- For an immature scheme, benefit outgo is low and therefore can be paid out of contribution income. [½]
- Liquidity will therefore not be a major issue and the scheme will have less need to invest in marketable and high yielding assets.
- Consideration should be given to any protection benefits offered, for example a lump sum payment on death in service could lead to liquidity risk for an immature scheme with only a small fund, which may lead to insurance being used. [½]

Diversification

- A diversified portfolio of assets reduces risk. The optimum position between diversification and minimising investment costs needs to be sought. [1]

Restrictions / legislation

- The State may restrict the types of investments held. For example, it may restrict the level of self-investment or set levels for minimum / maximum holdings of different types of investment. [1]

Tax position

- The tax implications of holding certain investments should be considered. The return net of tax is the key issue. [1]

Investment expenses

- The expenses associated with investment should also be considered. The return net of expenses is the key issue. [1]

Ethical / moral issues

- The trustees and/or sponsor may choose to avoid certain investments from an ethical / moral viewpoint. [1]

Competitor schemes / benchmarking

- The scheme is unlikely to want to risk poor performance compared to its peers, and may want to specify that the managers should not deviate significantly from the investment strategy followed by competitors' schemes (although this should not be a primary consideration). [1]

[Max. 10 Marks]

ii)

Accumulating contributions

The rate at which the contributions accumulate could be based on the return earned on the assets the scheme actually holds. [½]

However, if invested mainly in equities (eg to fund for the active liabilities), the return could be volatile (or even negative). [½]

Alternatively, could use notional returns on an investment product. [½]

This might be:

- equity-based (eg a managed fund or index return) [½]
- smoothed in some way (eg using a with-profits type approach) [½]
- or based on cash returns (eg a typical return on a savings account). [½]

Since these returns will be calculated independently (and indeed may be published publicly) they may be more readily perceived as "fair" by the member. [½]

A third alternative would be to use a notional stable interest rate, which should vary only occasionally. [½]

Issues to be considered

- Cost to the scheme – the higher the return credited, the more likely this benefit is to bite. [½]
- Degree of smoothing to be adopted, if any – if based on return held on actual assets, return could be volatile (or even negative). [½]
- Ease of use / simplicity – a simple approach will involve reduced calculation work and hence have lower costs. It will also be easier for members to understand. [½]

Conversion to a pension equivalent

Could use variable annuity rates, ie derived from the actual market … [½]

… the main downside of this approach is that, whether the member will benefit from the defined contribution or defined benefit promise will depend on conditions when the conversion takes place. [½]

This may not seem equitable and can make planning difficult. [½]

Alternatively use fixed-rate approach. The conversion rate will be known in advance and will not depend on market conditions: [½]

- This would be easy for the members to understand, perceived as fair to members retiring at different times and simple from an administration viewpoint. [½]
- However it will not reflect current market rates. Members may have a right to a transfer payment, eg to an insured contract, so terms should not diverge too far from market rates. [½]

Other issues to be considered

How far should the terms of the conversion reflect the characteristics of the members, eg age, sex, state of health, marital status? An average marital assumption may be used. [½]

Annuity should take into account the benefits that the plan provides, eg spouse's pension. [½]

Should there be an allowance for discretionary pension increases? [½]

Consistency with value of accumulated contributions – the conversion terms might be linked to investment roll-up. It does not make sense to have a market approach for one aspect and not for the other. [½]

[Max. 10 Marks]

[20 Marks]

Solution 3:

i)

General points [Max. 1 mark]

- Financial significance of demographic assumption [½]
- Allowance for prudence [½]
- Size of scheme [½]
- Any relevant regulation [½]

Specific points

- Due to the imbalance in benefit amounts the experience of the Bodyguards is likely to be most important to the position of the scheme [½]
- Likely to have quite different mortality expectations to general population [½]
- …In particular the Bodyguards will probably be in better health than average at the moment [½]
- …But it isn't clear if this will lead to longer longevity in later life [½]
- But at the same time, need to allow for possibility of injuries for Bodyguards during the safety of the top-notch people and to what extent they are at risk [½]
- …The pool of experience is likely to be very small (and Bodyguard's lifestyles have changed significantly over time so current Bodyguard pensioners are probably not a suitable indicator). [½]
- …But other staff may have experience more in line with the population as a whole [½]
- Bodyguards will have significantly different promotional salary scale to others in the scheme.
- It may be difficult to get experience for this as there will be little experience and a number of factors involved including the mentality of the Bodyguards, their susceptibility to injury and the kind of risk they take [½]
- The use of contracts that tie Bodyguards to the Agency for a set period of time should be factored into the withdrawal experience [½]

