Subject ST2 — Life Insurance
Specialist Technical

September 2009 examinations

EXAMINER'S 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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Comments for individual questions are given with the solutions that follow.

1

(i) Models will need to satisfy the following requirements:

- The model must be valid for the purpose to which it is being put.
- The model must be rigorous and adequately documented.
- The model points chosen must reflect adequately the distribution of the business being modelled.
- The parameters used must allow for all those features of the business being modelled that could significantly affect the advice being given.
- The inputs to the parameter values should be appropriate to the business being modelled and take into account the special features of the company and the economic and business environment in which it is operating.
- The outputs from the model should be capable of independent verification for reasonableness and should be communicable to those to whom advice will be given.
- However, the model must not be overly complex so that either the results become difficult to interpret and communicate or the model becomes too long or expensive to run.

(ii) A model for projecting life insurance business needs to allow for all of the cashflows that arise. These will depend on the nature of the contract, in terms of its premium and benefit structure and any discretionary benefits, such as non-guaranteed surrender values.

It also needs to allow, where appropriate, for the cashflows arising from any supervisory requirement to hold reserves and to maintain an adequate margin of solvency.

The cashflows need to allow for any interactions, particularly where the assets and the liabilities are being modelled together.

The potential cashflows need to allow for options under the business being modelled, for example, health options such as being able to effect a new term assurance without the need for further evidence of health.

Where appropriate, the use of stochastic models and simulations need to be allowed for in order to assess the impact of financial guarantees.

The time period for calculating the cashflows in the projection needs to be chosen bearing in mind that:

- the more frequently the cashflows are calculated the more reliable the output from the model.
- the less frequently the cashflows are calculated the faster the model can be run and results obtained.

The projection period will need to be considered, depending on the use to which the model will be put.

Both parts of the question were standard bookwork, candidates generally found part (i) straightforward. Part (ii) was less well answered where the most common mistake made by candidates was to replicate part of the answer from part (i).

2

(i) Policy Data Risks

The main actuarial reason for needing policy data is so that a regular valuation of the liabilities can be carried out, usually, but not exclusively, for insurance supervisory purposes.

The life insurance company will maintain this data and the actuary carrying out a valuation will not, usually, have a direct control over them.

There is, therefore, a risk that the company will not maintain the adequate records required by the actuary and hence the result of the valuation will not itself be accurate.

Data records may have been recorded inaccurately (i.e. containing errors), or they may not be complete or may be out of date. This may lead to incorrect benefit payments being made, which, in turn, may lead to customer service or regulatory issues.

A similar point relates to policy data required for any internal investigations carried out by the actuary in order to give appropriate advice to the company.

For some investigations a model of the whole or part of the business of the company may be used (e.g. the use of model points). There will be a risk that this model does not adequately represent that business.

There is a risk that any data extraction routines used may be wrong.

(ii) Policy Data Checks

A reconciliation of the current data with those used for the previous analysis can be attempted. The data are first grouped in some sensible way, for example, by year of entry within each broad contract type.

Using data similarly grouped relating to business that has come onto the company's books and gone off between the dates of the two investigations, the following check is made for each group:

Data at previous investigation + business on – business off = data at current investigation.

The above can check the following items of data:

- the number of contracts;
- the number of units actually allocated sub-divided by fund;
- current premium payable;
- current benefits available, e.g. amount of death cover.

The reconciliation also needs to allow for items such as:

- changes in the number of units allocated arising from switches between unitised funds.
- changes in the premium payable and benefits under existing contracts.

The movements data should in addition be checked against any appropriate accounting data, especially with regard to benefit payments, for example:

- A check that the numbers of units purchased by premiums and encashed to pay benefits are consistent with the corresponding revenue account items.
- A check that internal unit movements, for example charges and encashments, are consistent with the surplus emerging during the year.

Checks should be made for any unusual values, for example:

- very large or zero unit values;
- impossible dates of birth or retirement ages or start dates.

