

EXAMINATIONS

September 2000

Subject 302 — Life Insurance

EXAMINERS' REPORT

Comment

- The examination was reasonably straightforward but as usual simple marks were lost with candidates simply listing information rather than reading and answering the questions as set.
- There were a number of candidates who failed to show a basic understanding of the knowledge required, to pass this exam.
- Basic issues were often mentioned but there was a general failure to elaborate any further.
- Question 5 was generally poorly attempted.
- It became apparent during the marking that a number of candidates were not properly prepared for the exam. Even some of the more basic “bookwork” type questions were not completed well.

Question 1

Overall this question was done reasonably well.

Basic statements were often missed with few ever describing how an asset share was calculated.

Few candidates mention Policyholders Reasonable expectations and how these are generally managed.

Most students got the obvious marks – easy to calculate, auction values, well documented, not changing to frequently.

Question 2

This question was based around a core understanding of the basics of Life Assurance. Many candidates picked up on the basic issues but were unable to take this further and clearly show their understanding.

Question 3

Very poorly answered.

Part 1. There were very few correct definitions given.

Part 2. On a number of occasions , a bullet point was made but with no back up discussion
e.g. expenses will need to be considered!

Question 4

Well done in most cases.

Question 5

This question was very poorly attempted.

Part 1. Not enough points were made. Competition was brought out relating to premium rates but often in a very sketchy manner. A large number of candidates did not think about competition or marketing the product. Few candidates made the simple point that the revised mortality assumptions would improve premium rates.

The only relevant point on valuation students made was the requirement for some degree of prudence – therefore scoring 1 out of 6.

Part 2 was extremely poor with few points made by the majority. Many left this unattempted.

Question 6

There was a wide range of marks showing that some candidates had a poor understanding of reinsurance.

Throughout the question only the most basic points were really ever made. There was no real evidence of any wider thought on the topic e.g. declining large policies may be unattractive to the sales and marketing area in part 1.

Question 7

The Term Assurance and Annuity were often covered off reasonably well. The Unit Linked Policy (UL) was not. Very few candidates even identified the fact that a group policy was involved.

There was often little consideration of any of the issues other than, again, just mentioning them in passing.

There was certainly little appreciation of any link between comparing actual costs with fund-related charges and the ability of the company to raise charges in future.

Generally poor.

Question 8

Part 1. Most candidates were able to list the headings but were unable to follow this up with some discussion on why they were important.

Part 2. Little appreciation (or mention!) of capital issues. Basic comments on design were often forthcoming.

Part 3. This was a fairly straightforward part of the question. However again some easy marks were lost by candidates not making their points complete.

e.g. many answers often just noted 'the present value could be measured' without saying what it was the present value of.

- 1** Over the long term, the maximum value a company should pay out on a life policy is the asset share.

This represents the accrued premiums plus investment income less expenses, cost of risk benefits, tax and any transfers of profit to shareholders if applicable. In addition, allowance may be made for profits from other business and a charge may be made for the cost of guarantees.

Due to the fluctuating nature of the asset share calculations, there may be situations where slightly more or less than this value is paid out but on a smoothed basis, the company cannot afford to pay more than this value in the long term.

The level of payment on a surrender claim should be at such a level that policyholders who continue with the policy are not adversely affected.

Conversely, it would be inappropriate to penalise early leavers for the benefit of those policyholders who remain.

The idea is that the level of profit (or effect on the estate for mutual organisations) obtained from both sets of policyholders is consistent.

This profit should be consistent with the philosophy and design of how this profit was expected to flow through the term of the policy.

Where a policy surrenders close to the outset of the contract, it is likely that the asset share will be significantly less than the accrued premiums paid.

It is important that the policyholder is not given an expectation that the value will be consistent with the premiums paid at early durations and that all reasonable steps have been taken at the point of sale to explain the expenses incurred in setting up the contract.

This is usually best illustrated by supplying example surrender values for the first few years.

Given the management of the policyholders' expectations the company can then decide whether it will pay out more than the asset share in these early years so the policyholders do appear to get a fair value.

At the other end of a policy's lifetime it is important that the surrender value smoothes into the maturity value over the last few years of the contractual policy term.

The smoothed asset share would apply at maturity as per the company's philosophy and policy, and no termination charge should be applied.

The company can take into account auction values that may be obtained on their contracts. A target value would be expected to be lower than these.

One would expect the calculations procedures to be reasonably straightforward and well documented.

The basis should not be subject to frequent change in normal circumstances.

The company will have to take account of competitor comparisons and any previously released marketing literature, or any other representations made to policyholders.

