

# **EXAMINATIONS**

April 1999

**Subject 403 — UK Fellowship General Insurance**

*Paper One*

**EXAMINERS' REPORT**

- 1** (i) Future written premium income  
Future claims  
Future expenses  
Investment return  
Reinsurance  
The economic environment  
Catastrophes  
The insurance cycle  
[1 mark for four; ½ mark each thereafter, maximum 3]
- (ii) Future written premium income  
Monthly figures  
split by source of business  
Consult sales managers  
Future claims  
Claims split into development of notified claims and IBNR  
new claims from unexpired business and future business  
Future expenses  
Commission is a % of written premium  
Staff cost is more difficult to predict because they depend on projected business growth and staffing plan  
and allocation to this product.  
Investment return  
Depends on current investment policy and projected future investment policy.  
Reinsurance  
Depends on existing arrangements including possible changes and possible new arrangements  
The economic environment  
Future inflation  
and interest rates  
increased moral hazard  
during economic recession  
Catastrophes  
Difficult to make explicit allowance  
Implicit allowance in future claims rates and loss ratios  
The insurance cycle  
Take account of current position in the cycle and likely future movement as it relates to this product.

- 2** Tax is payable at normal corporation tax rates on trading profit.  
Losses are carried forward to offset any profit in the following year.  
Investment income and realised gains, but not unrealised gains, are included in the trading profit.  
Differences relate to investment income, investment gains, overseas profit, technical reserves and depreciation  
Level of reserves must be regarded as proper  
Eligibility of certain reserves is often individually negotiated with the tax inspector  
Inland Revenue can disallow a reserve if it feels that the insurer has been consistently over reserving in the past

Specific technical reserves:

Reported - allowed (case and statistical reserves)

UPR - allowed as per company act accounts

AURR - allowed provided that it is justified statistically that the UPR is insufficient

IBNR - require statistical justification

Claims handling expenses

- allowed for expenses which relate directly to claims reserves which are acceptable by the IR, and reserves for external claims expenses are allowable. Expenses relating indirectly to claims are not allowable

Equalisation reserves

- insurers are required to establish these reserves for certain classes of business. Statutory rules govern transfer to reserve (tax deductible) and transfers from the reserve (on which tax is payable)

Other catastrophe reserves are not allowable

- 3** (i) **Exposure measure.** Basic unit used by insurer to measure amount of risk.  
Usually over a given period eg vehicle year.  
**Risk Factor.** A factor which is expected to influence the intensity of risk  
Usually statistically backed  
**Rating Factor.** A factor used to determine the premium rate charged.  
Measurable, verifiable, objective.  
A risk factor or a proxy for a risk factor.
- (ii) Exposure Measure  
EL: payroll (preferably) or man-hours-worked  
Marine hull: insured value

Risk factors

EL:	Trade Processes Legal awards/judicial climate Safety and risk control standards Training standards Management awareness/attitude
Marine Hull:	Miles travelled Routes travelled Crew training/ability Management ability Vessel type Vessel condition and maintenance

Rating factors

EL:	Payroll Industry/occupation Location of workforce Materials handled Processes involved Deductible Past experience
Marine Hull:	Sum insured Type vessel Flag of operation Classification society Deductible Past experience

- 4 (i) (a) Excess of loss reinsurance:  
 Cover for losses which exceed a defined amount  
 up to an upper limit (usually)  
 Defined amount and upper limit may be indexed (stability  
 clause)  
 Usually relates to individual losses  
 but may be aggregate / catastrophe
- (b) Experience rating:  
 Premium for risk depends on claims  
 in previous periods, or that period

(ii)	<i>Accident year</i>	<i>Loss (000s)</i>	<i>Inflation factor claim</i>	<i>Development factor</i>	<i>Inflated and developed</i>	<i>Loss to layer</i>
	1996	300	1.09273	1.3	426,164	0
	1996	600	1.09273	1.3	852,327	352,327
	1996	900	1.09273	1.3	1,278,491	500,000
	1997	400	1.0609	1.4	594,104	94,104
	1997	700	1.0609	1.4	1,039,682	500,000
	1997	800	1.0609	1.4	1,188,208	500,000
	1997	500	1.0609	1.4	742,630	242,630
	1998	350	1.03	1.5	540,750	40,750
	1998	800	1.03	1.5	1,236,000	500,000
	1998	400	1.03	1.5	618,000	118,000
	1998	650	1.03	1.5	1,004,250	500,000

The total loss to the layer is 3,347,811 (the sum of the last column).

The experience-rated loss for the 1999 accident year =  $3,347,811 \times 1000 \div (700 + 800 + 900) = 1,394,921$

- (iii) The attachment point is 500,000, which is 25% of the Sum Insured.

LEV( 25%) = 80%

Limit + Attach is 1 million is 50% of the sum insured.

