

EXAMINATIONS

April 1999

Subject 304 — Pensions and Other Benefits

EXAMINERS' REPORT

The paper was reasonably well attempted by most candidates. The main problem was that candidates produced standard lists in response to questions rather than applying the principles they have learnt to specific situations. This creates unnecessary time pressure and scores relatively few marks.

Comments on individual questions appear at the end of each solution.

1 (i) Advantages

- Sets a minimum level of competence
- Sets a minimum level of consistency
- Promotes professionalism/PR for actuarial profession
- Provides a link to standards or guidance issued by other professional bodies
- Provides additional safeguard/security to scheme members about their pensions
- Interpretation of relevant legislation
- Guides less experienced actuaries or actuaries with little experience of a particular area
- May be a substitute/replacement for detailed legislation
- Provides a “legal defence” for actuaries

Disadvantages

- Maybe too prescriptive
- Restricts actuarial judgement
- Bureaucratic/costly
- Maybe difficult to make the guidance note definitive in all circumstances
- May become out of date quickly

(ii)

- Valuations/actuarial reports/assessment of assets & liabilities/reports to clients
 - setting out methodology and minimum content of an actuarial report
- Terminology
- Setting out a standard basis/method for individual transfer values
- Setting out a standard basis/method for splitting schemes or group transfer values
- Accounting information providing a link to accounting requirements
- Discontinuing a Pension Scheme
- Expert witness
- Other legislative requirements — as appropriate
- Professional standards/conduct of relationships
- Asset/liability model/other investment related issues.

(i) Generally well answered.

(ii) Candidates got the points on valuation and transfer values but often went little further.

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(i)

- To achieve a decent standard of living in retirement
 - a minimum target pension
- Universal coverage — widening pensions coverage to cover all the population
- To prevent people relying on the state/in the longer term/individuals will provide for themselves.
- To reduce long term government budgets although in the short-term these could increase as existing benefits are paid and incentives are given to those who save
- To reduce cross-subsidings between generations
- To create value for money pensions provision
 - lower costs (i.e. pensions bought not sold)
 - standardised products/administration efficiency
 - less likely to be surrendered early
 - competition
- Capital generation — flow of capital for long term investment/government bonds
- To enhance general awareness of pension schemes

(ii)

- Perceived as an extra tax/inflexible
- Politically sensitive
- Very low paid can't afford it
- Possible lack of general financial/investment awareness. The return will depend on the type of compulsion; e.g. investment awareness if DC
- Employers contributions = constraint on profitability/tax on jobs
- Difficult to communicate
- Transitional period for those (few) who have made existing arrangements
- Bureaucracy
- May distort/swamp local investment markets
- Needs trustworthy sellers of a trustworthy product
- May result in poor value for money for low earners where a high percentage of contributions will be taken for expenses or for older people with a short period to retirement
- Possible lack of incentive if there is a safety net

Generally well answered.

3

The principles the actuary should consider are:

- There may be competitive, existing insurance, industry standard or legislative conversion factors
- Scheme documentation/Trust Deed may require certain terms.

- Need to establish an equation of value between the benefits being surrendered and provided
- A starting principle is usually that a scheme should suffer neither profit nor loss if the option is exercised
- In theory need to consider an appropriate rate of discount to value the benefit
- Which is likely in theory, to be an appropriate current medium to long term bond return
- In practice it may be difficult or inappropriate to vary the return frequently so an average rate or valuation rate of return could be adopted
- In which case this should be reviewed periodically
- The mortality assumptions need to be set
- In theory, should consider the likely mortality rate of those who are likely to exercise the option
- Could assume that scheme will be selected against
- and that the option will only be exercised for those dependants in good health
- and/or members in poor health.
- In practice it may be that most people with dependants exercise the option
- and that no special allowance for mortality needs to be made.
- Age of member and dependant will be relevant to cost of surrender. Could use the actual age or an average figure.
- Need to decide a practical solution of strict accuracy of all the above points versus administration simplicity.
- Consider sponsors view. Do they want to encourage take up.
- Could also make allowance for additional administration and investment costs
- Need to consider to what extent, if at all, should include allowance for discretionary post retirement benefits in conversion terms for example pension increases
- We have no information on these from the question, but in general, a starting point would be fairness for the member and other beneficiaries in the Scheme i.e. to the extent the discretionary benefit may be expected for

the member/dependant (past practice, competitive pressure etc.). These should be allowed for.

