Actuarial Society of India

Examinations

November 2005

SA2 – LIFE INSURANCE SPECIALIST APPLICATIONS

INDICATIVE SOLUTIONS

Q.1)

i) Define the term "asset share".

The asset share is the retrospective accumulation of past premiums, less expenses and the cost of cover, at the actual rate of return on the assets. The accumulation could be carried out for a single contract or a group of contracts. It is also referred to as the earned asset share or the retrospective earned asset share.

In the case of with profits contracts, allowance may be made for miscellaneous profits from without profits contracts and from surrenders and lapses, and also for the cost of guarantees and any capital support provided. **[3]**

ii) Discuss the implications for the company of regularly calculating and updating individual asset shares.

- by using individual asset shares, the actual benefits attributable to each policyholder become known and the amount of investment earnings for each policyholder can be quantified
- calculating individual asset shares removes the need for assumptions to be made in selecting "representative sample policies" or model points
- if the "sample representative policies" have been chosen appropriately, when the existing basis is applied to all the individual policies the resulting aggregate asset share should be very similar to that produced using sample policies
- this needs to be verified for continuity and to quantify the amount of any discontinuity as a "change of basis" and to prevent any jump or fall in benefits
- the main reason to moving to an individual model is however that it can be more sophisticated then the sample model and allow for the actual experience of individual policies (the ultimate individual asset share is a unit linked policy)
- it follows that regular updates of experience will be required, particularly investment returns, perhaps more frequent than annually to allow for policies with premiums paid by instalments
- the volume of calculations will be greatly increased and the ability of current hardware and software to cope needs to be investigated
- for example the current sample model may well be in spreadsheets, whereas individual assets shares updated regularly may well require a move to a system like Prophet or TVS
- the "representative sample policies" together with overall assumptions means that the current model inherently smoothes out the experience
- after moving to individual asset shares and assumptions reflecting the experience more directly, it may be necessary to introduce some smoothing as an explicit additional step

[1 for each point, max 8]

iii)

a) Discuss the approaches which can be taken in setting the rates of investment return to be used in accumulating asset shares, including the possibility of determining investment returns according to product group and policy duration, and the advantages and disadvantages of each approach.

- return on assets notionally allocated to with profits business or to product groups within with profits business
- notional returns calculated using notional asset mix and returns on indices
- overall actual return on non linked assets
- if segregated assets are held for with profits business, the actual return on those segregated assets
- actual or notional assets could theoretically be allocated according to
  - different product groups (whole life has a longer original term than endowment)
  - original term and duration in force (in theory equity exposure increases with duration as the non guaranteed portion of the benefits grows)
- for all the above, the investment returns could be set annually or more frequently

Advantages and disadvantages:

- in practice assets backing with profits business are not allocated at a policy level or even at a sub group level
- with profits business is not marketed on the basis of detailed asset allocation, certainly not at the individual policy level
- policyholders do not expect a changing asset allocation over the term of their policy
- policyholders expect a pooled fund and some degree of smoothing is a desirable feature
- it would be complicated to reconcile changing asset allocation at a policy level with the asset allocation of the pool
- matching is done at a fund level, and assets are not allocated to individual policies

[1 for each point, max 10]

b) Discuss the ways in which the cost of capital could be included in the calculation of the asset shares.

- the base asset share excludes the allocation of cost of capital supporting reserves or solvency margins
- initially capital is however required at commencement of the policy
- as the asset share grows to exceed the reserve (because or terminal bonuses and smoothing) the policy becomes a source of capital and the adjustment for capital costs will *increase* the asset share
- the capital used at any time is the reserves plus solvency margins less the asset share
- the charge for capital would be the capital used multiplied by the percentage cost of capital
- the alternative is to charge for capital by an overall reduction in the rate of investment return – but this moves away from asset shares at the individual policy level back to the broad overall asset share approach

- so policies could be charged for capital in the early years but then receive a credit for capital provided by them in later years
- for surrenders, equity would require that policies should be charged for the capital they have used as they will not go on to be capital providers
- some capital is provided by shareholders, but some is provided by the policyholders themselves from unallocated surplus or from non reversionary bonuses

[1 for each point, max 8]

iv)

a) List the key principles to consider in determining surrender values.

- asset share
- profit and retained surplus
- policyholder expectations
- new business disclosure
- competitive considerations
- frequency of change in scales
- ease of application
- selection against the company
- surrender and re entry

[½for each point, max 4]

b) Discuss the implications of using the unadjusted individual asset shares for calculating surrender and maturity values.

