

Actuarial Society of India

Examinations

May 2006

CA12 – Liability and Asset Liability Management

Indicative Solution

Que 1)

In some territories there are statutory roles that can only be taken by actuaries. The statutory roles for actuaries mainly relate to the certification of the adequacy of the valuation of assets and liabilities of a life insurer, general insurer or pension scheme. The actuary is usually required to certify some or all of the following:

- ? In his or her opinion proper records have been kept for the purpose of the valuation of the liabilities.
- ? Proper provision for the liabilities has been made.
- ? The liabilities have been valued in accordance with any legislative rules setting out the method and assumptions for their valuation.
- ? The liabilities have been valued in the context of the assets, which in turn have been valued in accordance with the appropriate rules.
- ? In his or her opinion the premiums / contributions for future years will be sufficient, on reasonable actuarial assumptions, and taking into account the free assets of the provider to enable it to meet its commitments in respect of the contracts written, or pensions promised.
- ? A statement of the difference between the value of the provider's assets and its liabilities.
- ? He or she has complied with professional guidance notes.

[4]**Que 2)**

Underwriting protects the company from losses due to accepting substandard lives on normal terms or from accepting uninsurable lives.

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

However, 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

Also by assisting 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.

Reinsurance can also protect the company from catastrophic losses.

[4]**Que 3 (a)**

The need for regulation of financial markets is greater than the need for regulation of most other markets for two reasons:

- ? Confidence
- ? Information asymmetry

Confidence

The first is the importance of confidence in the financial system, the dangers of problems in one area spreading to other parts of the system, and the damage that would be done by a systematic collapse.

To prevent systematic collapse or loss of confidence it is not necessary to guarantee the solvency of every financial institution but merely to ensure that the failure of one participant does not threaten the whole system.

Asymmetric information

The second reason for the importance of regulating financial markets is the asymmetry of information, expertise and negotiating strength that often exists in financial transactions, particularly in retail markets.

This asymmetry is made significant by the fact that financial transactions related to investment, insurance and pensions have a significant impact on the future economic welfare of individuals.

(4)

Que 3 (b)

Regulation can take many forms. It can be prescriptive, with details rules setting out what may or may not be done.

Alternatively, regulation can involve freedom of action but with rules on publicity so that third parties are fully informed about the providers of financial services.

Finally, the regime can allow for freedom of action but prescribe the outcomes that will be tolerated.

Listing in the order of increasing degree of regulation, the following types of regulatory regime are possible:

? Unregulated markets

Where the costs of regulation outweigh the benefits, often the best option may involve no specific regulations. The participants are however still subject to the general trading and other laws applicable in the particular jurisdiction in which they operate.

? Voluntary codes of conduct

The rules and regulations are set by those with the greatest knowledge of the industry. This voluntary code will have no legal backing in most cases, and in all likelihood less severe penalties on a breach of regulations, than with statutory regulation. This method is vulnerable to a lack of public confidence.

? Self regulation

A self-regulatory system is organised and operated by the participants in a particular market without the regulator's intervention. The incentive is the fact that the regulation is an economic good that consumers of financial services are willing to pay for and which will benefit all participants. There may also be a threat that if self regulation does not work well, the regulator may impose statutory regulation.

? Statutory regulation

The regulator and the government set out the rules and regulations and police them. There are usually stringent reporting and compliance requirements, and this method can be costly and

inflexible. It is however less open to abuse and therefore commands greater public confidence.

? Mixed regimes

In practice many regulatory regimes are a mixture of all of the systems described above, with codes of practice, self-regulation, and statutory regulation all operating in parallel. Even a regime that is self-regulatory in name is likely to have statutory aspects. Regulations are often developed by market-driven private institutions (such as stock exchanges) as well as by governments.

(6)

Que 3 (c)

? Unregulated markets

Markets where only professionals operate, for example any wholesale market or where commodity products with guaranteed benefits are sold only on price, such as term assurance.

In such markets the parties are sufficiently well informed, and the costs of regulating may far outweigh the benefits.

