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25th May , 2011

To

CEO's of Non-life Insurance Companies.

Sub: Economic Capital for Non-life industry

Please refer our draft circular dated October 22, 2010. As indicated therein we conducted a one-day workshop for the Non-life insurance industry in January 2011. In the light of the feedback received from the participants the revised guidance note is enclosed as a reference document.

The calculation of Economic Capital for the business ending March 31, 2011 is to be submitted on or before September 31, 2011.

For any clarifications please contact janita@irda.gov.in.

Yours faithfully

(R. Kannan)

ESTIMATING ECONOMIC CAPITAL FOR GENERAL INSURANCE COMPANIES IN INDIA: A TECHNICAL NOTE

1. INTRODUCTION:

1.1. This technical note describes the framework for estimating Economic Capital (EC hereafter) for general insurance companies including standalone health insurers of India. Typically EC is calculated using "standard formula" approach or through the use of internal models (company specific models). This technical note describes the "standard formula" approach for estimating EC.

1.2. The structure of this technical note is as follows:

- **Section 2** defines Economic Capital
- **Section 3** covers the key applications of EC analysis
- **Section 4** sets the background to the note by highlighting the salient features of the EC framework with particular reference to a general insurance company
- In **Section 5**, we define the key decision variables associated with the estimation of EC
- **Section 6** describes the proposed approach for estimating the technical provisions
- **Section 7** covers the proposed approach for estimating EC pertaining to the non- life underwriting risks
- **Section 8** dwells on the framework for estimating EC for other sources of risks like market risk, credit risk and operational risk
- **Section 9** provides a summary of the discussion of the technical framework presented in this note
- The **appendix A** to this technical note provides the standard parameters for estimating premium risk and reserve risk
- The Economic Capital related disclosures are to be provided in **appendix B**
- This technical note does not include a discussion of the framework for estimating EC for the non-life reinsurance portfolio of a reinsurer.

2. CONCEPT OF ECONOMIC CAPITAL

2.1. **"**Typically, Economic Capital is calculated by determining the amount of capital that the insurer needs to ensure that its realistic balance sheet stays solvent over a certain time period with a pre-specified probability. Eg. The EC may be determined as the minimum amount of capital required to make 99.5% certain that the insurer remains solvent over the next twelve months."

2.2. "The word 'economic' indicates the fact that it measures risk in terms of economic realities rather than Regulatory or accounting rules which may have been designed to support non economic principles. This word also indicates that part of the measurement process involves converting a risk distribution into the amount of capital that is required to support the risk, in line with the insurer's target financial strength (eg. Credit rating)"

2.3. "At its most basic level, Economic Capital can be defined as sufficient surplus to cover potential losses, at a given risk tolerance level, over a specified time horizon"

2.4. "There are other definitions of EC :

- Sufficient surplus to meet potential negative cash flows and reductions in value of assets or increase in value of liabilities at a given level of risk tolerance, over a specified time horizon.

- Excess of the market value of the assets over the fair value of liabilities required to ensure that obligations can be satisfied at a given level of risk tolerance, over a specified time horizon.

- Sufficient surplus to maintain solvency at a given level of risk tolerance, over a specified time horizon"

3. IMPORTANCE OF ECONOMIC CAPITAL

"Economic Capital" plays a central role in the financial management of an insurance company for the following reasons:

3.1. Solvency and Capital Efficiency

Economic Capital Analysis enables an insurance company to strike an appropriate balance between

- Too much capital – which can lead to an excessive cost of insurance
- Not enough capital – which can lead to an unacceptable risk of insolvency

3.2. Risk Monitoring and Control

EC is a key component of an insurer's risk appetite frame work. The risk measurement and monitoring processes need to ensure that the insurer remains within that risk appetite. To do this, target ranges for EC utilization need to be established for each geography, business unit and/or risk and actual EC utilisation be monitored against these target ranges.

3.3. Performance Measurement and Management

By itself, EC does not represent a measure of business performance, but it provides a measure of the risk related to the business. In other words a higher level of EC for one business unit compared to another signifies a higher level of risk and therefore suggests that a higher level of reward should be expected.

Therefore to use EC to as a performance metric it needs to be incorporated with some related measure of return. One approach can be to calculate the RoRAC (Return on Risk Adjusted Capital) for each business unit, using EC as the (risk adjusted) capital measure in the denominator of the calculations.

3.4. Risk Based Decision Making

EC can be incorporated in the key risk based decision processes such as strategic asset allocation, ALM and reinsurance strategy. The impact of such decisions on the company's EC requirement needs to be assessed before embarking on a particular course of action.

