

EXAMINERS' REPORT

November 2011 examinations

Subject F104 — Pension and Other Benefits Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

- i.) Form of the benefit
 - a. Lump sum
 - b. Monthly income
 - c. Combination of both
- ii.) Nature of benefit – flat or related to earnings or inflation?
- iii.) If monthly income, level or increasing?
- iv.) Payable to spouse and children or just to spouse? Other beneficiaries?
- v.) Decide on level of benefit to provide
- vi.) Will all staff be covered? Any restrictions on who will be eligible for the benefit.
- vii.) Same benefits for all? Eg. Single male versus married male with young children?
- viii.) Will staff be given a choice as to the level of death benefits they have?
 - a. If choice – strategies to manage risk of anti-selection
- ix.) Integration of this benefit into other existing benefits
 - a. Post-retirement death benefit
 - b. Individual provision
 - c. State benefit
- x.) Payment for the benefit
 - a. Who will be paying for the benefit?
 - b. How will it be funded?
- xi.) Risk management
 - a. Will this benefit be self-insured, or will insurance be taken out?
 - b. Is insurance affordable?
 - c. Is insurance available – restriction on benefits placed by insurers?
- xii.) Decision on whether all causes of death would be covered, or if exclusions will be imposed
- xiii.) Offer benefit through the retirement fund or directly?
- xiv.) Tax implications – benefits taxable? Contributions tax-deductible?
- xv.) Consider legislated restrictions or requirements

Candidates who did not do well on this question did not limit their comments to those which apply to benefit design only. The question was well answered in general.

QUESTION 2

i)

Trust deed and rules:

- Is such a transfer allowed in terms of the Rules of the Dube Inc. Pension Fund?
- Any changes to be made to the trust deed or rules to facilitate the transfer

With respect to actual transfer:

- Comparison of the benefit structures of the two funds
- decisions as to how to 'equalise' benefits'
 - retirement benefits
 - other benefits, eg death or disability
- Contribution levels in the Legalsure fund
 - What happens if members are required to contribute more
- The Legalsure basis is weaker than the Dube Inc basis. Therefore need to consider:
 - Security of benefits in the Legalsure fund – funding position
 - Long-term guarantees for members of Dube Inc?
 - What will happen to any surplus in existence in the Legalsure fund?
 - The surplus in the Dube Inc fund will increase – what will happen to it?
 - Effect on members' benefit expectations
 - Effect on pension increases – pension increase assumption is lower in Legalsure
 - Investment strategy of Legalsure fund – possible impact on security and level of benefits

Sponsor covenant:

- What is the ability and willingness of the Legalsure Pension Fund's sponsor to be a strong sponsor?
- Assessment of risk management strategies if the sponsor covenant is assessed to be weak.

Regulation

- Compliance to any legal requirements arising out of the transfer

Assets

- Consideration should be given to process of transferring assets
 - Possibly convert to cash and pay to Legalsure
 - a. Liquidity considerations
 - b. Considerations as to the timing of any disinvestments
 - Possibly transfer ownership of existing investment holdings
 - a. Investigate viability and approvals

b. Valuation of asset holdings – e.g. value of direct property holdings may need to be agreed upon

$$\text{ii) Active member liabilities} = 62\,000\,000 * \left(\frac{1.1}{1.11}\right)^{25} * \left(\frac{14}{16.541}\right) = \text{R } 41\,850\,497.28$$

$$\text{Pensioner liability} = 15\,000\,000 * \left(\frac{(1.1)(1.05)}{(1.11)(1.065)}\right)^6 = \text{R } 13\,048\,111.07$$

$$\text{New surplus} = 85\,900\,000 - 41\,850\,497.28 - 13\,048\,497.28 = \text{R}31\,001\,391.64$$

(Rounded solutions would also have gained the marks, given that it is an approximation)

$$\text{iii) } \frac{250\,000}{54898608.36} * 31\,001\,391.64 = 141\,175.67$$

iv)