- This, however, will depend on the legislative environment and custom and practice.
- Consider external impact, e.g. disclosure or accounting.

Restrictions

In order to limit the risk of selection, the following measures might be taken.

- Impose a limit on the amount of a member's pension which can be surrendered
- It could be subject to satisfactory evidence of good health
- Availability may be restricted to a specified period e.g. just before retirement, or at a particular event (marriage).
- Once elected, the decision could be irrevocable.
- May restrict the dependant by the nature of the relationship
- or age - perhaps adjusting the conversion terms for large age differences if an average difference is assumed for conversion terms.

(i) Candidates were too dogmatic - stating how to do the calculation rather than the issues to consider. The range of issues raised was generally quite narrow.

(ii) Generally well answered.

4 The objectives of the ALM study. These will determine the actual data and

- the period over which the study is conducted
- the acceptable level of accuracy of the results
- the acceptable level of risk the client is prepared to accept

All data that is required for the regular funding valuations (assets and liabilities) are needed

Plus all options and guarantees not explicitly allowed for in the funding valuation

And the funding method and assumptions for the funding valuation (these are data requirements of an ALM)

Together with conclusions from the valuation (e.g. rate of contribution to be paid)

Realistic (i.e. no margins) parameters for pay, inflation and investment growth.

Standard deviation/correlation of asset classes
and realistic assumption for demographics (which may differ from valuations assumptions as all factors are likely to be included, e.g. new entrants or conversion terms which are likely to be ignored for the funding valuation)

Generally well answered. Some candidates went into far more detail than was warranted for the number of marks available.

5 (i) *The following points are relevant for the two scheme types. An equally valid approach is to take an issue e.g. risk and compare it under each approach. Either approach was given credit by the examiner.*

- Money Purchase Scheme:
 - Investments are generally earmarked to each member, so investment should ideally match that member's particular circumstances.
 - Legislation may impose restrictions on the investment choices available.
 - Members ideally require an investment that matches to annuity requirements close to retirement.
 - Further away from retirement, members may take the opportunity to invest in riskier assets in order to aim for a greater return
 - Members may want a real return over long term
 - Must decide whether to use one investment medium for all members or try to tailor the investments to the individual
 - One option available to tailor investments (if permitted) in a developed economy is to use "lifestyle" funds where equity type investments are used for younger members switching slowly to bond and cash type investments as retirement date is approached.
 - This assumes the economy is developed such that equities can be readily traded and they provide a real investment return.
 - In a less developed economy such an approach is unlikely to be viable.
 - This overcomes some, but not all, risks (e.g. early retirement may result in a mismatch of investments to annuity costs).
 - If a non-insured vehicle is used, a unitised vehicle is easier to administer/communicate than a portfolio of stocks.

- An alternative option to tailor benefits is to offer members a choice of investments
- Need to strike a balance between administrative simplicity, meeting the needs of staff, cost and the ability of staff to understand the choices.
- The investment risk is borne by the member rather than the Scheme which puts the onus on the provider/trustee to see that investment performance is appropriate for members as a whole.
- Final Salary Scheme
 - Investments should reflect the liabilities of the scheme as a whole.
 - Depending on size, legislation requirements and nature of markets, may have an insured contract, a managed/unitised fund or a segregated portfolio of stocks.
 - Must assess split of available asset types to provide the best (or least worst) match of the liabilities of the scheme.
 - If membership of the scheme is young an equity biased investment is usually appropriate in a developed market whereas if the profile is more mature, a Bond biased investment is more appropriate.
 - In less developed markets the investment choices may be much less wide.
 - Liquidity, i.e. contribution vs outgo will influence investments.
 - The investment risk is borne by the scheme and hence ultimately the sponsoring employer. Can reasonably consider the employer's tolerance for risk in setting strategy.
 - Could move away from a broadly matched position if they think this will profit the scheme (e.g. if surplus exists).
 - There may be legislative requirements that require investment in a particular way (e.g. surplus regulations or minimum funding requirements).
 - Diversification

(ii) Points to cover are:

- What are the available investment media. Is there a real practical choice available.
- What is degree of member knowledge - are members sufficiently financially aware to be able to make informed, realistic investment decisions?