? Voluntary codes of conduct

An example may be that a company will not “poach” key personnel from another competitor.

This is best administered by a commonly agreed code of conduct, and voluntary compliance by all participants. It is costly and practically difficult to regulate this otherwise.

? Self regulation

An example is that provided by professional bodies, such as the Actuarial Society of India. These aim to regulate the activities of their individual members for the greater good of both the profession as a whole, and the other parties for whom they provide actuarial services.

In such situations the professionals are the most well informed and knowledgeable to organise and operate a regulatory system. It is also in the interests of the profession to be seen to be providing services within a soundly managed environment; otherwise their clients would lose faith in the financial system.

? Statutory regulation

An example will be the capital adequacy and solvency requirements that are generally prescribed and regulated by the regulator or the government. There are stringent reporting requirements that have to be made periodically.

This will ensure a level playing field, and enhance public confidence in the security and durability of the participants in the financial system.

? Mixed regimes

An example will be the process to be followed before launching a new financial product by an insurance company. The actuary may be required to certify the adequacy of premium

rates, where he will be governed by the guidance and regulations of his professional body. In addition, there may be a review process that may require filing certain details about the new product with the regulator, prior to launch.

This will enable participants to launch products that satisfy consumer needs, but which are at the same time viable from the company's point of view. The regulator is able to review the process in order to ensure that the system is not abused by a few.

(5)

[15]

Que 4 (a)

When considering the benefits that might be provided to employees, an organisation may consider the drivers of its profitability.

Employees can then be made aware of their contribution to the profitability of the organisation. Each employee can then be rewarded according to their performance in managing the drivers of profitability that they control. For example, employees working in sales can be rewarded in terms of their performance against their sales targets.

The benefits should be chosen such that it is tailored to the needs of the workforce or sub-groups of the workforce. For example, the needs of a young workforce engaged in manual work may differ from those of the executive board of the same employer.

The benefits that will be provided should be easy to understand, and should demonstrably meet the needs of the employees. This will then enable retention of good employees.

Where benefits are not in monetary terms, for example perquisites, the benefit structure will need to be presented in a way that employees understand the value of the benefits actually being offered. The company may need to consider the tax implications also of such a benefit structure.

The benefit structure should be simple and easy to administer.

The benefit structure should meet minimum regulatory requirements wherever applicable.

The benefit structure should not discriminate between employees arbitrarily, for example, in terms of sex, physical abilities etc.

The company may choose whether or not it wants to offer benefits to employees in a tax-efficient way.

The benefits should be fair to employees who stay as well as those who chose to leave the organisation.

(5)

Que 4 (b)

Under flexible benefit schemes employees are offered the option to revise the level of an existing benefit or to choose different benefits which the employee “buys” either by reducing their pay or by giving up part of their existing benefits.

Flexible benefit schemes are useful when it is inappropriate to provide all employees in an organisation with the same benefit package.

Advantages to employees

- ? Benefit packages can change over time as personal circumstances change
- ? Can select from a menu of different benefit options
- ? The needs of different groups within the workforce can be met (eg single married, with dependants, without dependants young, old etc)
- ? Can choose benefits that are tax efficient, thereby increasing net income

Advantages to employers

- ? Recruit and retain talent by making the company a more attractive place to work
- ? Improving employee satisfaction, which in turn would improve customer satisfaction
- ? Providing benefits to staff in the most cost effective manner, *ie* there is less wastage in benefits
- ? May need to offer flexible benefits because the other companies are doing it

(5)
[10]

Que 5 (a)

The assets and liabilities can be stated as follows:

Assets

- ? insurance policy
- ? salary generation
- ? share options
- ? house (part)
- ? deferred pension (uncertain current provision)
- ? inheritance

Liabilities

- ? mortgage
- ? money required day-to-day (including pension provision, any private
- ? health care, further education fees, life cover, etc)
- ? potential need to put further money into business
- ? tax

The overriding investment objective will be to ensure that assets exceed liabilities. This is less clear for an individual than for an institution.

