

# **EXAMINERS' REPORT**

April 2010 Examinations

## **Subject ST2 — Life Insurance Specialist Technical**

### **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.

R D Muckart  
Chairman of the Board of Examiners

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### **Comments**

These are given in italics at the end of each question.

- 1** (i) Simple: Bonus expressed as a percentage of the basic benefit.
- Compound: Bonus expressed as a percentage of the basic benefit plus any attaching bonuses.
- Super-compound: Bonus comprises two parts – a bonus expressed as a percentage of the basic benefit plus a bonus expressed as a percentage of the attaching bonuses (bonuses previously declared). The bonus percentage declared on bonuses is usually higher than the bonus percentage declared on the basic benefit.
- (ii) Defers distribution of profit which can improve capital efficiency. The super-compound bonus method generally defers profit the most.
- (iii) Simple Approach:
- $$= 10,000 + (1\% * 10,000 * 3)$$
- $$= 10,300.00$$
- Compound approach:
- $$= 10,000 * (1 + 0.5\%) * (1 + 1\%) * (1 + 1.5\%)$$
- $$= 10,302.76$$

*This question was standard bookwork and was well answered by most candidates.*

- 2** (i) The product allows flexibility in the premium payments which will allow the investor to be able to alter premiums to suit their income. For example the investor may receive irregular income or bonuses at certain times of the year which he wishes to invest.
- The product allows the investor freedom to invest in a variety of different types of investment with the freedom to switch between types of investment. This meets the needs of high net worth individuals who like the choice of funds.
- This will suit the financially sophisticated who want to be able to control their investments, and change their investments as their appetite for risk changes.
- It is also likely that the range of unit funds available will include some relatively high risk funds, which would meet the needs of this type of investor.
- The product is likely to be costly to run and so the charges are likely to be high. This will be acceptable to investors who expect to pay more for a more sophisticated product which is suited to their needs.

The product may be used for other purposes e.g. potential use in inheritance tax planning and ability to provide life assurance protection to family members.

- (ii) These are complicated contracts which will require careful explanation of the benefits and charges at point of sale.

The product is aimed at high net worth individuals; it could be the case that these potential customers may in fact even initiate a sale.

The company has the following options:

### **Insurance intermediaries**

Insurance intermediaries (IFAs) are salespeople who must act independently of any particular life insurance company.

Their aim is to find the best contract, in terms of benefits and premiums, for their clients.

Usually they are remunerated, via commission payments, by the companies whose products they sell, but they may alternatively receive a fee from their clients.

It will often be the client who initiates the sale.

However, intermediaries are also likely to promote themselves actively to existing clients by, for example, instigating a periodic review of finances.

This method of distribution would be a good choice for this contract since the intermediary has access to the type of target market at which the product is aimed and will have the expertise to ensure the customer understands the contract and makes the correct decision.

As the IFA market is competitive the product will need to have terms comparable with competitors.

### **Tied agents**

Tied agents are salespeople who are “tied” to one, or sometimes several, life insurance companies, that is they offer to their clients only the products of those companies.

Typically they may be the employees of a bank or other similar financial institution.

Where the tie is to more than one company, it will sometimes be the case that the product ranges of the companies are mutually exclusive, but more often there will be overlap.

Tied agents are remunerated by the companies to which they are tied. The remuneration could be in the form of commission payments or by salary plus bonuses.

It will often be the client who will initiate the sale, but some tied agents may actively engage in selling.

If the company already deals with tied agents then this method of distribution would be a good choice so long as the clients of the tied agents fit the target market.

### **Own salesforce**

Members of the salesforce of a company will usually be employees of the life insurance company and hence will only sell the products of that company.

They may be remunerated by commission or salary or a mixture of both.

It will usually be the salesperson who initiates a sale, making use of client lists. However, once he or she has built up a rapport with a particular client, it will then often be the latter who initiates further sales.

If the company employs its own salesforce then this is likely to be the logical solution. However, the target market at which this contract is aimed is unlikely to be on the existing client list as they are more likely to use a distribution method that gives them access to a wider range of product providers.