3.5. Risk Based Pricing

As companies become more comfortable with their EC framework, and there is an acceptance that EC drives capital requirements, there will be a natural progression to embed EC in the product pricing process.

3.6. Business Planning

It will be important to assess the impact of alternative business plans (alternative product mixes and volumes) on the overall EC requirement of the insurance company. For example, business plans/strategies involving a wide range of products can provide higher diversification benefits and hence lower unit economic capital requirements.

3.7. Mergers and Acquisitions

EC will play an important role in the merger and acquisition process. The buyer will need to consider the EC requirements of the target company and the result of aggregating these with its own EC requirements, taking into account diversification where appropriate.

Given the above financial and strategic ramifications of economic capital analysis, it is important to put in place a robust framework for estimating economic capital as accurately as possible.

4. Economic Capital Framework

4.1. The term Economic Capital can connote either "Required Economic Capital" or "Available Economic Capital".
The term "Required Economic Capital" can be defined as the capital required to cover potential losses at a given risk tolerance level over a specified time horizon. It needs to be noted that this capital is "required" from an economic point of view rather than from a regulatory point of view.
The term "Available Economic Capital" can be defined as the excess of the value of the insurance company's assets over the value of its liabilities measured on a realistic or market consistent basis.
In this technical note, the term EC (unless otherwise stated) always refers to the Required Economic Capital.

4.2. An operational definition of economic capital is provided by the Solvency II framework. According to this framework, EC or Solvency Capital Requirement (SCR)[1] corresponds to the Value at Risk (VaR) of an insurance company, subject to a ruin probability of 0.5% over a one year time frame.

4.3. In other words, EC shall correspond to the VaR of the 'basic own funds' subject to a confidence level of 99.5% over a one year period. In this context "basic owned funds" is defined as [share capital + guarantee funds + retained earnings+ subordinated liabilities]

[1] The terms EC and SCR are used interchangeably in this note

4.4. The structure of the balance sheet of an insurance company within an EC framework will be as depicted in Figure 1.

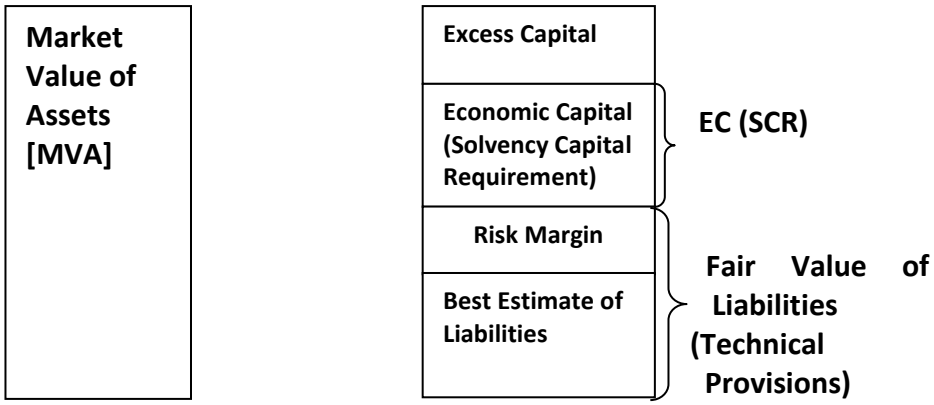

Figure 1: Economic Value Balance Sheet

4.5. In the above balance sheet, the best estimate of liabilities refers to the expected present value of future potential cash flows. The risk margin (also referred to as market value margin) is calculated using the cost of capital approach (which is explained in a later section of this note).

The EC [SCR] is calculated as the sum of the EC for:

