

REPORT OF THE BOARD OF EXAMINERS ON THE EXAMINATIONS HELD IN

April 2002

Subject 402 — UK Fellowship Life Insurance

Paper One

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.

K Forman
Chairman of the Board of Examiners

25 June 2002

EXAMINERS' COMMENTS

Question 1

This was answered well by most candidates.

Question 2

There was a wide variation in candidates attempts at this question. Some scored very well and others scored poorly. Those that scored well demonstrated a clear understanding of the impact of the reinsurance on both assets and liabilities.

Question 3

Candidates tended to fall into two groups here, either answering the question well or very poorly. In part (i), most candidates demonstrated an understanding of the 'change in assets'. The 'change in liabilities' was less well answered, where some candidates ignored the impact of new business and claims during the year in their derivation of the change in liabilities. In part (ii) many candidates recognised the different elements of surplus, and those that had made a good attempt at (i) made a good attempt at (ii).

Question 4

Candidates attempts at (i) were disappointing as many candidates failed to take into account the information provided in the question, and hence many produced a standard 'bookwork' list, rather than concentrating on negative sterling reserves. Part (ii) was generally well answered, although some candidates failed to recognise surrender penalties and low level allocation percentages as implicit charges unlikely to be allowed in the new regime.

Question 5

Candidates generally answered part (ii) better than part (i), getting a good selection of the relevant points for part (ii). Part (i) was less well answered, with some candidates not getting a good selection of the relevant points - in part this seemed to be as a result of a lack of planning of a solution on the candidates part and hence answers were not well thought out and tended to miss many of the relevant marks.

Question 6

Part (i) was well answered with most candidates making a good selection of relevant points. Part (ii) was generally poorly answered, with candidates demonstrating a lack of understanding of the options available to a proprietary company.

1 (i) Equating present values

This is a formula approach. The future benefits, premiums and expenses are all discounted to the start of the contract using the pricing assumptions and commutation functions.

The premium required for the policy is such that the present value of the future premiums equates to the present value of future benefits.

Profit is implicitly allowed for by margins in the elements of the basis

The method is often used for conventional with profits contracts because the flexibility added by variable bonuses can be used to make allowance for the required profit for shareholders.

If the bonus system is used to set payouts in relation to asset shares, detailed accuracy in the pricing is not important.

Equating present values is relatively less complicated.

Emerging costs

This method also involves discounting future income and outgo streams to the start of the contract.

However the elements of income and outgo are calculated for each future time period (which may be a month or a year), and then discounted.

A profit criterion is set and the premium is determined such that the discounted value of all the cash flows equals the profit criterion.

The method requires computing power.

- (ii) With the current easy availability of computing power the equating present values approach is virtually obsolete and is unlikely to be used.

The benefits of the emerging costs approach are that

- It enables the company to measure the expected return that the providers of capital will receive
- The sensitivity of profit to variations in experience can be tested. Variables in the contract design can be adjusted to minimize this sensitivity.
- The need to set up reserves and solvency margins can be included explicitly.
- By building a new business model from a range of specimen policies, the financing requirements of a new contract can be determined.
- The method allows more easily for withdrawals, with or without a surrender payment, and conversions to paid-up.

- It can cope more easily with complex charging and benefit structures, in particular where charges and benefits depend on future assumptions.
- It is easy to incorporate assumptions that vary over time, or stochastic assumptions.
- The risk discount rate can vary with term.
- Tax can be allowed for exactly rather than by reductions in the parameters.

2 (i) Surplus Relief

This method allows the insurer to access immediately part of the expected future profits on a block of new or in-force business.

The block of business is quota share reinsured on original terms, with the initial reinsurance premium equal to the reserves held by the insurer.....

.....and the future reinsurance premiums equal the quota share proportion of the original premiums received by the insurer.

In practice, the reinsurer will often deposit back the initial reinsurance premium with the insurer.

