

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2013 examinations

Subject SA4 – Pensions and other Benefits Specialist Applications

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

D C Bowie
Chairman of the Board of Examiners

July 2013

General comments on Subject SA4

This subject examines the ability of candidates to apply actuarial practice and concepts, together with specific knowledge of the UK pensions and employee benefit environment to potentially complex problems, integrating their analysis into a coherent whole, and evaluating and interpreting results to draw explicit conclusions.

The examiners therefore look for candidates to demonstrate their understanding of the syllabus by applying their knowledge and core actuarial skills to the specific situation that the examiners asked, having read the question carefully. Many of the unsuccessful candidates produce overly generalised answers relating to the subject matter of the question, reproduce non-specific core reading that does not directly relate to the question context, or focus on one aspect of the issue at length without covering the whole range of the question. This does not enable the candidates to achieve the required marks. The examiners encourage future candidates to remind themselves of what they learned in the Core Actuarial subjects, and to use past paper questions to practice applying these skills to the specific scenarios tested.

Good candidates demonstrate that they have structured their solutions well – this is a big advantage in making points clearly and without repetition. This also enables candidates to use the latter parts of questions to generate ideas for answers to the early parts (or use their solutions to earlier parts of questions to create a structure for latter parts). Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.

Comments on the April 2013 paper

The overall standard of scripts was lower than expected, and this was reflected in a lower pass rate. Candidates did appear to find both questions relatively difficult, seeming to find the application aspects of the course harder to score well on. This is an area that SA candidates consistently need to work harder on in preparation.

1 (i) ***Key Assumptions***

- Discount rate – an assumed annual rate set with regard to the return expected to be achieved from the plan assets.
- Or based on the benchmark assets
- Is often different for pre- and post-retirement
- It is applied to the cashflows expected to be generated in relation to the scheme.
- And converts those cashflows in to a capital value.
- It is a critical assumption for all valuations as it affects the value of all liabilities.
- Mortality in retirement – the annual rate at which members and their spouses die once in retirement.
- It is used to determine for how long the pension is anticipated to be paid.
- And is generally constructed with regard to current rates of mortality, and how these are expected to change in the future.
- It is a critical assumption for all valuations as it affects the value of all current and future pensioners.
- Consumer price inflation
- the rate at which pensions increase on an annual basis once in payment.
- and the rate at which pensions are likely to revalue in deferment
- will be a key assumption as all benefits linked to it.

“Less key” assumptions

- Pensionable pay inflation – the rate at which pensionable pay increases on an annual basis as a result of general inflation independent of individual performance or progression used to help in the determination of final pensionable pay at retirement or earlier leaving service.
- Mortality in service – if the plan does not provide death in service benefits and as such this assumption is only relevant to the extent that it influences the number of people who retire or withdraw from the scheme.
- Withdrawal rate – the annual rate at which members are anticipated to leave the scheme prior to retirement with an entitlement to a leaving

service benefits i.e. a deferred pension which the scheme must provide as a result of overriding preservation legislation.

- Rate of retirement in good health – the annual rate at which members are anticipated to retire from the scheme at age 65 with an entitlement to a scheme pension. Note there is no provision for early retirement pensions under this arrangement.
- Rate of retirement in ill health – note that an assumption is not required since there is no provision for ill-health retirement benefits under the rules of the scheme.
- Assets will probably be taken at market value for best estimate basis
- Options such as TV, commutation can be important to the extent that they are not cost neutral.

It is important for candidates to read the question well, concentrating on key assumptions and giving the required explanation.