Training will need to be provided to the salesforce as this is a complicated product.

### **Direct marketing**

At present this takes four main forms:

- mailshots
- telephone selling
- press advertising
- internet selling

The instigator of the sale varies depending on the method used.

This is probably not a suitable method to use to distribute this product. Direct marketing is normally limited to simple products; here the complex nature of the contracts (the flexibility and charges) would require the product details to be explained in person.

However it may be possible to generate initial interest in this product through direct marketing in carefully selected media (e.g. high quality newspapers).

*This question was generally well answered although many candidates weren't able to elaborate or demonstrate a deeper level of knowledge to justify the answers they were giving. For example, not stating why high net worth individuals may have variable income and so flexibility over premium payment would be beneficial to them. In addition, many candidates didn't state which sales method would be the most appropriate and which would be inappropriate. Better candidates related the book work on sales channels to the question, rather than just providing the standard list of features of each sales channel.*

**3 (i) Without profits decreasing term assurance**

The product could be reinsured using original terms (also known as coinsurance).

This method involves the sharing of all aspects of the original contract.

The ceding company may supply the reinsurer with the premium rates it is using for the decreasing term assurance (DTA) it wishes to reinsure. In return the reinsurer will determine the level of reinsurance commission it is prepared to pay the company.

Alternatively, the reinsurer may provide reinsurance rates to the ceding company on which it can load for profit and costs.

There are two ways of specifying the amount to be reinsured, quota share and individual surplus.

Under quota share a fixed proportion of each policy is reinsured, so for DTA the amount reinsured on a policy reduces over the term of the contract.

For individual surplus the amount reinsured is the excess of the benefit over the ceding company's retention limit on an individual life.

It will depend on the exact terms of the treaty in place, but for DTA this may mean that smaller policy sizes will not be reinsured if the retention limit is above the sum assured selected by the policyholder and that as the sum assured reduces over time the policy may no longer remain reinsured.

Another method of reinsurance that could be used would be to use risk premium reinsurance.

Risk premium reinsurance is where the ceding company reinsures part of the DTA sum assured with the reinsurer on the reinsurer's premium basis.

The risk premium rates may be guaranteed or reviewable.

As with original terms the amount reinsured may be determined on a quota share or individual surplus basis.

(ii) **Unit-linked endowment assurance**

A company is unlikely to be able to gain reinsurance for the unit liability as the reinsurer would need to match the unit liability.

Reinsurance could be obtained to protect a company against the mortality risk that would exist from the guaranteed sum assured under the product.

Risk premium reinsurance is most likely to be used.

The amount reinsured can be on a quota share basis or an individual surplus basis.

(iii) **An insurance company which has a low level of solvency**

The company may use financial reinsurance to quickly improve its low level of solvency.

There are two primary types of financial reinsurance that can be used, asset enhancing and liability reduction.

For asset enhancing, the reinsurer gives the company funds, with repayment contingent on the future emergence of the pricing and reserving margin, in the form of cash, over a given number of years.

This increases the assets in the regulatory balance sheet, but has no impact on the amount of liabilities as repayment is contingent on the future emergence of the margins.

There will be little to no change in the realistic accounts.

Liability reduction is often known as virtual capital or time-deferred-stop-loss.

The reinsurer agrees to cover a set amount of claims relating to policies of the longest term within the reinsured block of business.

The company can then reduce its liabilities by the set amount and assets are marginally reduced, by the reinsurance fee.

As the future margins emerge as cashflows over time the company recaptures the risk.

Company X may also use other types of reinsurance (if it is not already) to increase its solvency level in the longer term. This would help to reduce total claim payouts, claim fluctuations and reduce new business strain.

A company with low solvency would need to take particular care over its choice of reinsurer to minimise counterparty risk.