LEV(50%) = 90%

Hence we are covering  $90\% - 80\% = 10\%$  of losses.

Therefore, the expected loss is:

% of loss we cover  $\times$  loss ratio  $\times$  premium per risk  $\times$  number of risks

$$= 10\% \times 70\% \times 20,000 \times 1,000$$

$$= 1,400,000$$

- (iv) Method 1

- Credibility, number years, number claims
- Is claims inflation appropriate?
- Are LDFs appropriate?
- Failure to capture individual variability in claim development

Method 2

- Is the LEV curve appropriate for these risks?
- Is the underlying LR reliable?

- (v) Required return on capital 15%

Hence required return on premium =  $15\% \div \text{leverage} = 15\% \div 2 = 7.5\%$

Office premium = ( pure premium + fixed expense)  $\div$  ( 1 – commission and brokerage – var exp – profit load)

$$= (1,400,000 + 5,000/.5) / (1 - 10\% - 5\% - 7.5\%)$$

$$= 1,819,000$$

Given the contract has a premium of 2 million:

$$\begin{aligned}\text{Return on premium} &= 1 - \text{loss ratio} - \text{commission and brokerage} \\ &\quad - \text{var exp} - \text{fixed expense ratio} \\ &= 1 - 1.4/2 - 10\% - 5\% - 0.005/.5/2 \\ &= 14.5\%\end{aligned}$$

$$\begin{aligned}\text{Hence, return on capital} &= \text{return on premium} \times \text{leverage} = 14.5\% \times 2 \\ &= 29\%\end{aligned}$$

- 5** (i) Stabilise the technical result as some of the classes do have a volatile claim experience year on year.  
Limit the effect of catastrophes - in particular weather related claims on property business.  
Limit the concentration of risk, for example:
- flood or subsidence exposure
  - overseas property if it is in an area prone to say hurricanes or earthquakes.
- For this insurer gaining technical help wouldn't be a reason to purchase insurance, but it would be a secondary benefit - particularly helpful in areas such as the rating of flood or subsidence risks, or if the insurer was looking to move into a new field such as health insurance.  
If the class be large compared with the free reserves and other classes, the insurer may decide to set up some QS treaties.  
By reducing the variance in claims payments, less risk capital is needed so more business can be written on a given capital base.  
Reduce the risk arising from an individual class, for example:
- too much DMI or Creditor which both have a link to the economy
  - enable large risks to be accepted - e.g. commercial property
- The reinsurance may be perceived as good value.
- (ii) In making a decision on what reinsurance to buy, consider:
- the split of business - is there a need to spread the risk?
  - type of cover available in the market place
  - the terms available in the market
  - the security status of the reinsurers
  - the size of the free reserves - affects the level of retention
  - the availability of co-insurers

### Household

Risks are mainly weather-related catastrophes e.g. storm and flood.  
There may be several layers of XL.  
Some of the layers may not be 100% reinsured.  
Possibly aggregate XL if it can be obtained.  
Possibly risk XL on liability exposure.

### Commercial

Surplus based on the EML  
Risk XL  
Cat XL

### Motor

Layers of XL

Possibly quota share, but less likely

### Creditor

Risk is that there is an economic downturn and unemployment increases.

May choose to limit exposure via QS.

Possibly will not have any reinsurance.

An option is to take out aggregate XL over a period of time - say 3 years. (difficult to obtain).

### DMI

Risks are similar to Creditor - account is affected by a downturn in the economy, but in conjunction with falling house prices.

Again possibly QS to limit exposure.

- 6** (i) Costs must be allocated in proportion to the number of transactions, multiplied by their relative times.

#### New business

Motor:  $\frac{£250,000 \times 4 \times 20000}{4 \times 20000 + 3 \times 8000} = £192,308$

Household:  $£250,000 - £192,308 = £57,692$

#### Policy Servicing

Calculate total weights (in thousands):

		<i>Motor</i>		<i>Household</i>
Inviting renewal	60	60	40	40
Process renewals	$3(60 - 20)$	120	$2(40 - 8)$	64
Endorsements	$6 \times 3.5$	21	$8 \times 7.5$	60
Total		201		164

Allocated cost:

Motor:  $£700,000 \times 201 \div (201 + 164) = £385,479$

Household:  $£700,000 - £385,479 = £314,521$

[This may be broken down as follows:

	<i>Motor</i>	<i>Household</i>
Inviting renewal	£115,068	£76,712
Processing renewals	£230,137	£122,740
Endorsements	£40,274	£115,068

This information is not necessary for answering this part of the question, but it will be helpful in the next.]

Claims

$$\text{Motor: } \frac{£600,000 \times 14 \times 12,500}{14 \times 12,500 + 7 \times 3,500} = £526,316$$

$$\text{Household: } £600,000 - £526,316 = £73,684$$

Total

$$\text{Motor } £1,104,103$$

$$\text{Household } £445,897$$

$$\text{Total } £1,550,000$$

- (ii) First estimate the number of movements, and the cost of processing those movements.