- do we expect the overall level of benefits to change materially? no, the intention is to pay fairer values between one policy and the next
- if the model points and basis assumptions previously used are all consistent with the new individual asset shares, then these should be suitable without further adjustment
- but, policies that are quite different to the model points could have big changes with their new individual asset shares
- if different investment returns are to be used for different policies then the move to unadjusted
- using unadjusted asset shares will tend to undo the smoothing which policyholders expect to some extent
- the actual maturity benefits paid may still be calculated using reversionary bonus rates and terminal bonus rates, the unadjusted asset share will be reflected in an individual terminal bonus rate for the policy
- administration systems would have to produce asset shares in real time which is both complex and requires up to date experience parameters without delay
- the smoothing will have to be designed carefully to cope with all circumstances
- the surrender value must still blend with the maturity value **[7]**

v)

a) List the overall factors which establish PRE.

- contents of sales literature, advertisements, benefit illustrations, bonus notices and policy documents
- regular bonus rates and bonus history
- general level of bonuses in the industry as a whole

- past practice and history of market value adjustments
- maturity values of the insurer and the industry as a whole
- insurer's and industry's past practice in reviewing mortality and expense charges
- recompense to policyholders on Demutualisation
- expectations of policyholders in regard to surrender values, policy alterations and early maturity values
- special expectations such as the repayment of mortgages with the proceeds of an endowment policy
- fairness between different classes of policyholder
- fairness between policyholders and shareholders

[½for each point, max 5]

b) Discuss the use of asset shares in quantifying PRE and the implications of making asset shares known to individual policyholders at any point during the term of the policy.

- the published asset shares need to bear some simple relationship to the policy values actually paid
- if the asset shares are un smoothed and the bonuses and terminal bonuses are smoothed then policyholders will obviously have questions, espec ially when the asset share is higher
- marketing and bonus notice material will need to explain the meaning of the asset share
- the marketing material and bonus notice will need to explain how payout values are smoothed relative to asset shares
- if surrender values are below the asset shares there will be complaints, it higher then there will be anti selection at the expense of remaining policyholders
- if the asset shares are not calculated consistently from year to year this will also create problems
- asset shares are used by the company to establish the maximum payout available throughout the policy term, policyholders will view the asset share as a minimum, or at least a target
- the asset share calculations are much more complicated than bonus calculations and the company will need a high level of confidence that i) they are correct, and ii) that staff will be able to explain them

[1 for each point, max 5]

[Total 50]

Q.2)

A medium sized Indian Insurance Company sells all types of conventional with and without profit products and unit-linked endowments. There are three unit linked endowment products as follows

(a) low commissions, low initial charges and with very high minimum regular premiums,
(b) medium level of commissions, medium level of charges and medium level of minimum regular premiums and
(c) maximum statutorily permitted commissions, higher charges and with small minimum premiums.

The company prepares annual business plans at the beginning of the year and projects the P & L Account and Balance Sheets for the ensuing year and for the next two years.

A mid term review of the current year's plan shows that the actual reserves under the policies at the end of the half year are significantly higher than those projected.

(i) Discuss the possible reasons for the higher level of reserves as compared to the business plan.

[10]

Marking scheme: 10 marks for full coverage. Proportionate for partial coverage.

Business plans are usually made on assumptions about economic and business conditions. The actual experience in terms of investment returns, new business, lapse and other factors are likely to be different from the assumptions.

The year 2005 has seen stock markets significantly going up. The unit reserves in respect of both new and existing business would have gone up compared to the projections. There could more lump sum injections also.

The volumes of actual new business might differ from that expected. The timing or seasonality of the new business will also affect the reserve levels if not allowed for in the business projections.

The actual new business product mix could be different from that expected. Linked products having different levels of charges could lead to different levels of reserves.

Size: Linked policies with small premiums could require non-unit reserves to be set up. Under conventional products, large numbers of small policies would require larger (expense related) reserves to be set up than under a small number of large policies.

Term: Under conventional business, reserves under policies for shorter terms would be larger than under long term policies.

The experience of existing business on lapse, death, surrender and partial withdrawals could be different from that expected leading to different levels of reserves.

Valuation assumption changes would also affect the reserves.

You are the Appointed Actuary of the company and a newly appointed director has asked you send him a note on the principal risks the company is facing and how the legal and regulatory provisions seek to control these risks.

(ii) Briefly describe the items you would cover in your report. A drafting style is not required.

[15]

Marking scheme: 1 mark for each of the 5 risks and 10 marks for the discussions below.

