

ACTUARIAL SOCIETY OF INDIA

GUIDANCE NOTE (GN) 22: Reserving for Guarantees in Life Assurance

Business

Classification: Practice Standard

Compliance:

Members are reminded that they must always comply with Professional Conduct Standards and that Guidance Notes impose additional requirements under specific circumstances

Legislation or Authority:

1. The Insurance Act 1938 and amendments thereto (hereinafter referred to as the Act).
2. Insurance Regulatory and Development Authority (Actuarial Report and Abstract) Regulations, 2000 ((hereinafter referred to as the Actuarial Report Regulations)
3. Insurance Regulatory and Development Authority (Assets, Liabilities and Solvency Margin of insurers) Regulations, 2000 (hereinafter referred to as ALSM regulations).
4. Insurance Regulatory and Development Authority (Appointed Actuary), Regulations 2000 (hereinafter referred to as AA Regulations)
5. Guidance Note 1 - Appointed Actuary and Life Insurance Business, issued by Actuarial Society of India, (hereinafter referred to as GN1)
6. Guidance Note 2 - Additional Guidance for Appointed Actuaries and other Actuaries involved in Life Insurance, issued by Actuarial Society of India, (hereinafter referred to as GN2)

IAA International Actuarial Standards of Practice

Currently there is no applicable International Actuarial Standards of Practice issued by International Actuarial Association

Application

This Guidance Note is applicable to an Appointed Actuary, appointed in accordance with provisions contained under AA Regulations.

The purpose of this guidance note is to define the framework within which the Appointed Actuary shall discharge the responsibilities under Para 5.5(ii) and 6.2 of GN1.

Status

Issued under Due Process in accordance with the “Principles and Procedures for issuance of Guidance Notes (GNs) {ver. 2.00}”.

This Guidance Note shall constitute “Professional Guidance” within the meaning of Regulation 2(e) of the AA Regulations.

Version	Effective from
1.0	01 04 2005

A: Purpose

The purpose of this guidance note is to ensure that the actuarial reserves are adequate to meet the minimum guaranteed benefits arising due to the contractual agreement. This guidance note is framed to address

- Regulations 7(3)(d) and 8(d) of ALSM Regulations;
- para 5.5(ii) of GN1; and
- para 5.2 of GN2.

B: Scope

1. This professional guidance note recommends suitable methodology to be used by actuaries to reserve for guaranteed benefits. The guidance note recommends the minimum steps that should be taken by the actuary.
2. This guidance note recommends the use of stochastic models to quantify reserves required to finance possible shortfalls in respect of guarantees. The actuary may however make use of alternative methods (e.g. pricing a hedging portfolio) to quantify this liability, provided such models or methods are based on sound actuarial principles.

C: Methods

1. Stochastic Models

- a) In order to quantify the reserves it is necessary for the actuary to stochastically model investment returns and other factors typically correlated to investment returns such as lapses.

- b) No specific investment return projection model is prescribed. The actuary may use any stochastic investment return projection model that is deemed appropriate for purposes of quantifying reserves required to meet guaranteed minimum values.
- c) The economic assumptions underlying the stochastic model should reflect the market conditions as at the valuation date.
- d) It is recommended that the stochastically simulated investment returns display a minimum level of inherent variability to enable the actuary to make a reasonable estimate of the extreme ends of the distribution of the liability in respect of guaranteed minimum maturity values. As a reasonability check, the actuary could use any one or both of the following criteria to test whether the simulated investment returns display an adequate level of inherent variability:
- (i) Standard deviation of the annualised geometric average return over the following periods should exceed (to be determined as a benchmark and stated):
- | | |
|-----------|---|
| 5 years: | % |
| 10 years: | % |
- (ii) The standard deviations of the annual investment returns in each year of simulation should exceed % (to be determined as a benchmark and stated).
- d) Different variability criteria might be appropriate if the portfolios in which the policyholders' funds are invested differ substantially from the specific balanced portfolio used to derive the above criteria. The variability criteria provided above are thus merely indicative and aim to provide a possible reasonability test. The actuary should ensure that the stochastically simulated investment returns display an appropriate level of inherent variability to adequately reflect the asset composition of the underlying investment portfolio.
- e) In modelling non-economic factors such as lapses the actuary should take into account likely future policyholder behaviour and the extent to which this is correlated with the value of the guarantee. Thus in certain adverse scenarios where the guarantee becomes valuable lapse rates should be appropriately chosen.

- f) The actuary must decide on a practical number of iterations of future investment return scenarios, but the recommended minimum number of required iterations is 10,000.

3. Impact of prevailing market conditions

1. It is recommended that the Appointed Actuary apply an expected long-term rate of investment return in the stochastic investment return model that is in line with the economic assumptions in the annual statutory valuation. The actuary may use his/her judgement regarding the impact of prevailing market conditions on the stochastic investment return model at the valuation date. At every investigation, the actuary should consider whether the calibration of the model used in the previous investigation is still valid or whether the model needs to be recalibrated and the parameter values re-estimated given the development of the market conditions since the previous investigation. The stochastic model could potentially assume a different rate of investment returns for an initial period after which the projected investment returns revert to the expected long-term investment return.

