

EXAMINATIONS

April 2003

Subject 304 — Pensions and Other Benefits

EXAMINERS' REPORT

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The examiners are mindful that a number of interpretations may be drawn from the syllabus and Core Reading. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

The report does not attempt to offer a specimen solution for each question — that is, a solution that a well prepared candidate might have produced in the time allowed. For most questions substantially more detail is given than would normally be necessary to obtain a clear pass. There can also be valid alternatives which would gain equal marks.

Mrs J Curtis
Chairman of the Board of Examiners

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1 General

- Problems might arise if anything happens to employees which makes them unable to work, in particular, the money purchase fund may not be sufficient to provide an adequate level of benefits for that member and/or their dependants.
- E.g. inadequacy of invested monies could be greatest for young members with young families.
- On the other hand, would want to ensure that excessive benefits are not payable if a “risk” event happens just before normal retirement age so could use insurance to top-up benefits that can be provided from the fund.
- Consider required level of benefits to be paid, allowing for any legislative restrictions.
- Would need to consider availability and any restrictions on insurance.

Death-in-service

- usual to provide a lump-sum to cover immediate needs,
- e.g. funeral expenses, loan repayments
- often a multiple of salary at date of death
- say, twice salary

Pension for dependants on death in service

- spouse/partner — continuing income to avoid hardship
- possibly children's/orphan's until education/dependency ceases
- usually a multiple of salary at date of death, say 30% for spouse/partner,
- 10% for each child (usually up to a maximum number)

Benefits if in ill-health

- might provide cover to meet medical/hospital costs so that employee can get back to work more quickly
- might want to provide some sort of income continuance arrangement if illness chronic
- usual to provide % of salary (possible with allowance for any invalidity benefits paid by State)

- usually payable after certain period (say, six months)
- to continue until member recovers or retirement age reached
- % of salary say 50% to give some incentive to return to work

Most candidates quoted quite high multiples of salary for both lump sum and spouses' pensions which would have increased the employer's insurance costs unnecessarily too high

Many candidates did not consider legislative restrictions, availability and restrictions on insurance.

Only a few candidates discussed about Medical Expenses and ill-health cover. Of those that did, many did not quote sensible multiples of salary.

Poorer candidates lost marks by discussing only about the purposes of using insurance.

2 (i) Funding Valuation

Usually assumes the scheme will be continuing
Primary purpose is to provide advice about the future level of contributions
There is no single correct way to ensure that a pension scheme will provide the promised benefits

The objectives of the valuation also include:

- Comparing assets & liabilities to assess the degree of security for the benefits
- To review the financial progress of the Scheme since the previous Valuation
- To determine an appropriate investment policy

It is common for the valuation assumptions to be relatively cautious
It is important that the valuation of assets & liabilities are consistent

Discontinuance Valuation

The purpose is to assess how secure the members' accrued benefits would be if the scheme had to be terminated at the valuation date

All active members will be treated as early leavers
with benefits calculated with reference to salary at the valuation date (perhaps with some allowance for increases thereafter)

Benefits could be secured by purchase of insurance policies

Hence there is no real subjectivity in the calculations

Or the scheme could be run as a closed fund
adopting an appropriate investment policy
to minimise the investment risks

(ii) Discounted cashflow funding valuation

Assets are valued by estimating future income (dividends , rents etc) and discounting them to give a present day value

The discount rate used is consistent with the long term expected investment returns from the assets held

This is often derived by considering the real return on equities relative to the long term expected inflation rate and then making a deduction to reflect the other assets held

The liabilities are valued using the same long term rate of interest

As a result:

- the valuation of the assets and liabilities is on a consistent basis as the same long term discount rate is being used
- and market fluctuations in asset values are smoothed

Market Value Approach

The assets are taken at market value

To ensure a consistent approach a “market value” of the liabilities is needed

There are a number of different approaches to determining a suitable discount rate

These include:

- Discounting liabilities at bond yields
- Or allowing for an “equity premium” to take account of potential higher returns from investments such as equities

Why are different methods used at different times

A market value approach makes more sense in the context of a discontinuance valuation

because if the scheme were terminated at the valuation date the actuary would be testing to see if assets held at this point would be sufficient to buy the benefits

Accounting valuations often require assets to be taken at market values hence the overall valuation basis would be market based

The discounted cashflow approach produces a reasonably stable contribution rate over the long term
Whereas the contribution rate produced by looking at market conditions may not reflect the long term cost of the scheme
Hence a market value approach might also use a long term rate to determine the basic contribution to cover benefit accrual in the future
or alternatively it might use a short term rate
Depending on the circumstance of the scheme it might be prudent to set a contribution rate for the short term that is higher than the long term average

Question 2 (i)

Answered well by majority of candidates.