*This question was relatively poorly answered despite being a bookwork type question. The better candidates recognised which types of reinsurance were appropriate, and gave valid reasons. These candidates scored better than those who purely listed all types of reinsurance, whether relevant or not, and did not consider the type of business in the questions. For example, better candidates recognised that a reinsurer could not cover the unit liability of unit-linked business.*

- 4** (i) Dynamic solvency testing is the assessment of a life insurance company's future solvency position under a range of different economic and company specific circumstances.

It involves projecting the life insurer's balance sheet and revenue account forward for a number of years and looking at the insurer's solvency position in each of those years.

The projection needs to be for a sufficient period of years that the full effect of any potential risks may become apparent.

In particular, the life insurance company's ability to withstand future changes (in both the external economic environment and the particular experience of the company) would be investigated.

The projections could be done deterministically by stressing the relevant assumptions to test the effect of adverse future experience or the projections could be carried out using stochastic assumptions, with simulation to assess the level of probability of such adverse circumstances occurring (i.e. the probability of ruin).

When carrying out dynamic solvency testing consideration has to be given as to whether to allow for new business or not in the projections.

Assuming that the insurer is open to new business then allowing for new business is likely to give a more realistic assessment of the company's ability to withstand future adverse events.

Analysis of the impact of new business would influence the company's new business strategy and future development plans.

- (ii) In terms of solvency position, assume that we are looking at the impact on the company's statutory free assets, i.e. on the statutory valuation basis including any solvency capital.

Considering first of all how each of the events is likely to have impacted the current solvency position of the company:

**A reduction in sales of 25% of the previous year's levels:**

When written, new business normally causes capital strain due to high acquisition expenses and initial reserving and solvency capital requirements.

The fall in new business will therefore reduce this new business strain.

However, the company may have experienced a change in the mix of business, e.g. a recession may lead to fewer policyholders taking out discretionary savings products. Hence whether the new business strain has actually fallen this year compared to the previous year will depend on the mix of business written.

The reduction in sales is likely to increase the per policy expenses on the remaining business as costs are spread over a smaller book. This could contribute to a worsening solvency position.

**Worsening lapse experience on its unit-linked savings portfolio:**

It is not clear to what extent the company has to hold statutory non-unit reserves and solvency capital for these unit-linked savings contracts. This will depend on the local regulations depending on which country the life insurance company operates in.

The worsening lapse experience will result in higher statutory reserves and solvency capital being released than expected if the surrender values paid are less than the total of unit reserve, non-unit reserve and solvency capital.

In addition there may be a knock-on impact that, due to the higher lapses, the per policy expenses on the remaining business may increase, which could contribute to a worsening solvency position.

**A fall in equity markets of 25% and in corporate bond prices of 30%:**

We are told that the company is invested 40% in corporate bonds and 30% in equities and assuming that the company is widely diversified and hence experiences the same losses as the overall market, then the market value of the company's assets has fallen by  $[(40\% \times 0.3) + (30\% \times 0.25)] = 12\% + 7.5\% =$  approx. 19.5% (ignoring any change in value of the government bonds).

Unit reserves will reduce but this will be offset by a reduction in backing assets.

The statutory reserves may be valued using the yields derived from the underlying portfolio of assets held.

The fall in corporate bond prices means that the yield on corporate bonds has increased, as has the dividend yield on equities.

The rise in corporate bond yields will result in a rise in the valuation interest rate which will reduce the liabilities.

Whilst the valuation interest rate may increase, due to the increased yields on the equity and corporate bond assets, it is unlikely to increase to the same extent as the actual increase in the yields.



Hence the statutory value of the liabilities may fall, but not by as much as the fall in the value of the assets.

The relative impact also depends on the degree to which statutory liabilities and assets are matched by term.

If the solvency capital is defined as a % of statutory reserves, solvency capital may also fall.

The future fee income expected on the unit-linked savings business will have fallen dramatically as a result of the fall in the equity and corporate bond markets.

If this future fee income is allowed for in the calculation of the non-unit reserves then the drop in expected future fee income (due to the lower unit fund values) is likely to lead to an increase in the non-unit reserves (or a reduction in negative non-unit reserves).