2 (i) Investment experience on the unit fund.

Expense experience, comparing costs of acquisition, maintenance and claims costs relative to explicit charges levied.

Mortality/morbidity experience comparing death and serious illness claims with the unit deductions.

Lapse experience comparing actual and expected surrenders and paid ups.

(ii) Main risks:

In principle all the risks may be shared with the policyholders if the charges are variable.

However, there is a risk that this depends on how policyholders' expectations are set, e.g. how closely defined the circumstances are under which the charges may be varied.

Lapse risk on surrenders after age 60. The extent of the risk will depend on the level of the guarantee and the number of years from commencement.

Lapse risk in the early years of a policy. (The size of the acquisition costs is not given, but it is likely that the acquisition costs will be recouped over the first few years.)

Mortality/morbidity risk on death and serious illness claims. (Includes "systematic" risks such as improved diagnosis of serious illnesses, as well as the normal risk of fluctuations in claim frequency.)

Expense inflation risk. (Though in the long term expense inflation should be matched by higher nominal investment returns on the fund.)

- 3** (i) Dynamic Solvency Testing means assessing the ability of an office to withstand changes in both the external economic environment and the particular experience of the office.

It involves projecting the office's revenue account and balance sheet forward, and then changing the important assumptions in turn to establish the sensitivity of the office to changes in that particular assumption or assumptions.

This could involve stochastic modelling to assess the probability of ruin.

- (ii) Expense levels and the rate of expense inflation will be particularly important because there is no new business to cover overheads. Also the difficulty of reducing costs as the in force business decreases will have a large impact on the future surpluses arising.

There will be costs relating to closure as redundancies are made and, for example, branch offices are closed.

Rates of unit growth – possibly varying by fund types, as fund management charges are a source of surplus – and especially as there may be guarantees on some policies.

Unit pricing bases will be important as it is likely the office will move from an offer basis to a bid basis in the short to medium term.

Lapse rates and paid-up rates are important as the future profits and margins are dependent on the volumes in force - and future lapse rates may be quite volatile depending on the reasons for the company closing to new business.

Mortality/morbidity is unlikely to be too important provided the charges are reviewable.

Taxation- the future tax position of the office may change as a result of the closure

Allocation of profits to shareholders - the amount of profits distributed to shareholders will affect the capital strength of the company.

- 4** (i) Select investments appropriate to the nature, term, and currency of the liabilities.

Select investments to maximise the overall return on the assets, income plus capital.

Can depart from the first principle in order to improve the return, depending on resources available to cover adverse returns, including free capital.

- (ii) Regulation may affect investment directly by:

- specifying or restricting investment in certain types of assets;
- restricting the amount of certain assets that are “admissible” for solvency purposes.

Regulation may also affect investment indirectly by:

- making liability valuation assumptions dependent on the assets held;
- requiring reserves to cover mismatching of assets and liabilities.

- (iii) A cash flow model can be used to project both assets and liabilities into the future, enabling future asset cover and the risk of insolvency to be assessed.

The main steps to be taken are:

Make a suitable assumption about amount and type of initial assets e.g. in relation to reserves plus assumptions about free capital.

Project non-investment cash flows for one time period (e.g. 1 year) using expected future experience.

Use a stochastic model for investment returns on the various asset types over the same time period.

Determine valuation reserves at the end of the period having regard to the projected asset distribution.

Repeat for as many future periods as required, and with lots of simulations.

If there is a mismatch between the assets and liabilities, the assets may be re-arranged to eliminate or reduce the differences so that the risk of insolvency is within acceptable limits.

- 5** (i) This year's mortality investigation is likely to confirm that there has been a fundamental improvement in mortality since the pricing assumptions were last changed. One needs to consider to what extent the improvements will be maintained in the future.

Pricing

The pricing basis may allow for some mortality improvement already, so only improvement above that assumed would make a difference.

The office has the choice of passing this improved mortality through to the customer in reduced rates or to maintain the premium rates and allow the mortality profit to emerge in the future. Underwriting standards might also be changed.

The credibility of the data generally should be high as there is a significant volume of business – but care must be taken in some areas where the data might not be credible once it is split up into homogenous groups e.g. female lives.

The decision would depend heavily on the level of competition in the market. If there is no competitive pressure, then it may be that the premium rates are left as they are and allow the mortality profit to emerge.

Alternatively, premium rates could be cut in the hope of achieving higher volumes of business and a higher total profit.

If competition is stronger, premium rates could be cut to protect the current market position and maintain overall profitability.

Future mortality investigations would monitor this change in basis.