- Underwriting risk
- Market risk and
- Other risks

4.6. The above modular approach for calculating EC is depicted in Figure 2 for a general insurance company.

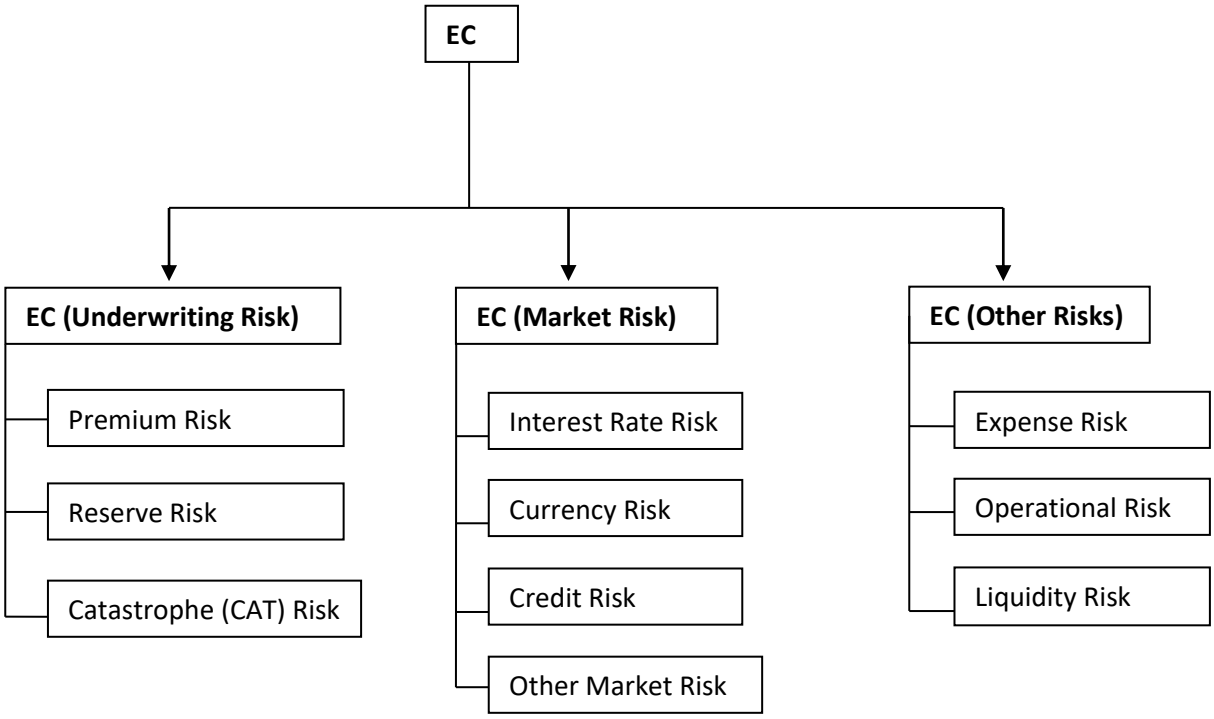

Figure 2: Modular Approach for Calculating EC

4.7. As stated earlier it is important to distinguish between EC and the current regulatory solvency capital (which is 150% of Required Solvency Margin). The EC calculation recognizes the capital requirement for specific risks a non-life insurance company is exposed to, as opposed to a formula approach based on simple proportion of premium or claims.

4.8. The Regulatory Required Solvency Margin (RSM), which a general insurance company requires to hold, is defined by section 64VA of the Insurance Act, 1938, IRDA (Assets, liabilities & solvency margin of insurers) regulation, 2000 and circular no.29 /IRDA/Actl/RSM-NL/2005-06.

5. DETERMINATION OF ECONOMIC CAPITAL: THE KEY DECISION VARIABLES

The key decision variables which need to be defined upfront (for estimating economic capital) are summarized in Table 1

Table 1: Key Decision Variables

Sl. No.	Key Decision Variables	Proposed Definition
1	Time Horizon	One Year
2	Measure of Risk	Value at Risk (VaR)
3	Type of Risks to be Considered	▪ Underwriting ▪ Premium Risk ▪ Reserve Risk ▪ Catastrophe Risk ▪ Market ▪ Interest Rate Risk ▪ Currency Risk ▪ Other Market Risks ▪ Credit Risk ▪ Other ▪ Expense Risk ▪ Operational Risk ▪ Liquidity Risk
4	Quantification Methodology	Formula Based Approach
5	Statistical Correlations	Specified
6	Target level of Security (Confidence Coefficient)	99.5%

6. ESTIMATING TECHNICAL PROVISIONS: PROPOSED APPROACH

6.1. The approach proposed in this section for establishing technical provisions is driven by the need to calculate liabilities on a market consistent basis.

6.2. Since the future cash flows associated with general insurance liabilities cannot be replicated using financial instruments that have a clear market value, the technical provisions are determined as a discounted best estimate augmented by a risk margin. The three underlined terms can be interpreted as follows:

- Best estimate: The best estimate (undiscounted) provision is equal to the probability weighted average of future best estimate cash flows

- Discounting: The best estimate is discounted for time value of money using the risk free interest rate term structure (gilt yield curve)

- Risk Margin: The risk margin is determined as the present value of the cost of holding the economic capital (solvency capital requirement) for non hedgeable risks during the whole run off period of the in-force portfolio using the risk free interest rate structure (gilt yield curve)

6.3. The technical provisions need to be established for both outstanding claims and unexpired risks.

6.4. Valuation Methods for Technical Provisions related to Outstanding Claims

- Currently, the valuation methods for determining the IBNR incorporate implicit margins for prudence. These valuation methods are described in the "Manual for Estimation of Provision for IBNR and IBNER Claims in General Insurance Business" published by the IRDA (May 2008). As per the current practice, the IBNR reserve is not calculated based on discounted cash flows.