The cost of guarantees is also likely to have increased as a result of the falls in asset values.

It seems likely that overall, the fall in equity markets and corporate bond markets, is likely to have significantly worsened the overall solvency position of the company.

### **General comments**

Whilst it is not possible to know for sure the overall impact on the solvency position of the life insurer, the fall in the asset markets seems most likely to be the event that drives the overall impact on the company.

Although this impact may be mitigated to some extent by actions taken by the management.

The first two events impact the level of one year's worth of new business (which is likely to be a small impact in relation to the size of the in-force book for a well established insurer) and the level of lapses on one part of the product portfolio.

It should be recognised that lower sales does not automatically mean that the company's solvency position will have improved. This depends on the balance between the level of new business strain and the surpluses being released from existing business, and the extent that any new business strain is mitigated by reinsurance financing.

But overall it seems likely that the solvency position of the company will have worsened as a result of the combination of the three events mentioned.

- (iii) Although it is possible that the situation will improve, this is not guaranteed and there may be future deterioration in experience.

The life insurer has a responsibility to ensure that it remains solvent in all possible foreseeable events.

And the local regulator is likely to also want the company to be able to demonstrate that it will remain solvent in all possible foreseeable events.

Dynamic solvency testing is particularly useful in this context, especially where stochastic simulations are used, with probability weights attached to each stochastic projection, since this will provide the insurer with insight into the future solvency position of the company in a range of “what if” scenarios.

Hence the insurer can investigate what would happen to the projected solvency position of the company in a range of economic scenarios. This would include a wide variety of scenarios such as:

- A scenario similar to the one that the marketing director anticipates, where equity and corporate bond prices revive, sales volumes return to more normal levels and lapses return to the long term assumed levels. Whilst interesting, this is likely to be the “best case” scenario.
- A scenario where conditions continue to worsen where one or more of the following scenarios are included – sales volumes continue to deteriorate, continued change in mix of business, continued deterioration in persistency or further falls in stock markets

A number of different versions of this scenario are likely to be tested e.g. specific shock events (1 day fall in stock market of further 20%), long term steady deterioration etc.

The recent events might have resulted in the company changing its views of constitutes a reasonable “adverse scenario”, particularly if the actual events were worse than those previously anticipated.

If the company does its dynamic solvency testing stochastically then it will have to recalibrate its economic assumptions to the current conditions, which may for example have higher volatility than previously.

The insurer will project the balance sheet and the income statement for a number of years under each of these economic scenarios. The company will be able to analyse the impact on its solvency position in each future time period.

The insurer may explore the impact of each event separately initially, and then combinations of events, to better understand the knock on possible impact of a number of events occurring at the same time.

The insurer will be able to explore how it could improve its solvency position in certain events by considering the management actions that it could take in response to certain events e.g. reducing bonuses/crediting rates, increasing mortality charges, increasing AMC's/policy fees etc.

In extremely negative scenarios, the insurer may want to consider the impact of more strategic events, such as closing particular lines of business or distribution channels, changing the business mix significantly, introducing new low-cost distribution channels, stopping sales in particular geographic regions etc.

The investigations should be updated frequently (especially during times of uncertainty), such that the Board of Directors can use the information to monitor the solvency position of the company.

Investigations should be made into the reasons behind the movements and potential impacts on expectations of the future. This could include seeking expert external opinions.

*This question was poorly answered. Part (i) was bookwork but many candidates missed out on basic points. In part (ii) the better candidates discussed the impact of reduced sales on both NB strain and future expenses. For increases in lapses they recognised that the company would have been holding a reserve; poorer candidates did not consider this and purely considered the outgo from the surrender. For the market fall part of the question a number of candidates failed to consider the impact on both assets and liabilities. Better candidates also included comments on the level of matching and the impact on non-unit reserves. Part (iii) was poorly answered by many candidates and only the exceptional candidates recognised the need to use dynamic solvency testing, despite it being the subject of the first two parts of the question.*

- 5** (i) The reserves should be sufficient to meet all liabilities arising out of the contract.

