

**EXAMINATION**

May 2006

**Subject ST3 — General Insurance  
Specialist Technical**

**MARKING SCHEDULE**

- 1** The major consideration which should be taken by company A is that if the suggestion is taken up, the discharge payment taken across must be at least adequate to allow for the claims which it would have made on company B.

As far as company A is concerned they should be looking for the highest payment possible making due allowance for the following factors:

Employer's Liability business will have a long tail.

Consideration should be given to IBNRs.

A conservative allowance should be made for this (i.e. for industrial disease such as asbestosis, deafness).

The net rate of return on reserves over a long period of time should be considered.

The rate of judicial and wage inflation affecting claims must be allowed for.

Some measure of credibility should be put on the current estimates of outstanding claims.

The expected outstanding duration on any annuity payments should be considered conservatively.

Look at any treaty terms which may quote conditions for discharge of liability.

Effects of any profit commission.

Effects of any non-proportional covers A may have.

The effects, both on company B and company A's accounts must be looked at and the profit and loss arising from the transaction must be reviewed with great care

In theory, company B will be reserving a higher figure than the likely payment to be made to company A if it has not discounted its reserves or discounted at a low rate

On the other hand the actual allowance for inflation has to be looked at in conjunction with this figure

In practice it would be unsound to discount the reserves at a higher rate than the real return on assets, then adjusted for any tax implication.

The tax effects on both companies need to be looked at carefully.

In respect of the Motor Excess of Loss Treaty company A again will be looking for the highest settlement possible, due consideration again being given to:

Assessing the IBNR; this only relating to further potentially very large claims.

The outstanding claims need to be assessed very carefully making allowance for: the expected date of settlement

and any potential out-turn in any Court award.

Look at claims handling expenses.

All these claims probably without exception will be liability claims.

If there are any material damage claims they should be considered separately.

Further consideration to be given to looking on a claims size distribution by year of origin to ascertain the further number of claims which potentially could increase in value to exceed the excess point.

Look at effects of any indexation clauses.

Note that each of the claims 1 to 4 could fall below the excess level but equally could increase in value.

As far as company B is concerned similar considerations as to the above will be made but will obviously be looking at the lowest possible level of settlement.

Company A may have to consider further reinsurance protection elsewhere.

Also, the reasons for B wishing to commute should be considered.  
If in a run-off situation the chances of payments actually being made should be considered.

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(i)

Let the free assets at 1/1/05 be A, then  
 $SM \text{ at } 1/1/05 + \text{Insurance Profit} + \text{Yield on SM} = SM \text{ at } 31/12/05$   
 $A + 5 + 0.04 \times (A + 60) / 2 = 60$   
 therefore  $A = 52.75$

Average Capital employed =  $(52.75 + 60) / 2 = 56.37$   
 Yield on average Capital employed =  $0.04 \times 56.37 = 2.25$   
 Projected return on average capital employed =  $(5 + 2.25) / 56.37 = 12.9\%$

(ii)

Let the required level of growth be i, then  
 $SM \text{ at } 1/1/06 + \text{Insurance Profit} + \text{Yield on SM} = SM \text{ at } 31/12/06$   
 $60 + 5(1+i) + 0.04 \times (60 + 60(1+i))/2 = 60(1+i)$   
 therefore  $i = 13.8\%$

(iii)

The projection is as follows:

	2006	2007	2008	2009
Premium	150.0	187.5	234.4	293.0
Insurance Profit	5.0	6.3	7.8	9.8
Yield on SM	2.3	2.6	3.0	3.4
Total Return	7.3	8.8	10.8	13.2
SM at end of year	60.0	68.8	79.6	92.8
Percentage SM	40.0%	36.7%	34.0%	31.7%

[Note that the SM at the end of the year (and hence the yield on the SM) are calculated by a similar formula to that which calculated the free assets at the beginning of this solution. For example end-2007 solvency margin (B) is calculated as:  
 $60 + 6.3 + 0.04 \times (B+60)/2 = B \Rightarrow B = 68.8$ ]

It can be seen that the solvency position of the company will reduce over the period.

This is because in any given year the total return earned from the insurance profit plus the yield on the solvency margin is less than that necessary to increase the initial solvency margin by 25%.

(iv) If growth continues at this rate then the solvency will cease to fall once it has reached a given level. This level, M, can be calculated by the standard formula used previously, as follows (premium P):

$$\frac{P}{1.25}M + \frac{5}{150}P + 0.04 \times \frac{1}{2} \left[ \frac{P}{1.25}M + PM \right] = PM$$

$\Rightarrow M = 20.3\%$

(v)

The solvency margin (as a percentage of premium) could be increased in the following ways:

a rights issue

merge with or take over a company with free assets

increase profitability (probably by increasing premiums or reducing expenses)

reinsure more business

reduce rate of premium growth

reduce technical reserves by stripping out over-estimation or by discounting.

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**3**

Restrict the type of business that a general insurer can write / classes it is authorised for

Limits on the premiums that can be charged.