- Under the EC framework, the first step is to determine a best estimate for the technical provisions.

- Once a best estimate provision is determined, the next step is to adjust the best estimate for the time value of money to get the 'discounted best estimate technical provisions'. For this purpose, a payment pattern can be used to separate expected future cash flows into annual incremental amounts. The incremental expected cash flows are then discounted at the risk free rate applicable for the relevant maturity at the valuation date.

6.5. Valuation Methods for Technical Provisions related to Unexpired Risks:

- The technical provision for Unexpired Risk will consist of Unexpired Risk Reserve (URR) plus a Premium Deficiency Reserve (PDR) as defined under the Insurance Act, 1938 and the Regulations notified by the IRDA in this regard.

- The PDR should be calculated separately for each line of business (LOB) specified in appendix A of the technical note in order to arrest underwriting losses for each line of business.

6.6. Determining Risk Margins :

- The risk margin is derived using a cost of capital (CoC) approach. Under the CoC approach, the risk margin is calculated by determining the cost of providing the capital necessary to support the insurance and/or reinsurance obligations over their future life time. Necessary capital in this context will be equal to the EC for reserve risk (as described in section 6).

- The steps involved in calculating the risk margin are as follows:
  - ✓ Project the EC for reserve risks for all future periods until the portfolio has run off
  - ✓ Multiply EC for each future period by the CoC rate which is set equal to 6% which reflects the difference between cost of equity and the risk free return.
  - ✓ Discount the amounts calculated in the previous step at the risk free rate using the gilt yield curve
  - ✓ Sum the discounted values

Thus the formula to calculate the risk margin (RM) is:

$$\sum_{t} 6\% * EC_{\mathrm{Res}}(t) * [1 + r(t)] \wedge (-t)$$

7. ESTIMATING EC FOR NON-LIFE UNDERWRITING RISK: THE PROPOSED APPROACH

7.1. The steps discussed in this section for calculating EC are based on the modular approach illustrated in Figure 2 (Section 2) and are broadly modelled on the Solvency II framework

7.2. Salient Features of the Solvency II Approach:

- The salient features of the Solvency II approach[2] for estimating EC for non life underwriting risk are as follows:

  - ✓ Article 105 of the Solvency II Level 1 Text1 states that the non life underwriting risk module shall reflect the risk arising from non life insurance obligations, in relation to the perils covered and the processes used in the conduct of the business.
    It shall take account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing insurance and reinsurance obligations as well as to the new business expected to be written over the next twelve months.

    The Solvency Capital Requirement for the non life underwriting risk module will be calculated as a combination of the capital requirements for at least the following sub modules:

    a. The risk of loss, or of adverse change in the value of insurance liabilities, resulting from fluctuations in the timing, frequency and severity of insured events, and in the timing and amount of claim settlements (non life premium and reserve risk)

    b. The risk of loss, or of adverse change in the value of insurance liabilities, resulting from significant uncertainty of pricing and provisioning assumptions related to extreme or exceptional events (non – life catastrophe risk)

  - ✓ As stated above, the Solvency II framework, distinguishes between current year risk, which is called as premium risk and previous year risk, which is called as reserve risk.

    In this context Premium Risk refers to the risk pertaining to future claims arising during and after the period until the time horizon for the solvency assessment. The risk is that expenses plus the volume of losses (incurred and to be incurred) for these claims (comprising

[2] CEIOPS – CP – 48/09 dated 02-07-2009

both amounts paid during the period and provisions made at the end of the period) is higher than the premiums received

Premium risk relates to policies to be written (including renewals) during the period and to unexpired risks on existing contracts. On the other hand, Reserve risk refers to the risk arising from two sources: (a) the absolute level of the claims may be mis- estimated; and (b) actual claims will fluctuate around their mean value due to the stochastic nature of the claim payouts

- ✓ In addition to the Premium Risk and Reserve Risk, Solvency II considers the category of CAT risks which are modelled with a face amount indicating the expected loss of natural catastrophes and man-made catastrophes.