As well as looking at individual values, it may also be possible to group items and look at how well distributed they are. For example, an unusually high clustering of birth month may represent a data input error worthy of further investigation.

It is good practice to compare an extract of the computer held data with the information in the paper administration files. This can be done on a spot check basis by randomly selecting a number of policies.

A check should be made to see if there have been any changes to the data extraction process or the system holding the data that might have affected the information provided.

Answers to part (i) were reasonable, most candidates were able to identify the main issues, but did not then link that in to the risk of using the data. Part (ii) was typically well answered, with most well prepared candidates able to generate a variety of checks that could be employed.

3

(i) Reinsurance normally passes a share of the profits from the business to a third party. The company may wish to keep a larger share of the profits. In particular rates applied by reinsurers may have hardened thus increasing the cost to the life insurance company and reducing its profits further.

The company is growing and may now feel it has a diverse enough portfolio to be able to accept more risk.

It may have taken out reinsurance to get support on pricing and other aspects and may now feel it has enough experience to manage such a process on its own.

The company may have increased its risk appetite and as such is prepared to take more risk.

The tax or regulatory treatment of reinsurance may have changed, hence reducing the attractiveness of the arrangement to the insurer.

The company may have concerns over the solvency of the reinsurer or have had a commercial disagreement with the reinsurer.

The financial strength of the company may have improved, so it may be more able to withstand adverse events and/or need less financing commission.

(ii) The company will be exposed to the full amount of claims. This will increase the volatility of its experience and will lead to more volatility in its profits.

It also means that the company is much more exposed to risks from large individual sum assureds, concentrations of risk, catastrophes and large random fluctuations, which could jeopardise solvency, particularly since the company is still small.

As reserving bases are normally stronger than pricing bases, term assurance usually requires reserves to be set up in respect of future claims. Solvency margins are also required as a percentage of reserves and sum at risk. Removing reassurance will increase both reserves and solvency margin requirements. This would increase any pressure on the company's solvency position.

Even if solvency is not an issue, the proposal may also constrain the company's ability to grow its new business due to the increased new business strain, particularly if the reinsurance arrangement included financing commission.

Pricing risk may be increased, if the reinsurer has been providing technical support.

On the positive side the reduction in reinsurance will reduce the counterparty default risk to which the insurer is exposed.

(iii) Claims fluctuations may be managed by limiting the size of individual policies for new business. In particular, it may choose to market fixed size policies to encourage a spread of smaller policies.

It may also be managed by ensuring a spread of business by geographical region and / or occupation.

The company may also choose to increase its profit margins, in respect of the additional risk taken on, through its premium rates, or by introducing reviewable premiums.

The increased reserving issues may be controlled by different forms of reinsurance. The company may take out excess of loss cover, catastrophe reinsurance, or stop loss cover. Rather than reinsuring claims the company may seek financing reinsurance to reduce capital strains.

Equally it may seek a further capital injection from its shareholders if it can demonstrate the returns from taking on this extra risk.

More generally the experience can be managed through tighter underwriting.

In particular, larger policies may be heavily underwritten to ensure only the lowest risk policies are accepted. In addition the company may add additional premiums to cases deemed higher risk.

It may also diversify its risk through introducing new product lines.

The company may use other sources of information (e.g. industry statistics or its own experience) to mitigate any pricing risk.

Part (i) was well answered, a few candidates failed to read the question and subsequently provided an answer to why companies reinsure. Part (ii) was adequately answered with better candidates able to provide a spread of impacts from removing reinsurance. Part (iii) was less well answered – better candidates provided structured answers based on the risks identified in part (ii).

4

(i) Insurance Intermediaries (IFAs)

- These are independent of any particular life insurance company. They aim to find the best terms available to clients through either better benefits or lower premiums.
- Often the client will initiate the sale by making contact with the IFA.
- However once an IFA has a customer on their books they may instigate reviews, which lead to repeat business.