The reinsurer advances a capital sum to the insurer, in return for its quota share of the future surpluses arising on this block of business, if and when they arise — i.e. only if surpluses arise does the insurer have to make any repayments to the reinsurer.

The reinsurer may withhold the capital sum (i.e. not pay cash).

Because of the contingent nature of the insurer's repayments, the insurer is not forced to set up any reserves for these repayments, although the Appointed Actuary will need to disclose the amount of reinsurance finance outstanding in his/her report to the regulators.

Hence the insurer gets an immediate increase in capital, since its assets have gone up by the capital sum received from the reinsurer less the reinsurance premium. Its liabilities have reduced by the same amount as the initial reinsurance premium. The net effect is to increase the free assets by the amount of the capital sum.

The extent to which the insurer can take account of future profits in its Statement of Solvency (Form 9) in the returns to the regulator may be limited by the need to pay some of those profits to the reinsurer.

Surplus relief reinsurance would normally be effected on non-participating or unit-linked business, since the reinsurer recovers the capital sum out of the surplus not distributed to policyholders.

To reduce the level of risk in the transaction, the reinsurer would only pay part of the value of expected future profits as the capital sum.

The reinsurer would levy a straightforward transaction charge plus an interest charge on any cash transferred.

(ii) Virtual Capital

This is a relatively new form of financial reinsurance, designed to improve the solvency position of insurers where the use of surplus relief is not practical.

It is normally used for with profits funds.

As long as the candidate recognises that it's the longest term liabilities that are being reinsured, then marks were awarded. It is important to recognise the use of liabilities of the longest term in the arrangement. The reinsurer agrees to pay the last liabilities (up to the agreed amount) of the fund after all the other assets have been used. The insurer reduces its total reserves by this agreed amount, in anticipation of claim recoveries from the reinsurer.

However, no cash claim is paid by the reinsurer at this stage. (The insurer would pay fees in cash to the reinsurer.)

The reinsurance cover will be increased by the valuation rate of interest (to avoid the problem of trying to discount something that falls due at an unknown date) and the fees paid to the reinsurer (to avoid having to reserve for these). The reinsurance cover will be reduced over an agreed period (typically ten years) by a pre-determined amount.

The pre-determined amount is subject, each year, to a maximum of the insurer's surpluses arising before distribution as bonus.

There has been a decrease in the liabilities that the insurer needs to hold, without a corresponding fall in assets, and hence the insurer's overall solvency position is improved.

To reduce its risk the reinsurer will only allow a claim amount which is a fraction of the total surplus that is expected to emerge (typically less than 10-15%). The reinsurer will levy an annual fee expressed as a fraction of the amount of claims outstanding in that year.

This fee would be added to the reinsurance cover so as not to reduce the available capital of the insurer.

General point about virtual capital: no cash changes hands except perhaps for a fee.

3 (i)

Total surplus arising = increase in assets less increase in liabilities

$$\begin{aligned}\text{Increase in assets} &= P + P^N - E - E^N - C + I \\ &= P + 0.16P - 0.05P - 0.5 \times 0.16P - C + I \\ &= 1.03P - C + I\end{aligned}$$

$$\begin{aligned}\text{Increase in liabilities} &= V1 - V0 \\ &= V0(1+i) + P(1+i) - E^R(1+i) + V1^N \\ &\quad - V0^C(1+i) - P^C(1+i) + E^{RC}(1+i) - V0 \\ &= V0(1+i) - V0^C(1+i) + \{P - 1.1 \times 0.05P \\ &\quad - 0.08P + 1.1 \times 0.05 \times 0.08P\}(1+i) + V1^N - V0 \\ &= V0(1+i) - V0^C(1+i) + 0.8694P(1+i) + V1^N - V0\end{aligned}$$

$$\begin{aligned}\text{Surplus arising} &= 1.03P - C + I - V0(1+i) + V0^C(1+i) - 0.8694P(1+i) \\ &\quad - V1^N + V0 \\ &= 0.1606P - 0.8694Pi - C + I - iV0 + V0^C(1+i) - V1^N\end{aligned}$$