Still, the individual must ensure that capital is available to repay mortgage, fund retirement and leave income sufficient to pay for day-to-day living expenses. Salary income has been received this year but the amount is uncertain for the future, given the nature of the business.

Subject to meeting liabilities, the individual will be looking to generate an acceptable real return. If calls on wealth can be satisfied, it is sensible to ensure return maximised. The returns should also provide protection against inflation – keeping risk at a reasonable level

Overall risk of the assets should be kept at an acceptable level. Striving for additional return will increase risk and an overall balance should be struck.

The term of the investment is important. Given the uncertain nature of the business, liquidity may be preferred in case there is an emergency need for cash. Otherwise, gearing investments toward retirement might be sensible (medium to long-term) or specific known expenses (children at university).

Diversification

Care should be taken to avoid wealth being concentrated in particular assets. This is an extension of the need for risk control and will include a spread of currencies (unlikely to need to concentrate on local currency despite liabilities being in local currency).

Return after tax and expenses important.

Where possible, the tax burden should be minimised. Note that this objective can be complicated where return enhancement or risk control benefits of assets sufficiently attractive. Note that there may be a liability for inheritance tax. Similarly, value for money spent on managing assets will be desirable.

Consistency with partner's assets

The partner is likely to have a similar asset/liability structure. The balance of risk and return should be set for the whole as far as possible.

(5)

Que 5 (b)

Further Investment in Existing Assets

The money could be used to reduce the mortgage on the house. This is attractive from the point of view that a sizeable part of the living expenses would be immediately “bought out”. This option would involve concentrating investment in a single asset. A fall in the value of the property would destroy wealth, although it would only be crystallised upon sale. The desire for return may be better served by investing elsewhere (if the interest on the mortgage is less than the rate of return elsewhere). It would also be difficult to realise cash in the future unless the house was remortgaged. Alternative property investment is unlikely to be favoured from either a risk reduction or return enhancing angle. The benefit of use associated with investing in the family home makes it a special case.

Investing further in the business may be an option. The nature of the business could mean that this is a high risk, potentially high return, asset. Again, this would mean concentration of wealth in a single asset.

Additional risk is generated by tying up wealth with the ability to generate more wealth (i.e. salary). It would be difficult to realise this money to cash in an emergency.

Other Assets

Equities

Equities should provide a real return over long periods of time. Income from dividends, capital gains when assets sold and potentially volatile returns over short periods. The individual's lack of investment expertise and time will mean advice would have to be bought in.

Overseas equities carry additional volatility due to the currency effect and other risks. Quoted equities should be adequately liquid. The individual might be forced into dealing at a poor price if there were a need to realise cash at short notice.

Equity investment carries risk (companies do fail with little or no return for shareholders). The return is expected to be higher to cope with this and the associated volatility. The portfolio possible with a Rs 25,00,000 investment will allow adequate diversification.

Bonds

High quality bond-based investment (government, local authority, AAA, etc) will provide a secure, fixed or index-linked income and capital redemption. Security and stability mean lower risk and consequently, expected returns lower than equities. Potentially, a lower return than the mortgage rate being paid. There will be a variety of terms available and the assets can be readily sold, if required.

Return can be enhanced by taking more risk on. Lower credit ratings on corporate bonds can be bought with associated higher default risk, reduced liquidity, etc. These will require a yield premium to government-backed assets.

Foreign bonds, too, should provide higher yields than the local equivalent because of the additional uncertainties.

Cash

Obvious liquidity benefits. Potentially higher risk for this investment as long-term cash is not a match for the liabilities. The return is likely to be the lowest available (although guaranteed).

Derivatives

High risk, potentially higher return. Given the balance of other assets and liabilities, this is unlikely to be suitable for investment.

(7)

Que 6 (a)

RDR is the rate used to discount uncertain future cashflows to give their present value.

It represents the risk-free rate of return that the providers of capital demand plus an amount to allow for the risk that the profits may not emerge from the contract as expected.