(ii)

- Important to note that it is the net interest rates that affect the liabilities rather than the absolute levels of the assumptions.
- The discount rate could be determined using the distribution of the actual investment portfolio or the scheme's strategic benchmark (if the current asset allocation is not representative of the scheme's usual investment strategy).
- For schemes which are closed to new members, it is not uncommon for two discount rates to be chosen. One is applied to pensions in payment (and future pensions once they start to be paid) and the other is applied to the period prior to retirement. This approach is used as a proxy to reflect how the investments of the scheme might move as the scheme continues to mature.
- For asset backed discount rates, it is necessary to consider the expected return to be generated from the actual assets in which the scheme invests (and expects to invest in the future).
- Under the bond yield plus risk premium approach, risk free bond returns of appropriate duration are established using mark to market techniques
- and then adjusted to take account of additional returns anticipated from other asset classes.
- Note that application of an unadjusted mark to market methodology will not produce a best estimate discount rate if "growth assets" e.g. equities are held which are expected to provide higher returns in the long term.

- Pensionable pay inflation is generally derived by considering market based price inflation
- and adding a margin to reflect relative improvements in standards of living.
- Taking account of the views of the sponsor.
- Indices are available which show the historic margin, but the actual rate to be used will also depend on the actual industry, the economic outlook and the views of the management of XYZ plc.
- together with current published pay scales.
- Consumer price inflation – there is no current market in CPI related investment products
- as such a CPI inflation rate is usually determined by adjusting RPI rates.
- RPI can be measured by considering the Bank of England inflation curve
- or by comparing the yield curves of conventional and index linked gilts.
- The gap between CPI and RPI can be assessed by noting the different mathematical construction and constituent make up of the relevant indices.
- Although supply and demand affects the gap
- The Bank of England target rate could be taken account of
- Mortality in service and in retirement – use scheme experience to determine the base table
- possibly in conjunction with a postcode mortality assessment.
- In relation to mortality improvements, there is no recognised standard approach in the industry
- source material is available from various tables published by the Continuous Mortality Investigation.
- Note that generally, a minimum improvement floor/convergence to long term rate is applied to these tables.
- Alternatively use scheme experience to adjust standards tables. This may be particularly appropriate with regard to pre-retirement mortality where the frequency of the event is lower and therefore less data will be available

- Retirement rate at age 65 – this is a “survivor rate” which can be determined from other tables by considering which members are not assumed to withdraw or die before retirement.
- Withdrawal – scheme experience can be used to determine a withdrawal decrement. This is likely to vary by various characteristics e.g. age and sex.

Those who answered well were dependent upon firstly upon having identified the key assumptions in (i), then critically going through them in careful sequence giving a sufficiently complete “description”. This is a good example again of reading the specific instruction or requirement of the question.

(iii)

- The main objectives have been outlined but any secondary objectives given that the first is met and the investment strategies that are to be considered should be determined.
- A stochastic approach may help in assessing the risks and rewards and in achieving an appropriate balance between them. For example when determining the optimal funding strategies.
- An asset liability model uses a stochastic model for the economic cashflow elements, in combination with a model for the demographic elements that is usually deterministic or scenario-based in nature.
- In order to calculate a probability that a particular funding measure will be achieved it is necessary to have a model which sets out, for each assumption, (a) a potential outcome and (b) the probability that this outcome will arise.
- And to apply this approach to experience over the inter-valuation period.
- And also to the potential change in best estimate assumptions at the end of the inter-valuation period.
- It would be appropriate to consider assets and liabilities separately for this purpose.
- So for example, a simple model for a discount rate which is established on a bond yield plus risk premium approach might be to assign a probability of 25% that the risk premium will be 1% p.a., 50% that it will be 2% p.a. and 25% that it will be 3% p.a., and to use this alongside a bond return model to determine potential changes in asset values over the inter-valuation period.
- A stochastic model may be used for the economic elements and a deterministic model for the demographic elements.