Must define: I = actual investment income and gains received during 2001
 i = rate of interest used to calculate reserves
 $V0$ = in-force reserves start of year (excluding new business)
 $V0^C$ = start year reserve in respect of policies becoming claims
 $V1^N$ = end year reserve in respect of new business during the year

Possibly also: P^N = new business premiums
 P^C = in-force premiums on policies becoming a claim during 2001
 E = actual renewal expenses in respect of business in-force at start of year
 E^N = actual new business expenses
 E^R = valuation expenses in respect of business in-force at start of year
 E^{RC} = valuation expenses in respect of start year policies becoming claims
 $V1$ = total in-force reserves end of year

(ii)

Investment surplus:

$$\begin{aligned}&I - iV0 - i\{P + P^N - E - E^N\} \\ &= I - iV0 - i\{P + .16P - .05P - .5 \times .16P\} \\ &= I - iV0 - 1.03Pi\end{aligned}$$

Expense surplus:

$$\begin{aligned}
 & \{E^R - E\} (1 + i) \\
 &= \{1.1E - E\} (1 + i) \\
 &= 0.1E (1 + i) \\
 &= 0.1 \times 0.05P (1 + i) \\
 &= 0.005P (1 + i)
 \end{aligned}$$

Claim surplus:

$$\begin{aligned}
 &= \text{Reserves held at year end in respect of terminating policies less claim amount paid out} \\
 &= V0^C (1 + i) + \{P^C - E^{RC}\} (1 + i) - C \\
 &= V0^C (1 + i) + \{.08P - 1.1E^C\} (1 + i) - C \\
 &= V0^C (1 + i) + \{.08P - 1.1 \times .08 \times .05P\} (1 + i) - C \\
 &= V0^C (1 + i) + 0.0756P (1 + i) - C
 \end{aligned}$$

May define:

E^C = actual renewal expenses received in respect of policies becoming claims in 2001

New business surplus:

$$\begin{aligned}
 & \{P^N - E^N\} (1 + i) - V1^N \\
 &= \{0.16P - 0.5 \times 0.16P\} (1 + i) - V1^N \\
 &= .08P (1 + i) - V1^N
 \end{aligned}$$

(iii)

$$\begin{aligned}
 \text{Total surplus analysed} &= I - iV0 - 1.03Pi + 0.005P (1 + i) + V0^C (1 + i) \\
 &\quad + 0.0756P (1 + i) - C + .08P (1 + i) - V1^N \\
 &= I - iV0 - i \{1.03P - 0.005P - 0.0756P - 0.08P\} \\
 &\quad + \{0.005P + 0.0756P + 0.08P\} + V0^C (1 + i) - C - V1^N \\
 &= I - iV0 - 0.8694Pi + 0.1606P + V0^C (1 + i) - C - V1^N \\
 &= .1606P - 0.8694Pi - C + I - iV0 + V0^C (1 + i) - V1^N \\
 &= \text{Surplus arising (as derived in part (i))}
 \end{aligned}$$

- 4 (i) The policy has a low allocation in the first year, but this in itself is unlikely to be sufficient to eradicate new business strain.

However, the policy conditions meet the requirements for negative sterling reserves.

The charging structure is such that, on the valuation basis, there are likely to be positive cashflows in the future.

These cashflows can be discounted and used to offset positive reserves set up on other policies.

The extent to which this is possible is limited by the size of the sterling based surrender penalty.

At no point can the reserve be lower than the contractual surrender value.

- (ii) The new policy is going to produce significantly higher returns for the policyholder due to the capped charges and tax free investment.

Depending on any promotional advertising carried out by the government, the market for the new product could be huge.

In any case high net worth individuals would find this policy particularly attractive.

Lapse rates could increase due to the removal of the surrender penalty.

Since this is an XSI contract, the company's overall tax burden would reduce, although the benefit of this mainly falls to policyholders. In fact the loss of tax relief on expenses exacerbates the impact of the reduction in fund charges.