Answer:

Credit, concentration and counterparty risk: Arises mainly from investments.

Market risk: Adverse market movements affecting the value of investments.

Liquidity risk: Lack of liquidity to meet cash flows

Operational risk: Arise out of mis-selling, frauds etc.

Insurance risk: the insurance experience being adverse - death, lapses, surrenders etc. worse than expected.

The first three items are addressed by the Investment Regulations (and Sec.27 of the Act) that place restrictions on investment of funds. The investment policy covering Asset Liability Management is required to be approved by the regulator. The controlled fund has to be invested as per pattern mentioned in the regulations. The investment pattern for linked funds has to be submitted to and approved by the regulator.

Operational risks are addressed by the requirement to have audits and other financial control measures. Market conduct is also controlled by the requirement to get product brochures and benefit illustrations approved by the regulator. The advertisement regulations further prescribe norms. The agents regulations define the duties and responsibilities of agents so as to control mis-selling risks.

Insurance risks are controlled at the product design and approval stage by requiring product features to take account of the risks. Further, reinsurance is required to be done to minimize these risks.

The valuation regulations require best estimates of policy liabilities determined, with additional margins. On the assets side, besides the investment regulations, for the conventional business constituting the controlled fund, buffers are kept by valuing assets at the lower of book or market value. On the qualitative side, the valuation is subject to a peer review and also a further review by the actuaries review panel of the regulator.

Required Sovency Margins are to be kept as a further security to protect against fall in asset values and adverse mortality and morbidity experience. These are further subject to a minimum of Rs. 750 million.

Ceilings on commissions and management expenses are prescribed in the Insurance Act.

The director after seeing your report writes to you saying that investment markets are very volatile and following failure of some big companies there is global concern about the financial strength of life insurance companies. He feels there is a need to hold more capital than the statutory required solvency margins.

iii.) Briefly explain the primary reasons, besides the risks you have mentioned, why you would require additional capital above statutory requirements. [16]

Marking scheme: 1 mark for each of the first 8 points and 2 marks for each of the second set of points.

Answer:

Insurance companies usually require capital for the following purposes:

- Finance new business strain
- To pursue an aggressive investment policy
- Towards working capital needs and in the case of a new company to finance expense over-runs
- To finance expansion – new branch office, new system etc.
- To acquire other companies or blocks of business.
- To support with-profits bonuses and their smoothing.
- To support more stringent solvency valuation requirements.
- More generally, to cover the day-to-day risks to which a company is exposed, such as:
  – policy guarantees (*eg* annuity options)
  – with-profits growth guarantees
  – investment risks – capital and interest rate
  – credit and counterparty risks
  – persistency risks
  – operational risks (*eg* accidents, terrorism, malicious damage or systems failures)
  – mortality risks, especially **increasing longevity.**

Investment markets have been very volatile in the recent years. There have also been failure of some companies due to market conditions (low interest rate environment) and also due to internal problems like excessive guarantees, lack of Asset Liability management etc. Insurance company ratings also depend on the levels of free capital available. Most companies are therefore feeling the need for additional capital besides the statutory capital requirements. The following are the major reasons:

- Companies would like to meet internally derived risk based capital as a part of a holistic risk management framework.
- Short term risks such as a natural calamity or turbulence in markets require buffers to avoid a breach of regulatory capital.
- Companies would like to retain and improve their target financial strength rating from external agencies.
- Additional capital may be required to provide additional comfort that the company can meet policyholder obligations and support reasonable benefit expectations often to ensure continued sales of new business.

iv.) You have been asked to advise on a suitable policy framework for the additional capital. List the items you would consider in giving this advice. [9]

Marking scheme: full 9 marks for any 5 of the following.

Answer:

The Appointed Actuary would consider at least the following while giving his advise on the proposed additional capial.

- the scope of risks and other requirements the additional surplus is expected to cove r
- The nature of the business, types of products and underlying risks
- the extent to which the Insurance Act, the regulations and other regulatory requirements cover the need for the additional capital.
- the extent to which internal management practices including product management, asset liability management, internal audit and control and capital management would cover the additional capital needs
- the risk tolerance of key stakeholders and how this is defined and measured;
- the accessibility of capital;
- the ability of the organisation to source additional capital in adverse circumstances if regulatory requirements are breached;
- the integrity of the process, including systems, to determine target surplus; the management information system available to accurately measure the surplus position on a reasonably frequent basis; and
- the appropriate communication of the policy and its basis to the rest of the management team.

Total [50]