



**Actuaries  
Institute**

# Setting Risk Margins: Framework

LAGIC Risk Margins Methodology Taskforce  
(Life Insurance)

# Agenda

- Purpose
- Random stress margins
- Future stress margins:
  - Approach for collecting risk data
  - Application of framework
  - Outputs
  - Key learnings
- Other stress margins
- Q&A

# Purpose

- **Taskforce objective:** To develop a framework for determining LAGIC stress margins for life insurance companies.
- **Outline framework:** The draft information note is now available.
- **Practical considerations when implementing the framework:** Share learnings from companies who have implemented it.
- **Tangible value:** how to gain value from the work.

# Random Stress Margins - Background

## Background

The 'random stress' margins...[must have] regard to the nature of the mortality and morbidity risks to which the company is exposed.

The margins for random stresses must be applied for 12 months from the reporting date. Each random stress must reflect the uncertainty arising due to adverse fluctuations in experience, but excluding the impact of single events....

The size of these margins will depend on factors such as the number of expected claims, the distribution of sums insured, and the impact of existing reinsurance arrangements.

# Random Stress Margins

Approaches	Strengths	Weaknesses
Full stochastic	<ul style="list-style-type: none"> <li>• Most reflective of claims profile</li> </ul>	<ul style="list-style-type: none"> <li>• Needs policy data</li> <li>• Needs computing power</li> </ul>
Simplified stochastic	<ul style="list-style-type: none"> <li>• Still reflective of key drivers of claims profile</li> <li>• Reduced policy data and computing requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Setting of homogenous groups may be subjective</li> <li>• Credibility of homogenous group depends on data volume</li> </ul>
Statistical method	<ul style="list-style-type: none"> <li>• Low policy data and computing requirements</li> </ul>	<ul style="list-style-type: none"> <li>• May be difficult to calibrate parameters</li> </ul>

# Future Stress Margins – Background

## Background

LPS 115 – “The stress margins, before the adjustment for diversification, must be determined at a 99.5 per cent probability of sufficiency over a 12 month period.....allow for the possibility that the best estimate assumptions may need to be changed in 12 months time, either because they were misestimated at the reporting date or because adverse trends have been identified during this period. The size of the margin will depend on the adequacy of the investigations used to determine the best estimate assumptions, and the range of adverse factors that could affect trends in claims experience.”

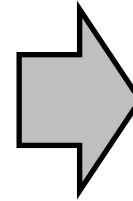
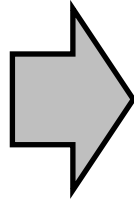
# Future Stress Margins - General principle

## Framework

### Risks:

1. Pricing
2. Medical advancement
3. Claims
4. Underwriting

....



**Future  
Margins**

- **Framework:** to convert risks into margins in a manner that is (1) transparent, (2) able to be replicated year on year.



# Future Stress Margins – Types risk data to collect

<b>Past</b>	<b>Examples</b> <ul style="list-style-type: none"><li>• BE assumption changes</li><li>• Benefit design changes</li><li>• Repricing</li><li>• Underwriting &amp; claims case load</li><li>• Staff turn-over</li><li>• Reinsurance review finding</li></ul>	<b>Examples</b> <ul style="list-style-type: none"><li>• APRA risk reports</li><li>• Australian Bureau of Statistics</li><li>• Other industry reports (i.e. NMG, Plan for Life)</li><li>• Insights presentations</li></ul>
<b>Future</b>	<b>Examples</b> <ul style="list-style-type: none"><li>• Up and coming projects</li><li>• Known changes</li></ul>	<b>Examples</b> <ul style="list-style-type: none"><li>• RBA economic forecast</li><li>• Information from reinsurers on future developments</li></ul>
	<b>Company</b>	<b>Industry</b>

## Future Stress Margins – Approaches in collecting risk data

Approaches can be varied in collecting the data. For example, one or a combination of:

- Devising questionnaires and meeting with different teams
- Building a data base from known reports
- External research.