- Any suitable stochastic investment model will require a large number of input parameters covering the expected returns and standard deviations of return on each asset class, the degree of correlation (for example equity returns and price inflation), etc.
- Consistency between the investment model and the discount rate and other financial assumptions should be considered.
- In practice, the actual model to be adopted is likely to be continuous rather than a probability being applied to discrete points.
- The key characteristic of any such probabilistic model is the degree of volatility around the central assumption.
- In principle the same approach can be taken for all of the assumptions being made by the actuary.
- However, this is more difficult for demographic assumptions since the probability distribution needs to be applied to the assumption being made for the contingent event to happen at each age.
- And there is often little empirical evidence to support specific models in such cases.
- Particularly in relation to the allowance to be made for future mortality improvements or the promotional salary scale.
- Given that the particular parameters chosen will not be borne out in practice, it is important to test the funding strategy for robustness under alternative assumptions.

This was a good question for identifying those with a deeper knowledge and understanding – the need to discuss clearly identified those with that depth of understanding. A further list of ideas is not sufficient to score the required marks.

(iv)

- The main objective of this approach to setting technical provisions would be to give a very high probability that the scheme has sufficient assets to cover the best estimate cost of the liabilities at any particular point in time.
- As a result, a reserve above the actual best estimate cost will be established to make an appropriate allowance for potential adverse experience in the intervalation period.
- The size of this reserve will be dependent on a number of factors including the assumptions underlying the probability model used for the calculations, and the demographic profile of the scheme membership.
- If a risky investment policy is followed a larger reserve will be held.

- The larger the reserve it could be considered the more secure the liabilities.
- This is only effective in achieving this measure of security in so far as assets are held to meet this funding requirement. If the scheme is underfunded the liabilities are less secure.
- If we ignore the covenant provided by the employer, the best measure of security for the accrued benefits of the membership is the buy-out cost of transferring the liabilities to an insurance company.
- Under this measure of setting technical provisions, there is no direct relationship between the valuation reserve (i.e. the technical provisions) and the buyout cost.
- However, under current pricing conditions, there is a very significant difference between the best estimate value of liabilities and the buy-out cost.
- And as a result it would be expected that the technical provisions in this case are less than the buy-out cost.
- This method does therefore mean that there is continued reliance on the covenant of the employer in order for the accrued benefits to be fully secure.
- Another approach to assessing security is to look at the likelihood that the benefits can be met as they fall due with no future contributions being made by the employer.
- In theory, if technical provisions are set on a best estimate basis (with no reserve for adverse experience) then the valuation reserve should be sufficient to ensure that the liabilities are covered on this basis at least 50% of the time.
- And since the reserve for future salary increases would be released, the percentage is higher than 50%.
- And with the reserve for adverse experience, it will be higher again (although it is unlikely to reach 100%).
- As a result, under this scenario, technical provisions constructed in this way, do offer quite a high level of security.
- But in practice, trustees are only likely to operate the scheme on an ongoing basis if the employer is there to pick up the deficit if it turns out that the scheme does not have enough money.

- And if the employer is insolvent, they are far more likely to turn to the insurance markets and try to secure a reduced level of benefits with the money that is available.
- Or to apply for the scheme to enter the Pensions Protection Fund if there is not enough money to secure PPF benefits in the insurance market.

Similar comments to (iv) apply.

(v)

- The trustees must meet legislative requirements which require assets to be held, in particular, the Statutory Funding Objective under the Pensions Act 2004 requires an ongoing scheme to have appropriate and adequate assets to meet their technical provisions.
- An estimate of the solvency of the scheme is also required under the SFO.
- The technical provisions are the actuary's assessment, on scheme-specific funding assumptions determined by the trustees, of the amount required to meet the scheme's liabilities as they fall due.
- The trustees must consult with the employer and the regime is designed to encourage agreement between trustees and sponsors on the assumptions underlying the technical provisions.
- The assumptions should be prudent, with, if applicable, an appropriate margin for adverse deviation.
- The Trust Deed and Rules may also impose requirements and restrictions on the trustees and employer.
- The trustees will want to consider TPR's funding guidance and TPR may take action if it considers funding targets to be insufficient.
- The theory underlying the assertion made by the employer is that the employer is more than capable of meeting all of the liabilities of the scheme even if there are no assets in the scheme.
- And if "surplus" is measured as the difference in (a) the value of the contributions that the employer could pay if necessary less (b) the value of the liabilities, then it could be argued that the scheme may be in "surplus".
- Although the relationship between market capitalisation and buy-out deficit is a "red herring".
- Since the assertion relates to the whole of the liabilities, rather than the deficit.