2. The preferred approach is to calculate the reserves described in this guidance note at the financial year-end. The actual market value of the underlying assets (i.e. the asset shares) as at the valuation date should be used as the starting values to project the expected asset shares at the claim date. For the published reserves, the reserves required to meet guaranteed minimum values can be calculated prior to the valuation date, since there may not be sufficient time during the year-end valuation to calculate these reserves. However, in this case, the necessary adjustments, based on changes in the values of the underlying assets between the calculation date and valuation date, must be made to the reserves. The actuary should use his/her judgement regarding the adjustment required to determine the reserves at the valuation date since the theoretical calculation might be too complex and time-consuming.

3. Although the approach described above might introduce volatility to the annual statutory reserves required from year to year, this is to be expected from reserves based on the annual statutory reserve methodology. A reserve higher than the theoretically calculated reserve can be held to reduce the volatility of the results. Discussion with the Peer reviewer is recommended to agree on the size of the reserve held.

D: Reserving Methodology

1. Calculating reserves

- a) For each policy with an applicable minimum contractual guarantee value, the market value of the underlying assets as at the valuation date is used

- as the starting point. This value is accumulated with future premiums at the stochastically simulated investment returns allowing for charges and taxation etc., to determine the projected guaranteed value for each policy or group of policies. The projected guaranteed values are calculated based on best estimates of all future contingencies (e.g. expenses, mortality), other than the future investment returns and factors such as lapses which may be correlated to investment returns.
- b) For each policy the projected value is compared to the contractual minimum guaranteed value. If the projected value exceeds the guaranteed value, a nil shortfall is recorded. If the projected value is less than the minimum guaranteed value, the shortfall should be reserved for. The actuary may take credit for the accumulated value of premiums explicitly charged for the minimum guarantees.
 - c) The above methodology applies for unit-linked policies where the policyholder will be paid the greater of the projected value and a guaranteed value. For non-linked business, there could be a positive or negative difference between the projected assets and the guaranteed value, both of which would be taken into consideration when calculating the reserve.
 - d) The shortfall (and possible surplus, in the case of non-linked business), at surrender/maturity dates must be discounted to quantify the value of the required reserve at the valuation date. The appropriate discount rate is discussed in (i). Once all the policies or have been projected on a specific series of simulated investment returns, the entire process is repeated for each of the independent projections of future investment returns.
 - e) In this manner a series of reserves, equal in number to the number of investment return projections, is calculated at the valuation date. Note that in the case of non-linked business, a number of these reserves might be negative. All the reserves are then ranked from smallest to largest. The series of ranked reserves is used to determine the annual statutory valuation liability.

3. Conditional Tail Expectations (CTE)

This guidance note recommends the use of conditional tail expectations (CTE) to determine the guarantee reserve. The $CTE[p]$ is defined as the arithmetic mean of the largest $100(1-p)\%$ reserves from the series of ranked reserves described above. For example, a 95% CTE (i.e. $CTE[0,95]$), will be the average of the highest 5% of the reserves. $CTE[0]$ is the arithmetic mean of all the reserves from the Monte Carlo simulation.

The level of confidence (i.e. the value of the parameter p) will be chosen by the actuary or as prescribed by the IRDA. The value chosen should be disclosed in Regulation 4(3)(e) of the Actuarial Report Regulations.

4. Assumptions

a) Appropriate discount rate

- (i) The shortfalls (and if applicable, surpluses) at maturity, if any, must be discounted to the valuation date to quantify the reserves required to meet guarantees. The actuary must use discount rates derived from the stochastic projections of future investment returns that are consistent with the asset composition of the portfolio that supports the reserves required to meet maturity guarantees. The discount rates used should be consistent with the applicable investment returns for the specific investment return simulation.
- (ii) If the reserve required to meet the minimum surrender/maturity guarantees is invested in the same portfolio as the policies itself, the shortfalls (and if applicable, surpluses) at surrender/maturity must be discounted at the investment return implied by the specific iteration of investment return projections from the stochastic model. If the reserve is, for instance, invested in a portfolio of only fixed interest assets, it may be required to derive the discount rate from the stochastically projected returns on that specific asset class.

5. Results

- a) Once the reserve implied by each projection of the future investment returns has been determined, the series of reserves is ranked from smallest to largest. The reserves required to meet the cost of the minimum guarantees can then be determined by calculating the appropriate CTE measure from the ranked reserves.
- b) The reserves should be held on a policy-by-policy basis for unit-linked business.
- c) For non-linked business the reserves can be held on an aggregate basis. Reserves in respect of participating and non-participating business should be held separately.

- d) The guarantee reserve should be additional the statutory reserve calculated otherwise.

6. Extreme Observations

Due to the skewness of the distribution of the reserves, the investment return projection model might give rise to a number of relatively large reserves that result from particularly poor future investment return projections. It is recommended that these values are not discarded or artificially reduced. If the actuary is uncomfortable with the level or number of these reserves, it is suggested that he/she rather revisits the calibration of the particular investment returns projection model used or alternatively choose a different stochastic model.