- What advice/information is available to members. At the very least, communication material will be needed and should be made available to members where they have a choice.
- Sponsor should possibly provide source of advice to members.
- How much choice and what are the cost implications.
- The level of detail will probably depend on the sophistication of the economy.
- Should switches be permitted, and if so at what cost (if any).
- There could be a default option for members who do not wish to exercise choice. This default option should be a realistic and reasonable option appropriate in the majority of cases (e.g. a lifestyle arrangement)
- Sponsors may be liable to complaint from a member if their choice has been unsuitable and no comment was made on that choice when taken, advice was not made available.

(i) *Better candidates understood the issues particularly in a non UK environment and scored well.*

(ii) *Generally less well answered than part (i) with only the best doing well.*

6 (i) Check that:

Current ages < max scheme retirement age.
Ages at joining \geq minimum scheme entry age.

Check the following and ask for an explanation of unusual findings:

Date of joining company \leq date of joining scheme

Individual salary levels look reasonable

Individual salaries and average salary have not increased by an excessive amount since the last valuation

Individual salaries have not decreased since the last valuation, except for the eight senior employees

Average past service consistent with last time, allowing for new entrants

Average age consistent with last time, allowing for new entrants

Number of actives last time + new entrants – exits (left service, retired, died) = number of actives this time

Number of deferreds last time + scheme leavers – (transferred out, retired, died) = number of deferreds this time

Reconciliation against payroll or external source to check completeness of data

If accounting information available, check:

Scheme and member contributions in the last year are approx equal to Σ pensionable salaries \times relevant contribution rate.

Average transfer out per transferring deferred pensioner

(ii) Demographic Assumptions:

Total membership likely to be in the hundreds rather than in the thousands (i.e. the scheme is small) since over half of the liabilities at the last valuation related to only 8 senior employees

so even in normal circumstances the numbers would be too small to give reliable statistics.

Random fluctuations would have a very significant impact on the measured rates.

When numbers are small it is possible to aggregate the experience of several years.

However, the data may not be homogeneous. Rates produced this way may conceal the effects of changes over time.

In this scheme there have been significant changes. The membership now has a very different composition from that three years ago.

Withdrawals and early retirements:

It would be unwise to assume similar large scale movements from the scheme, unless the company anticipate further cut backs since withdrawal benefits are usually somewhat less valuable than those payable to stayers. However, if the scheme paid enhanced benefits to some or all of those made redundant, it may be prudent to include a margin if more of the same is anticipated.

Mortality, marital statistics etc.:

Other experience of the current membership may also differ from the past because the members are doing different jobs and may come from different backgrounds.

New entrants (if appropriate):

The large scale recruitment exercise may have been a one-off. It would be necessary to check with the company what their future intentions are.

If the SCR reduces as the number of new entrants increases then it would not be prudent to assume too many new entrants.

Other general reasons:

There may have been changes in the way data is recorded.
There may have been errors in past data records.

Financial Assumptions:

Salary growth:

The large number of redundancies in one business area and the large scale recruitment in another is likely to have produced atypical salary growth.

(iii) (a) What is the impact of the pay cuts on pensionable salaries?

Is pensionable salary basic salary or total?

Has the reduction in basic salary been compensated by other payments which are pensionable?

Pensionable salaries may be averaged over a period and may take account of pensionable salaries for a number of years prior to date of calculation.

If pensionable salaries are averaged then they may be revalued in line with prices or average earnings.

Is it expected that their salary levels will be restored or improved in real terms (short term)?

What is their likely salary progression to retirement (longer term)?

Are there any replacement (non pensionable) awards?

Are there any plans to make such income or benefits pensionable?

How close are the senior employees to normal retirement?

What are their early retirement plans?

Are normal and ill health early retirement benefits more generous than the value of accrued benefits?

If so, it is usually/rarely given?

Is trustees/employer consent required for early retirement?

What is the state of health of individual senior employees?

(b) Safest course of action is to assume the following:

Mortality: no-one dies before retiring.

Withdrawals: no-one leaves service before retiring.

Assumes that withdrawal benefits are less valuable than stayers' benefits.

Early retirement: value the most costly option available as a right.

Marital status: actual statistics (or 100% but recognise this might over reserve).

Age difference of member and spouse: use actual details if available.

Consider how post retirement mortality should differ from normal to possible.