Valuation

The company can reduce its valuation mortality assumption in the light of these investigations, although it is unlikely that the full improvement shown this year will be taken into account as the supervisory valuation basis requires a degree of prudence in each element.

The revised mortality assumption would depend on the trend in improvement shown in the investigations, and whether this was also observed in other classes of business.

Industry investigations and reinsurers would provide further evidence.

If it were decided to reduce the valuation basis, then similar considerations would apply as to pricing, although the valuation basis is unlikely to be cut by as much.

- (ii) The company may well have a significant volume of other business that makes up the majority of the published reserves.

The term assurance reserves will then probably be small by comparison. Thus there may be little need to change the valuation basis.

The mortality profit would then continue to emerge as statutory profit each year as claims incurred are less than expected in the valuation.

Reversing the change in valuation basis may be harder as the regulators prefer not to see ad hoc changes in the basis.

Reducing the valuation basis would lead to two sources of profit. Mortality profit for each year would continue to emerge, as to be prudent the full improvement for the year would not be taken into account in the new basis.

There would be a one-off source of profit due to the change in basis.

This would capitalise the future mortality profits that would have emerged had the basis not been changed.

Reducing the premium rates would reduce profits per policy. This may lead to an increase in new business and therefore overall profits, although profits could be reduced by lapse and re-entry of current profitable in force business.

- 6** (i) Underwriting protects the company from losses due to accepting substandard lives on normal terms or from accepting uninsurable lives.

However, it can only remove the possibility of large claims, which might threaten the company's solvency, by declining any proposals for sums assured above a certain limit.

This is unlikely to be attractive to the sales and marketing area.

Hence, the company is more likely to accept the larger risks and reinsure the excess over a retention limit.

The reinsurer may also be able to offer some expertise to the company.

For example, in underwriting certain types of substandard lives or in developing products, in which the company has little or no experience.

The value of this depends on the resources and level of expertise the company already possesses and on the type of product being reinsured.

- (ii) The company will be retaining some of the mortality risk under the policies being reinsured.

Hence, it will remain exposed to losses from substandard and uninsurable lives.

Thus, underwriting will still be required to provide protection.

Otherwise, the company will be vulnerable to selection by prospective policyholders. There might also be a profit sharing element to the treaty.

The company could reduce the exposure by having a low retention limit.

However, this would be undesirable, as a larger proportion of the profit arising under the business would then be passed to the reinsurer.

In any event, the reinsurer will insist on certain minimum standards of underwriting, in order to protect itself from losses, otherwise the reinsurance premiums will be high.

(iii) Co-insurance

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

The reinsurer will pay a percentage of all claims for the same percentage of the office premium.

In return the reinsurance company will determine the rates of reinsurance commission it is prepared to pay to the ceding company for the business (this may be paid by way of a premium rebate but the principle is the same).

The re-insurer will have regard to its likely future experience and its knowledge of the quality of the ceding company's underwriting. It will also want to make a profit on the business.

The reinsurance commission will cover - in respect of the reinsured portion of the policy - the commission that has been paid by the ceding company and part or all of the ceding company's other expenses.

In certain countries, the supervisory authority may require the reinsurer to "deposit back" its share of the total reserve under a reinsured contract with the ceding company.

Even where it is not a requirement, this is sometimes done so that the ceding company gets the benefit of reinsurance whilst at the same time being able to maintain a reserve for the whole contract and hence maximise the funds it has to invest.

Risk premium reinsurance

The ceding company reinsures part of the sum at risk, i.e. the excess of the benefit payable over the reserve, with the reinsurer on a yearly renewable risk premium basis.

The reinsurance company determines its risk premium rates by assessing the likely experience of the business it is to reinsure and then adding expense and profit margins. It may or may not guarantee these rates for the term of the policy.

Risk premiums are usually paid annually, irrespective of the frequency of payment of premiums under the original policy, but monthly risk premiums may be paid for certain unitised policies.

The risk premium method can also be used for critical illness, sickness and long-term care insurance business. In these cases, the reinsured "sum at risk" either remains at a constant amount of benefit or varies - to reflect for example an RPI increase in benefit under a sickness contract.

The risk premium paid will reflect the probability of a claim arising in that year - or month in the case of unitised contracts - associated with the expected value of the benefits payable under that claim.

7

(i) Without profit term insurance

The investment return assumption is unlikely to be important, as only relatively small reserves will accumulate under the policy.

The expense assumption will be more important, because of the small premiums and probable lack of any facility for the company to increase the charges loaded in the premium rates. Hence expense inflation is important.

Underwriting and claims handling costs are likely to be particularly significant.

