

# EXAMINATIONS

September 1999

**Subject 403 — UK Fellowship General Insurance**

*Paper One*

EXAMINERS' REPORT

- 1 (i) Investment Income: Speed that losses are paid out (not incurred)  
Speed that premiums are received \*  
Speed that acquisition expenses/overheads are paid \*  
Acquisition Expenses: Advertising cost/Sales commission etc  
Contribution to overheads  
Profit Loading

*The two points marked \* were not generally picked up; others were more commonly picked up.*

- (ii) **Investment income:**  
Assume interest=6% per annum  
Current rate on short-term gilts  
Earned for 9 months  
Losses paid fairly quickly in short-term class  
Premium paid on average mid way through year  
Premiums typically ¼ly in advance, but delay with brokers  
Assume acquisition expenses of around 6%  
Typical for direct writers  
Assume contribution to overheads of 5%  
paid at the same rate that premiums are received  
Profit Loading 10% of undiscounted premiums  
With 50% solvency margin, amount to RoE of about 20%

$$\text{Premium} = \frac{\pounds 1,000,000 * (1 + 6\%)^{-\frac{9}{12}}}{(1 + 6\%)^{-\frac{1}{2}} * (1 - 6\% - 5\%) - 10\%} = \pounds 1,252,203$$

*This part was moderately answered, with more successful candidates generally going into more detail. Some candidates lost marks by not constructing the formula appropriately.*

- 2 It should be noted that many of the things listed below are double-edged, and can be advantages or disadvantages. For example, the difficulties over the definition of volatility are the other side of being able to allow for the particular aspects of it that are considered most important. The marks should be given if the candidate appears to understand the issue, rather than for getting the classification “right”, in accordance with the list below.

- (a) Advantages  
Takes into account each company's individual experience  
Simple to administer  
Easy to verify  
  
Disadvantages  
Penalises companies that hold adequate reserves  
Or charge adequate premiums.

Does not distinguish between companies with similar levels of but different mixes of business  
Including direct companies compared with pure reinsurers

- (b) Advantages  
Recognises the volatility inherent in the business  
Penalises companies that are poorly reserved  
Or have inadequate premium rates.  
May take asset risk into account  
And other types of risk – credit risk for example

Disadvantages  
Practical difficulties of deciding:  
    Definition of profit  
    Definition of volatility  
        Should it depend on company or industry experience?  
    Period over which to measure volatility  
How to allow for reinsurance and reinsurer security  
Whether or not same proportion should be applied to the volatility of all companies.

*This question was generally well answered.*

- 3** (i) We need an idea of the variability of the result. *This was the only part of the question that most candidates answered. Few gave valid examples or explanations.* For example, do we believe it will be between £400,000 and £500,000 with absolute certainty, or is there a 45% probability of a complete loss, with no other result possible? The former will reduce expected losses by £150,000 a year, the latter by only £67,500. We need to express the losses as a random variable with mean £450,000.
- (ii) The impact on the expected loss amount is the difference between the expected loss of the random variable and the expected loss of the random variable capped at the amount of the aggregate deductible. In statistical notation the expected losses after the annual aggregate deductible =  $E[\text{Losses}] - E[\text{Losses}; \text{AAD}]$ .  $E[\text{Losses}; \text{AAD}] \leq \text{AAD}$  with equality only when the standard deviation of the distribution is zero. *This part of the question was not generally answered in detail, and few candidates gained many marks.*
- (iii) The amount of money that could be lost as downside risk is the same before and after the aggregate deductible, but will be higher as a proportion of premium, so the percentage loading for profit should be higher.

*Overall, this question was not well answered. Candidates failed to go into sufficient detail.*

- 4 For individuals insured under a policy written by an insurance company authorised to underwrite business in the United Kingdom, protection is provided under the Policyholders Protection Act and administered by the Policyholders Protection Board. The Board will pay 100% of a valid claim under a compulsory type of insurance (such as motor third party liability), or 90% under other classes, less what the insurance company is able to pay. This is financed by a levy of up to 1% per year on the written premiums of all insurers authorised to write business in the United Kingdom. Protection is limited to private people, not companies.

If a Name at Lloyd's defaults on his obligations, policyholders may be reimbursed from the Central Fund. This is financed by an annual levy on the authorised premium limit of each Name. The levy is set at such a level that it will be expected to be sufficient to cope with any defaults that may occur in the coming year.

