#### <u>Annexure-1</u>: Background information on Economic capital

- "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. E.g. the Economic Capital 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."
- "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 (e.g. credit rating)"
- "Regulatory capital on the other hand is the amount of capital a regulator has determined an insurer needs to hold, but is generally not as specific to the insurer as Economic Capital would be. The Regulatory capital for particular risks would be calculated more broadly and the definition of risk would be a systemic one, rather than an insurer specific one"
- "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"



Determining Economic Capital

Source: Tillinghast

- "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"
- "While Definitions 1 and 3 refer to sufficient surplus, Definition 2 focuses on the characteristics of market value of assets and fair value of liabilities that define this surplus. All these broad definitions imply that all risks are to be taken into account. Although the definitions vary slightly, some common themes that tie them together are:
  - Sufficient surplus to cover adverse outcomes;
  - A given level of risk tolerance and risks covered;
  - A specified time horizon"
- "In calculating EC there are some key decisions to be made and the approach taken should reflect the nature of the company's risks as well as management's risk tolerance and objectives. The following are suggested at this stage:

Decision 1	Time Horizon:	One Year
Decision 2	Measure of Risk:	Value at Risk
Decision 3	Type of risks to be considered:	<ul> <li>Insurance</li> <li>Operational</li> <li>Market</li> <li>Credit</li> <li>Liquidity</li> </ul>
Decision 4	Quantification Methodology / Approaches to implementation:	Stochastic simulation / Stress Testing
Decision 5	Statistical Correlation:	Aggregation/Diversification
Decision 6	Target level of security:	• Eg 99.5% or 99.9%

### Annexure-2 Details of the calculations including guidance points

This section provides a brief explanation of the section requirements of the template. The statutory solvency balance sheet items are self explanatory and in total should be same as reported as part of filing annual return submissions to the authority. All amounts to be filled in INR '000s

Insurers should mention the quantification method e.g. stress testing/Stochastic simulation/Factor based method used to quantify individual components. Insurers should parameterize and quantify individual risk based on their own assessments and views about particular risks. Participants are also encouraged to add additional rows to the table to incorporate further details

#### 1. Liabilities

- 1.1. Policyholder liabilities. Policyholder liabilities should reflect market consistent values on a realistic basis.
- 1.2. Any other liabilities (if any) not classified in 1.1
- 1.3. Other economic adjustments depend upon the methodology adopted and may include among other items such as cost of options and guarantees
- 1.4. For statutory valuation, while valuing the liabilities the technical rate is taken as the sum of risk free rate and a risk margin. This risk margin varies from insurer to insurer based on their own experience viz., portfolio performance, variability in the yield, claims experience, surrender, lapses etc. But, for economic capital calculation, keeping in line with international practice, the valuation of liabilities should be done at risk free interest rate which could be the yield on 10 year Government of India security.

#### 2. Capital requirements

The relevant sections contain example parameters and example quantification methodologies for illustrative purposes only. Participants should parameterize and quantify risks based on their own risk assessments

- 2.1. **Insurance risk**. Insurance risk includes components like mortality, morbidity, longevity, persistency, catastrophe, expenses, inflation etc.
  - 2.1.1. *Mortality/Morbidity risk*: The total economic required capital (ERC) for Mortality/Morbidity should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification Parameters
Mortality		Refer Appendix of economic capital and	Refer Appendix of economic capital and MCEV report by IOAI

		MCEV report by IOAI	
Longevity			e.g. +10% improvement in mortality rates for annuity business
Morbidity		e.g. Stress testing	e.g. +10% increase in morbidity
Catastrophe		e.g. factor based	e.g. 1.5 per thousand applied on death sum at risk
Total	Same as 2.1.1 from the main table		

2.1.2. *Lapse/Surrender etc risk*: The Lapse/Surrender/Withdrawals/Top-ups ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example.