- And market capitalisation is not the same thing as “ability to pay”. It doesn’t indicate the liquidity of the company’s assets, or their annual profits.
- Note also that the value of the liabilities for this purpose could be the buy-out cost – but this would only be relevant if the employer was actually proposing that all benefits be secured with an insurance company.
- Or the value of the liabilities could be assessed as the long term cost, perhaps with a margin for prudence.
- Note though that unless a buy-out transaction is imminent, there can be no certainty that the employer will be able to meet the long term cost at all points in the future.
- Unless the employer enjoys a Crown guarantee.
- And a probability distribution of the employer’s ability to pay at different points in the future would therefore be required in order to make assessment of “surplus” on this basis meaningful.
- Determining such a probability distribution is in reality an almost impossible task and rarely attempted in practice.
- Since the future prospects of an employer are dependent on so many variables many of which are difficult to model even in isolation.
- And there is a relationship between some of the variables impacting the future prosperity of the employer and the financial position of the pension scheme (e.g. gilt rates, price inflation etc.).
- All that being said, it is generally accepted practice (supported by the Pensions Regulator) that in a relative sense a strong employer covenant is a reasonable justification for setting technical provisions making less prudent assumptions than for a weak employer covenant.
- And standard metrics for the employer covenant assessment are starting to emerge.
- However, there is no accepted methodology which determines the precise relationship between the strength of the employer covenant and the prudence of technical provisions.
- And practice varies widely.
- One approach is to seek to benchmark against other employers/schemes in a similar position.
- And ensure that the chosen relationship is not out of line.

- Although the driving motivation is probably to minimise reputational and compliance risks.
- Either from the employer (if the technical provisions are higher than accepted standards e.g. towards buy-out/self sufficiency costs).
- Or the Pensions Regulator/members (if the technical provisions are very weak).
- TPR has suggested a formula for monitoring the value of the sponsor covenant from time to time. This compares the value of the liabilities on some form of self-sufficiency or discontinuance basis with the liabilities measured on the technical provisions basis.

There were lots of opportunities to score marks on this question, but the less successful candidates were unable to offer sufficient breadth to their answers, tending to go into too much depth on a smaller number of points with some repetition.

2 (i)

- The relationship between the company and the trustees.
- The principal assumptions used to measure scheme liabilities.
- The sensitivity of the principal assumptions used to measure the scheme liabilities.
- How the liabilities arising from defined benefits schemes are measured.
- The future funding obligations in relation to the defined benefits scheme.
- The nature and extent of the risks arising from financial instruments held by the defined benefit scheme.

This was relatively straightforward bookwork answered well by successful candidates.

- (ii) Settlement – An irrevocable action that relieves the employer (or the defined benefit scheme) of the primary responsibility for a pension obligation and eliminates significant risks relating to the obligation and the assets used to effect the settlement.

Curtailment – An event that reduces the expected years of future service of present employees, or reduces for a number of employees the accrual of defined benefits for some or all of their future service.

Past Service Cost – the capital value of benefit improvements granted during the year (excluding benefits that do not vest immediately or which are financed partly out of surplus treated as not recoverable by the employer). This cost can be negative.

Again well answered by successful candidates.