It is used in profit testing to discount policy cashflows to give the present value of profits e.g. as percentage of premiums.

A different rate may be used for different parts of the basis — in particular a higher rate for uncertain items of cashflow — although this level of sophistication is unusual.

It may also be used to calculate the payback period for initial capital strains.

(3)

Que 6 (b)

Consider a suitable risk free rate based on long term gilt yields (currently around 7.5%).

Then consider a suitable margin for risk.

Considering the variability of profit in this particular product design and sensitivity to withdrawals, expense variations etc.

The unit linked design may suggest a lower risk discount rate than on conventional products

...since investment risk is passed predominantly to policyholders

...and other items of cash flow may be matched by charges.

Can also consider risks compared to other uses for capital such as equity investment. (It is usually more risky so a higher rate is appropriate.)

May however simply use the same risk discount rate as for existing products (perhaps following Board instructions).

If it is felt that the new market is riskier (or lack of experience brings risk) then may use a higher rate although may just allow for this with margins elsewhere in the basis.

(4)

Que 6 (c)

(iii) Reducing risk discount rate, RDR, would increase reported profit for a given premium....

...or could give the same reported profit (as a percentage of premium) with a lower premium rate. Although in this latter case there would be a reduction in the actual monetary amount of profit unless increased business volumes result from the premium reduction.

Similarly, reducing the RDR will not, for a given premium, change the underlying profit emerging as this will always depend on experience. All we are doing is reducing the risk margin we are using above the risk free rate in placing a present value on future profits.

Reducing the RDR means less margin to allow for the actual risks in writing the business.

The RDR should only be reduced if we consider it to be too cautious based on current risk free rates (e.g. gilt yields) and an appropriate risk margin for the particular product.

If we are considering reasons to justify reducing rates it is better to understand the true impact on underlying profitability.

We can then make an informed decision balancing the impact on competitiveness (business volumes, average expenses) and profitability.

(4)

[11]

Que 7 (a)**i. Claims**

- ? Lack of previous experience of the risks concerned
- ? Variability of experience?
- ? Changing types of business
- ? Changing underlying risk characteristics
- ? Changing attitudes of policyholders to claiming
- ? Anti-selection by policyholders
- ? Economic deterioration
- ? Random climatic effects
- ? Occurrence of catastrophes
- ? A new type of claim which had not been anticipated
- ? Insufficient allowance for the effects of future claims inflation
- ? Changes in legislation or court decisions setting new precedents
- ? Poor management control over underwriting and claims settlements
- ? Failure to recover R/I or third party recoveries
- ? Changing policy holder attitudes to claims.

ii. Expenses

- ? Higher than expected inflation on costs
- ? Increased legal and professional charges
- ? Lower level of business than required to cover fixed expenses
- ? Costs related to a need to obtain more new business than anticipated
- ? Unexpectedly heavy expenses such as new systems or legislative changes
- ? Unexpected one-off expenses such as introduction of tax on premiums
- ? Poor management
- ? Catastrophe leading to higher expenses

Commission

- ? Commission should automatically be met by loadings in the premium basis
- ? It may be necessary to increase commission above normal level to attract better business
- ? Or retain business
- ? Change in mix by intermediary
- ? Where different commission terms exist

iii. Investment Return

- ? Credit is taken in premium basis for expected investment return

Return may not be achieved because of:

- ? Adverse market conditions
- ? Larger than expected portion of assets not available for investment
- ? Payment of claims sooner than expected
- ? Need to realise unmatched assets in unfavourable conditions
- ? Poor investment management
- ? Taxation changes

- ? Reinsurers slow in payment
- ? Currency mismatching

(12)

Que 7 (b)

- ? Impact on future new business
- ? Investment strategy, returns, movements in asset values
- ? Cash flow impact on writing particular types of business
- ? Effect of reserving requirements
- ? Capital that is implicitly tied up in writing the business
- ? Rate of return that can be expected on that capital
- ? Uncertainty underlying any cashflow
- ? Robustness of the premium rates
- ? Inflation of claims and expenses