Table 2.1.2 Risk	Risk canital	Quantification method	Quantification
components	Risk capital	(Decision 4)	parameters
Lapse trend		e.g. Stress testing	e.g. +20% increase or -20% decrease in lapse rates
-			whichever is onerous
Surrender shock		e.g. Factor Based	e.g. +50% of surrender strain (Surrender Value in
			force less economic provisions
Withdrawal, Top-up			
Total	Same as 2.1.2		
	from the		
	main table		

2.1.3. *Expense/Inflation risk*: The total Expense/Inflation ECR should be input in the economic capital column. This total amount should be further detailed in the following table The format is provided here as an example.

Table 2.1.3 Risk components	Risk capital	Quantification method (Decision 4)	Quantification parameters
Expense and inflation		e.g. Stress testing or	e.g. +10% increase in expenses and 1% increase in inflation rate
		e.g. Factor based	or e.g75% of liabilities
Expense/Inflation ECR	Same as 2.1.3 from the main table		

2.1.4. *Insurance other risk components*: The Insurance other risk ECR should be input in the risk based capital column. This total amount should be further detailed in the following table. The format is provided here as an example.

Table 2.1.4 Risk components	Risk capital	Quantification method (Decision 4)	Quantification parameters
XXXX			
Insurance other risk ECR	Same as 2.1.5 from the main table		

- 2.1.5. A simple arithmetic aggregation of all insurance risk components without accounting for diversification.
- 2.2. Market risk. Market risk includes components like interest rates, equity returns etc.
  - 2.2.1. *Interest rate risk*: The Interest ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification parameters
Interest rate risk		e.g. Stochastic simulations	e.g. 1000 simulations using short rate mean reverting interest model with a mean reversion level of 7% and a volatility of 15 %
Interest ECR	Same as 2.2.1 from the main table		

2.2.2. *Equity risk*: The Equity ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification Parameters
Equity risk		e.g. Stress testing	e.g. 60% fall in equities
Equity ECR	Same as 2.2.2		
	from the main		
	table		

2.2.3. *Foreign Currency Exchange risk*: The Forex ECR should be input in the risk based capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated. It is recognized that, presently, this item may not be relevant or may be immaterial for most of the insurance companies in India.

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification Parameters
Forex risk		e.g. Stress testing	e.g. 10% fluctuation in domestic currency
Forex ECR	Same as 2.2.3 from the main table		

2.2.4. *Property risk*: The Property (i.e. real estate) ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification Parameters
Property risk		e.g. Stress testing	e.g. change in rental yields; e.g. change in market values
Property ECR	Same as 2.2.4 from the main table		

example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

2.2.5. *Other Market risk components*: The Other Market risk ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example.

Table 2.1.4 Risk components	Risk capital	Quantification method (Decision 4)	Quantification parameters
XXXX			
Market other risk ECR	Same as 2.2.6 from the main table		

- 2.2.6. A simple arithmetic aggregation of all insurance risk components without accounting for diversification.
- 2.3. **Operational risk**. Operational Risk is the risk of loss resulting from inadequate or failed internal process, controls, controls, people, and systems or from external events

The Operational ECR should be input in the economic capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

Table 2.1.1 Risk components	Risk capital	Quantification method (Decision 4)	Quantification parameters
Operational risk		e.g. factor based	e.g. factor applied on head count or expenses or economic capital
Operation ECR	Same as 2.3 from the main table		

2.4. Credit risk. Risk of default and change in the credit quality of issuers of securities, risk of counterparty default

The credit risk ECR should be input in the risk based capital column. This total amount should be further detailed in the following table. The format is provided here as an example. For example, the quantification method (Decision 4) for individual risks should be clearly mentioned and the relevant parameters stated.

Section	Description		Statutory solvency 31 <sup>st</sup> March 2010		Economic capital 31 <sup>st</sup> March 2010		Brief Remarks (to be filled in by the insurers as per ECR provided)		
1	Tota Liabili	ll ties	=Row(1 Row(1. Row(1	.1)+ 2)+ .3)	=Row Row( Row	(1.1)+ (1.2)+ (1.3)			
		C(	omponents	T	on cupitur	method	l (Decision 4)	parameters	
		S	Spread risk			e.g. str	ess testing	e.g. 2% widening of bond spreads	
		E	Default risk			e.g. fa	ctor based	e.g. probability of default applied on counterparties	
		Cre	edit risk ECR	Same the	e as 2.4 from main table				

- 2.5. **simple arithmetic aggregation** of all risk components viz. insurance, market, operational and credit risk ECR without accounting for diversification.
- 2.6. **Impact of Aggregation/Diversification of above risks**: An aggregation/diversification of all risk components has to be quantified. The statistical correlation methodology (Decision 5) along with the relevant parameters and matrices should be mentioned here.