(iii) Why figures are different

- Surplus of £1m compared to deficit of £16m.
- Funding assumptions are set prudently
- will include margins
- they are set by Trustees
- taking into account strength of employer's covenant.
- Trustees may have different attitude to risk than employer
- discount rates based on assets held in respect of liabilities
- or on the benchmark assets
- Funding method must be AAM or accrued benefits method

- FRS17 assumptions generally "best estimate"
- set by directors of company
- and agreed by auditors
- discount rate set in relation to corporate bonds of suitable term
- irrespective of actual assets held
- valuation method has to be Projected Unit
- assets are taken at fair value (bid value if quoted)
- other different assumptions could have been used

- Inflation
- Salary
- Mortality
- Withdrawal/retirement
- Cash commutation

- Valuation could be at different dates
- so assumptions and assets will have changed.
- FRS17 valuation can be approximate roll forward.
- There could have been significant membership movements between two dates
- Could have different treatment of expenses.
- A significant change could have happened between the two dates

Recovery Plan stopping

- If a valuation reveals that the scheme does not have sufficient assets to cover its technical provisions, the trustees are required, having regard to the advice of the Scheme Actuary and after consulting with the employer, to prepare a Recovery Plan to restore the scheme to 100% funding.

- The assumptions used for the Recovery Plan are not required to be prudent and TPR is accepting the use of more realistic assumptions.

- Recovery Plan reviewed at next valuation
- or sooner if trustees feel necessary

- expect fluctuation between triennial valuations
- £1m surplus is small compared to size of scheme
- So could disappear quickly
- Does expansion of business mean that company is strong?
- In order to determine the recovery period, trustees should take into account the employer's covenant.
- Covenant is ability and willingness to pay (*this is from Core Reading, a more up to date definition is also acceptable*)
- Does this mean the covenant is stronger as the company is expanding?
- or weaker as ability/willingness to pay could decrease
- will expanding the business mean the company can provide more support to the scheme in the long term
- accounting figures expected to be different
- no reason for changing recovery payments
- The trustees may also consider the solvency position if they believe the covenant has weakened.

This is a question where here were several opportunities to score marks. Less successful candidates tended to give incomplete answers, often tending to go into too much depth on too small a number of points.

(iv)

- Ongoing – to check if Statutory Funding Objective is met
- Required by legislation under the Pensions Act 2004
- The responsibility is primarily the trustees but they must consult with the employer
- Requires the use of prudence
- basis used to set ongoing contributions
- and recovery plan if shortfall
- Solvency – shows expected cost if scheme were to wind up
- An estimate of the solvency of the scheme is required under the SFO legislation.
- and secure benefits with insurance company
- often long term target for trustees
- also used for debt on employer if employer insolvent
- or on cessation of participating employer

- The calculation of the transfer value is covered by legislation which requires that, except in special circumstances, the transfer value is no less than the actuarial value of the deferred pension given up.
- shows coverage for total of members' CETVS
- if less than 100% funded trustees can reduce TVs
- by maximum shown in report
- options not allowed for if worth less
- Transfer values may include an allowance for discretionary post-retirement pension increases, depending on their likelihood.
- PPF – carried out on prescribed basis
- Under Section 179 of Pensions Act 2004, a section 179 valuation is required to determine the scheme's PPF levy
- based on PPF benefits not scheme benefits
- Neutral – The Pensions TAS requires that as part of the funding valuation the Scheme Actuary is to provide the trustees with a “neutral estimate” of the scheme's liabilities
- used to show level of prudence in ongoing valuation
- basis with elements of prudence removed
- neither optimistic or pessimistic
- FRS17 – to show pension obligations in company accounts by ensuring that
- company pension assets and liabilities are measured at “fair value”
- and financing and other cost recognised in appropriate period
- and there is proper disclosure. Ensures consistency between companies in reporting pension costs.

Differences between FRS, TV and neutral

- neutral basis is set by actuary
- TV basis set by trustees after advice from actuary
- FRS basis by directors of company after advice from actuary
- TV and neutral should be similar
- but TV will not allow for options if less valuable
- TV basis may include expenses
- TV basis assumes that all members have left service
- So no salary assumption,
- FRS basis will have discount rates based on corporate bonds
- FRS could be at different date
- And could be approximate roll forward
- FRS may not include pensioners secured by annuities
- Funding methods used; PUM for FRS17 but accrued benefit/AAM for neutral estimate

- Discount rate approach; single rate for FRS17 and usually more than one rate for others – so impact depends on characteristics of the scheme
- allowance for discretionary practices.

