Institute of Actuaries of India

Subject SA3 – General Insurance

October/November 2007 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Q. 1

a) Advantages:

The insurer is able to expand his business quickly by taking over the new company with its network of branches, agents and brokers.

It is able to get expert underwriters and claims managers of the company bought by it.

This is a less risky option than to spend huge amount in trying to set up huge net work of branches, recruit staff and agents and train them.

The company is buying good will consisting of the company's sales force, brand and customer base which will generate future sales.

It will be buying administration and IT system and may have access to past data to decide on premium rating.

Disadvantages:

It needs to pay for the goodwill and other above benefits. It needs to consider whether the price is worth all the benefits it supposes to receive.

It may have to pay off VRS benefits for those who leave the service and also for any retirement benefits.

It may be loaded with an outdated IT system and need to integrate the business into its own system.

It has to overcome any resistance to changes in working practices or to sales methods and change the work culture of the incoming staff. It needs to retain expert staff and see that they do not leave the company.

Most importantly, it needs to consider whether it is taking over any latent claims

b) Calculating the purchase price:

We need to calculate the net worth of the company and also put a value on goodwill.

The net worth comprises the free assets calculated on a realistic basis. An adjustment needs to be done for capital tied up to keep the company solvent (required solvency margin and prudence in the outstanding claims reserve).

Alternatively, a model has to be built projecting the cash-flows, allowing for the new business, then calculate the shareholder's share of profits and discount it at an appropriately high rate of interest to allow for uncertainties of general insurance business and the company's circumstances.

As a consultant Actuary, I would give a range of alternatives under various scenarios and assumptions with possible likelihoods and it is for the company to decide the ultimate purchase price.

Free Assets: This is calculated as the total market value of assets less a realistic estimate of the liabilities.

Liabilities are listed below.

Outstanding claims reserve

This would be a realistic estimate of money required to meet the future claims that have been reported. Collect as much data as possible to split claims by type

and by class of business.
The claims should include claim handling expenses.
Claims inflation should be allowed for in future claims using suitable index.for each type of claim
It would be useful if we can judge or get data on reserving basis and the time to run off the claims.
The figures should be net of reinsurance.
If claims are discounted, this would increase the profit and hence the purchase price.
Unearned premium reserve:
Calculate as accurately as possible for each class of business the unexpired portion of the premiums received allowing for the incidence of risk. You need to have start and end date of each cover.

The calculation should be net of reinsurance.
If we have any doubt about the adequacy of the premium, allow for additional unexpired risk reserve. (URR)

IBNR
Allow not only for claims incurred but not reported in respect of recent claims but also for latent claims. Different delay tables need to be used for different class of business.
For latent claims, you need to judge the company's exposure, by class, in respect of all previous underwriting years.
Goodwill
This can be roughly calculated by applying combined ratio (claim ratio plus expense ratio) to premium in each future year. The premium needs to reflect new business and renewals allowing for lapses/persistency.

It should be remembered that the loss ratios differ for each class of business and from year to year depending on insurance cycle.
The present value of the future profits would represent the good will and the profits needs to be discounted at a high interest rate to reflect the fact future sales may not arise as planned.
Adjustment for capital..
If substantial amounts of capital are tied up within the company, an adjustment needs to be made to the purchase price. The capital consists of statutory solvency margin and any margins in outstanding claim reserves.
Take the current solvency margin and calculate the present value of investment income earned on the solvency margin. For this, we need to estimate the investment income earned and require a risk discount rate and estimate of average time when all claims will be paid.
For new business, allowance has to be made in the loss ratio.
For short tailed business, the discount rate could be close to interest rate earned.

c) Other points to consider

Potential for new business growth
Quality of the distribution channels
Quality of the company's management
The amount of data available and its quality
The extent of reinsurance arrangements
The security and safety of investments and diversification of assets
Quality of admin and age of the IT system
The company's image and brand name
Redundancy and other costs
Surplus/deficiency in the retirement benefits scheme
Are there any other potential buyer/competitor that will push up the price

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Q. 2

a) report, by ...., consulting actuary, explains the investment principles underlying the choice of assets recommended. The report was commissioned by the CEO on behalf of the Board of Directors.

l explains the basic investment principle and how it relates to this company's financial position. Para 2 analyzes the company's liabilities and Para 3 suggests suitable assets to hold against these liabilities. Para 4 explains that there is no one correct asset allocation. The decision rests with the Board and depends on its risk appetite. In Para 5, I give my recommendations.

The basic investment principle should be such that the company is able to pay all the claims and other liabilities as they arise/become due. Thereafter, it should strive to maximize the returns to the shareholders of the company. The freedom to maximize returns depends on the availability of capital in comparison with the required statutory solvency margin.

From the Balance sheet, it is noted that the liabilities are 675 Crores and the total assets are1200Crores. The free assets are 525 Crores.

Household liabilities account for 300 Crores i.e. 25% of the total assets and E.L. accounts for 375 Crores i.e.31.25%. It implies that 56.25% of the assets need to be invested in suitable assets to meet the liabilities of 675 Crores. The company should try to maximize 43.75% of the remaining assets (525 Crores). The extent to which the company can deviate from this matched position depends on the solvency capital available.

A quick calculation of the required solvency margin as given in the question gives a) 20% of 650 premiums that is 130 and b) 30% of the incurred claims amounting to 490 that is 147. Ignoring reinsurance, the higher of the two calculations give the RSM as 147 and the excess of assets over liabilities is nearly 3.6 times the required margins. If we take the maximum permissible factor for reinsurance as 0.5, then the free assets nearly 7 times the required margin. The company has a good degree of freedom to move away from the matched position to try to maximize the returns.

