

# **EXAMINATIONS**

April 2004

**Subject 402 — UK Fellowship Life Insurance**

**Paper One**

## **EXAMINERS' REPORT**

### **Introduction**

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. 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.

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Chairman of the Board of Examiners

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**1** The types of benefit that are taxable depend on whether or not the policy is “qualifying”

To be qualifying the contract must satisfy certain criteria. These are based on the term of the contract, the premium paying term, the frequency of those premium payments, the relationship between premium amounts in each 12 month period and the relationship between the premiums payable and the benefits on death.

If a policy is not qualifying tax is payable on maturity, death, surrender or part surrender. If it is qualifying tax is only payable on surrender or part surrender within 10 years, or three quarters of the term if less.

Tax is payable at a rate equivalent to the policyholders marginal rate less the basic rate of tax. Tax is therefore only payable by higher rate tax payers. The taxable amount is the excess of the benefit over the premiums paid.

On part surrender a tax free allowance of 5% per annum of the premium(s) paid is given, with tax only payable on any excess surrendered.

On death the taxable amount is the excess of the benefit over the surrender value at the time of death.

For general annuities, the annuitant is liable to tax on the amount of each annuity payment that exceeds this capital content. The capital content is obtained by dividing the total premium, or premiums, paid by an expectation of life as at the vesting date of the annuity, based on a mortality table specified by the Inland Revenue.

*Examiners comment: This question was generally well answered although there were a surprising number of candidates who didn't demonstrate adequate knowledge of this basic bookwork.*

**2** (i) Waiver benefit should be underwritten medically and occupationally. There should be a cost benefit analysis however to compare the costs of a particular level of underwriting compared with the expected reduction in claims costs. Medical limits could be set at a low level.

For some occupations, the risk of disablement from “usual occupation” will be unacceptably high. Those cases should be either declined for waiver, or offered an alternative benefit, e.g. based on disablement from any occupation. The policyholder should be required to tell the company if he/she changes occupation. This may lead to a change in terms for the waiver benefit.

When setting the charge to be taken for providing this benefit, the company should try to ensure that the charge is sufficient to cover the expected cost of claims across the portfolio. The company will do this by considering any past experience it has from offering similar benefits.

The company should monitor the claims experience carefully and it may reserve the right to vary the waiver charge if claims experience differs from

pricing assumptions. In addition, a claims management process could be introduced whereby claims are underwritten and then checks are carried out subsequently to ensure people are still off sick.

Other options the company could consider are as follows:

- The level of premium waived could be based on the original premium level or have an upper monetary cap.
- There could be a maximum age at which waiver will apply.
- The waiver would not apply if the policyholder were to become unemployed.
- The six month period could be extended.
- The company could introduce a maximum term for which the waiver will be applied.
- Change the standard waiver definition to “any occupation”.

Clearly the company could remove the waiver option altogether to remove the risks associated with it.

- (ii) The company's liability for retirement benefits, for a policy in deferment, is “on call” at the policyholder's option. To match this liability, short-dated investments are needed. This is a different investment profile from the usual with profits fund. Without doing this, the company is open to selection on a market fall; it would effectively be guaranteeing that the value of equities would not fall, which could be very expensive. The company could charge any cost that arose to other with-profits policyholders but would need to consider whether this was equitable.

At normal retirement date the units should be switched out of with-profits investment. Terminal bonus should be added at that point. The fund used for policies in deferment may be a unit-linked cash fund (with normal unit pricing, including a capital risk), or a “unitised non-profit” fund with a unit price that cannot fall (although this might be expensive to set up), or a fund investing in long-dated gilts, which would “match” the annuity to be bought on vesting.

If the company chose to use any of these approaches, it would need to ensure that policyholders understood the investment profile during the deferral period, since policyholders may expect to have exposure to the with profits fund. It could do this through policy documentation.

The company could have more frequent bonus declarations for these policies.

The potential loss could be reduced by simply removing the option or limiting the MVA free points to a series of dates such as policy anniversaries.

*Examiners comment: Part (i) was reasonably well answered, although many candidates failed to discuss the need for the company to monitor its experience and use this information to update its charges. Part (ii) was less well answered. Whilst many candidates recognised the risk that the option posed*

*for the company, they did not adequately describe the options that the company might consider to minimise that risk.*

- 3** (i) Achieved profits calculations are traditionally deterministic, and hence there is logic in the decision. However, the directors need to bear in mind the purpose of the published information.