Only a few candidates mentioned that advice on future level of contributions was the primary purpose of the funding valuation. Not many mentioned purpose being to review financial progress since last valuation or to determine an appropriate investment strategy.

Discontinuance Funding was not answered well.

Question 2(ii)

Not answered well by many candidates.

The choice of a suitable discount rate under both methods and its derivation was not discussed particularly well.

The second part was answered poorly. Not many candidates discussed about the possible use of a market value approach to determine both a short term and long term contribution rates.

Not many candidates remarked that the discounted cashflow approach produced a stable long term contribution rate.

Some candidates did not gain marks by discussing at length about different funding methods (ie. Accrued versus prospective methods)

3 (i) Demographic factors

- birth rates
- death rates
- employment rates
- combination of these three affects the ratio of retired population (receiving the benefits) to those in work (that are financing benefits)

- many countries anticipate a demographic “timebomb” where this ratio is increasing significantly
- due to
 - fall in birth rates reducing level of younger working population
 - prior baby booms leading to increased retired population
 - people are living longer and collecting retirement benefits for much longer
 - employment rates — retirement patterns changing

(ii) Give credit for 4 ways maximum of 2 marks each

- Increase age at which benefits can be drawn
 - perhaps from 60 to 65, or higher
 - reduces ratio of retired to working populations
 - means benefits are paid for less time overall
- Reduce the level at which the benefits increase
 - to price inflation rather than earnings increases
 - reduces total amount in payment over time
- Toughen the eligibility requirements / reduce accrual rate
 - e.g. increase the number of years required to qualify for a full pension
 - so less people get the full benefit

- Means testing
 - only pay it to those who need it / with other income below some threshold
 - reduces number of people receiving some or all benefit
 - Encourage private sector funding
 - i.e. “contract-out” future liabilities
 - may need incentives and/or compulsion
- (iii) Other issues that the Government should consider in making changes
- should consider the needs of recipients, the state and employers
 - needs of recipients
 - any reduction will make some people worse off
 - means testing can cause failure to claim entitlements
 - what is the desired net replacement ratio, particularly for lowest paid and those without occupational pensions?
 - needs of the state
 - are the changes socially (and politically) acceptable?
 - will the changes make administration more complex/expensive?
 - macro-economic impact of changes
 - means testing benefits may discourage some existing private sector funding / personal savings
 - deferring retirement might increase other social security costs if people are not in employment
 - needs of employers
 - impact on employers of people staying in work longer because they can't afford to retire until state pension is paid
 - Will the changes encourage or discourage occupational pension provision?

- Need for encouragement (tax breaks, generous contracting-out rebates)?
 - Need for compulsion (require employers to provide benefits at minimum levels)?
- Transition issues
 - Requirement to educate population regarding any changes to manage expectations
 - trade-off between desire to reduce outgo and reasonable expectations of those approaching retirement
 - short-term fiscal impact; in particular, issues around one generation paying twice if switching to funded basis for future pensioners

Question 3(i)

This was answered reasonably well but not many candidates mentioned other demographic factor such as employment patterns or migration rates.

Question 3(ii)

This was also answered well but most candidates failed to mention encouragement of Private Sector Funding.

Question 3(iii)

This was not generally answered well. The majority of candidates did not discuss either the needs of the recipients and of the employers well enough.

4 (i) General issues include:

The liability structure of the scheme by nature and term
and any likely changes in the short & medium term

The scheme's funding position

The size of the fund and whether increasing, static or decreasing

- is the scheme mature and closed to new entrants

- what is the expected cashflow

Liquidity

Marketability and the realisation of assets

The kinds of investments to be held and suitable diversification

The risks relating to the current investment policy and the expected returns

Consider insuring the liabilities

The stance on socially responsible investments

The trustees should regularly review the investment principles and strategy, in particular following any major changes affecting the scheme (e.g. merger of schemes, benefits changes etc.)