- Members will need to be told about the possible change, and how it may affect them, including possible changes to:
 - o Details of benefit entitlements
 - o Contribution obligations
 - o Expense charges
 - o Investment strategy
 - o Risks involved
 - o Treatment of entitlement in event of insolvency
 - o Any options available to members
- The regulator will need to be told about the possible change.
 - o May need to approve the transfer of members
 - o May need to demonstrate fair treatment of members in the transfer
- Disclosure to owners of capital
 - o Need to disclose how the proposed transfer may affect the accounting disclosures and hence the effect on the balance sheet of the transfer

v)

- Continuation of the Dube Inc Pension Fund without further accrual of benefits
- Transfer the benefits to the beneficiary – i.e. pay them their accrued rights
- Transfer the funds to an insurer – to invest and provide the benefits
- Transfer the liabilities to an insurer to guarantee the benefits

In general, candidates performed well on this question. For part i), candidates struggled to generate sufficient points to get all the marks, and a number did not consider the issues from the perspective of the Dube Inc. Pension Fund trustees. Part ii) was not well answered

QUESTION 3

i)

Asset-based discount rate

- Assets are taken at market value
- Implied discount rate determined per asset class
- Eg – for equities estimate the discount rate implied by market value and expect dividend and sales proceeds or fixed interest securities – use gross redemption yield
- Discount rate is calculated as a weighted-average of each asset class rates – with weights being the proportion per asset class.
- This rate used to value liabilities
- Could use a notional portfolio that matches liabilities

Replicating portfolio

- Involves taking the market (fair) value of the liabilities as the market value of a portfolio of assets which most closely replicates the liabilities by duration and risk characteristics.
- Two methods:
 - o Mark to Market
 - Assets taken at market value
 - Implicit assumption that a set of bonds can be found that replicates the expected cashflows from each type of benefit
 - A yield curve is derived for each set of bonds
 - Liabilities are discounted using the yield curve
 - o Bond Yields plus risk premium
 - Assets taken at market value
 - For liabilities, the discount rates are based on bond yields as with mark to market, but then increased to take account of actual returns expected on other asset classes
 - The increase in the discount rate is called the equity risk premium

ii)

- Assets would now be valued at market value, which could be higher or lower than the value using discounted cashflow methods
- The liabilities would be value based on the yield available on bonds at the date of the valuation, with the addition of an equity risk premium.
- Equity risk premium would be expected to have small effect on total yield used to discount liabilities, given small equity holding
- Method will closely resemble mark the market
- Therefore expect yield on this basis will be lower than the long-term rate of return used in previous valuation, as actuaries have traditionally used a long-term rate of

return higher than that available on bonds

- The value of liabilities would be expected to increase to the extent that the discount rate now used is lower than that used previously
- Overall, expect results under bonds plus equity risk premium for this fund to result in a lower funding level, but this would depend on the change in the asset value
- Expect a higher SCR than under the discounted cash-flow method
-

This question was poorly answered, given that it was predominantly a bookwork question. Part (ii) was not well answered with many candidates ignoring the fact that the fund had an equity holding.

QUESTION 4

i)

Detailed rules and meeting notes relating to benefits and contributions
Communication to beneficiaries to summarise their benefits and the approach taken to finance those benefits
Details of past discretionary practices
Details of previous actuarial advice,
a. including factors that are currently used for benefit options
b. Previous asset values
c. Factors and data used in providing the advice
Views on future discretionary practices
Possible future changes to benefit entitlements
Future investment strategy
Planned levels of general and promotional salary increases
Any events that may affect the sponsor's ability to fund the benefits
Any events that may affect the employment and earnings prospects for members
Possible changes in legislation and how the fund is likely to react to these.
Previous valuation data, including:
a) Benefit payments
b) Exits and new entrant details
c) Previous static data

ii) Can't do reconciliation of the total number of members and changes in membership – using previous data and accounts
Can't do checks for existence of new members – which, if there are none, could indicate an error in the data
It would not be possible to do a comparison of current average benefit levels, (or current average levels of various components of the benefit calculation – eg salaries, past service), with the averages from previous data and accounts

Would not be able to check, for the inter-valuation period, the contribution levels and the amounts of benefit payments shown in the membership data with those shown in the accounts.