*This question was generally well answered, although many candidates did not supply enough points of detail to get as many marks as they might have done.*

- 5 Overall, this question was moderately well answered. Most candidates gained a reasonable number of marks, but many omitted important points of detail. The area covered below under **Statistical Estimation** was especially sparsely covered. Part (ii) was generally adequately answered, although the four marks available for drafting showed wide variations, with the quality of work varying widely.

- (i) The following points should be made:

#### **Case Estimation**

##### Advantages

Allows for facts and circumstances of each claim.

Can allow for variability arising from small portfolios, large claims, random variation.]

Provides early indication of trends in the experience

Past history is not required.

##### Disadvantages

May be insufficient data when received to make accurate estimate of claim.

Does not allow for IBNR, reopened claims or late development

Administration costs may be high

Requires consistency from claims handlers.

Sensitivity testing is not possible as some assumptions such as future inflation may be implicit.

#### **Statistical Methods**

##### Advantages

Can allow for IBNR, reopened claims or late development

Can use explicit assumptions  
Methods may disclose trends in numbers and amount of claims  
Methods may be easier to understand and explain

Disadvantages

Past experience may not be repeated in the future, because of

- Changes in policy terms and conditions
- Changes in portfolio mix
- Changes in reporting and settlement patterns
- Changes in law or court awards
- Industrial action / other delays affecting settlement speed
- Changes in taxation
- Changes in market environment – e.g. end of knock for knock
- Changes in size of account

Distortion because of large claims, nil claims, part payments  
Need to estimate tail factor  
May need to advise reinsurers of large claims outstanding.

General conditions for statistical estimation to work:

Large number of outstanding claims in these classes  
Pattern of settlement numbers and amounts reasonably stable  
Data has been collected for a number of years (five at least)  
No major changes in portfolio mix  
No large claims which cannot be identified and treated separately  
Element of uncertainty in claim estimation  
e.g. private motor injury where liability amount may not be settled for years

The possibility of hybrid systems – statistical estimation for all claims not more than two years old, or not assessed as being large, and case assessment for these – should be mentioned.

- (ii) Premium rates  
The underwriting profit  
Deferment or acceleration of tax on profits  
The amount of dividends declared from profits  
The visible solvency margin and hence the amount of free assets.  
Reinsurance renewal negotiations

**6** *This question was poorly answered. Few candidates gained more than 1 or two marks on either part (i) or part (ii). There seemed to be little knowledge in depth of how policies of this nature are designed, although it is a standard type of policy.*

- (i) Cover is normally of fixed amounts. That is, when an insured event occurs, a set level of benefit specified in the policy is paid, rather than an indemnity amount. Cover may be for lump sum benefits, usually paid only in the event of permanent injury or death, or regular income payments. Often policies are offered in multiples of a fixed sum assured – say £50,000.

There are two main outcomes in respect of which claims are paid: death and personal injury. A policy may cover either, but more normally both. The injury must be suffered in an accidental event – the normal policy wording is that it must arise from violent, visible and external means.

A policy which provides benefits on death or injury will normally limit the total benefit which may be payable. For example, if a claim is paid in respect of a serious injury, which then leads to death, the death benefit will normally be reduced by the amount already paid.

Cover for injury is normally on what is known as a “continental” scale. This is, that the full benefit will be paid out on the most serious injuries, such as paraplegia, the loss of by amputation or the complete loss of use of at least two limbs, or complete blindness. Lesser injuries will give rise to smaller payments, and there may be a detailed list ending with a small payment in the event of the loss, for example, of a single toe. Normally only the worst single injury to a particular insured person from one accident will trigger payment, but if there were two separate injuries in different parts of the body both might be payable, so long as the total claim was within the policy maximum.

It is usual for a full sum insured to be payable upon death, but this is not necessarily the case if the main intent of the policy is to provide for care or rehabilitation for an injured person. On the other hand, providing a lower sum insured may cause difficulties if somebody dies after becoming seriously injured. One exception is with children, in respect of whom death benefits are usually limited to the cost of a funeral, while the costs of care and rehabilitation are likely to be just as great as for adults.

Regular income payments may be made while the insured is completely disabled (usually to the extent of being unable to work) until he recovers, or possibly, if only permanent disability is covered, from the date that the disability was agreed as permanent, until, say, the insured's 60th birthday. Sometimes it will be stipulated that no payments will be made before, say, two years after the accident, to allow the condition to stabilise.