The achieved profits method was developed primarily as a result of proprietary life companies wishing to give shareholders an idea of the true value of their interest in the business and how that value changes over time as a result of the management of the company's resources. Analysts also use this information. The published figures should therefore be a realistic assessment of the value and change in value of the company, allowing for an appropriate level of prudence to reflect risk and uncertainty. At present the embedded value is overstated because no allowance has been made for the guarantees. The directors could be challenged that these accounts may not be considered "true and fair".

The product may not be the significant in the context of the overall results of the company, hence the provision may not be necessary.

If stock markets were to perform badly again in the next year, the hurdle rates would increase and the guarantees may then bite at, say, 7.5% p.a. This would have a direct profit impact (a loss) and could lead to questions from shareholders and analysts.

The assumed future investment return of 7.5% may not be appropriate. It is subjective; no-one knows with certainty what future equity investment returns will be. Only a relatively minor change in this assumption (e.g. to 7.0% p.a.) would lead to a provision having to be established under the current methodology. This would again lead to a one-off reported loss.

As the product has been sold for a number of years, it is likely that the maturity dates are spread over a number of years. Even if the 7.5% p.a. future investment return assumption turns out to be correct over the lifetime of these contracts, it will not be earned uniformly year on year. Hence it is likely that the unit value of some contracts will be insufficient to meet the guarantee amount for some maturity periods. For example if investment returns are 0% in year 1 and 15% in year 2, then those contracts maturing in year 1 will result in a cost to the shareholder.

Analysts often require standardised supplementary disclosures. They may or may not ask for some allowance for cost of guaranteed maturity benefit within the disclosures.

The final decision on whether or not an allowance for the cost of the guaranteed maturity benefit in the achieved profit result is likely to depend on the latest SORP from the ABI and the approach it recommends for allowing for guarantees in the achieved profits result.

In addition, the directors are likely to be influenced by the approach taken by other companies in the market and the extent to which analysts expect an allowance for such guarantees to be included in the results.

- (ii) The maturity guarantee could be valued by calculating the probability weighted expected cost of the guarantee. This takes into account the probability of various economic scenarios arising, and the cost of the guarantee in each of these scenarios.

This could be done by stochastic modelling, or by a closed form option costing approach such as Black-Scholes.

To make the use of a stochastic model feasible, model points would be needed else it is likely the run times will be prohibitive. The stochastic model will perform say 5,000 to 10,000 projections so that the potential distribution of the guarantee costs can be determined.

The guarantee cost in each case would be the discounted value of the difference between the guaranteed maturity amount and the reserves at that time. The expected guarantee cost would be then determined by taking say the 99<sup>th</sup> percentile of the cost distribution.

The expected guarantee cost calculated by this methodology would then be deducted from the present value of future profits, giving a fairer statement of the potential cost to shareholders akin to the cost of hedging their exposure.

This approach should also result in less volatile achieved profits. The provision calculated in this way will vary to some extent with market conditions, however the difference in the size of the provision will be lower than in the current situation.

*Examiners comment: Many candidates failed to generate sufficient points in both parts of the question to score well. Those candidates who had an understanding of why the achieved profits method was introduced tended to give the more detailed answers. Part (ii) was answered poorly even though it was a fairly standard stochastic modelling question.*

- 4** (i) The value of existing business is the present value of future surplus emerging. Over the year these cash flows will become a year nearer so will be discounted by one year less. This implies that the existing business value will grow over the year by the same rate as the risk discount rate.

In addition, experience over the year may differ from that expected which will impact the net assets and the present value of future profits. Any changes in the reserving assumptions will impact net assets and the present value of future surplus emerging. Similarly, any changes in future assumptions will impact on the present value of future surplus emerging and hence the embedded value.

These changes will be expected to impact on experience over all future years. The embedded value will be impacted by the present value of the change in cash flows over all these future years.

Experience and assumption changes may occur for a range of basis items including mortality, sickness, withdrawals, expenses, tax, investment return, risk discount rate or charges on unit-linked business.

There will be investment earnings on the net assets.

There may also be one-off adjustments such as modelling refinements, mis-selling costs or one-off accounting adjustments that may affect the change in shareholder value during the year.

- (ii) (a) The reduction in risk discount rate will increase the value of future cash flows from the business. Therefore the embedded value will increase.

Assuming the mean term of the liabilities is around 15 years, the change in the value of future surplus emerging will be:

$$(1.08/1.07)^{15} - 1 = 14.97\%$$

This would give an embedded value of £5,599m ( $4000 \times 1.1497 + 1000$ ).

- (b) The fall in the value of free assets will reduce the embedded value. The free assets are the embedded value minus the present value of future profits i.e. £5000m – £4000m = £1000m. A fall of 20% will reduce the free assets by £200m.

This gives a revised embedded value of £4,800m.