Relatively well answered by most of the better candidates, but for a relatively straightforward question was not clearly described by many.

(v)

- Costs are calculated as at date of occurrence
- Assume assumptions have stayed same during year
- no membership movements
- 30 June – curtailment as actives become deferred
- assume 15 years until retirement on average
- cost of accrual = service cost (20%) plus members' conts (5%) = 25%
- Est. liability before change – $94\text{m} \times 1.050.5 + 0.5 \times 25\% \text{ £}20\text{m} \times 1.050.25 = 98.9\text{m}$
- after change – $98.9\text{m} \times (1.03/1.04)^{15} = \text{£}85.6\text{m}$
- Negative curtailment cost of $98.9\text{m} - 85.6\text{m} = 13.3\text{m}$
- 30 June 2012 – past service cost due to extra service granted
- Initial cost is $25\% \times \text{£}20\text{m} = \text{£}5\text{m}$
- However, no longer linked to final salary
- Actual cost is therefore $\text{£}5\text{m} \times (1.03/1.04)^{15} = \text{£}4.3\text{m}$
- 30 September 2012 – Settlement cost
- Estimated position as at 30 September 2012
- Actives – $(\text{£}85.6\text{m} + \text{£}4.3\text{m}) \times 1.050.25 = \text{£}91.0\text{m}$
- Deferreds – $\text{£}65\text{m} \times 1.050.75 = \text{£}67.4\text{m}$
- Pensioners – $\text{£}89\text{m} \times 1.050.75 - \text{£}4.5\text{m} \times 1.050.375 = \text{£}87.7\text{m}$ (estimate pensioner payroll of $\text{£}4.5\text{m}$ say)
- Total liabilities $\text{£}246.1\text{m}$
- Buy-out cost $\text{£}300\text{m}$
- Settlement cost – $\text{£}53.9\text{m}$

Some students may have accounted for the changes in a different order so will get slightly different figures. It is also possible that some will assume that the salary link was not broken until 30 September 2012 and this should also be given credit.

Generally quite poorly answered. Candidates tended to score quite well, or quite badly – not much between. This is often the case with numerical questions, and a methodical approach often pays dividends.

(vi)	Assets	£0m
	Liabilities	£15m
	Deficit	£15m

This balance sheet assumes that the employer did not pay the £300m into the scheme so this should be given credit.

Timing of the payment has not been allowed for so a discounted value of the £15m is also correct, as would be an allowance for any interest that may be charged by the insurer

Expenses can also be allowed for.

Not well answered except by those who did well on the previous question.

- (vii)
- Listed companies need to disclose under IAS19
 - Similar to FRS17 except treatment of gains/losses can be different as there are two choices:
 - (a) Full recognition in the Statement of Recognised Income and Expense (akin to STRGL under FRS17), or
 - (b) Gradual recognition in the pension cost (P&L) of only gains/losses that exceed 10% “corridor”, where
 - Corridor is max(Benefit Obligation, fair value of assets)
 - and spreading is over employee’s future working lifetime
 - From 2013 there will be immediate recognition
 - Discount rate based on high quality corporate bonds as opposed to AA under FRS17
 - Expected return on assets component of P&L based on discount rate under IAS19 (for periods after 1.1.13)
 - A figure higher than discount rate can be used under FRS17.
 - In the next few years, the ASB is proposing to withdraw FRS17 and defer substantially to the international accounting standards and therefore a move to IAS19 is likely in any event.
 - The setting of the assumptions to be used is the responsibility of the directors in both cases. However, under FRS17 the advice of an actuary should be taken, whereas under IAS19 the involvement of a qualified actuary is encouraged but not required.

Well answered by those who had an understanding of the different accounting requirements, otherwise very poorly addressed.

END OF EXAMINERS' REPORT