Tied Agents

- These are salespeople who are tied to one or a few insurance companies.
- They may be an employee of a bank or other financial institution.
- Often the client will initiate the sale with this channel, drawn in by advertising in or outside high street branches.
- However, such agents may try to actively promote their insurance product e.g. to customers paying in deposits into bank accounts.

Own Sales force

- These are employees of an insurance company so only sell their products.
- Here the sale is often initiated by the seller who actively builds his own client list.
- However, once a relationship is established clients may approach the seller with repeat business.

Direct Sales

- These may be through a variety of media including mail shots, telesales, press adverts and internet.
- In the case of mail shots it is the company who initiates the sale. In the case of others it may be a blend of client or company.
- Products in this channel tend to be simpler as there is less direct contact with the client to make explanations.

(ii) The main cost associated with IFAs is the commission payable in respect of sales. There may also be an element of internal cost managing IFA relationships. Increasingly, instead of by commission, IFAs are paid a fee directly by their client. However, the cost to the company is likely to remain the same as the commission allowance is likely to be applied back to the client's product.

With Tied Agents there may be some fixed overhead cost internal to the insurance company in the form of relationship management support. The primary cost is however commission payable to the tied agent based on sales.

With a Direct Sales Force the main cost of this channel is the cost of the sales force itself. This has a fixed element including a base salary and other benefits such as pension and national insurance contributions as well as the cost of any office space. It also normally has a variable element being commission / bonus payable on sales performance.

The costs associated with the Direct Sales channel depend on the type of media used. They range from the cost of setting up and maintaining a website, the staff cost of a telesales team or, as with the other channels, the costs of producing and publishing marketing materials and mail shots.

Ongoing maintenance costs for all channels will include premium collection, policy administration and policyholder/adviser communication.

Both parts of the question were well answered. A number of candidates included details of costs in both parts – whilst candidates obtained the marks for part (ii), this undoubtedly wasted time in the exam.

5

(i) An Endowment Assurance contract acts as a savings contract and provides a benefit on survival to a defined date. It normally also provides a benefit on death during the contract term. It therefore also operates as a protection contract for the life assureds' dependents.

The savings benefit is linked to returns on assets that the premiums paid are invested in. The customer can choose from a range of available unit funds, and takes the investment risk.

The death benefit may be higher than the underlying value of the investments giving rise to a mortality risk to the insurance company. This is normally charged for directly as a fraction of the at risk amount payable by unit deduction.

Other charges are taken to cover the company's expenses including ongoing administration and fund management. These are normally taken via a combination of a level annual management charge, a bid/offer spread, premium allocation rates and monthly unit deductions.

Alternative charging structures include an initial charge payable to cover set up costs including commissions. However for marketing reasons such charges

may be avoided giving rise to some risks from early surrenders that may be loaded into the overall annual management charge.

Normally the value of the unit fund is payable on withdrawal part way through the contract term. This may be reduced by a surrender penalty in early years in particular if the set up costs are recouped out of ongoing annual management charges.

Often premiums are payable regularly (normally monthly) but there may also be single premium contracts available.

There may be riders such as waiver of premium on sickness or unemployment.

(ii) As unemployment is high there are less people in work, which reduces the number of people who can afford to take out assurance products. This is likely to be compounded by confidence of those who are in work being knocked by the economic situation. They too may be less willing to take out insurance products.

There may be more waiver of premium claims (if rider benefit available) as a result of unemployment or sickness (e.g. stress related).

If house prices are falling it is likely to reduce the number of people buying houses. As endowment assurances may be used to back a house purchase this may also reduce the potential market for sales.

Overall sales of the product are likely to be lower.

In addition, the higher unemployment is likely to lead to a number of people struggling to keep up with regular bills. This may lead to people stopping making regular payments into their policy and use premiums for other bills, or fully surrendering their policy (e.g. if house is repossessed). The reduced premiums and higher surrenders will reduce the level of income the company receives through charges.