- (c) If the assumed expenses reduce then the value of future emerging surplus would increase, thus increasing the embedded value. Assuming that the reduction already takes account of inflation, then with a risk discount rate of 8%, if expenses reduce by £50m per annum then the value of this in perpetuity is £625m.

The embedded value would therefore increase to £5,625m.

- (iii) (a) The impact of the change in mortality will depend on how the benefits paid on death compare to the value of the policies at the time of death. For pensions business these are normally similar so the impact of the change is likely to be small.
- (b) Increased lapses are likely to cause a reduction in future emerging surplus. This would reduce the embedded value. Whilst it is not possible to calculate the precise impact, the effect for pensions business is likely to be significant.

*Examiners comment: Part (i) was quite well answered although some candidates gave answers that were too superficial. In part (ii), candidates scored well where they realised they needed to make an assumption about the term outstanding of the existing liabilities. However, some candidates failed to answer the question asked in part (ii) and did not describe the impact on the embedded value. Part (iii) was poorly answered with many candidates showing little understanding of pensions business.*

- 5** (i) Consistency checks should be performed — average sums assured premiums, ages and so on should be broadly consistent with the previous year's data. For classes no longer written average ages should increase by close to 1 each year, and outstanding terms should similarly reduce. The ratios of sum assured to premium and attaching bonus to sum assured should be consistent, allowing for the bonus declaration.

Outliers and unusual data — for example nonsensical ages — should be investigated.

The current valuation data can be reconciled with the previous years' and the movements data, at least at a contract type level for policy counts, sums assured and premiums.

Data for new products/systems would be checked for any unexpected problems. Random checks could be made on individual policies and values checked back to source documents. Totals from the valuation file output should agree with the policy data, to ensure every policy is valued.

Once the valuation is complete, an analysis of surplus and a comparison of trends with prior years could identify possible data errors.

- (ii) (a) The reserve can be split into two parts:
- the pre-vesting contract which funds for cash
  - the reserve for the guaranteed annuity rate at vesting.

#### **Pre-vesting basis**

A prospective net premium valuation would be used. However, a gross premium valuation could be used if it were demonstrated to be at least as strong as a net premium valuation would be.

The general approach to setting a basis is to:

- analyse the experience
- take into account industry data
- exclude any exceptional/ one-off items
- consider future trends
- add on a margin for prudence

Mortality can be ignored if there is a return of fund on death before vesting.

Interest: This will probably be driven by the yield on the assets backing the business, which is likely to be a mixture of fixed interest and equity-type assets. The maximum yield permitted by regulation would be considered, allowing for the cap as there is future reinvestment of premiums and income. The rate would be reduced to allow surplus to emerge in an appropriate manner, depending on the size of the bonus loading in the premiums.

Because of the option to retire early on guaranteed terms in the last five years, each policy should be valued using the notional retirement age that gives the greatest mathematical reserve.

Tax: None as UK pensions business

Initial expenses could be recovered by use of a Zillmer adjustment. Renewal expenses are provided for within the margin between office and net premiums. This needs to be checked to ensure it is adequate to meet future expenses, including expense inflation and claim expenses. If not, then the net premium can be reduced to a maximum percentage of the office premium and/or an explicit reserve held.

Negative reserves would be eliminated.

### **Annuity guarantee**

A stochastic model would be used to value the guarantee, irrespective of whether the guaranteed rate is greater or less than the current annuity basis, with appropriate allowance for future mortality improvement. It might be acceptable, depending on experience, to make a prudent allowance for policyholders taking part of their benefits as a tax-free lump sum at vesting.

No allowance should be made for transfers, if in doing so the reserves reduce.

Allowance could be made for possible changes in the take up rate of tax free lump sum at vesting. This could be included in the stochastic model.

- (b) The units in force at the valuation date can be accumulated at the guaranteed rate to the maturity date, and then discounted back at the valuation rate of interest. Depending on policyholder expectations established regarding the bonus rate of interest, it may also be necessary to allow an addition in respect of bonus interest when rolling the fund forward. If this approach is adopted, it will also be necessary to carry out a discounted cash flow valuation, to determine whether a non-unit reserve is required. The non-unit reserve would be determined

by working back from the last cash flow and taking the most negative result.

A more common method would be to set the mathematical reserves equal to  $\max(\text{bonus reserve value}, \min(\text{PRE surrender value}, \text{unadjusted surrender value}))$ . The bonus reserve value is the discounted value of units at the valuation date of interest allowing for future reversionary bonus consistent with PRE. The unadjusted SV is the amount that would be paid on surrender disregarding terminal bonus and market value adjustments but allowing for standard surrender penalties. The PRE surrender value is the amount that would reasonably be expected to be paid on surrender having regard to the representations of the company in the event of a significant level of policy discontinuances.