- ✓ The risk measure used is the 99.5% value at risk.

- ✓ The EC is not distribution based. In other words the formulae used for calculating the EC provides a single number as opposed to a distribution from which the EC needs to be estimated

- ✓ The framework distinguishes between different lines of business. The parameters like the correlation between premium risk and reserve risk for each line of business and the correlation between insurance risks of different lines of business are specified. These are standard values which are the same for all companies and which do not depend on the size of the company. These parameters are provided in Appendix A of this note

7.3. <u>EC for Non –Life Underwriting Risk: The Mechanics[3]</u>

- This section provides the formulae for calculating EC for underwriting risks. The underlying model assumptions leading to these formulae have not been covered in this note.

  We will use the following notations in this section for calculating the capital charge for premium and reserve risks.

  a) Pi = Volume Measure of Premium Risk

  =Maximum of

  i. Estimate of net written premium for the ith LOB during the forthcoming Year

[3] This section draws heavily on the paper: "Gisler, Alois," "The Insurance Risk in the SST and in Solvency II: Modeling and Parameter Estimation".

ii. Estimate of net earned premium for the ith LOB during the forthcoming year
iii. Net Written Premium for the ith LOB during the previous year

b) Ri = Volume Measure for Reserve Risk
= best estimate for claims outstanding for the ith LoB at the end of the previous year + PDR for the ith LoB at the end of the previous year

c) Vi = Pi + Ri

Note: (1) If the EC calculations are being carried out as on 31st March 2011, the term "forthcoming year" will refer to the financial year 2011-12, and the term "previous year" refers to the financial year 2010-11.

(2) The estimate of the projected net earned premium for a LoB during the forthcoming year will be calculated as follows:

Step 1: Calculate the ratio of the net earned premium to the gross earned premium in Table 2.1 of the Financial Condition Report (as per the format specified by IRDA)

Step 2: Calculate the net earned premium for the forthcoming year as the product of the Gross Earned Premium reported in Section 3 of the Financial Condition Report and the ratio determined in Step 1

d) σ (premium) = standard deviation for premium risk for the ith LoB
e) σ (Res) = standard deviation for reserve risk for the ith LoB
f) P_o = Volume measure of premium risk for all LoBs
g) R_o = Volume measure of reserve risk for all LoBs
h) $V_o = P_o + R_o$

- The list of LoBs is provided in appendix A.1. The market wide premium risk and reserve risk parameters are provided in Appendix A.2

- We will now introduce a variable Z_i to denote the combination of premium risk plus reserve risk for the ith Lob. We will define Z_i as follows:

$$Z_i = \frac{1}{V_i}(P_i X_i + R_i Y_i)$$

Where $V_i = P_i + R_i$

Therefore

$$Variance(Z_i) = \frac{1}{V_i^2}\left[P_i^2 Variance(X_i) + R_i^2 Variance(Y_i) + 2P_i R_i \rho(X_i, Y_i)\sigma_i \tau_i\right]$$

$$= \frac{1}{V_i^2}\left[P_i^2 \sigma_i^2 + R_i^2 \tau_i^2 + 2P_i R_i \rho(X_i, Y_i)\sigma_i \tau_i\right]$$

We will denote $\varphi_i = \sqrt{Variance(Z_i)}$

- We will assume that $\rho(X_i, Y_i) = 0.5$ for all i

b) The next step is to consider the correlations between Zi and Zj. Let us denote $\rho_{ij} = Corr(Z_i, Z_j)$

c) Solvency II framework provides the standard values for ρ_{ij} which are the same for all companies. These correlation coefficients are tabulated in Appendix A.4

d) We will now introduce a variable Z_o defined as follows:

$$Z_o = \sum_{i=1}^{I} \frac{V_i}{V_o} Z_i$$

We can then obtain $\varphi^2 = Variance(Z_o) = \sum_{i,j=1}^{I} \frac{V_i V_j \varphi_i \varphi_j}{V_0^2} \rho_{ij}$

Where I denotes the number of LoBs

e) The formula used for calculating the EC for the combined premium and reserve risk is as follows:

EC (Premium Risk + Reserve Risk)

$$= V_o * \left[\frac{\exp\left(\Phi^{-1}(0.995) * \sqrt{\log\left(\varphi^2 + 1\right)} \right)}{\sqrt{\phi^2 + 1}} - 1 \right]$$