The reserves should be calculated by a suitably prudent actuarial approach.

The reserve should be at least as great as the guaranteed surrender value (i.e. the face value of units).

Non-unit reserves should be held.

The reserves should cover future expenses, including commission.

The reserves should take credit for premiums due to be paid under the terms of each policy.

A prudent valuation is not a “best estimate” valuation and should include appropriate margin for adverse deviation of the relevant factors.

Valuation should take account of nature, term and method of valuation of corresponding assets.

Use of appropriate approximations and generalisations is allowed.

Valuation rate of interest for the non-unit reserve should be chosen prudently taking into account currency of policy and having regards for yields on corresponding existing assets and yield expected to be obtained on sums invested in the future.

Demographic and persistency assumptions should have regard to type of business and country of residence.

Method should recognise profit in an appropriate way.

The method should not be subject to discontinuities arising from arbitrary changes to the valuation basis.

Method and bases should be disclosed.

- (ii) The reserve will comprise two components: a unit reserve and non-unit reserve.

Unit reserve equal to the value of units held at the valuation date.

As the contract has surrender penalties the company could use actuarial funding to hold reserves less than unit value.

Consider year-by-year (or month-by-month) occurrence of non-unit related cashflows.

Project forward unit reserves including allowance for allocated premiums, fund charges, investment return etc

Project forward non-unit cashflows on reserving basis allowing for the following items:

- charges received (AMCs, policy fees)
- bid/offer spread
- expenses expected to be incurred in the future
- commission expected to be paid
- mortality charges received
- expected death claims in excess of the unit fund
- surrender penalties

Perform projections on a policy-by-policy basis and start with last projection period in which net cash flow becomes negative.

Amount set up at start of this period sufficient to zeroise negative cashflows, after allowing for earned investment return over the period.

This amount is then deducted from the net cash flow at the end of the previous time period.

The process continues to work backwards towards valuation date with each negative being zeroised.

If adjusted cash flow at the valuation date is negative then a non-unit reserve is set up equal to this absolute amount.

As there are surrender penalties it may be permissible to hold negative non-unit reserves, subject to certain other conditions being met. For example, total reserve should be greater than or equal to the surrender value.

Ensure that the relevant reporting regulations of the local country are met and hold a mismatch reserve if required.

**(iii) Data**

May be valuing cancelled policies in error.

May be missing some policies.

Inadequate/incomplete policy data e.g. premiums, maturity date, age etc.

Data errors (e.g. decimal point in wrong place when input).

Unit reserve incorrect due to unit pricing error.

Reinsured business incorrectly allowed for (e.g. incorrectly marked as reinsured or the treatment of the reinsurance in the valuation does not reflect the actual treaty).

Using “rolled forward” rather than actual data, due to reporting deadline pressures.

**Assumptions**

Valuation basis not prudent enough or may be excessively prudent.

Demographic assumptions may not reflect latest expected future experience of business.

Valuation interest rate may not reflect assets backing the business.

Assumptions may not allow for known future changes e.g. expenses.

Surrender assumptions may not reflect impact of surrender penalties.

**Other**

Potential calculation errors in any manual reserves or using inappropriate approximations.

Errors in automated valuation systems, e.g. due to lack of testing.

Basis may not be documented adequately.

Not keeping up with guidance/regulatory changes.

Model not including all relevant product features.