If the MVA policy is robust (i.e. policyholder expectations have been established that an MVA will be applied at maturity as well as on surrender in relevant circumstances), then it is possible to hold a mathematical reserve less than the bid value of units. This would normally be calculated by running a "shadow fund" to calculate the asset share of the policy. This is the accumulation of premiums less charges at the actual investment return earned on the fund from year to year.

Assuming that the MVA and terminal bonuses are set to bring the notional value of units up or down to the asset share, using the shadow fund, it would be justifiable to hold a mathematical reserve equal to the value of the shadow fund. In this case no specific valuation basis would be required.

(iii) Basis for Contract A:

**Pre Vesting:**

Mortality: 90%–100% AM/AF92.

Interest: probably 2.5%–4.0% p.a. (after bonus loading)

Initial Expenses: The maximum permitted is the lower of 3.5% of the basic sum assured and initial expenses amortised over the term of the contract, but if commission is premium related, it would be normal to use an amount based on the premium, in order to match the expenses better.

Renewal Expenses: £25–£40

Claim expenses: £60–£100

Investment expenses: 0.1% to 0.15% of reserves

Inflation 3%–4%pa, consistent with the economic conditions backing the interest rate.

Could use a gross premium method if a suitable waiver has been obtained

### **Post vesting**

A suitable post vesting basis to use in the assessment of the cost of guaranteed annuity options is:

Mortality: PMA/PFA92. Projected using the CMI December 2020 cohort projections.

It is necessary to consider what allowance should be made for future mortality improvement – for example, a minimum of the central cohort, up to the higher cohort might be used.

Interest: depends on the matching assets. Assuming these are gilts and corporate bonds, 4% to 5.5% p.a.

Expenses: depends on company experience and payment frequency.

Possibly £25–£50 p.a., escalating at 3%–4.5% p.a. (alternatively at a rate consistent with the investment rates, say gilts less 2%)

An economic scenario generator would be used to generate future investment scenarios, so assumptions will need to be made about future interest rate volatility.

*Examiners comment: Part (i) was generally well answered.*

*In part (ii)(a) many candidates missed obvious points when setting a basis such as looking at past experience to derive assumptions, allowing for trends and allowing for margins for prudence. In addition many candidates discussed the need for tax assumptions even though the question is about pensions business. The need for a stochastic model to value the annuity guarantee was mentioned by many candidates but often no further points were made.*

*In part (ii)(b) many candidates failed to describe how the unit fund might be rolled up at the guaranteed rate and discounted back at the valuation rate.*

*Many also didn't discuss shadow funds.*

*In part (iii) the pre-vesting basis was generally described quite well (though candidates tended to provide tax assumptions for life rather than pensions business). By contrast the post vesting basis part was not well answered, with some candidates missing it out altogether.*

## **6 (i) Falling New Business**

All new business will contain loadings that will assume a certain level of overhead costs that are expected to be borne in practice. Some contracts may have been priced on a marginal basis, that is they make a contribution to

overhead costs but not sufficient to cover the full amount. Since new business levels have been falling, it is likely that the new business loadings are now insufficient to cover the company's fixed overhead expenses. All other things being equal this would reduce the profitability of the new business.

The same may be true for maintenance expenses, but this is less likely to be material as the established company will have a significant in-force book over which to spread costs. Also, the pricing will have assumed a level of maintenance costs to be incurred over the lifetime of the contract, so the impact of a deviation over a short timescale is not likely to be significant.

### **Falling stock market levels**

The fall in stock market levels may signal lower future dividend levels, and changes in the returns on other investments which may mean the profitability of new business is impacted. There may also be other repercussions on, for example, asset mix and changes in investor confidence in certain products.

### **Change in tax position**

Pensions business is taxed on a profits basis so the change in tax position will not have any impact on the new business profitability.

The life business is likely to have been priced when the company was XSI. This means that tax would have been assumed to be paid on taxable income and tax relief obtained on expenses. The rate of tax relief on expenses assumed should have included some allowance for deferral because acquisition expenses are relieved evenly over seven years if sufficient life (BLAGAB) investment income is available.

Now, the life investment income will not be taxed and not all allowable expenses will be relieved in the current year, leading to even more deferral. Investment contracts typically would be expected to generate more taxable income than relievable expenses over their lifetime. The change in company tax basis will therefore make these contracts more profitable than they were before. The converse is true for protection contracts — which have little investment component.

The impact on the company's overall new business profitability will therefore depend on the mix of business it has been writing and whether the change in stock market levels / tax basis is expected to reverse in the near future.