Minimum solvency requirement with prescribed measurement system.

Restrictions on type / amount of a particular asset that can be taken into account for demonstrating solvency.

Prescribed basis for calculating premiums

Prescribed basis for valuing assets and liabilities for demonstrating solvency.

Prescribing reinsurance programme.

Prescribing assets that can/can't be held.

Restricting who can run an insurance company.

Prescribing reporting format, timetable and frequency.

Licensing of agents selling insurance.

Requirements on methods of sale.

Legislation to protect policyholders if general insurer fails.

Restrictions on the information that may be used in underwriting and premium rating.

Requirement to deposit assets to back o/s claims reserves.

Requirement to pay levies to consumer protection bodies.

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#### **4 Quota Share**

Proportional, written on a treaty basis, constant proportion reinsured for all risks in treaty

Usually written on a policies incepting basis.

Cedant and reinsurer will have proportionately the same underwriting experience on business included in the treaty.

There may be differences in expenses and commissions.

Purpose is to spread risk, write larger portfolios of risk and encourage reciprocal business

Directly improves the solvency ratio and helps the insurer to satisfy the statutory solvency requirements.

Limitations are that it cedes the same proportions of low and high variance risks.

It cedes the same proportion of risk irrespective of size and passes a share of profit to the reinsurer.

There are capped limits for catastrophes, limited in terms of the absolute amount recoverable.

### **Surplus**

Proportional, written on a treaty basis, differing proportions can be reinsured for each risk in the treaty.

Usually written on a policies incepting / risks attaching basis.

EML or SI used as a measure of risk.

Cedant and reinsurer will have different underwriting experience as they will be on risk for differing proportions of the same risks.

Purpose is to let an insurer write larger individual risks which may otherwise be beyond its underwriting capacity.

Main purpose is to allow the insurer to fine tune its exposure for the class concerned.

Limitations are that surplus is administratively more complex than for quota share as each risk needs the amount ceded assessing and recording.

### **Risk XL**

Non-proportional, can be facultative or treaty but relates to individual risks.

Indemnifies the cedant for the amount of any loss above a stated excess point.

Should the loss exceed the upper limit of the reinsurance the excess will revert to the cedant.

Often multiple stacking layers are purchased.

Limits are often indexed.

Purpose is to permit an insurer to accept individual risks that could lead to large claims.

Large is relative to the insurers solvency margin.

Reduces the risk of insolvency from a large claim and stabilises the technical results of the insurer.

Limitations, if facultative may be done for each risk, lots of administration.

Reinstatement premiums payable if there is a claim.

Can be an expensive way of getting cover compared to treaties.

### **Cat XL**

Non-proportional treaty, intended to cover events involving losses to many different insured risks.

All the losses that are within the scope of the treaty are added together for the purposes of claiming.

The excess point can be very high.

The event should be defined carefully as event may not be instantaneous e.g. windstorm.

Hours clause may exist to limit claims to losses within a specified period.

Once an event has occurred the cedant chooses the start point of the specified period.

Each layer is usually written on a coinsurance basis by several reinsurers.

There may be many layers of stacking cover each with a different set of reinsurers.

Reinstatement premiums are usually payable in the event of a claim.

Also minimum and deposit premiums with adjustments at the end of the treaty year.

Purpose is to reduce risk of insolvency from a catastrophe.

Also limits the impact of a catastrophe on the technical results of the insurer.

Limitations are that a catastrophe may come out of the top of the cover.

Can be “expensive” depending on previous world events.

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**5 . Factors that should be taken into account when determining the allowance that should be made for future investment return when pricing a general insurance product.**

Mix of assets held to back the required level of reserves ( including free reserves)

It is important in order to assess the likely future returns, investibility of the assets ( including premium payment pattern ), risk of default.

Expected level of investment return

This component is less important when the expected rate of return is low

Term of policy / Exposure Profile

More relevant when the policy term is greater than 1 and significant portion of the exposure is later in the policy term

Length of the tail of the business being underwritten

More relevant for long tail business

The capital allocated to this part of the business

how is capital allocation determined

just technical reserves, with free reserves elsewhere, or does it include a portion of the free reserves

Extent to which assets held are mismatched to liabilities

mismatching increasing the level of risk so a downward adjustment to the assumed return may be appropriate.

The degree of uncertainty in the expected level and timing of claim payments

increased certainty means less of a reduction for mismatching

Any legislative factors that affect the extent to which such allowance can be made.

Consistency with other assumptions, especially inflation.

Investment expenses

Tax treatment of investment returns. Any allowance should be made net of tax  
Currency considerations

[8]

## 6 Appropriateness of investments currently held:

Company would want to maximize return subject to meeting liabilities as they fall due.