*Part (i) was bookwork which was generally well answered although key items of the bookwork were missed by many candidates. In part (ii) candidates who could logically describe how a non-unit reserve was calculated scored well, although many candidates failed to mention that a unit reserve needed to be calculated and projected. Part (iii) was poorly answered, many candidates focused on one area rather than thinking widely. For example, considering many types of problems with assumptions but not considering issues with data or models.*

- 6** (i) Using the conventional method, the information we require is:

$$A_{[60]} = 0.45510$$

$$A_{65} = 0.52786$$

$$\ddot{a}_{[60]} = 14.167$$

$$\ddot{a}_{65} = 12.276$$

$$D_{[60]} = 880.56$$

$$D_{65} = 689.23$$

$$\ddot{a}_{[60]:5} = 4.559$$

$$A_{[65]} = 0.52550$$

$$\ddot{a}_{[65]} = 12.337$$

The expected present value of the benefit is:

$$EPV(B) = 10,000 * (A_{[60]} + D_{65}/D_{[60]} * A_{65})$$

$$= 10,000 * (0.45510 + 689.23/880.56 * 0.52786) = 8682.7$$

The expected value of premium income is:

$$EPV(P) = P(A_{[60]}) \ddot{a}_{[60]} + P(A_{[65]}) * D_{65}/D_{[60]} * \ddot{a}_{65}$$

$$P(A_{[60]}) = 10,000 * A_{[60]} / \ddot{a}_{[60]} = 10,000 * 0.45510 / 14.167 = 321.24$$

$$P(A_{[65]}) = 10,000 * A_{[65]} / \ddot{a}_{[65]} = 10,000 * 0.52550 / 12.337 = 425.95$$

$$321.24 * 14.167 + 425.95 * 689.23/880.56 * 12.276 = 8643.8$$

So the expected present value of the option is  $8682.7 - 8643.8 = 38.90$

*Credit was given if candidates approached this part by taking the value of the difference in the theoretical premium less actual i.e.  $P(A_{65}) = 430$  and so:*

$$(430 - 425.95) * 12.276 * 689.23/880.56 = 38.915$$

This must equal the expected present value of the extra premium to cover the option cost, so:

$$P(\text{extra}) \ddot{a}_{[60]:5} = 38.90 \text{ (or 38.81 if used unrounded numbers)}$$

$$P(\text{extra}) = 38.90/4.559 = 8.53 \text{ (or 8.51 if used unrounded numbers)}$$

*Where candidates used different methods, appropriate credit was given provided full workings were shown.*

- (ii) One way of determining the take up rate is to calculate the rate required such that the ultimate mortality at age 65 can be derived from the assumed rates for healthy and unhealthy lives.

The ultimate mortality rate at 65 = 0.014243

The rate of those who take the option 65 + 5 = 0.024783

The rate of those who do not take the option 65 – 1 = 0.012716

Assuming 100% of those who would benefit from the option will take the option, we can equate the percentage ( $x$ ) that take the option from the following equation:

$$x * 0.024783 + (1 - x) * 0.012716 = 0.014243$$

$$\text{so } x = 0.12654$$

*Other methods were given credit provided full workings and assumptions were shown.*

Using the North American method:

The expected present value of the cost of providing the option is the expected present value of the benefits less the expected present value of the premiums.

The additional information we need is:

$$A'_{65} = A_{70} = 0.60097$$

$$\ddot{a}'_{65} = \ddot{a}_{70} = 10.375$$

The expected present value of the benefits is:

$$EPV(B) = 10,000 * (A_{[60]} + 0.1265 * D_{65}/D_{[60]} * A'_{65})$$

$$EPV(B) = 10,000 * (0.45510 + 0.12654 * 689.23/880.56 * 0.60097) = 5146.0$$

The expected present value of the premiums (excluding the extra premium) is:

$$EPV(P) = 321.24 * \ddot{a}_{[60]} + D_{65}/D_{[60]} * 0.1265 * \ddot{a}'_{65} * 425.95$$

$$= 321.24 * 14.167 + 689.23/880.56 * 0.12654 * 10.375 * 425.95 = 4988.7$$

The expected present value of the additional cost of the option is therefore:

$$5,146.2 - 4,988.7 = 157.5$$

*Credit was also given where the value of the premiums saved was calculated instead, i.e.*