Considering any changes in the liability structure of the scheme in the short & medium term

Any changes in the funding position

Legislative guidelines

- (ii) A major consideration is to ensure a consistent approach in valuing the assets and the liabilities in terms of benefit outgo

The following assumptions are required for the valuation of the scheme's assets

i = long term average annual rate of return on new investments

g = the average annual rate of growth in dividends for equities and

p = the long term annual rate of inflation

Equities

Approach 1

The discounted value of an income stream of I increasing at a rate of g discounted at a rate of i can be taken as:

$$I / (i - g) = MV \times D / (i - g)$$

Assuming dividends are due in one years time

Where I = Dividend income, MV = market value &
dividend yield = $D = I/MV$ %

Usually it is assumed that the scheme holdings in equities represent the same cross section of the whole equity market of the appropriate country

OR

Approach 2

Alternatively if dividends are assumed to be payable continuously the formula for the discounted value becomes

$$I / \ln (i - g) = MV \times D / \ln (i - g)$$

For overseas equities the values can be calculated for each market using separate assumptions for dividend growth

An alternative approach is to value the dividend stream for a fixed period and then assume the shares are sold

Property

A similar methodology can be adopted to value the rental income from a property but this can be an extremely complex process.

Assumptions need to be made about future rental growth, rental values, expenses, and capital values.

A more common approach to the problem of valuing property is by transformation into a notional holding of equities

Bonds

The value of redeemable fixed interest stock is straightforward as the amounts of income & redemption proceeds are known

The risk of default by many governments is negligible

If the income of j p.a. is expected for n years with redemption value C after n years then the discounted value

$$ja_{\overline{n}|} + Cv^n$$

For some corporate bonds the above formula would have to be adjusted to allow for the increased risk attached to the receipt of payments either by applying a probability of payment factor or using a higher discount rate

- (iii) Alternatives to direct investment include:

Managed Fund

Assets are pooled and units purchased from a wide choice of specialist investment funds (e.g. equities, property, bonds)

A unit price is declared which fluctuates with the returns on the underlying pooled assets

as such no investment guarantees are given

With Profit Arrangements

Contributions are invested in a with-profit fund comprising a mix of assets often with a high equity based content

There is no choice of investment mix as this is determined by the insurance company

Regular bonuses are declared which are effectively guaranteed once declared

together with a final bonus at maturity (retirement) reflecting capital growth

Deposit administration

Contributions are accumulated with a mixture of guaranteed and bonus rates of interest

The underlying assets mix is usually more conservative than a typical with profit fund

Annuities

Immediate annuities may be purchased to insure a pension benefit in payment.

As such the pension payments are guaranteed and the longevity and investment risk are transferred to the insurance company

Income withdrawal / annuity deferral

Investment income is received from retirement funds deferring the purchase of a guaranteed annuity

The above alternatives to direct investment may be provided by Insurance Companies, banks or other financial institutions

The provider of the investment products may also be able to provide other services to produce a cost effective 'package' and reduce the administrative complexity for the employer & trustees

This is particularly appealing to relatively small / medium sized schemes either by asset size and scheme membership

The product may also provide some forms of insurance for the scheme or its members

Question 4 (i)

This was answered quite well.

Some candidates had very similar answers to both 4(i) and 6(iv). The majority of the candidates did not discuss either the Trustees' responsibilities as regards investment principles and strategy, or the stance on ethical investments or considering the insurance of liabilities.

Question 4(ii)

The answers in respect of property and bond valuations were varied. Complex formulae were put forward in respect of property. Very few candidates mentioned the possibility of a fixed term for equities or of different ways for valuing non-domestic equities, or for valuing different types of bonds (e.g. corporates).

Question 4(iii)

This section was poorly answered.

Most candidates found this part difficult. Quite a few failed to mention "Managed Funds" but rather referred to it by the collective term "pooled investment" funds.

Some candidates mentioned endowment policies, derivatives, shares in property management companies.

Not many candidates explained the With profit and Deposit administration policies well enough to achieve maximum marks nor the additional services that these product providers can give.

- 5 (i) Need to find return (j) such that:

$$10200*(1+j)^6 + 4400*(1+j)^{4.5} + 3*500*(1+j)^{1.5} - 6*200*(1+j)^3 = 17462$$

$j = 3.0\%$ works.

Assume benefit payments relate to "A" only.