The effort required to meet the tax regime would probably require ring-fencing both the investment income and expenses associated with this product from the rest of the business.

The company has four main options:

A — It could embrace the new product and withdraw the existing product from the market.

B — It could continue with the existing product and offer the new product in a limited way as a niche product.

C — It could decide not to enter the new market and to continue with the existing product.

D — It could withdraw from the regular savings market altogether.

Option A

Clearly this would lead to severe financial impacts on the company.

The maximum charge allowed is unlikely to support the existing cost base as the current charges just meet shareholders' requirements and the new charges are significantly lower.

The product is therefore highly unlikely to make a profit with the existing cost base.

There would need to be a significant investment to reengineer the business processes so that per policy costs were significantly lower than at present so that the policy could become profitable.

Similarly methods of distribution would have to be re-examined to bring the costs of distribution down.

This could involve bringing down levels of commission or finding lower cost routes which do not involve the insurance intermediaries.

Either route is likely to alienate the insurance intermediaries and this could threaten distribution for other products in the company's range.

The potential size of the market would have to be huge and the company would need to be confident of attracting a large slice of that market to make the investment and distribution risks worth it.

Option B

There may be compliance issues if both products were to be offered through any controlled channels.

To avoid the significant investment in systems, the company could set a very high minimum premium.

But this could be counter to the government's aims and may prompt the introduction of a statutory low minimum premium.

Option C

For this to be viable, the company would have to be sure that the market size for the existing product was still viable.

This route may lead to disfavour with the government and there may be accusation of selling inappropriate products.

The company is at risk from existing policyholders discontinuing premiums or transferring their policies to other providers who opt to offer the new product. This would put pressure on per policy expenses.

Option D

This would clearly inhibit sales potential.

In addition the risk of lapse of existing business is as for Option C.

The company would have to be sure that its other product lines were of sufficient volume to allow the growth of the company.

Or else accept a decline in premium income and lower potential for growth.

It would also have to consider the possibility that the government could intervene in other product lines.

- 5** (i) The biggest influence on reversionary bonus rates is the long term expected return on the assets held.

Higher reversionary bonus rates increase the level of guarantees under the contract and hence the level reserves which need to be held.

This, in turn, reduces the free assets and hence the investment freedom and ability of the company to write new business.

Thus, if the company thinks that future investment returns are likely to be lower than in the past, then it is likely to reduce reversionary bonus rates.

Otherwise the free assets of the company will reduce since the total assets will be lower in future without a corresponding decrease in the total reserves.

Even if the expectation of future investment returns has not reduced, the company may feel that the level of guarantees built up from past reversionary bonus declarations is higher than it is comfortable with given the value of the underlying assets so will reduce the reversionary bonus rates accordingly.

Some companies base reversionary bonus levels on long term gilt yields, since these give an indication of the guaranteed investment returns which are obtainable, so a fall in reversionary bonus rates may be triggered by a fall in gilt yields.

Reversionary bonus rates may have been reduced as a result of a fall in the market value of the assets held.

Although this will primarily impact on terminal bonus levels, it may also lead to a reduction in reversionary bonus levels if it is felt that it is a permanent revision of market levels rather than a temporary feature. This is because the value of the assets held will reduce relative to the level of guarantees under the contract.

Large volumes of new business are unlikely to have an impact on reversionary bonus levels.

Although this new business is profitable in terms of having a positive embedded value, the cash flows under the contracts are likely to be negative at outset followed by a series of future positive cash flows.

The writing of new business will therefore act to initially reduce the free assets of the company.

Unless the company has very high free assets it is unlikely that it will want to further reduce its free assets by increasing reversionary bonus levels.

Furthermore, the positive embedded value of the new business is based on a set of assumptions about future experience. If it turns out that actual experience is poorer than expected then the business may turn out not to be profitable after all.

If the surplus had already been distributed in the form of reversionary bonus then this would cause further problems.