$$10,000 * A_{70} / \ddot{a}_{70} = 10,000 * 0.60097 / 10.375 = 579.25$$

$$0.12654 * (579.25 - 425.95) * 10.375 * 689.23/880.56 = 157.53$$

$$P(\text{extra}) * \ddot{a}_{[60]:5} = 157.5$$

$$P(\text{extra}) = 157.5 / 4.559 = 34.55$$

*Credit was also given if candidates followed the approach of disaggregating the contract fully from year 5 then give relevant marks for the workings. The answer would be different but valid:*

$$\begin{aligned} EPV(B) &= 10,000 * (0.45510 - 689.23/880.56 * 0.52786) \\ &+ (0.1265 * 20000 * 0.60097 + (1 - 0.1265) * 0.51333 * 10000) \\ &* 689.23/880.56 = 5119.1 \end{aligned}$$

$$\begin{aligned} EPV(P) &= 321.24 * (4.559 + 689.3/880.56 * (10.375 * 0.1265 \\ &+ (1 - 0.12654) * 12.653)) + 425.95 * 689.3/880.56 * 0.1265 * 10.375 \\ &= 5011.3 \end{aligned}$$

*So option = 107.8*

*Note it is important that the candidate recognised that the total mortality post year 5 is ultimate and does not assume that those not taken the option are ultimate on their own.*

- (iii) The North American method gives a significantly higher cost than the conventional method.

There will be an impact for the fact that the assumed take up rate is based on the  $q$  at age 65 whereas the costs include valuing benefits using mortality for the rest of life, and the proportion with higher mortality would not remain at this fixed level. However this is unlikely to be the main reason.

The key reasons that the cost for the conventional method is lower is because there is the assumption that 100% of policyholders take the option and the assumed mortality is different. Those with healthier lives have mortality rates which are lower than those assumed in the new policy pricing basis, even allowing for the selection allowance in the pricing.

These policyholders are paying more than the cost of their benefits and so are subsidising the policyholders in ill health.



It is unlikely that these policyholders could get special rates on the market due to them having slightly lower mortality than the select rates imply, and so they may well take the option.

However, since they could get standard rates based on select mortality in any case, it is optimistic to assume that 100% would take the option.

Therefore the cost based on the conventional method is likely to be too low.

- (iv) The insurer should adopt continual monitoring and review of the benefits of options versus their costs.

At an objective level, the insurer should seek to monitor the charges/loadings included for options in the product pricing with the actual costs being experienced.

The analysis should look separately at both the uptake rate for the option and the profit or loss which arises once an option is exercised.

Mortality experience analyses should be performed looking at those who take the options and those who don't as well as looking at the combined experience.

If these assessments show that the continued availability of the option, even allowing for a subjective assessment of the increased marketability which the option brings, carries a net loss for the insurer then the option's pricing should be increased and/or its availability should be reduced or removed altogether.

The time lag between removal of an option and the impact on experience emerging must be borne in mind. It is easier, legally, to amend suitably the terms of new business written.

It may also be possible to reduce the impact of options under existing business by a strict interpretation of policy literature, subject always to the interpretation satisfying policyholders' reasonable expectations.

The company could also ensure that initial underwriting is appropriately strict, taking into account the potential future option.

The company may use reinsurance to manage the overall risk, although the reinsurer will include charges to reflect the uncertainty regarding the option.

The company could add margins in both the pricing of the option and the valuation bases until adequate data is determined.

*The answers to this question were very mixed. Candidates generally answered part (i) well but struggled with the other parts. Marks were awarded for all valid approaches. Many students lost marks for looking up incorrect values from the actuarial tables, however follow through marks were awarded if this was the only mistake. In part (ii) many candidates lost marks for using a too simplified approach for the take-up assumption. Parts (iii) and (iv)*

*were poorly answered. Many candidates in part (iii) purely stated the difference between the two approaches but did not expand wider to consider points such as healthy policyholders cross-subsidising those in ill-health. In part (iv) most candidates mentioned reinsurance and underwriting but only the better candidates considered performing experience analyses for take-up and mortality, and reviewing the rates following such reviews.*

## **END OF EXAMINERS' REPORT**