# Please see the table below and this will give a form at for final presentation of economic capital figures, for each of the item explained above:

				Insurers required to mention main principles to arrive at the
	Policyholder			value of economic liabilities like the valuation method, target
1.1	liabilities			percentiles, any margins etc.
				Insurers required to list components of any other liabilities (if
1.2	Other liabilities			any) not already included above
				Insurers required to list components of other economic
				adjustments (if any)
				Separately, insurers are required to mention whether implicit
				and explicit guarantees are accounted for and their method of
	Other economic			estimation e.g. stochastic, scenario based, closed form solution
1.3	adjustments			or any other appropriate method
	Capital			Insurers required to mention target level of security, time-
	requirements			horizon and the measure of risk while quantifying their
2		=Row (2.6)	=Row (2.6)	economic capital (Decisions 1, 2 and 6)
2.1	Insurance risk	= <b>Row</b> (2.1.7)	= <b>Row</b> (2.1.7)	
			Input	
			Mortality/Mor	
	Mortality/Morbi		bidity risk	
2.1.1	dity risk		ECR	Additionally, please fill in table 2.1.1
			Input	
	Lapse/Surrender		Lapse/Surren	
2.1.2	risk		der risk ECR	Additionally, Please fill in table 2.1.2
			Input	
	Expense/inflatio		Expense/inflat	
2.1.3	n risk		ion risk ECR	Additionally, Please fill in table 2.1.3
			Input	
			Longevity	
2.1.4	Longevity risk		risk ECR	Additionally, Please fill in table 2.1.4
			Input	
	Any other		Insurance	
	insurance risk		Other risk	
2.1.5	component		ECR	Additionally, Please fill in table 2.1.5 (If any)
	Arithmetic			
	aggregation of		=Sum of	
	insurance risk		above Rows	
2.1.6	components		2.1.1 to 2.1.5	

2.2	Monkot nick	$-\mathbf{Dow}(227)$	$-\mathbf{D}_{ow}(2,2,7)$	
2.2	Iviai Ket 115K	- <b>K</b> 0w(2.2.7)	Input Interest	
2.2.1	Interest rate risk		risk ECR	Additionally, Please fill in table 2.2.1
2.2.2	Equity risk		Input Equity	Additionally. Please fill in table 2.2.2
			Input Forex	
2.2.3	Forex risk		risk ECR	Additionally, Please fill in table 2.2.3
			Property risk	
2.2.4	Property risk		ECR	Additionally, Please fill in table 2.2.4
	Any other market risk		Input Market Other risk	
2.2.5	component		ECR	Additionally, Please fill in table 2.2.5 (If any)
	Arithmetic		-Sum of	
	market risk		Rows 2.2.1 to	
2.2.6	components		2.2.5	
2.3	Operational		Input	Additionally, please fill in table 2.3
	risk		Operational	
			LISK LUK	
2.4	Credit risk		Input Credit	Additionally, please fill in table 2.4
2.5	Total of all risk		Row(2.1)+	
	categories		Row(2.2)+	
			Row(2.3)+ Row(2.4)	
2.6	Aggregation/Div			
	ersification effect of above			
	risks			
2.7	Total of all rick		2.5 minus 2.6	
	categories after			
	adjustment for			
	aggregation/div			
2.8	Total Assets		1 plus 2.7	
	Required			
2.9	Total Assets			
	Available on an			
	Economic Basis			
2 10	Tatel of			
2.10	statutory			
	liabilities and			
	150% OI KSM			
2.11	Total Assets on an IRDA Basis			

## Calculate A) 2.9 divided by 2.8 and also B) 2.11 divided by 2.10.