$=V_o \; VaR_{0.995}^{mean}(\Psi)$

Where

Ψ = lognormally distributed random variable with E (Ψ) =1 and Variance (Ψ) = ϕ^2

$VaR_{0.995}^{mean}(\Psi)$ =99.5% value at risk of [Ψ - E (Ψ)]

$V_0 = P_o + R_o$

$\Phi(x)$ = Standard normal Distribution

7.4. Estimating EC for Catastrophe Risks:

- ✓ A Catastrophe Risk- CAT_k -is characterised by a face amount C_k to be interpreted as the expected loss for the company if this catastrophe happened

- ✓ For natural catastrophes the amount C_k can be taken as being proportional to the underlying written premium i.e., if $\tilde{C}_t P_t$ if only the t th LoB is hit by the event. On the other hand if several LoBs are hit, it will be a corresponding sum over several LoBs

- ✓ It is assumed that the different Catostrophe –risks CAT_k, $_k$ = 1,2,.....K are independent and normally distributed with $VaR_{0.995}(CAT_k) = C_k$

- ✓ It therefore follows that the EC for all CAT risks taken together will be:

  EC (CAT) = $\sqrt{\sum_{K=1}^{K} C_k^2}$

  Where K denotes the number of CAT risks

7.5. Estimating EC for Non Life Underwriting Risks

The EC for Non life underwriting risk – premiums risk, reserve risk and CAT risk – taken together is given by the formula

$$\text{EC (NLWR)} = \sqrt{EC_{pr+res}^2 + EC_{CAT}^2}$$

Where NLWR denotes non life underwriting risk

pr denotes premium risk

res denotes reserve risk

and CAT denotes Catastrophe risks.

It is assumed that the correlation coefficient between premium & reserve risk on one hand and the CAT risk on the other hand is Zero

8. EC for Market Risk and Other Risks

8.1. The risks covered in this section are:

- Market Risk
- Other Risks

8.2. The sub risks covered under Market Risk are

- Interest Rate Risk
- Currency Risk
- Credit Risk
- Other Market Risks (eg: Property and Equity Risks)

8.3. The sub risks covered under Other risks are

- Liquidity Risk
- Expense Risk
- Operational (including legal) Risk

8.4. <u>EC for Market Risk: Interest Rate Risk</u>

- The proposed approach is a Stress Testing Approach. The steps involved are as follows
  - ✓ The net asset value (NAV) will be calculated under two pre defined interest rate scenarios
  - ✓ The delta (ΔNAV) for each interest rate scenario will be calculated as follows:

ΔNAV = [NAV under the predefined interest rate scenario minus base case NAV]. Thus we will have two delta NAV values: ΔNAV_1 and ΔNAV_2

- ✓ The EC for interest rate risk will be set equal to the more onerous ΔNAV determined in the previous step

- ✓ The NAV in this context will be defined as
  NAV = MVA – TP
  Where MVA denotes Market Value of Assets
  And TP denotes Technical Provisions

- ✓ The two predefined interest rate scenarios can be:
  Scenario A: A 50 BP upward parallel shift in the gilt yield curve
  Scenario B: A 50 BP downward parallel shift in the gilt yield curve
  Where BP denotes Basis Points.

  A more sophisticated approach for defining the interest rate scenarios will be to allow for movements in the level, slope and curvature of the

term structure of interest rates and also allow for an increase in the interest rate volatility.

8.5. EC for Currency Risk

- The proposed approach is a stress testing approach. The steps involved are as follows:

  - ✓ For each foreign currency (FC), delta NAVs are calculated based on two predefined scenarios: a rise in the value of the FC relative to the Indian Rupees (INR), and a fall in the values of FC relative to the INR.

  - ✓ The delta NAV in this context is defined as $\Delta NAV\ (FC_1)$ = Delta MVA (FC_1) – Delta TP(FC_1)
    Where FC_1 denotes the foreign currency under consideration (e.g.: USD)
    MVA (FC_1) denotes the market value of assets denominated in that FC
    And TP (FC_1) denotes the technical provisions denominated in that FC

  - ✓ Based on the previous step, we will have two ΔNAVs: $\Delta NAV_1\ (FC_1)$ and ΔNAV_2 (FC). The EC for the currency risk pertaining to that currency will be equal to the more onerous ΔNAV.

  - ✓ The total EC for currency risk will be the sum of the ECs over all FCs in which the assets and liabilities are denominated.

  - ✓ The two predefined scenarios in this context can be:
    Scenario A: a 10% rise in the value of FC relative to INR
    Scenario B: a 10% fall in the value of FC relative to INR.