Rapidly growing :

Hence size of the free reserves relative to written premium and statutory solvency margin may be under pressure

Different matching considerations for vehicle damage and bodily injury

Balance of these liabilities depends on the type of policies written ( e.g. comprehensive vs. third party liability )

Vehicle damage claims reported and settled quickly and bodily injury claims longer tail

Cash is liquid

and has a stable capital value ( good for solvency)

but it does not provide inflation protection for either the property damage claims or bodily injury claims

index linked government securities provide some level of protection against inflation .....

... however, the inflation affecting bodily injury claims will not necessarily correspond with the type of inflation underlying the index

Can get Index Linked government securities (ILGS) with different terms ....

.... and try to match tail of the liabilities.

ILGS capital values can be volatile and may not be suitable if solvency under pressure.

However, marketability of asset is not an issue as co can pay claims out of premiums currently being received but may depend on the currency of assets and liability.

Risk of default with both cash and ILGS is low.

Value of money:

would expect other assets to produce higher returns over the longer term e.g. equities....So would consider using other asset classes for matching the free reserves.

However, other assets may not be suitable if there is then a currency mismatch

different taxation rate for different assets may affect decision

May depend upon any statutory solvency test

May be compulsory type of investment.

[7]

## 7 (i) Stochastic approach:

Collect data for number of years.

Collate the data into homogeneous groups . The data should at least be split into policy groups that have different excess levels, for example level of cover or age bands.

Adjust the data for inflation, IBNR, Changes in cover etc.

Fit a density function to individual claim amounts. You may also fit a density function to the probability frequency but this is less crucial and it may be modeled deterministically instead.

Check the goodness of fit and revise the parameters/ distribution function if necessary.

The expected claim experience can be determined using simulation techniques allowing for chosen excess levels.

This can be repeated for different excess levels.

**7 (ii) Other factors:**

There should be corresponding change in the premium rates to accompany the change in the excess level. The expected impact on profitability should be examined.

As the premium rates are changing the loading for expenses, profit and contingencies should also be reviewed to ensure, for example, that the contribution to fixed expenses is still adequate.

The attitude of the policy holders towards claim may change. For example, if the excess is increased then policyholder may not consider claim previously made to be large enough to bother claiming. This would also lead to lower administration expenses.

Alternatively, policyholder may also try and inflate the claims so as not to lose out financially.

The effect the change in excess will have on new business volumes should be considered. Will policy holders be disillusioned by any change.

The excess of level of competitors should be examined.

Check that the change to administrative system and policy documents can be made.

Reinsurance arrangement may need to be revised.

[10]

**8: (i) Different types of experience rating:**

prospective or retrospective & number or amount based

In prospective rating the, renewal premium depends to some extent on extent of the risk prior to renewal.

Insurer takes all underwriting risk



In retrospective rating, the premium for the current year is adjusted based on the experience of the period of risk.

Insurer takes less of the underwriting risk

Number based system depends upon the numbers of claims made and amount based system depend upon amount of claim made.

**8 (ii)**

**Prospective vs. retrospective:**

Broker network with many customer ( personal lines) would means prospective may be easier to apply.

Retrospective less risky to insurer

Retrospective more difficult to apply as there is uncertainty as to the amount of some claims (e.g. subsidence)

Prospective means the quote change at the time of underwriting - more likely to have desired impact.

Prospective require more data upfront - 15 years should be okay

Retrospective deals better wit new customers.

Prospective therefore rewards loyalty

**Number vs. Amounts**

neither is ideal if claim frequency is small.

number based most likely to discourage “costly small claims”.

numbers more appropriate when claim size is very variable.

amount could be capped to make this more usable.

**8: (iii)**

**Impact of introduction of the experience rating system:**

potential large movement in the individual premiums at the point of renewal

customer may not like the volatility introduced by such system

May cause an exodus of policyholder ; good and bad

In general, poorer risk see an increase in premiums

Leave and go to cheaper insurer

Company doesn't lose money on poor risks that leave

better risk see a reduction in premium - more likely to stay, even at "high" premium relative to actual risk cost

likely to attract better risks from other insurer too

important to get correct rates or else may be selected against

Need to monitor the experience of the new business closely

rapid growth in new business may cause new business strain ( impact the solvency)

Rapid growth may cause to poor service to customer leading to loss of business

ensure that underwriting and Claim systems are capable of capturing necessary information

Cost of changing underwriting and claims system capability

Education of brokers is required

business may become more complex to administer

Difficult to apply to new customer as may need to rely on the honesty of the policyholder especially as no other insurer uses such a system.

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**9. Different ways in which expenses can be categorized:**

*Split fixed and variable expenses*

Fixed expenses are those that do not vary with business volume e.g. CEO basic salary

Variable expenses are those that vary directly according to level of insurance business that is being handled at that time and may be linked to number of policies or claims or claims .

*Split direct / Indirect*

direct expenses can be identified directly as belonging to a particular class of business.

Indirect expenses are those that do not have a direct relationship to any one class of business.

all variable expenses are direct  
but fixed expenses can be direct or indirect  
split according to functionality  
e.g. investments, acquisition, renewal etc.

[4]

**END OF MARKING SCHEDULE**