The economic conditions may well include falls in the values of investments, which will compound this problem if some of the company revenue is through an annual management charge and linked to market values.

In addition losses may be made on early lapses if charges not recouped upfront.

Falls in stock market prices will also reduce investor confidence and unit-linked products may become less popular.

Part (i) was well answered, with most candidates able to provide a wide spread of points. Part (ii) was adequately answered, with most candidates linking unemployment with the ability to pay premiums.

6

(i) Profitability

- meet shareholders required return on capital.
- cover initial development costs and other expenses.

- profit per contract x volumes is important, as well as required profit margin on each policy sold.
- initial development costs likely to be low as enhancing an existing product (e.g. no new major system development costs or new marketing literature).

Marketability

- The level of intermediaries' commission will be important in this market as the market is highly competitive and transfers are initiated by intermediaries.
- Need to consider whether to pay commission as initial or renewal commission on regular premiums received in the future.
- Need to consider what is to be the differentiator to make product attractive in competitive market. For example, a good range of investment funds available.
- The company is already a player in the unit-linked endowment assurance market and so is unlikely to need to increase its brand awareness.

Competition

- Consider products offered by competitors and whether they have products targeted at the transfer market.
- Consider the charges and commission offered by the competition.

Financing requirements

- Wish to minimise financing requirements.
- Low new business strain as receiving single premium on day one, which is likely to cover policy, set up costs and initial commission.

Need to consider risk characteristics

- Due to the nature of the market there is a risk of higher transfer rates on this business, especially in the early years, which would likely result in a significant loss of future profits.
- There is a potential risk of mis-selling.
- There is a need to consider any guarantees offered, e.g. as part of the death benefit.

Need to consider sensitivity of profit

- Company would not want profits being too sensitive to changes in experience.
- Unit-linked product so profit will be dependent on charges received and commission/expenses incurred.
- The sensitivity of profit to policy size could be reduced by varying the charges with the size of the initial transfer value.

- Could also reduce sensitivity of profit by having variable fund charges, but this then reduces marketability.

Consistency with other products

- The initial transfer value is likely to be larger than initial premiums received from new endowment assurance business and as such lower charges can be offered.
- If the company is offering additional enhancements to attract business from other companies, then the company will have to consider whether this is fair to genuine "new" policyholders who would be on less attractive terms.
- If the enhanced terms are to be offered to new customers there is a need to consider the impact on the existing book of policies.

Other considerations

- Large volumes of transfers will potentially have an impact on administration staff and their ability to cope.
- Extent of cross-subsidies. As the company is targeting transfer business, by definition, there are going to be few cross-subsidies.
- The company will have to consider any regulatory or tax requirements.

(ii) Addition of sufficiently high transfer penalties in the early years to discourage policyholders from transferring their policy.

Addition of a loyalty bonus to the product to encourage the policyholder not to transfer the contract, for example, lower charges once the policy has been in force for a number of years.

Recovery (or claw back) of a portion of the initial commission when the policy transfers in early years.

Trail commission, for example, commission not paid on day one but instead paid over the policy lifetime dependent on fund size or dependent paid at time future premiums are received.

Monitor persistency by intermediary and offer enhanced terms for those with good persistency. Maintain a list of intermediaries the company does not want to do business with due to past exceptionally high turnover of business.

Monitor persistency frequently and update experience assumptions in pricing and valuation models appropriately.

Put in place a customer retention team to speak to customers when they initially request to transfer away from the company.

Improve customer service so customers do not want to leave.

Improve marketing and branding of the company so customers do not want to leave.

Reduce the opportunities for the policyholder to lapse, for example, ensure any future ongoing premiums are received through automated premium collection.

Reduce the policyholder's incentive to switch by having more competitive benefits and charges than its competitors.