Then we can calculate A's and B's assets as:

$$\text{A: } 10200*(1+j)^6 + 3*500*33.3\%*(1+j)^{1.5} - 6*200*(1+j)^3 = 11391k$$

$$\text{B: } 4400*(1+j)^{4.5} + 3*500*66.7\%*(1+j)^{1.5} = 6071k$$

- (ii) Don't have any information about experience gains/losses, so let's start by rolling up at the discount rate of 7% to find the expected liabilities at 1.1.03

$$\text{A: } 9000*(1.07)^6 + 6*500*33.3\%*(1.07)^3 - 6*200*(1.07)^3 = 13262k$$

$$\text{B: } 4400*(1.07)^{4.5} + 4.5*500*66.7\%*(1.07)^{2.25} = 7713k$$

This gives total of 20974k, approximately 8.5% below the total liabilities given

We have no information about how this additional deficit has arisen, so let's add 8.5% to both A and B

$$\text{A: } 13262*1.085 = 14389k$$

$$\text{B: } 7713*1.085 = 8368k$$

So giving deficits as

$$\text{A: } 14389 - 11391 = 2998k$$

$$\text{B: } 8368 - 6071 = 2297k$$

[in practice, round answers to 10ths of millions — get the same results if use annuities to accumulate cashflows]

- (iii)
- Is it valid to assume constant investment return?
 - Actual experience over the period has been volatile for most pension schemes invested largely in equities
 - 3% looks too low a return if the scheme was invested in bonds
 - Likely pattern is high returns early, then low (negative) returns later (given world markets)
 - **This pattern would reduce B's share because its cashflows have occurred later than A's**
 - Can get information from scheme accounts

- Bulk transfer: we have assumed that it was calculated on the valuation basis
- Actually it is likely to have been on a quite different basis
- And then subject to adjustments between calculation and payment
- So there could have been a significant surplus or deficit for B when the transfer took place
- There should be recorded advice on the effect from the scheme actuary, either at the time of transfer or in the 2000 valuation report
- Or it should be possible to find a description of how the TV was calculated and so estimate the liabilities
- Need to verify client's statement that actuarial basis is unchanged
- This could materially affect the starting position for A
- Should be able to get a copy of the 1997 and 2000 valuation reports
- Need to check the apportionment of benefit cashflows
- Likely to be mostly A's because that is the mature section
- Can get information from the annual trustee accounts
- Need to verify the allocation of contributions
- The ratio of payroll A:B may not have been stable
- Information will be in A/B's company accounts
- We have assumed that A and B operated separately
- In practice employees may have transferred, or have worked for both at the same time
- We need HR information to see if this affects the separation
- The value of accruing benefits over the period could be quite significant part of the liabilities now
- It may well be different for A and B if their membership profiles are different
- Want to obtain data on average age for each company, now and in the past — this may not be easy
- Also, is it valid to assume stable cost from year to year? A/B may have been growing/shrinking
- Client should have information about this from payroll/HR records.
- Need to verify timing of all these items — probably not valid to assume took place in the middle of relevant periods,
- nor valid to assume equal amounts in each year.
- Unlikely to have significant effect on the results.
- You need to understand better what caused the additional liabilities
- **Salary experience and retirement/turnover are likely to be major sources of variation — could be quite different for A/B.**
- There should be information about the experience in the 2000 and 2003 valuation reports

- **Also, need to consider events since 1.1.03**
- 2003 accounts drafted? And up-to-date investment reports
- And consider whether the actuarial basis is still appropriate to assess the funding position of the new schemes
- Get full details of the basis from 2003 valuation report (if done)

Question 5(i)

Generally answered well but marks were lost by a few candidates forgetting their compound interest.

Most candidates assumed benefit payments were in the same proportion as payroll rather than justifying all payments to Company A.

Question 5(ii)

This was poorly answered with quite a few not attempting at all.

The more able candidates projected forward just one company's liabilities and assumed the other company's liabilities as the remainder. This, however, gave a disproportionate deficit/surplus between the two companies.

Question 5(iii)

There were some good attempts.

Candidates gained few marks by discussing at length, the choice of actuarial assumptions, different funding methods instead of concentrating on the profile and experience differences between the two companies since 1997.

Few candidates made sensible requests for additional information.

6 (i) Contribution requirements

- Company currently meets the entire cost of scheme
- contributions assessed at actuarial valuations
- cost of scheme cannot be predicted with certainty so actuary makes assumptions
- if experience not in line with assumptions, future contributions will need to be adjusted to correct imbalance
- some flexibility over when contributions paid
- but there may be legislative restrictions on this
- deficit will lead to higher contributions

- surplus may lead to benefit improvements
- hence putting up cost of providing original promise
- could introduce member contributions
- but HR issues
- but this would increase volatility of Employer's contributions
- or members could meet say one-third of cost.