For the inter-valuation period, would not be able to check that the amount of investment income shown in the asset data corresponds to that shown in the accounts.

Would not be able to check that benefits paid during the inter-valuation period fell between any minimum or maximum benefit levels.

Part (i) was well answered. A number of candidates answered part (ii) incorrectly. They stated the data checks that could be done, instead of stating how the checks the actuary would like to do would be compromised. Also, the question was specific to data validation checks, and a number of candidates extended this to other checks – e.g. experience investigations, analysis of surplus, mortality investigations etc., which were not asked.

QUESTION 5

- i) Assuming that 70th birthdays are distributed uniformly over the calendar year, and assuming that q_{70} varies linearly over the year.

Number of lives aged 70 last birthday in mid-2011 = $0.0126 * 732\ 000 = 722\ 776.8$

x	Number of male pensioners aged x last birthday - mid-2010	q_x	$q_{x+\frac{1}{2}}$	$p_{x+\frac{1}{2}}$	Number of male pensioners aged x last birthday - mid-2011
70		0.0252			722 776.8
71	753 700	0.0282	0.0267	0.9733	733 965.5
72	785 300	0.0316	0.0299	0.9701	731 164.4
73	724 000	0.0354	0.0335	0.9665	758 992.5
74	795 000	0.0390	0.0372	0.9628	697 067.2
	Total				3 643 966.4

ii.a.) In favour:

- It will increase the levels of savings in the country as members of the population will be required to contribute towards their own retirement. This will occur at least in the short term, while the fund is building up.

- The country's capital markets will benefit from the state's saving as investments will develop to meet the investment need created.
- This additional capital investment may stimulate economic growth.
- Investment returns earned on the investments will reduce the long-term cost of the benefits
- As the fund builds up, it will potentially allow smoothing of contributions may ease the pressure of the ageing population.

Against:

- Economic benefit will not be derived if the savings are not used to create real investment. For example, investing in existing shares does not create real capital investment.
- The ultimate cost of the benefits is going to increase, given the ageing population, and a funded approach does not solve this.
- The transition arrangements may be problematic. In this context, it would need to be decided how to introduce the additional contributions to build up the fund. Building up the fund would require current contributors to pay twice – once towards their own benefit, and also need to pay for those currently in receipt of the benefit. This occurs even if those currently in receipt of the benefit continue to be paid on a PAYG basis.

ii.b.) Scaled premium method:

- Work out a contribution rate for a control period, which will be sufficient to pay benefits due over the same period
- Fund is not allowed to fall to zero
- Example, with 20-year control period, **INITIAL** contribution rate would be:

$$\frac{\text{PV of benefits paid over the 20 – year control period}}{\text{PV of salaries paid over the 20 – year control period}}$$
- Results in a contribution higher than benefit payments upfront, which allows for a fund to be built up
- When the fund begins to fall, as benefit payments rise, before the end of the control period, recalculate the contribution rate over the next control period.
- In an ageing population ,this results in an increasing, stepped contribution rate

Implications for use:

- Allows the building up of a fund without the need for it to be fully funded
- May be complicated to operate
- Experience will not follow what is assumed, which will impact the fund build-up
- The contribution rate is recalculated as soon as the fund starts to fall – which means as soon as the capital built up is being eaten up. This is as a result of the

requirement of this method to have a non-decreasing fund. Until that point, investment returns are funding the benefits. It is therefore possible to invest in assets that need never be sold.

- The scaled premium contribution rate can reach a stable state if the income from the assets and contributions equals the benefit payments in each time period.