Another possibility is that income payments will be made on a daily basis as long as the insured is in hospital as the result of an accident.

The availability of reinsurance may be an important factor in determining precisely what benefits may be offered.

- (ii) *Almost all candidates answered the points that have been underlined, but very few got any others.* The arrangements will need to be negotiated separately with each affinity group. Some will view it as a major income-producing exercise, others as a service to members. The level of commission, and therefore the gross premium, will vary between these two cases.

There are two basic arrangements that could be made. The first is that the insurer would pay the affinity group for the use of its mailing list. The second is that the affinity group would receive a commission on each policy sold. A hybrid is also possible, in which some up-front payment is made and some commission, although at lower levels than if they were the sole way the affinity group were paid. Which is chosen will depend to some extent on the affinity group's attitude to risk.

It would be normal for the insurance company to pay the costs of the mailing, if a dedicated mailing were used. If the marketing material for the insurance is to be included in one of the affinity group's regular mailing to its members then the insurer may be expected to pay a contribution to the mailing costs, plus the production cost of the marketing material for the insurance.

The affinity group may carry out some of the necessary policy administration. This will affect the financial arrangements in each case.

It is normal for an agreement to be made preventing the insurer from soliciting any more business from customers it has gained through the affinity group mailing, without the group's permission.

- (iii) *This was rather better answered than the other parts of this question. Most candidates got around half of the points available.* It will be difficult to estimate loss costs from the insurer's own records, even if it does already underwrite business of this type, because of the very low claim frequency. In this case, external sources of data may be more helpful. Assistance should be relatively easily obtainable from reinsurers, or government accident statistics. Loadings or discounts may be required in respect of the occasional affinity group which presents high risks – a skiing club, for example, but a sensible guess may be sufficient in these cases. The price at which business may be reinsured will to a significant extent govern the price that can be charged.

The difficulty comes in pricing for expenses. The collection of premiums may be a variable factor between different affinity groups. At one extreme, the insurer may be responsible for initiating and collecting direct debits; at the other end of the scale the affinity group may collect all premiums with its membership fees and pass them to the insurer with a bordereau. The former could be costly to the insurer and the latter very cheap – the actual costs for each project should be costed in in each case.

The costs of mailing will need to be recovered. To estimate the loading required, we will need to consider the following three items:

- The cost of the mailing (including any up-front payment for the right to mail to the list);
- The expected take-up rate;

- The expected lapse rate of policies in force.

These items will need to be estimated from the insurer's experience of such schemes. From the second we can estimate the number of policies expected to be written; divided into the first it gives the sum to be recovered from each policy. At this point we must add the cost of fulfilling the policy and setting it up, including any free gifts offered as part of the promotion. The third item may be used to work out the number of months or years the policy is expected to be in force, which may be used to derive the annual or monthly loading per policy.

The lapse rate is likely to be affected, inter alia, by the way the premium is collected. A high visibility collection method, such as monthly by credit card, may make the insured think about cancelling each month. A low visibility method, such as the affinity group collecting it along with normal payments, may lead to a lower cancellation rate. An annual collection gives a much higher premium to be paid, which may lead to low renewal rates, but leaves the policies that do renew in force for a whole year. This is something that must be considered afresh for every mailing.

When these elements are added together, loadings for profit and the agreed commission should be added. The resulting gross premium should then be reviewed – if very high or very low, the penetration assumptions may need to be revisited. However, the product is probably not very sensitive to the insurance cycle.

A typical formula for a monthly gross premium might be:

$$\frac{\pounds C + \pounds P + \pounds M}{(1 - p - c)}$$

Where:  $\pounds C$  is the expected monthly claim cost  
 $\pounds P$  is the expected monthly processing cost  
 $\pounds M$  is the required monthly contribution to marketing cost  
 $p$  is the proportionate contribution to profit and overheads  
 $c$  is the agreed commission rate.

- 7** *This question was moderately well answered. The areas that were generally known and understood are the need for matching in various ways, and the unsuitability of equities for most insurance liabilities on this criterion, the possibility of a degree of matching of longer tailed liability claims through equities, and the statutory solvency and admissibility implications. It was quite common for candidates to point out the liquidity drawbacks of equities.*

The objective of an insurance company's asset selection strategy should be to maximise its investment return, subject to the overriding requirement to meet its obligations to policyholders and being able to maintain the required minimum level of solvency.