Although the distribution could effectively be “clawed back” by a reduction in the terminal bonus which would otherwise have been declared, it would again lead to an increase in the level of guarantees under the contracts relative to the total assets held.

If the new business does turn out to be profitable then it is more likely that it will be distributed over time in the form of increased terminal bonus rates.

- (ii) Terminal bonus is the most appropriate form in which to distribute the surplus arising from this line of business.

However, the embedded value is the present value of future profits on a set of assumptions as to actual experience.

The actual surplus from the business will only arise over time. If actual experience is worse than expected then the actual surplus will be lower.

If the total embedded value had been distributed in the terminal bonus rates of policies becoming claims in the following year then any adverse experience

will impact on the bonus rates of the remaining policies. The policies which benefited from the higher terminal bonus rates will be unaffected.

This may be considered inequitable, particularly since the volumes of business written in the year were higher than those expected longer term.

Furthermore, even if actual future experience turns out to be as expected, it may be felt that it would not be appropriate for only those policies which became claims in the following year to benefit from the writing of the new business.

In theory, the policyholders who should benefit are those who supplied the capital to enable the business to be written which are the policies which have been in force longest, but not just those about to become claims.

And those policies whose potential benefits will be most exposed to the risk of experience being worse than expected. These will tend to be policies written more recently.

There is probably no one correct answer but, in practice, a reasonable approach for allowing for the surplus arising from this business in bonus declarations may be to increase the investment return credited to the asset share of all policies which share in the profits from this line of business.

A further problem with the proposal is that it will lead to a step jump in terminal bonus rates.

This is unlikely to be consistent with policyholder expectations.

In taking out a with profits policy, policyholders will expect a smoothing of experience from year to year.

The extent of the smoothing will vary from company to company but should be consistent with past practice.

If there had not been a similar treatment in respect of past new business profits for policies becoming claims in recent years then the proposal will not be equitable between those policies and those becoming claims in the following year.

Policies becoming claims in the previous year would be likely to feel particularly poorly treated.

Also, it is not expected that there will be a similar level of profitable new business written in future years. This would lead to a marked reduction in terminal bonus rates in subsequent years which would also not be consistent with smoothing principles.

The director is correct that increased levels of terminal bonus is likely to lead to an increase in new business levels as past performance is one of the things which influences choice of company.

However, if the higher terminal bonus levels are not sustained then there is unlikely to be much benefit as a sustained period of past performance is usually required as evidence that similar good performance is likely in the future.

It may also be felt to be misleading if the past performance arising from the proposals is used to generate higher new business levels if the company knows that it is unlikely to be able to repeat the reasons for this performance in future.

There is also a practical problem with the proposal in that uncertainty about mortality experience means that the actual number of claims in the following year is uncertain. Thus it is impossible to know for certain how much the terminal bonus rates should be increased so as to distribute fully the embedded value of the new business.

The company would need to investigate whether it is sufficiently well capitalised that it can accept even higher new business levels.

- 6** (i) The extent to which the life insurance company will want/need to take actions to improve its free asset ratio, "FAR", will depend on the level of the FAR prior to recent falls and the size of the drop in FAR relative to its original level.

The actions the company may take to improve its free asset ratio include:

- Reducing the liabilities:

The company could weaken the statutory valuation basis.

It could do this by reducing the implicit allowance for future bonus declarations, for traditional with profits business, if the company believes that the reduction in stock market returns is permanent and future bonuses will be at a lower level than previously assumed in the valuation basis.

However, the valuation must make allowance for policyholders' reasonable expectations, so the extent to which the company can assume bonuses will reduce in the future, will depend on PRE.

The company could increase the valuation interest rate if possible.

The valuation interest rate is dependent on the yields on the assets backing the liabilities, so the extent to which the valuation interest rate can be

changed must be judged with reference to the redemption yield on fixed interest securities and the running yield on both equities and property.

The company could consider reallocating investments into higher yielding asset classes, to increase the valuation rate of interest that can be used to value the liabilities.