8.6. EC for Other Market Risks:

- The other Market Risks include Equity risk, property risk and concentration risk

- Considering the materiality of these risks and also the mandated prudential investment norms, it is proposed that EC for other market risks can be set equal to zero at this stage.

- However if the equity exposure in the investment portfolio exceeds 10% of the market value of the investment portfolio as on the balance sheet date, then there will be an EC requirement for equity risk.

- This EC requirement will be calculated as 45% of the market value of equity exposure in excess of 10%.

8.7. EC for Credit Risk

- Credit Risk relates to the possibility of loss or adverse change in the company's financial position due to non fulfilment of contractual obligations by third parties.

- Credit risk can be viewed as an aggregation of sub risks like

  - ✓ Spread Risk which refers to the volatility of credit spreads over the 'risk free interest rate term structure

  - ✓ Default risk which refers to the risk of not receiving the principal and/or interest on Corporate Bond Investments

  - ✓ Counterparty Default Risk – An example will be the risk of default by counter parties to reinsurance contracts

  - ✓ Concentration Risk – additional risk of loss due to large exposures to the same issuer or counterparty

  - ✓ Other Risks like migration risk

- For modelling credit risk directly, risk parameters such as probability of default, loss given default and exposure at default are required. While a certain amount of relevant historical data will be readily available (e.g.: from rating reports published by credit rating agencies), availability of sufficient and credible data is a challenge in modelling credit risk

- In the Indian context, non life insurance companies are subject mandated investment patterns and the exposure/prudential norms stipulated by the IRDA. Hence the credit risk inherent in the investment portfolios of the insurers is fairly minimal. Therefore it is proposed that the EC for the investment related credit risk be set equal to zero.

- The EC for the credit risk inherent in the reinsurance recoverable will be calculated as follows :

  If the reinsurer has a credit rating of AAA or AA[which will include a AA(-)] on the balance sheet date, then the EC for the credit risk pertaining to that reinsurer will be set equal to Zero.

If the reinsurer has a credit rating of A(+) or a rating lower than A(+) [subject to the minimum credit rating of BBB as stipulated in the Regulations] then the EC for the credit risk related to that reinsurer will be set equal to 25 BP [Basis Points] of the reinsurance recoverable from that reinsurer.

If for some reason there is a reinsurance recoverable [as on the balance sheet date] pertaining to a reinsurer whose credit rating is below BBB ,then the EC for the credit risk related to that reinsurer will be set equal to the entire amount which is recoverable from that reinsurer.

The credit ratings referred to in this context will be the most recent credit ratings available on the balance sheet; and these credit ratings must be assigned by any credit rating agency approved by the Authority under the IRDA [General Insurance – Reinsurance Regulations].

The EC requirement as outlined above will not apply to the reinsurance recoverable under any obligatory cession to the Indian reinsurer.

8.8. <u>EC for Liquidity Risk</u>

- Liquidity risk is defined as the risk of loss due to insufficient liquid assets to meet cash flow requirements associated with policy holder obligations

- Liquidity risk takes on many forms and can arise from both the liability and asset sides of the insurer's operations. The main drivers of liquidity risk can be <u>either internal</u> (e.g.: poor underwriting of insurance risk, operational risk, credit risk exposure and difficulty in managing ALM risk) or <u>external</u> (e.g.., general economic downturns or a currency crisis)

- Contrary to life insurers, general insurers tend to have liabilities that are more sensitive to liquidity risk. However on the asset side, most general insurers have investment portfolios which are fairly liquid in nature.

- Under the Solvency II Framework, no capital requirement has been prescribed for liquidity risk under Pillar 1. This risk is typically examined within Pillar 2 as part of the supervisory review.

- Taking into account the preceding two observations, it is proposed that no explicit EC needs to be maintained for liquidity risk.

8.9. EC for Operational Risks:

- Operational Risk is defined as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events"

- Under the Solvency II framework there are two proposed approaches for quantifying exposures to operational risk: a standard formula approach building on the elements of the base SCR or the use of the internal model. The standard formula approach suggests a capital charge for operational risk not exceeding 30% of the base SCR

- The "Rule of Thumb" approach[4] recommended for Life Insurance Companies in India is to set the EC for operational risk equal to one percent of the technical provisions

- We propose that the EC for operational risk can also be set equal to one percent of the technical provisions

8.10. EC for Expense Risks:

- There are no widely recognised and accepted methodologies for determining the EC pertaining to expense risks[5].

- In line with what has been recommended for Life Insurance Companies in India, it is proposed that EC for expense risk can be set equal to 0.5% of the technical provisions.