Before we decide the suitability of the investments, we should have regard to the nature, term and the uncertainty of timing and amounts. E.L is long tailed and likely to increase above inflation in real terms. They are also subject to considerable uncertainty due to court awards.

It will not be surprising if 10 to20% of the claims are still outstanding at the end of 10 or more years after the claim event. Assets of similar nature need to be chosen to meet these liabilities.

Household liabilities are short tailed with the majority of the claims being settled say within 12 to 15 months and are not subject to as much uncertainty or claim inflation as E.L. Short term assets/ cash should be available to match these liabilities.

Para3. Let me discuss what types of assets are available to suit the above liabilities.

Short term gilt edged securities maturing in 1 to 5 years are suitable to meet short tailed house hold portfolio and also to meet cash flow requirements. These are safe and secure but the returns are low and hence not suitable for Employer's liability business or shareholder's funds.

A wind storm or earthquake event may lead to many claims to be paid in a short period on the household portfolio and hence the company needs to keep adequate level of marketable short term assets

Long term gilts are secure and safe, returns are higher but these are sensitive to interest rates and their market values could be very volatile. As returns are fixed in monetary terms and hence are not suitable to real liabilities.

Equities

These are generally volatile in the short term. But a well diversified blue chip stocks are reasonably safe, easily marketable and would be expected to give good returns in the long run. Returns include dividends and capital gains. The equities give better returns compared to other assets and therefore would be suitable for the class of employer's liability business and share holders funds.

Property

Like equities, a well diversified property portfolio offers a return above inflation in the long run. The returns are better than cash deposits or short term gilts. These can be considered as addition to equities. These assets are illiquid and the company needs to commit a large portion of its portfolio of investments in order to have a well diversified portfolio. The company can house its own head office and branch offices in properties owned by it.

Others

Derivatives and options can be considered as hedging instruments to achieve the required investment returns.

No details of non interest earning assets like agent's and broker's balances are available. If these form substantial portion of the assets, then we should consider the effect of these assets on the cash flows.

Para4. I have discussed the type of assets suitable to the company's liability profile.

There is no unique solution as to what proportion of assets is to be invested in each category of assets. The most conservative and cautious investment strategy would be to match asset proceeds exactly to liability outgo.

This may not be practicable for the following reasons.

uncertainty over new business and premium income

uncertainty of the timing and amount of future liability outgo

lack of suitable assets in which to invest

The cautious approach would be to invest in gilts which are secure but returns will be low. But in view of substantial excess of free assets, the company can decide to mismatch depending on the risk appetite of the company as decided by CEO and the Directors of the Board.

Para5. Recommended asset mix

A rough indication of asset mix is indicated below;

Cash deposits and short dated gilts	25% to 30%
Medium term gilts	06%to10%
Equities	40%to50%
Property	5%

b) Yes, it is true that there is a positive cash flow at the end of this financial year. Can

we assume that this would be so in future as well. It may not be true in future. The current positive cash flow may be due to growth in premium income but this growth is not guaranteed in future.

Large claims or catastrophe events may result in negative cash flow albeit for short periods.

The claim experience can worsen or deteriorate.

Expenses may increase.

Future business mix may change resulting in different pattern of run off claims.

The regulatory requirements may fix the pattern of investments and prescribe admissibility rules as they require the company to be solvent at all times.

The company needs to keep some short term and liquid investments should there be a negative cash flow so that it does not require to realise investments when market values are low. If the market is bullish, the equities would be over priced and there is a real danger of buying just before a significant fall in values.

Sale of large block of stocks may result in depressing the prices in the market. If the company were forced to take any such unusual decision, it may lose the confidence of the brokers and the public.

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Q. 3

i) As all the employees of the employer are being covered under this class, the accumulation is implicit. An explosion causing injuries to several employees is one such example.

Industrial diseases such as deafness/asbestosis can cause accumulation of risk. It will be some time when this comes to light as employees become aware and may affect the whole industry or an individual firm that failed to take precautions.

Retrospective change in law suddenly exposes the employer to events which occurred in the past.

ii) Domestic Household:
Storms can give rise to an accumulation of risk. A storm can affect the contents as well as buildings if strong winds are accompanied by heavy rain.
In times of recession, there can be a spate of thefts of contents in localized areas.
A fire or explosion in a block of flats can give rise to accumulation of risk both to buildings and contents cover.
Extreme cold weather resulting in burst pipe claims affect both buildings and contents.
Flooding can result in accumulation of risks depending on the insurer's exposure. and concentration in the affected area. .These are localized and mainly affect the content's cover.
Subsidence is another example affecting building cover.

iii) Reinsurance department should be aware of the accumulation risk and arrange for appropriate reinsurance protection. It should be prepared for additional work load following a major or multiple risk loss.
Underwriting department should continuously monitor the accumulation of risk limiting the exposure in any area or arrange for cover if it exceeds the retention. It should avoid over exposure in any selected area and arrange for reinsurance protection and stay within the limits of reinsurance bought.
Claims department is subject to severe work pressure following a major catastrophe cover and needs to work overtime to deal with large number of losses.
Investment department has to maintain adequate liquidity and arrange for stand by credit arrangement.
The Actuarial department is faced with the problem of pricing such risks and to plan how to reserve for the likelihood of such events.
The public relations department should be ready to face media enquiries and issue press announcements as lot of queries will be raised.
The I.T.department will ensure sufficient capacity of the system to meet likely volumes.

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