(ii) **Benefits**

- final salary so in theory company could award lower salary increases to contain costs
- but this may be uncompetitive
- could change approach to revalued career average
- with revaluation at a predetermined rate (e.g. price inflation or fixed % per annum or zero)
- or discretionary revaluation depending upon availability of funds
- could change accrual rate
- or provide lower rate of pension increases on the pension once in payment
- or lower level of contingent benefits
- again, need to consider competitive position
- one way of reducing costs is to attempt to control use of discretionary powers, e.g. access to valuable early retirements benefits augmentations, partner pensions, discretionary pension increases

- may be impossible if not at discretion of Employer
- Different or lower sale for future recruits

(iii) Insurance

- can be used to reduce or remove some of the risks associated with providing the scheme benefits
- common for small schemes to insure lump sum death-in-service benefits as cash flow required immediately
- reduces variability of cost of providing lump-sum benefit
- and benefit likely to exceed reserve held in the scheme at date of death
- insure either total lump-sum, or
- insure total payments in excess of predetermined benefit.
- might want to consider insuring spouses death-in-service benefits (or approximate lump sum to be used to meet cost of providing this benefit).
- Would want to see how value of spouse's benefit compares to reserve held
- although not such an issue if financial strain here as spouse's pension payable over a period so shortfall can be met over period.
- Could purchase matching non-profit annuities when members retire
- can be difficult if practice of granting discretionary increases
- but passes mortality and investment risk to annuity provider.
- Insurance company will load for expenses, profits and contingencies so likely to be more expensive in the longer run.
- Profit sharing agreements can be negotiated for death-in-service cover (particularly lump sum)
- but still might expect premium to exceed actual cost of providing benefit through scheme
- and some (hopefully small) risk that insurer will be unable to meet claim.

(iv) Investments

- Strategy may be at discretion of other parties, e.g. trustees
- Major risk is that assets will be at depressed values when need to be realised to meet benefit payments.
- or cannot be realised as illiquid
- poor investment performance:
 - relative to other managers
 - relative to movement in liabilities over time.
- Cash flow timings / some uncertainty
- Legislation changes
 - e.g. tax
 - restrictions on certain holdings
- bonds probably match liabilities but lower return so expected to increase the cost of providing the pensions package.
- Whoever sets the strategy will wish to maximise returns subject to an acceptable level of risk.
- The attitude of the employer will need to be taken into account, in particular the ability and willingness to inject additional contributions when necessary.
- The liability profile of the scheme, i.e. the nature and term of the liabilities should be considered.
- May be possible to reduce risk by “matching” assets and liabilities.
- High yielding assets may be attractive (the degree depending upon the cash flow requirements of the scheme).
- The current funding position should be considered
- If a surplus, a less conservative policy can be pursued as there is some cushion to offset poor experience.
- If the funding position is weak, a more prudent strategy would be more appropriate.
- In practice, funding position is dependant on the strength of the chosen valuation basis.

- Diversification will reduce risk:
 - overseas equities
 - property
- are there any restrictions, consider their impact:
 - legal
 - ethical
- a more informed assessment would require an asset liability study to be undertaken
- this will highlight the levels of risk being undertaken; or
- could consider risk of alternative strategies

Question 6(i)

This was poorly answered and many candidates lost marks by discussing at length prospective versus accrued funding methods. The better candidates mentioned introducing member contributions (fixed and/or shared cost)

Question 6(ii)

This was very poorly attempted with most candidates losing marks by restricting their answers to reducing only the lump sum and spouses' death benefits.

Not many candidates considered either reducing the accrual rate or fixing salary increases or introducing a career average scale.

Question 6(iii)

This part was better attempted.

A few candidates however mentioned insurance/reinsurance arrangements usually associated with General Insurance.

The better candidates mentioned the liquidity risk in having a policy of buying out annuities in the open market.

Question 6(iv)

This part was poorly answered in general. Not many candidates mentioned that investment strategy may be at the discretion of the Trustees or that poor performance should be measured relative to other investment managers / movements in liabilities over time.

A few candidates repeated their answers of 4(i). Very few candidates outlined the use and advantages of an asset/liability exercise.