[4]Institute of Actuaries of India(2009): Report of the committee to draw the road map for moving towards economic capital and market consistent embedded value for the life insurance industry in India

[5] IAA Ad hoc Risk Margin Working Group (2008): Measurement of Liabilities for Insurance Contracts and Risk Margins

9. Summary

9.1. This technical note provides a framework for estimating EC for general insurance companies in India

9.2. To a large extent, this technical note draws on the standard formulae/methodology used under the Solvency II framework for estimating the EC for general insurance companies

9.3. Where applicable, this note has proposed the same methodologies as recommended by the IRDA for estimating EC for life insurance companies in India

Appendix A

LoBs and Standard Parameters

The Lines of Business [LoBs] to be considered for estimating PDR and the EC for underwriting risk are provided in this Appendix. This appendix also provides the relevant premium and reserve risk parameters, the correlation coefficients within and across the LoBs and the credibility coefficients which are relevant for estimating the EC for underwriting risk.

A.1 : LINES OF BUSINESS

LOB	DESCRIPTION
1	FIRE
2	MARINE
3	ENGINEERING
4	MOTOR OD
5	MOTOR TP
6	HEALTH
7	AVIATION
8	MISCELLANEOUS

A.2 : STANDARD PARAMETERS FOR PREMIUM RISK AND RESERVE RISK

LOB	DESCRIPTION	PREMIUM RISK PARAMETER	RESERVE RISK PARAMETER
1	FIRE	11%	10%
2	MARINE	12%	10%
3	ENGINEERING	7%	10%
4	MOTOR OD	9%	7%
5	MOTOR TP	12%	12%
6	HEALTH	4%	10%
7	AVIATION	44%	10%
8	MISCELLANEOUS	11%	10%

A.3 : PAIRWISE LOB CORRELATION MATRIX FOR COMBINED PREMIUM AND RESERVE RISKS

LOB	1	2	3	4	5	6	7	8
1	1.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2	0.25	1.00	0.25	0.25	0.25	0.25	0.25	0.25
3	0.25	0.25	1.00	0.25	0.25	0.25	0.25	0.25
4	0.25	0.25	0.25	1.00	0.50	0.25	0.25	0.25
5	0.25	0.25	0.25	0.50	1.00	0.25	0.25	0.25
6	0.25	0.25	0.25	0.25	0.25	1.00	0.25	0.25
7	0.25	0.25	0.25	0.25	0.25	0.25	1.00	0.25
8	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.00

A.4: The correlation coefficient between premium risk and reserve risk for each LOB is assumed to be 0.5.

Appendix B

Economic Capital Related Disclosures

(In Rs. 000s)

Description	Amount	Notes and Comments
A. Technical Provisions A1.Technical Provisions Related to Outstanding Claims A2.Technical Provisions Related to Unexpired Risks		
B. Other Liabilities		
C. Other Economic Adjustments		
D. Total Liabilities = A+B+C		
E. Economic Capital (EC)Requirements : E1. EC for Underwriting Risk E1.1 EC for Premium and Reserve Risks E1.2 EC for Catastrophe Risk E2. EC for Interest Rate Risk E3. EC for Currency Risk E4. EC for Other Market Risks E5. EC for Credit Risk E6. EC for Liquidity Risk E7. EC for Operational Risk E8. EC for Expense Risk E9. EC for any other Risk(please specify)		
F. Aggregate EC Requirement =		

E1+E2+E3+E4+E5+E6+E7+E8+E9		
G. Total Assets Required = D+F		
H. Total Assets Available on an Economic Basis		
I. Total of Statutory Liabilities and 150% of Required Solvency Margin (RSM)		
J. Total Assets on an IRDA Basis		
K. TAA/TAR Ratio on EC Basis Where TAA denotes Total Available Assets on EC Basis (Item H) and TAR denotes Total Assets Required on a EC Basis (Item G)	=H/G	
L. TAA/TAR Ratio on IRDA Basis where TAA denotes Total Available Assets on IRDA Basis (Item J) and TAR denotes Total Assets Required on IRDA Basis (Item I)	=J/I	

The "Notes and Comments" column needs to be used for providing explanatory notes particularly where the AA has used an approach which is different from what has been recommended in the Technical Note.

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Appendix C

Members of the Working Group

- K. Sriram - Chairperson
- Biresh Giri
- Tania Chakraborti
- MBVN Murthy
- J. Anita
- Sulochana Enjeti
- Aditya Tibrewala