(iii) Policyholder funds at retirement are insufficient to purchase an immediate annuity at the guaranteed level so company has to bear the strain. The company may not have sufficient capital available to bear the strain, but reserving requirements mean the company will have to reserve for a guarantee at retirement, so sufficient capital should have been set aside.

The strain may be due to annuity conversion rates moving against the company over time. Either through lower interest rates at retirement compared to those assumed when accepting the guarantee; or improved longevity assumptions resulting in lower annuity conversion rates; or the unit-linked endowment investment funds performing poorly over the lifetime of the policy; or volatile fund performance close to retirement resulting in insufficient policyholder fund value at retirement to provide for the guarantee.

The policyholder fund may only be sufficient to provide for the guaranteed annuity and no additional annuity, leading to bad press.

Anti-selection risk if pricing terms for accepting the guarantee are less than competitors.

There may be reputational risk through alleged mis-selling if a guarantee is lost (e.g. on future premiums) and policyholders do not immediately realise they have lost it.

(iv) Split the transfer value into the proportion deemed to be backing the guarantee and the non-guaranteed proportion. Apply higher charges on the transfer value relating to guaranteed minimum annuity to meet the cost of the guarantee.

Apply an additional loading to the risk discount rate used in pricing to reflect the extra risk.

Offer a restricted fund choice for the transfer value required for the guaranteed minimum annuity. For example, less volatile funds with a high fixed interest backing.

Apply automatic switching into less volatile funds close to retirement on funds backing the guaranteed minimum annuity.

Require a minimum amount of transfer value before accepting guaranteed annuity.

Not accept business with the guaranteed minimum annuity or from companies previously offering generous guarantees. Not accept business with the guaranteed minimum annuity when policy has less than a certain number of years before retirement.

Use derivatives to remove the investment related risk or longevity swaps to hedge the mortality risk.

Reinsure the guarantee with an external reinsurer.

The potential reputational risk can be avoided by appropriate disclosure at the point of sale and with appropriate sales training.

The company could consider buying out the guarantee from policyholders at the point of transfer.

Part (i) was reasonably answered, most candidates structured their answers around the appropriate headings but then failed to go into sufficient detail. Part (ii) was a relatively straightforward question, however a number of candidates failed to score highly. Very few candidates included persistency monitoring in their answers. Parts (iii) and (iv) were poorly answered, in part (iii) at best most answers only briefly mentioned lower interest rates, longevity risk and poor fund performance. In part (iv) a number of candidates concentrated on the matching of the annuity payments and expenses once the annuity was in payment, which was not required.

7

(i) Embedded Value is the present value of future shareholder profit stream from existing business plus the value of any net assets attributable to shareholders.

(ii) Components of EV are

Shareholder share of net assets

Net assets = excess of assets over those required to cover liabilities.

Assets valued at market value, they may be discounted to allow for the lock in of any assets required to cover solvency requirements.

Present value of future shareholder profits arising from existing business

The process is similar to performing a profit test, except that some items will not be required (e.g. new business expenses).

Conventional without profit business

For without profits business the embedded value is effectively the release of margins within the solvency reserves relative to the assumptions used within the embedded value calculation. The embedded value is

- Present value of future premiums plus investment income;
- Less claims and expenses;
- Plus release of solvency reserves.
- Where these must be consistent with those used in the determination of the net assets (e.g. whether they do or do not include solvency capital in addition to basic reserves).

Unit-linked business

The embedded value is

- Present value of future charges, including surrender penalties;
- Less expenses and benefits in excess of unit fund;
- Plus investment income on non-unit reserves;
- Plus any release of any non-unit reserves.

Conventional with profits business

The embedded value is

- Present value of any future shareholder transfers, e.g. as generated by bonus declarations.

For all business: allow for tax as appropriate

(iii) The present value of future profits (PVFP) calculation will require both experience assumptions and reserving assumptions. The reserving assumptions used to determine future supervisory reserves in the PVFP calculation should be consistent with those used to determine the supervisory reserves in practice.