However, higher yielding assets, such as gilts, tend to produce lower overall returns over time, which is eventually likely to lead to a reduction in both the returns to policyholders and the FAR, and hence is unlikely to be a desirable long term strategy.

The expense assumption could be reduced through a cost-cutting exercise, e.g. through cutting distribution costs by reducing branch network/cutting size of sales force etc.

The expense assumption used cannot be less than that required to meet expenses should the company close to new business within twelve months of the valuation.

The matching of assets and liabilities could be improved through the reallocation of assets, which may lead to the ability to release mismatching reserves, and hence improve the FAR position.

It should be noted that any changes in the valuation basis would have to be justified, as the FSA would take a dim view of arbitrary changes in the valuation basis.

- Increasing the value of assets by:

Including an implicit item for future profits in the statutory valuation.

Reducing/eliminating holdings of inadmissible assets and moving into admissible assets.

Issuing subordinated debt or securitising future profits.

- Use of reinsurance:

The mutual could use financial reinsurance, either surplus relief or virtual capital, to improve the FAR.

Could use reinsurance to reduce the solvency margin requirement.

- Product changes:

The writing of new products can reduce free assets if there is new business strain, ie the expenses of writing the business and the solvency capital requirements are greater than the premiums received.

Closure to new business would remove this strain but this is unlikely to be attractive to the company and would only be done as last resort.

Products could be redesigned to reduce new business strain, although this could create marketing conflicts.

Financing commission within a reinsurance arrangement could be used to reduce new business strain.

Changes could be made to the bonus structure for with profits policies, for example increasing the relative proportion of terminal rather than annual bonus, or moving to accumulating or super-compound bonus structures.

- Change company structure:

The company could demutualise and/or put itself up for sale.

Provided the mutual company is selling new business, a willing purchaser would be prepared to pay for the future profits expected to arise on any new business plus an element of goodwill for the brand name.

The financial restructuring and capital injection which the company would receive would be likely to lead to an increased FAR.

Alternatively, the company could restructure internally in order to maximise the FAR, for example by moving all unit-linked business to a subsidiary.

Demutualise or merge with another company

- (ii) Many of the points raised above would be equally applicable for a proprietary company e.g. changing the valuation basis to improve the FAR.

However, the actions the proprietary company takes to improve its FAR will be influenced by the shareholders, and it is unlikely to be able to make as many changes to the valuation basis from one year to the next as a mutual company might.

The company will also be influenced by the impact that changing the statutory valuation has on, for example, the calculation of the embedded value, since the change in the embedded value from year to year will be used as a performance indicator and may be used to remunerate directors.

In addition to the points made in (i), a proprietary company may also:

- Seek a capital injection from its shareholders.

The shareholder will only be willing to inject capital where the return on capital is adequate (and the shareholder could not earn a higher return from an alternative investment of equal risk).

If the shareholder views the injection as necessary to ensure that future new business targets are met, for example, and that without improving the FAR the future new business targets will be under threat then the shareholder may be willing to inject capital.

- Raise additional equity through a share placement on the equity market.

Equity markets/values are currently depressed, and it is unlikely that the share placement would be viewed favourably, due to the lack of apparent financial strength because of the low FAR.

However, if for example a new management team has recently been put in place, then market sentiment may be more positive and equity placing may be viewed more favourably.

- Raise additional equity through a corporate bond placement.

Whether this is likely to be a successful route to improve the FAR will depend on:

- the size of the corporate bond placing required to achieve to raise the required funds
- the extent that the company has issued corporate bonds in the past to raise capital
- the success (or otherwise) of other corporate bond placings of a similar size and nature
- the margin over gilt returns offered on the bond
- the relative levels of supply and demand for bonds
- the perception of the life insurance company's prospects in terms of new business volumes, security, quality of management team.
- the ability to change charges or reduce expense allowances (e.g. changing the net premium valuation cap from 85% of net premium to 90% of the net premium).
- the impact of changing the bonus structure for a proprietary company, since the bonuses distributed will have an impact on the transfers to shareholders.