Things to consider:

- Materiality
- How replicable it is from year to year? (i.e. storing of information, elimination of subjectivity)
- How to make people share information? (i.e. clear articulation of purpose)

# Future Stress Margins Approach

## – Step 1: Set Valuation Classes

Valuation class (Step1)			
Class A1			
Class B1			
Class C1			
Class D1			
Class A2			
Class B2			
Class C2			

# Future Stress Margins Approach

## – Step 2: Set Risk Categories

	Internal company risks			External risks			
<b>Risk categories (Step2)</b> <b>Valuation class (Step1)</b>	Data quality	Assumption setting process	Claims management risk	Medical risk	Economic and social risk	Legislative and legal risk	
Class A1							
Class B1							
Class C1							
Class D1							
Class A2							
Class B2							
Class C2							

# Future Stress Margins Approach

## – Step 3: Set Risk Factors

Risk margins by category for each valuation class (Step4)	Internal company		Stress margins by risk factor (Step3)		External risks		
Risk categories (Step2) Valuation class (Step1)	Data quality	Assumption setting process	Risk Factor	Stress margin	Economic and social risk	Legislative and legal risk	
Class A1	1		1	5%			
Class B1	1		2	20%			
Class C1	1		3	40%			
Class D1	2		4	100%			
Class A2	2		5	200%			
Class B2	1						
Class C2	1						

# Future Stress Margins Approach

## – Step 4: Assign Stress Margins

Risk margins by category for each valuation class (Step4)	Internal company risks			External risks			
Risk categories (Step2) Valuation class (Step1)	Data quality	Assumption setting process	Claims management risk	Medical risk	Economic and social risk	Legislative and legal risk	
Class A1	5%	5%	5%	5%	40%	5%	
Class B1	5%	5%	40%	20%	100%	40%	
Class C1	5%	5%	40%	20%	200%	40%	
Class D1	20%	20%	20%	20%	40%	100%	
Class A2	20%	20%	20%	100%	20%	200%	
Class B2	5%	5%	40%	40%	100%	100%	
Class C2	5%	5%	5%	5%	20%		

Stress margins by risk factor (Step3)	
Risk Factor	Stress margin
1	5%
2	20%
3	40%
4	100%
5	200%

# Future Stress Margins Approach

## – Step 5: Calculate Undiversified Stress Margins

Risk margins by category for each valuation class (Step4)	Internal company risks			External risks			
Risk categories (Step2) Valuation class (Step1)	Data quality	Assumption setting process	Claims management risk	Medical risk	Economic and social risk	Legislative and legal risk	<b>AVERAGE STRESS MARGIN (Step 5)</b>
Class A1	5%	5%	5%	5%	40%	5%	11%
Class B1	5%	5%	40%	20%	100%	40%	35%
Class C1	5%	5%	40%	20%	200%	40%	52%
Class D1	20%	20%	20%	20%	40%	100%	37%
Class A2	20%	20%	20%	100%	20%	200%	63%
Class B2	5%	5%	40%	40%	100%	100%	48%
Class C2	5%	5%	5%	5%	20%		10%

Stress margins by risk factor (Step3)	
Risk Factor	Stress margin
1	5%
2	20%
3	40%
4	100%
5	200%

# Future Stress Margins Approach

## – Step 6 & 7: Calculate \$ Stress Impact

Risk margins by category for each valuation class (Step4)					
Risk categories (Step2) Valuation class (Step1)	AVERAGE STRESS MARGIN (Step 5)	Unstressed PV Claims (Step 6)	Stress Impact (\$) (Step 7)	Div Factor	DIV STRESS MARGIN (Step 9)
Class A1	11%	1,000	108		
Class B1	35%	800	280		
Class C1	52%	200	103		
Class D1	37%	400	147		
Class A2	63%	150	95		
Class B2	48%	500	242		
Class C2	10%	250	25		



# Future Stress Margins Approach

## – Step 8: Calculate Diversification Factor

Risk margins by category for each valuation class (Step4)			
Risk categories (Step2) Valuation class (Step1)			
Class A1			
Class B1			
Class C1			
Class D1			
Class A2			
Class B2			
Class C2			