(4)

Que 7 (c)

- ? Relative size of the new premiums
- ? Market rank of the premiums
- ? Size of the increases imminent renewals will face
- ? Previous changes to volumes following changes in premiums
- ? Comparison with general economic circumstances at previous rate change
- ? Volumes of business written by different insurers with different premium rate rankings
- ? Views of underwriters as to the sensitivity of the market to premium rates
- ? Extent to which policyholders' choices are affected by rate changes
- ? Efficiency of the market for the class of business
- ? Reputation of insurer in market place
- ? Loyalty between policyholder and insurer
- ? Competitors' expected increases by time and amount
- ? For direct selling, introduce new rates for sample of proposers and observe result
- ? Effect of rate change on other insurers' rates
- ? Price elasticity by channel.

(7)

[23]

Que 8 (a)

- ? Trust deed and Rules
- ? Scheme booklet
- ? Any announcement letters
- ? Breakdown of Scheme assets at valuation date
- ? Copy of last valuation report
- ? Scheme accounts for the intervaluation period
- ? Member data for actives, deferred and pensioners at the valuation date
- ? And member data for those who have been scheme members at some time since the last valuation including reason for leaving

(4)

Que 8 (b)

- ? Check current non pensioner ages are less than NRD
- ? Age at date of joining is greater than minimum entry age
- ? Contributions are consistent with salary and service
- ? Look at maximum and minimum salaries
- ? Date commenced Pensionable Service consistent with service date
- ? Date commenced pensionable service before valuation date
- ? If provided accrued pension consistent with data

(3)**Que 8 (b)**

- ? Carry out valuation using same basis as was used for previous valuation
- ? Calculate average pensionable salary at this valuation and last valuation
- ? Calculate average past service at this valuation
- ? Estimate average past service at last valuation taking account of membership changes disclosed in company accounts
- ? Estimate expected active liability by multiplying last times liability by average service and average pensionable salary at this valuation divided by estimated average service and average pensionable salary at last valuation
- ? Adjust for the implications of any changes in average age (if disclosed)
- ? Estimate expected deferred pension liability by multiplying last times liability by total deferred pensions at this valuation divided by total deferred pensions at the last valuation
- ? Estimate expected pensioner liability by multiplying last times liability by total pensions in payment at this valuation divided by total pensions in payment at the last valuation
- ? Compare future service contribution rate with that calculated at the previous valuation adjusting for implications of any changes in average age (where disclosed)
- ? Compare any loadings for insurance costs and/or expenses with those disclosed in the previous valuation report.
- ? Take account of any benefit changes.
- ? Take account of any changes in method.

(5)**[12]****Que 9**

- ? General principle that for the group of members as a whole, the assumptions may, on average, provide a good estimate of future experience — the variance of the “best estimate” is larger for smaller samples.
- ? Volatility of contribution rate greater for small schemes.
- ? Relationship between assumptions is equally valid.
- ? Need to take account of individual assumptions which significantly affect the finances of the scheme e.g. marital status & age of spouse.
- ? Relative importance & sensitivity of assumptions.
- ? Volume & reliability of experience data e.g. mortality.
- ? Industry Statistics valid for large Schemes.
- ? More “standard” approach for smaller Schemes.

- ? Allowance for investment vehicle & asset mix and hence likely return.
- ? Implicit / explicit scheme expenses (admin, actuarial & legal fees).
- ? Membership profile — relevance / possibility of “accurate” estimates.
- ? Early retirement — availability & level of benefits.
- ? Ill health retirement — availability? PHI Scheme?
- ? Insured Death in Service benefits.
- ? Withdrawal rates — often ignored for small schemes.
- ? Salary Scale — implicit for small schemes.
- ? Employer/Trustee discussion less likely for smaller Schemes.
- ? Annuity rates may be crucial for a small scheme (cash flow considerations).
- ? Implicit/Explicit margins.
- ? In a small scheme, one member may significantly affect the liabilities and therefore it may be appropriate to be a little more conservative.

[9]