In general, over the long term, ordinary shares have tended to give a higher investment return than most other forms of investment available to general insurance companies. However, the value of shares often fluctuates sharply from day to day, and it may be difficult to sell significant quantities of shares at short notice without affecting the market. This would be especially true if the insurance company concerned were a large prominent one.

This gives rise to two particular problems for an insurance company wishing to place significant amounts of its funds in ordinary shares. Firstly, if the value of shares falls significantly, current valuation regulations, which require insurers to value their assets at market value, will mean that the company must reflect the fall in value in its assets in its statutory returns. In an extreme case, this could lead the company to become technically insolvent, even if it were satisfied that the income-producing potential of the assets was undiminished, and that the expected income remained enough to fund the liabilities. This might be countered to some extent by discounting liabilities to reflect the higher yield implicit in the assets' lower price, but the ability to do this is constrained by regulations, and to introduce discounting at a time of market stringency might be seen as a sign of weakness by brokers and regulators. Also, since the term of liabilities tends to be shorter than the term of ordinary shares, the solution could only be partial in any case. *These points are important, but very few candidates commented on them.*

The second problem is that if a company has a large proportion of its assets in equity shares, it may find it difficult should it become necessary to realise large sums of cash, for example to fund claims following a catastrophe. This would not be the case if the company's assets were held in short term deposits or gilts, for which there is a large, highly liquid, market.

The usual investment principles that allow an insurer to be able to meet its liabilities are that assets should be matched to liabilities by term, nature and currency. In general, equity shares, which have no redemption date, are not well matched to insurance liabilities. These generally have a mean term of only a few years, even on long-tail classes, with reducing amounts being expected to be paid in successive future periods. In short-tail classes the average term of the liabilities may be only a few months. Only a small proportion of claims, such as those arising from asbestos and pollution losses, have terms which are measured in decades rather than years, and may more appropriately be matched by equities. Significantly, these are the types of claim for which the discounting of reserves is likely to be most acceptable to the market.

Matching by nature means comparing whether assets and liabilities are defined in nominal terms, or affected by inflation after the balance date. Short tail claims may be affected by inflation, but with only a short period to payment the level of uncertainty involved is unlikely to be significant, and will not justify investment in equities. Long-tail classes are usually liability or casualty insurance, and are greatly affected by inflation. In addition, they are often affected by what is sometimes known as "judicial" inflation, which is very hard to predict. Since dividends on equity shares are paid out of profit, which is derived from doing business in current money, they may be expected to rise

with inflation, and to form a reasonable hedge against it. Therefore it may be sensible to hold equities against some of the longer-dated liabilities in these classes. The hedge is not perfect – few companies will have profits that are linked to judicial inflation – but it is better than most other asset types can offer. On the other hand, an unexpected burst of inflation will probably give rise to an increase in interest rates, which may lead to a rise in the yield from equities, giving rise to a fall in prices. This would exacerbate the problems of valuation at current market values, and of liquidity in the case of a sudden need for cash.

The question of matching by currency is a complex one. An equity share will be denominated, and its dividends paid, in a particular currency, but the underlying exposure will be to the currencies in which the company issuing the share does its business. A multinational company's shares represent an investment in a number of currencies, which may or may not be a good match with the insurance company's liabilities. This is a question that would require a detailed review. *Most candidates got the simple point at the start of this paragraph, but almost none pursued the greater complexities.*

There is also a danger of correlation between a company's insurance risks and its investments. For example, a major earthquake in a large city might cause a large fall in local stockmarkets and a significant fall in worldwide ones, just at a time when assets needed to be sold to pay claims. *Very few candidates commented on this.*

A further problem exists in that a single company's equity may be taken into account for the purpose of asset values in the statutory returns only up to 2½% of the insurer's general business amount. This means that holdings have to be spread quite widely in order all to be admissible, and there is always a possibility that if the value of shares of which an insurer owns a large amount appreciate substantially then the company will be restricted in the amount of the appreciation in its shares it can take into account in the valuation. *This point was generally well understood.*

In summary, equity shares may give a better return than most of a company's other likely asset choices, but a large holding may be a poor match for its liabilities and endanger its solvency and its ability to meet liabilities. A large solvency margin does give the company a cushion for this problem and allow it to make some investment in equities. However, shares are unlikely to form a large proportion of a general insurer's investment portfolio for these reasons. The average for the largest United Kingdom insurers is about 15% to 20% of total assets, and is significantly less than their level of free assets, so that even a substantial fall in the value of these assets would not lead to technical insolvency.