Step 8 Correlation Matrix - DF1		
	Class B	Class C
Class B	1	0.25
Class C	0.25	1

Stress Impact (\$)	
Class B	522
Class C	128
<b>Total</b>	<b>650</b>
<b>Diversified</b>	<b>568</b>
<b>DF1</b>	<b>87%</b>

Div Factor	DIV STRESS MARGIN (Step 9)
100%	
87%	
87%	
100%	
100%	
87%	
87%	

# Future Stress Margins Approach

## – Step 9: Calculate Diversified Stress Margins

Risk margins by category for each valuation class (Step4)					
Risk categories (Step2) Valuation class (Step1)	AVERAGE STRESS MARGIN (Step 5)	Unstressed PV Claims (Step 6)	Stress Impact (\$) (Step 7)	Div Factor	DIV STRESS MARGIN (Step 9)
Class A1	11%	1,000	108	100%	11%
Class B1	35%	800	280	87%	31%
Class C1	52%	200	103	87%	45%
Class D1	37%	400	147	100%	37%
Class A2	63%	150	95	100%	63%
Class B2	48%	500	242	87%	42%
Class C2	10%	250	25	87%	9%

# Future Stress Margins – Gain value from output

## **Potential valuable outputs are:**

- i. To build a database of risk measures across different functions
- ii. Allow actuarial teams to be more involved with the business
- iii. To create link between business actions and their return on capital

# Future Stress Margins

## – Learnings from companies who have implemented

### Key learnings:

- i. An avenue to engage and understand the business more.
- ii. Good tool for collecting key business risks.
- iii. Have discussions as broadly as possible - don't pre-empt answers
- iv. State the purpose clearly to the business in order to engage in honest and open discussion.
- v. Before finalising margins, sense check the results against the riskiness of different products / business lines

# Lapse Stress Margins

- Background
- LPS 115 – “The stress margin for lapses must be determined by the Appointed Actuary, having regard to the nature of the company’s lapse risks. The stress must be determined so that the Insurance Risk Charge for the statutory fund has a 99.5 per cent probability of sufficiency over a 12 month period. The lapse stress may allow for correlations with other insurance stresses, with the exception of servicing expenses. The lapse stress may vary for different types of policy. A decision as to whether to increase or reduce lapse rates must be made for each type of policy depending on whether an increase or reduction would increase the stressed policy liabilities.”

# Lapse Stress Margins

- Can take the form of a future or random stress margin.
- Should consider correlation with other risks: could be positive (selective lapsation) or negative (pandemic encouraging people to keep their insurance)
- Broadly, the same approaches can be used to set these margins as for Mortality and Morbidity future and random stress margins.
- Consideration should be given as to any interaction with repricing.
- Some question as to the level at which the test of higher or lower lapses should be made: RPG? APRA Product Group?

# Event Stress Margins - Background

## Background

LPS 115 Paragraph 35 – “The ‘event stress’ allows for the impact of single events that could commence in the 12 months following the reporting date and cause multiple claims. These events could include pandemics, terrorist attacks and natural catastrophes and may affect either or both mortality and morbidity experience.”

LPS 115 Paragraph 36 – The event stress, before adjustment for diversification must at a minimum include a pandemic scenario with the impacts on mortality and morbidity as prescribed by APRA.

Note: applies to mortality and income protection, not TPD and Trauma

# Event Stress Margins - Risk factors and Techniques

- Risk factors
- Disease related (Pandemics)
- Concentration risks (Group schemes)
- Geographic (Earthquakes, Tsunamis or Terrorism related)
- Policy terms related (Underwriting risk)
- Techniques
- Qualitative assessment
  - Impact-likelihood chart
- Quantitative assessment
  - Pandemic modelling
  - Reverse stress testing
  - Sum at risk / maximum loss net of reinsurance
  - Scenario based models – establish clear cause and effect



# Questions?



## Members of the taskforce

(1) Rob Desoisa (Chairman), (2) Daragh Brady, (3) Anna Byrne, (4) Jessica Chen, (5) Briallen Cummings, (6) Ioana Gudas, (7) Shweta Krishna, (8) Bolin Li