Many candidates did not score well on Part (i), as they failed to adjust the q_x rate to take account of the fact that a pensioner aged 70 last birthday in mid-2010 is aged 70½ on average at that point. Many candidates did not state the assumptions used, or total the number of pensioners. Most people correctly described the scaled premium method in Part (ii)b but did not discuss the implications of its use.

QUESTION 6

i)

- a.) Expected asset value at 1 April 2011:

$$145 * (1.095)^3 + 0.6*(1.095)^2 - 2*(1.095)^3 - 2*(1.045)*(1.095)^2 - 2*(1.045)^2 * (1.095)$$

$$= 190.3752 + 0.7194 - 7.5234$$

$$= R 183.571m$$

$$\text{Actual asset value} = R 171m$$

Actuarial loss on assets = 183.571 – 171 = R12.571m

$$b.) \text{ PUC SCR for the 3 years} = \frac{\frac{3}{60} \times \left(\frac{1.07}{1.095}\right)^{18} \times 16.541}{a_3} = \frac{0.54574}{2.677651} = 20.38\%$$

$$\text{Expected active member liability} = 0.2038 \times 2.677651 * 22*(1.095)^3 + 94*(1.095)^3 = R139.1791m$$

(Alternatively, could find accrued service to be 23.4877 years at 1 April 2008, and work out the actuarial liability using this. The answer is the same.)

$$\text{Actual active member liability} = R134m$$

Actuarial gain on active member liabilities = R5.1791

- c.) Expected pensioner liabilities = $27 * (1.095)^3 - 7.5234 = 35.4492 - 7.5234 = R27.9258m$

$$\text{Actual pensioner liability} = R25m$$

Actuarial gain on pensioner liabilities = R2.9258m

d.) Expected contributions :

$$22 * 0.2038 * 2.667651 * (1.095)^3 = R15.7634m$$

$$\text{Actual contributions} = R0.7194m$$

$$\text{Actuarial loss on contributions} = \mathbf{R15.044m}$$

ii)

- a. Actual investment returns less than 9.5%.
- b. Actual salary increases lower than 7.0%.
- c. Actual pension increases lower than 4.5%
- d. Actual contributions lower than expected under the PU method.

iii) Investment return on initial surplus = $24 * (1.095)^3 - 24 = R \mathbf{7.5104m}$

Total loss items = R27.615 m

Total gain items = R15.615 m

Reduction in surplus of R12m explained.

iv)

- The funding method affects the pace of funding the accruing benefits
- It does not directly affect the cost of the benefits
- Closed fund, therefore the average age of the fund will increase each year
- As will the cost of each year's accrued benefit
- Switching to the CU SCR will decrease contributions in the short term but will result in higher contributions later
- ..to make up for the under-contribution now.
- In a closed fund, the absence of new entrants will exacerbate the situation, and the CU SCR will increase significantly as the membership ages
- The sponsor can choose to pay the CU SCR if current budget constraints require it
- ...but must understand the long-term implications.
- Sponsor may, however, need a contribution rate that remains stable as the membership ages
- The Attained Age method will achieve this
- Targets a stable contribution over the future lifetime of active members
- Will have a higher contribution rate than the current PU contribution rate.
- Intended to build up surpluses now which can be used to keep the contribution rate stable as the cost of accrual increases
- Ultimate cost will be affected by actual experience, so even the AA ACR may vary over the future life of the fund.
- Rate will aim to fund active member liabilities, does not account for surpluses or deficits arising from pensioner liabilities

Part i) was not well answered in general, with many candidates being unable to correctly calculate the PU SCR. Parts c) and d) were particularly poorly answered. Many candidates attempted very long answers from first principles, and ran out of time.

Part ii) was well answered. Most candidates were aware of the major issues to cover in part iv) but did not cover enough points to gain full marks.

QUESTION 3

i Numbering for this level uses lower case roman numerals

a. Numbering for this level uses lower case alphabetic

1. Numbering for this level uses Arabic numerals

General comments on student performance on the question (in italics)

END OF EXAMINERS' REPORT