(i) *Most candidates understood the issues and scored well. Many wasted time by including comments on pensioners even though this was specifically excluded from the question.*

(ii) *Most understood the issues but answers lacked depth and missed many points. Many candidates wrote twice as much on Question 4 than on this part.*

(iii) *Better candidates did well. Many, however, missed the point of the question answering in general terms rather than relating their answers to the 8 senior employees.*

7 (i)

Projected Unit:

$$AL = \sum_{\text{All members}} \frac{S}{60} \times Pay \times \left(\frac{1+e}{1+i} \right)^{65-x} \times \tilde{a}_{65}$$

$$SCR = \frac{\sum_{\text{All members}} \frac{Pay}{60} \times \left(\frac{1+e}{1+i} \right)^{65-x} \times \tilde{a}_{65}}{\sum_{\text{All members}} Pay \times \left(\frac{1+e}{1+i} \right)^{0.5}}$$

Revaluation-adjusted Current Unit:

$$AL = \sum_{\text{All members}} \frac{S}{60} \times Pay \times \left(\frac{1+r}{1+i} \right)^{65-x} \times \tilde{a}_{65}$$

$$SCR = \frac{\sum_{\text{All members}} \left\{ \frac{Pay}{60} \times \left(\frac{1+r}{1+i} \right)^{65-x-1} \times \left(\frac{1+e}{1+i} \right) \times \tilde{a}_{65} + AL \times (e-r) \right\}}{\sum_{\text{All members}} Pay \times \left(\frac{1+e}{1+i} \right)^{0.5}}$$

Defining above symbols/terms:

| | |
|-------|---|
| S | is years of company service to date |
| Pay | is current pensionable pay |
| e | is the assumed annual rate of pensionable pay increases |
| r | is the assumed annual rate of CPI increases |

| | |
|---------------|--|
| i | is the assumed discount rate |
| x | is age of member |
| \tilde{a}_x | is the annuity appropriate to value benefits payable on retirement at age 65 |

Assumptions:

- pensionable pay increases, discount rate and revaluation rate don't vary by year (to simplify formulae)
- pensionable pay increases on average in half a year's time
- company contributions are paid on average in half a year's time
- excludes deferred pensioners

(ii) Advantages of MV

- objective
- quick/easy
- works for all traded assets
- most people feel comfortable with using market value (i.e. they are uncomfortable if a figure significantly different from MV is used)
- users of the figures can see the volatility resulting from any asset mismatching

Disadvantages of MV

- some assets may not be sufficiently traded to have a meaningful price
- volatility may hinder decision making (i.e. smoothing is required)
- MV implies changing the liability valuation basis each year which makes comparison of previous years' results difficult

(iii) Factors which may cause the scheme not to meet its liabilities on discontinuance in the future:

- funding policy which does not include a sufficient cushion to allow for the investment mismatching
- future out-performance by deferred and immediate annuity premiums compared with the equity investments held by the scheme

because of ...

- relative increases in the prices of long-dated government bonds compared with equities
 - increases in the margins in insurance company pricing bases (e.g. for profit, solvency, reinvestment risk)
 - lack of competitive quotes from insurance companies when they are required
- future unfavourable experience in the scheme ...

e.g. higher than expected pay increases or lower than expected withdrawals etc.

- a failure by the company to pay its contributions (i.e. corporate insolvency risk)
- future changes in legislation

e.g. imposing statutory increases in liabilities or increasing tax on pension scheme investments relative to other investors

- theft or fraud
- errors in actuarial assessment e.g. because of poor data

(iv) Advantages of matching investment policy for company shareholders:

- company less likely to have to pay unexpectedly higher contributions at short notice
- less likelihood of surplus arising over which there may be pressure to introduce benefit improvements
- less likelihood of legal sanctions

Disadvantages for company shareholders:

- they may be assuming that the scheme will continue to invest in equities for the extra expected investment return
- the higher expected return on the equities could have been taken into account in the funding of the scheme which depending on local jurisdiction, may give shareholders the advantage of this extra return (possibly without some of the downside risk if it emerges that the scheme is under-funded and there is no requirement to make this good)

Advantages for members:

- if the scheme is discontinued, their benefits are more likely to be met

Disadvantages for members:

- out-performance by the existing riskier assets increased the chance of members receiving additional benefits (e.g. as a discretionary increase or on winding up)
- company may choose to wind up the scheme (e.g. to set up a worse DC scheme in its place) because of the higher expected cost