Renewals invited

There should be the same number as last year – the book is in stationarity, and the premium rate rises will not affect policy numbers until the renewal is actually invited. Therefore they will cost the same as last year. That is  $£115,068 + £76,712 = £191,781$ . (Preserving decimal places in the underlying calculation.)

Renewals processed

This will be the same number as last year (as the same number were invited), reduced because of the premium rate rises. The reduction in motor is 15% and in household 12%. These will also be the changes in the cost.

$$\text{Motor: } £230,137 \times 0.85 = £195,616$$

$$\text{Household: } £122,740 \times 0.88 = £108,010$$

$$\text{Total: } £303,627$$

The actual numbers renewing will be  $(60,000 - 20,000) \times 0.85 = 34,000$  and  $(40,000 - 8,000) \times 0.88 = 28,160$ , respectively.

Proposal Processing

There has been a 40% increase in advertising, and accordingly a 40% increase in quotations. However, the premium rate rises will have caused falls in the number that would otherwise have been accepted of 25% and 36%. The cost will be proportional, hence:

$$\text{Motor: } £192,308 \times 1.4 \times 0.75 = £201,923$$

$$\text{Household: } £57,682 \times 1.4 \times 0.64 = £51,692$$

$$\text{Total: } £253,615$$

Assume that the number of claims and endorsements are proportional to the average number of policies in force, measured by half the sum of the beginning and ending numbers. The ending numbers are:

$$\text{Motor: } 34,000 + 20,000 \times 1.4 \times 0.75 = 55,000$$

$$\text{Household: } 28,160 + 8,000 \times 1.4 \times 0.64 = 35,328$$



The average numbers therefore are 57,500 and 37,664 respectively.

### Endorsements

Motor:  $57,500 \div 60,000 \times £40,273 = £38,595$   
Household:  $37,664 \div 40,000 \times £115,068 = £108,348$   
Total: £146,943

### Claims

Motor:  $57,500 \div 60,000 \times £526,316 = £504,386$   
Household:  $37,664 \div 40,000 \times £73,684 = £69,381$   
Total: £573,767

Note that this assumption is probably a poor one in respect of claims, as the actual claims handled include some from a number of years back, and only part of the total handling of this year's claims. However, no information is given to enable a better one to be made.

Total processing costs are

$£191,781 + £303,627 + £253,615 + £146,943 + £573,767 = £1,469,733$

Increase this by 185/155 to allow for the postage, etc, cost, gives  
£1,754,197.

The advertising cost and the cost of staffing and running the call centre will all rise by 40%, giving  $(800 + 700 + 500) \times 1.4 = £2.8$  million. Other costs should not change, giving total expenses for 1999 of  $£1,754,197 + £2.8 \text{ million} + £1,150,000 = £5,704,197$ .

- (iii) We may expect earned premium to be half of last year's, plus the same amount uprated for premium increases and reduced for the closing business in force.

Motor:  $10,000 \times (1 + 55 \div 60 \times 1.1) = 20,083$   
Household:  $5,000 \times (1 + 35.328 \div 40 \times 1.18) = 10,211$   
Total: 30,294

Assume that the investment income increases by 7% of 1998's retained profit, to 3,070

Claims incurred should change in line with the average number of policies in force.

Motor:  $17,000 \times 57,500 \div 60,000 = 16,292$   
Household:  $9,000 \times 37,664 \div 40,000 = 8,474$   
Total: 24,766

Assume that there is no change in the dividend policy, that management costs are unaffected by business levels, and that taxes will

be a constant proportion of gross profits, and we have the following profit and loss account:

Premium earned	30,294
Investment income	3,070
<b>Total income</b>	<b>33,364</b>
Claims incurred	24,766
Management expenses	5,704
<b>Gross profit</b>	<b>2,894</b>
Taxation	724
Dividend	500
<b>Retained profit</b>	<b>1,670</b>

- (iv) The premium rate rises have served their purpose in that the company's profits have increased by about 46%. Whether or not this is now a satisfactory position depends on the company's criteria. Assuming a 50% solvency margin, which would not be unusual for a company of this type, then the gross return on capital is about 19%, which would generally be considered satisfactory.

It is important to realise that this is a transitional year. The stationary position will be more favourable, with higher earned premium and lower claims, which by themselves will add about £1½ million to gross profits.

Much depends on whether or not the higher lapse rates will continue beyond 1999. It may be that they will not, as policies now on the book are those who did renew or start after the rate rises. It may also be that competitors will be in a similar position and raise premiums, which should improve the company's competitive position. If so, then advertising can be scaled back. As the extra advertising and the associated increase in the activity of the call centre cost £800,000 in 1999, this could be a significant source of future profit.