- (ii) A model of the business will be required, using model points chosen to be representative of the whole portfolio. The projection should include both new business and the in-force business. The projection should be on a realistic best estimate basis. A deterministic projection is sufficient and different scenarios will need to be tested.

The company will be XSE so long as the total taxable income, "I", less allowable expenses, "E", (including unrelieved E brought forward) is lower

than the NC1 result. The projection will need to include life and pensions business — although the latter is not taxed on an “I-E” basis, the projection is needed to determine when any case VI losses are relieved. A key assumption is the future investment return.

For the life business, it will be important to distinguish between the components of the investment return in order to model accurately the taxable income. (This is not important for pension business — it is only the profits and hence the overall level of investment return that is important.) Assumptions will therefore be required for franked investment income, unfranked investment income and capital gains (split between realised and unrealised, chargeable and non-chargeable) in the life fund.

An assumption will also be required for future inflation, since chargeable gains are realised gains after allowance for indexation relief.

Expense assumptions may need to be revised because of the reduced volumes of new business.

The level and mix of future new business assumed will also be important. This is because all new business typically generates more expense than income in the year in which it is written. Therefore, the higher the new business levels assumed, and the rate of their growth, the higher will be the relievable expenses.

For life business the expenses need to be split between acquisition and maintenance – as relief on acquisition expenses is spread over 7 years.

The mix of life business between investment and protection will have an impact on future levels of taxable income generated in the life fund. Having constructed the model, the company's taxable income, allowable expenses and surplus are projected for each year in the future and the tax computation performed for each year of the projection.

Since the company is currently XSE, a decision needs to be made to what extent the relief of the XSE will be allocated to in-force business and to what extent it can be used to subsidise new business. Either way allowance would be made within the projections for the additional relievable expenses carried forward.

Similarly, for pensions business, new business often generates a Case VI loss initially so projections are needed to determine when those losses will be relieved.

The current taxation rates and rules would be assumed to continue for the duration of the projections

By inspection of the results the company can see what tax basis applies in each year in the future. The company may find its tax position changes more than

once over the course of the projection, and so will consider the sensitivity of the results to changes in assumptions, and test alternative scenarios.

It is unlikely that a stochastic model would be used because of the complexity of the calculations, and the additional value that would be added.

- (iii) The company may take no action if it believes the current situation will change quickly.

The company may amend its pricing basis if it expects to be XSE for a considerable time, or if it revises its expense assumptions.

Some products may require re-pricing as they may now fail the company's profitability criteria. The extent to which this is possible will depend on the market — it may not be possible to increase prices in some highly competitive segments. Conversely it may be possible to reduce the prices on some products, making them more competitive.

If the company felt it could achieve higher sales to compensate for the reduced unit profitability then this might be a sensible course of action.

The company may decide to take action to reverse the tax position if the projections suggest that it will remain XSE for some time. This essentially means either increasing taxable I or reducing E. The company may try to manage its sales mix by offering, e.g. sales incentives or special offers to ensure that increased unit profitability from XSI contracts offsets the reduced unit profitability from XSE contracts.

It could consider switching from direct equity holdings to holding unit trust or OEIC assets which have gains subject to "deemed disposal" rules (that generally accelerate tax), or it could consider switching from UK equities (generating franked investment income) to other assets that generate more unfranked income — however investment considerations may make this undesirable. This however, may not be what policyholders expect, which will be conditioned by what has been said in literature and past practice.

The company might try to improve its experience e.g. expenses by implementing a cost reduction programme. The IFA channel is highly competitive with regard to commission — if the company tries to reduce this alone then it will find sales fall very rapidly. Internal management expenses are more under the company's control, but any expense reduction program is likely to increase costs in the short term (due to redundancy and re-organisation costs). Alternatively, it could consider outsourcing.

The company may have to investigate whether it can launch into higher margin channels but this may not be possible in practice eg due to cost/risk. This might be different product segments, or alternative distribution. There would be considerable risks in attempting either of these.

The company could review its current distribution channel to identify any poor performing salesmen.

It may to improve profitability through lowering capital required to right the business e.g. through reinsurance or redesigning products

The company may find it has little alternative but to accept lower profitability in the hope that market levels reverse, which would reverse the company's tax position.

*Examiners comment: In part (i) candidates generally assessed the impact of falling new business levels and falling stock markets quite well. However, the impact of the change in tax position was poorly answered.*

*In part (ii) many candidates started well but failed to think through the issues specifically related to projecting I and E.*

*Part (iii) was reasonably well answered.*

## **END OF EXAMINERS' REPORT**