(v) Some possibilities:

- Fund on revaluation-adjusted CU basis using discontinuance basis plus a margin for mismatching compared with MV of assets — this will automatically ensure that the long term liabilities are met while ensuring that the discontinuance position is monitored. The scheme's financial position should be reviewed regularly.
- Fund on a realistic assumption PU basis using smoothed value of assets but subject to monitoring the discontinuance position on a frequent and regular basis. This recognises that discontinuance is unlikely and tries to look to the long term. Under normal market conditions, the extra margin for pay increases over revaluation in deferment may provide an implicit margin for the ongoing position over the discontinuance position.
- Fund on a sufficiently prudent PU basis using smoothed value of assets to ensure that the discontinuance position is almost certainly met if the scheme is 100% funded on the ongoing basis (although still check the discontinuance position regularly). This recognises that discontinuance is unlikely, looks to the long term and aims to smooth company costs by maintaining a cushion against the volatility of the discontinuance basis compared with the ongoing basis.

(i) *Generally very well answered. Some candidates defined the SCR for the Revaluation adjusted CU method. Nearly all candidates defined the terms used, but few stated the assumptions.*

(ii) *Most candidates mentioned the main points. A number of candidates listed the advantages and disadvantages of the Discounted Income method, although this wasn't asked for. A number of students suggested that the liability valuation would be inconsistent with the asset valuation, rather than consider the effect of valuing the liabilities on a market value basis.*

(iii) *Most candidates mentioned mismatching and failure of company to pay contributions. The better students also identified the other possible causes.*

(iv) *Poorly answered.*

(v) *This was poorly answered by many candidates, if attempted at all. Most of those who did, only considered the liabilities and did not mention how they would value the assets.*

8 Overall

Under a money purchase scheme it is the member who takes the risk
under a defined benefit scheme it is the company.

In a defined contribution scheme, if experience is favourable the member benefits with a larger pension if experience is worse than assumed the member receives a lower pension.

Company A

The funding basis for the defined benefit scheme was a global rate for all members based on an average of individual rates.

Money purchase schemes are individually funded i.e. there are no cross subsidies.

Assuming a positive investment return relative to salary inflation it costs more to provide the same pension accrual for an older person because there is less time to invest money.

People currently retiring are likely to have been older than the average age of the scheme when the change was introduced and therefore they would expect to be underfunded.

The funding method for scheme might have been Projected Unit.

This means only funding for one year's accrual with no allowance for ageing because assumed a flow of new entrants.

The contribution rate for the defined benefit scheme was a combination of a future service rate and an adjustment for a past service surplus/deficit.

The contribution rate being paid at the date of the switch might have been less than the future rate because a surplus in the scheme was being used to reduce the rate.

Benefits taken under the defined contribution scheme may be in a different format e.g. the pension may include pension increases after retirement where none were provided in the defined benefit scheme.

Company B

There may have been a change in the amount of state benefits received in addition to the company pension and these could reasonably be taken into account when looking at member's comparative benefits.

This is most likely due to actual experience being more favourable than was assumed when the actuary set the age related rates.

The benefits may also not be in the same format as the defined benefit scheme.

For example the member may be single and not purchasing a spouse's pension not including a guarantee period or not including pension increases.

Experience

Actual experience may have been worse than was assumed in the funding basis of the defined benefit scheme for company A and better than the actuary's assumptions used for calculating the rates for company B.

Investment returns have been different from those assumed due to economic conditions.

Alternatively in company A members may have chosen to invest in lower risk investments whereas in Company B members chose riskier investments

Salaries will have increased at a different rate from what was assumed. The funding basis for Company A may have allowed for decrements before normal retirement date e.g. withdrawals, death which are inappropriate when funding an individual case.

The cost of purchasing a pension may be different from that originally assumed due to changing interest rates and annuity terms e.g. insurance company expenses.

In Company A the member may be married whereas funding assumed a proportion married.

The age of spouse may be significantly different from average age assumed in funding.

Expenses and/or life insurance costs may have been treated differently in the Company A's defined benefit scheme from how they are treated in the money purchase scheme.

A tough question which tested candidates' understanding of the fundamentals of funding and bases. Well prepared candidates who adopted a logical approach were able to score well. Candidates who did not structure their answers as suggested in the question were not penalised but this did create unnecessary difficulties.