The assumptions for supervisory reserves may be prescribed by regulation, whereas embedded value assumptions are unlikely to be prescribed. For the experience basis in the PVFP calculation, the assumptions will depend on the purpose of the embedded value. If published in accounts then the experience assumptions will have to comply with accounting principles rather than the principles applying to supervisory reserves, for example, whether it is to be done on a going concern basis or a break-up basis.

If the embedded value is part of an appraisal value calculation, then the assumptions depend on whether it is being calculated by the buyer (high margins of prudence) or the seller (ambitious assumptions).

Generally however embedded value experience assumptions will remove some of the prudence within the supervisory reserves.

For example:

Mortality

Mortality assumptions are likely to be closer to best estimate of future mortality than supervisory reserves, i.e. for protection policies this would be lower mortality and for annuities would be higher mortality or lower mortality improvements on annuities.

Expenses

Expense assumptions in the supervisory reserves will include a margin over best estimates; embedded value assumption will remove this margin to some extent. Expense inflation is likely to be best estimate of future inflation in the PVFP, whereas the supervisory reserves assumption is likely to be higher.

Persistency

It is likely that supervisory reserves will not allow for any assumptions regarding lapses, going paid up or surrenders, unless to do so would increase reserves. For PVFP, specific assumptions will be made for lapses, paid ups and surrenders by product group and by duration.

Commission

Commission will be allowed for as paid, i.e. the same as for the supervisory reserves. Within the PVFP the value will allow for commission claw back, if this is a feature of the remuneration, whereas it is unlikely to feature in the supervisory reserves given lapses are unlikely to be assumed (and if they are, the value of potential claw back may instead be considered an asset).

Investment returns

Supervisory reserves are determined by discounting future liability cashflows using a risk-adjusted yield based on the assets being used to back the liabilities with a prudent margin built in. The prudent margin is deducted from the discounting yield for supervisory reserve calculations.

The yield permitted may only be based on income and not on total investment return including gains.

For the PVFP calculation, two different types of "investment return" assumptions are required: one to project investment returns into the future and one to discount the future profits (the risk discount rate). Projected future investment returns within the PVFP calculation will be based on the total expected return and are unlikely to include any material prudent margins.

A company may set a unit growth rate for unit linked business, based on the best estimates of returns on the assets held to back the unit funds – this is likely to be higher than the assumption used for supervisory reserves.

The risk discount rate used for the PVFP will need to be consistent with investment return and inflation assumptions and will be based on the shareholder's required rate of return on the capital invested in the business allowing for the inherent risks. The risk margin is added to the discount rate for PVFP calculations.

A company may calculate a specific "loss of" investment return to calculate the lock in of the solvency requirement.

Bonus rates

To calculate the present value of shareholder transfers there will need to be assumptions regarding future bonus rates. These should be consistent with the investment return assumptions used for with profits business. Allowance for future bonus in the supervisory reserves may be very approximate.

Tax

The embedded value would need to allow for shareholder tax on profits, but this would not be appropriate for the calculations of supervisory reserves.

Part (i) was a straightforward bookwork definition, where marks were generally lost for not being precise in the answer and not referencing back to the shareholders. Part (ii) was adequately answered and followed on from part (i), where candidates were expected to explain how the present value of future profits attributable to shareholders, for each product, and the shareholder owned net assets are determined. Most marks were lost for not being specific enough to the question by discussing each of the unit-linked, without profits and with profits products in turn. Part (iii) was poorly answered, most candidates were too brief in their answers given the number of marks available. Some candidates failed to consider the different assumptions in turn and when the answer was structured in this way answers tended to be too vague or brief. It was not sufficient to just answer 'prudent' for each supervisory reserving assumption without giving an indication of what prudent meant in each case.

END OF EXAMINERS' REPORT