[Max. 4 Marks]

ii)

- The actual experience of a scheme should be monitored as part of the Actuarial Control Cycle [½]
- Changes in demographic experience compared to assumptions will lead to funding surpluses or deficits for the scheme [1]

- Monitoring can help identify trends [½]
- The analysis of experience enable managers of the scheme to check whether the method and assumptions adopted for financing the benefits continue to be appropriate [½]
- …and, if not, what changes should be made in order to achieve the desired level of prudence e.g. changing the assumptions [½]
- Small numbers of Bodyguards make up significant proportion of the liabilities - their experience will be most important to monitor [½]

[Max. 2 Marks]

iii)

- Higher than expected mortality [½]
- …This will result in lower current pension payments being made than were expected leading to a reduction in outgo for the scheme [½]
- Lower than expected promotional salary increase [½]
- …For example, if wage increases are contingent on many safety parameters of the Bodyguards that do not materialise [½]
- …This will reduce the future benefit outgo compared to what was expected [½]
- Lower than expected ill-health / injury occurrence [½]
- …This will reduce the payments that need to be made out of the scheme for members of the scheme who are in ill-health. [½]
- Higher than expected withdrawal [½]
- ….as long as salary increases is higher than deferred revaluation
- Higher exercise of option terms less generous than funding basis (e.g. TV, commutation) [½]
- …reduces / removes liabilities in respect of pension benefits [½]
- Higher deaths in service [½]
- ….if death in service benefit less valuable than retirement benefit [½]
- Lower proportion married / older spouses [½]
- …lower benefits paid to dependants [½]
- …or for shorter period of time [½]

[Max. 3 Marks]

iv)

- Likely to be a significant portion of the total fund that is transferred out [½]
- Expect this to lead to significant cashflow requirement for the scheme [½]
- The transfer may occur at a time when it is not beneficial to realise assets [½]
- And wlll incur transaction costs [½]

- The scheme / assets / liabilities will be substantially smaller after the transfer [½]
- Share of fund transfer values wouldn't impact funding level / best estimate transfer Values would have a geared impact on the funding level [½]
- May be more difficult to achieve strong investment returns given the smaller Fund size [½]
- Some investment options / asset classes may no longer be accessible or appropriate for a smaller scheme, e.g. swaps, property [½]
- … will require a review of investment strategy [½]
- Will need to reassess contributions to the scheme / conduct new valuation [½]
- Likely to have diseconomies of scale [½]
- …expenses will become a larger proportion of scheme costs and need to be managed accordingly [½]
- …may look to review advisers / outsource some services [½]
- Membership profile will be more stable / less volatile after the transfer [½]
- … leading to lower risk / predicable costs for the sponsor [½]
- Smaller population leading to lower contributions [½]
- ….which should be reviewed following transferring out

[Max. 4 Marks]

v)

- More flexibility over form of benefits [½]
- …In particular they may be able to take benefits earlier which could be necessary given their long retirement period [½]
- More flexibility over the investment choice [½]
- …They can set investments that match their risk appetite [½]
- More flexibility over the contributions they pay [½]
- …They can choose to pay as much or as little as they like, depending on their preferences, tax situation etc [½]
- Less certainty over the level of benefits [½]
- …No guarantee over the exact amount they will receive [½]
- Will now have all the risks (investment, longevity, inflation, expenses) [½]
- Covenant may or may not be better depending on where their new benefits are held [½]
- Loss of 'safety net' of risk benefits in case of early end of career, eg due to injury [½]
- Likely to incur higher expenses [½]
- May need to obtain financial advice in order to invest wisely as the Bodyguards appear to be not well versed in financial matters [½]

- Will lose out on any employer contributions [½]
- May not receive full value of benefits from the transfer value out of the scheme [½]
- … but if an enhanced TV was offered then might be more valuable [½]
- Loss of future accrual [½]
- More portability, useful if changing the Security Agencies frequently [½]
- Different / no spouses benefits [½]

[Max. 6 Marks]

vi)

Investment strategy should be reviewed regularly as part of the pension scheme's governance process.