The withdrawal rate assumption will be less significant, with no surrender value likely to be payable under the policy but will be important in the early years until initial costs have been recovered.

Hence, withdrawals will generate losses at early durations, where initial expenses will not yet have been recovered, and profits later during the term.

Selective withdrawals may affect the mortality rate assumption.

(ii) Without profit immediate annuity

The investment return assumption will be important, because of the large reserves under the policy, the potentially long duration of the liabilities and the guaranteed nature of the benefits.

Because of the guarantee, the return will be set relative to fixed interest yields, gilts and corporate bonds, and reviewed regularly.

As it may not be possible to match perfectly, allowance will need to be made for mismatching and the reinvestment risk.

The initial expense assumption will be less important, as it is likely to represent a small percentage of the premium paid. However, payment expenses will be more important.

No withdrawals are likely to be allowed under the product.

(iii) Unit-linked group pension

The investment return actually experienced will be a critical determinant of the level of the fund-related charges.

However, the investment return assumption in the pricing basis is of less importance, as it is closely correlated to the rate used to discount the charges.

The investment return is passed on to the policyholder, with large non-unit reserves under the policy unlikely, given the nature of the charges.

The expense assumption will be more important, the comparison between the monetary costs and the fund-related charges being the only source of profit.

The degree of importance will depend on the scope the company has to raise charges in the future.

The withdrawal rate assumption will be extremely important, both as regards member turnover and the overall scheme discontinuance rate.

High member turnover will increase costs without increasing charges.

At early durations costs are likely to exceed charges. The shortfall should be recovered later in the term as the size of the fund grows, but vulnerable to market crashes and longer term poor investment performance.

A high rate of scheme discontinuance will therefore require higher charges to compensate.

8 (i) The following are the factors that an actuary would consider when determining the suitability of a proposed contract design:

- Profitability - It will want to ensure that overall the charges will be sufficient to cover the expenses to be incurred.
- Marketability - The benefits offered need to be attractive to the market in which the contract will be sold. Innovative design features may make a contract more attractive as may the addition of options and guarantees.

The charging structure under a unitised contract needs to be attractive to the potential market and consideration needs to be given to whether the charges should be guaranteed.

More generally, it needs to be considered what guarantees should be given with regard to premium rates.

- Competitiveness - A company will not want the structure and level of the charges under a unitised contract to depart too far from those of competitors, but this depends on how it will market the contract.
- Financing requirement - Unless the company has substantial capital resources it will want the benefits and charges to be designed so as to minimise its financing requirement.
- Risk characteristics - Consideration will need to be given to the acceptability of the level of risk associated with a proposed contract design.

The level of risk that may be acceptable will depend upon the company's ability or willingness either to absorb risk internally or to reinsure it.

- Costs of any guarantees - The company will need to consider the cost of any guarantees.
- Sensitivity of profit - Under a unitised contract, it may be possible to have a charging structure that reduces the sensitivity of the contract's profitability to variations in future experience.

- Extent of cross-subsidies - A company needs to decide on the extent of any cross-subsidies between for example large and small contracts.
- (ii) The product design is intended to optimise the use of the available capital.

In this case substantial amounts are available so the aim is to design a competitive, capital-intensive product which generates a high IRR.

Most companies offer contracts which repay capital quickly to the company which reduce early surrender values.

Consequently the availability of capital may allow a very marketable contract design, producing high volumes of business.

Charging elements available include:

- (a) Low initial allocations
- (b) Initial (or "capital") Units
- (c) Allocation rates after initial period
- (d) Withdrawal penalties
- (e) Bid/Offer Spread
- (f) Annual Management Charge
- (g) Risk charges for mortality
- (h) Policy Fee
- (i) Switching Fee

The product might be designed having no annual initial allocation period or initial units, but extracting charges to cover expenses and provide profit through lower than average allocation rates, annual management charges and/or a regular policy fee.

Need to consider a withdrawal penalty:

- Either introduce a withdrawal penalty so that we can be confident that variable (and unpredictable) withdrawal rates make little difference to the profitability of the product (but still producing higher surrender values than the market).

or

- Have little or no withdrawal penalty so that a full allowance for withdrawals is made in profit testing and this feature is promoted to encourage greater sales volumes.
- Mortality charges will be made to match deductions to experience.

- Expense charges will match expected bid offer spread to match premium related commission and increasable policy fee to match renewal costs.
- (iii) A high internal rate of return may be required – say 15% or the rate required to justify capital.

However, also useful to calculate the net present value of future profits as a check.

This may be expressed as a percentage of premiums for comparison with other products, or as a percentage of commission to align sales drive with profit.