- The strategy may be reviewed in light of recent asset performance, or performance of particular fund managers. For example, following strong asset performance the pension scheme may wish to move into less risky asset classes to reduce the volatility of returns, locking into the current funding position.
- If there have been problems with the performance of a particular manager and they wish to remove him, the pension scheme may wish to carry out a broader review of investment strategy. This could be to avoid the possibility of a future review requiring dis-investment of funds; hence ensuring only one set of transaction costs will be necessary.
- Changes to the liability structure will lead to a review of investment strategy. This is because the assets should reflect the nature of the liabilities, considering term and whether fixed or inflation linked. For example, there may have been a large number of retirements or withdrawals from active service.
- Bulk transfers into or out of the pension scheme could also change the liability structure as in the above case.
- The sponsor's attitude to investment risk may have changed.

[Max. 5 Marks]

vii)

The term of the liabilities is shorter as it effectively ceases at retirement. [½]

Some issues regarding matching:

- Annuity prices are often driven by the market in government bonds. The scheme will need to consider assets that match annuity prices at retirement, eg fixed-interest and/or index linked government bonds dependent on the nature of pension increases and investments available. [1]
- Some cash may also be necessary depending on whether retirees have the option to take a cash sum at retirement. [½]
- The degree of matching depends on the scheme's level of funding and will be less of an issue the more surplus funds exist. [½]
- The scheme may need a higher proportion in marketable / liquid assets. Assets may have to be realised to supplement any positive cashflow into the scheme when securing a pensioner's benefits. This will depend on the scheme's cashflow position. [1]

[Max. 4 Marks]

[28 Marks]

Solution 4:

i) Data checks

Perform the following checks and request an explanation of any unusual findings:

- Check that current ages of members are less than the scheme's retirement age [½]
- Check that the ages of joining scheme are at least as great as the minimum scheme entry age. [½]

Ideally the data for active members will need to be split between:

- Senior Management
- Business which has had redundancies
- Remainder of the business. [½]

Do checks in each category on those in force at both valuations and new entrants separately. [½]

Produce a reconciliation of membership movements for these categories. This will involve reconciling the number of actives at this valuation with the number of actives at the previous valuation plus new entrants minus exits. [½]

For deferreds it is unlikely that you would be able to split the data between business streams. You could do a global check that the number of deferreds at this valuation equals the number of deferreds at the previous valuation minus exits (transfers, retirements and deaths). [½]

Check that the average deferred pension and the average transfer value is sensible. [½]

The figures need to be reconciled against payroll or external source to check completeness of data. [½]

Check whether the scheme and member contributions are in the correct proportion. [½]

In addition, do the total contributions paid approximately equal the pensionable payroll multiplied by the contribution rate? [½]

Senior employees

- Reconcile each individual record to the last valuation record.
- Check maximum salaries.
- Check the average past service. This is likely to increase by three years.
- Check documentation for any special arrangements.

[½ mark per bullet point, max 2 marks]

Business which has had redundancies

- Check average past service. This may be lower, depending on whether mainly older or younger members were affected by the redundancies.
- Alternatively if they have had a last-in first-out redundancy policy it may be shorter service employees who have left.
- Check the average age, average salaries and past service of those who were present at the last valuation.

[½ mark per bullet point, max 1 marks]

Remainder of business

- Check that overall numbers of members can be reconciled.
- Expect stability of age and past service.
- Check that salaries have increased in line with what the company expected.

[½ mark per bullet point, max 1 mark]
[Max. 7 Marks]

ii)

Consider the nature of the surpluses especially the surplus arisen out of equities. 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. [1]

Consider the nature of the benefit improvements. The temporary contribution reduction is also a one-off benefit however, the improved pension escalation rate is an ongoing 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. [1 ½]

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. [1½]

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. [1]

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. [1]

This is particularly the case when surpluses are unrealised and reversible, such as the equity market surplus that constitutes 60% of the total surplus. [1]

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. [1]

The former increases members' security should the employer have financial difficulties. [1]

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. [1 ½]

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. [1]

It would be necessary to consider the perceived value of the pension increases. Although the long term inflation proofing guarantee is valuable and may be perceived well both by pensioners and deferred pensioners, it may be that in the short term pension increases may even be expected to be much below 3.5%. [1]

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. [1]

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. [1 ½]

A reduction in the employer's contributions should increase the strength of the company and this should improve employment prospects, as mentioned in the question itself by the Actuary in his advice. This may be an important factor to staff concerned about any further reduction in staff numbers. [1 ½]

Past decisions on distribution of surplus will influence expectations of employees as they create some expectations. It will also be necessary to consider scheme rules, legislation and regulation, and the scheme's investment strategy. [1]

[Max. 15 Marks]

[22 Marks]

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