The Actuarial Profession
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Embedding Stress Testing as Part of an Integrated Risk Management Framework

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Agenda

- The Stress Testing Environment
- A Group Risk Perspective: The Group ERM Framework
- A Life Company AFH Perspective: AFH Responsibilities
- Key Success Factors for Maximising the Value from Stress Testing

General Stress Test Environment

Stress testing has a long history

Not all stress tests are effective

Stress tests don't always deal with the obvious

Extreme events can happen

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Stress Testing Environment

- Regulatory stress testing of banks during financial crisis
- FSA / EIOPA Stress Testing Exercises for Insurers
- PS09 / 20: Reverse Stress Testing / Need for Effective Stress Testing Programme / Active involvement of Board
- Insurers increasingly using stress tests to explain risks to the Board he Stress Testing Environment

- **More stress tests in shorter timeframes**

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Stress Testing Environment

To get full value from stress testing need to ensure that stress tests embedded within ERM framework in a planned and integrated way

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The benefits of stress tests

- In tranquil times, statistics and measurement important. In crises, economics and management more important.
- Crises not caused by regular issues so statistics less well suited for considering these
- Understanding environment and assumptions is key, not more sophisticated modelling
- Need to communicate risk in a form that allows challenge and assessment by senior exec and Board
- If everyone adopts the same behaviours then models break down
- Risk management is about thinking creatively of scenarios, not just following the output of a model

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The ERM Framework
Our Approach

Risk Culture	• Right staff, right jobs, roles and responsibilities clearly defined • Right structure, effectively implemented, risk focussed committees and management • Group wide awareness, deepening understanding of risk, ongoing embedding and change
Strategic Risk Management	• Putting risk at heart of our business planning • Understanding our risks and strategy and making the right decision • Effective strategic control and allocation of capital
Risk and Capital Models	• Modelling and understanding our business • Managing complexity, achieving consistency and clarity with common metrics • Risks effectively quantified and business fully profiled
Emerging Risks	• Fully defined process for identification of emerging risks • Supported by extreme scenario testing of business plans • Raising awareness at executive level and across the Group
Risk Control Processes	• Driving group wide operational excellence • Operational Risk and Control: Integrated system, consistent application • Active Control Management – make the right things happen the first time, identify when things have not gone right and understand why, recover the position quickly when things have not gone right

Key is to put in place a framework that enables the Executive and Board to make informed and consistent decisions about risk and reward

Strategic Risk Management: Key Risk Metrics

Key "shareholder focused" risk metrics approved by Board, embedded in business planning, and allowing Group wide consistent assessment of risk exposures (based on economic capital principles) and profiling.

- We set risk appetites by reference to 2 key risk metrics
  - ➢ These metrics are well aligned with group strategy and will provide enhanced focus on value, capital and liquidity.

	Excess Working Capital	*Shareholder Value*
Definition	Shareholder cash that is in excess of regulatory requirements, target solvency requirements, and any further operational constraints.	The value of the shareholders' economic interest in the group's assets; the present value of cash earnings on a particular enterprise or activity. It will be determined as either the embedded value or present value of future dividends.
Management Objective	Management of the primary source of funding for the business, for the strategic activities of the group and for distributions to shareholders.	Management of the financial strength of the group and delivery of long term shareholder value.
Exposure Measurement	The reduction in excess shareholder cash that a business might expect to see as a consequence of a defined risk event.	Loss in value of cashflow that a business might expect to see as a consequence of a defined risk event.
Appetite Calibration	One year in five	One year in two hundred

Stress and Scenario Testing to Supplement Economic Capital Modelling

Process	*Purpose*	*Metric*
Capital Planning	To enable the Group Board to judge the adequacy of the quality and quantity of the Group's capital and funding position in light of its strategic objective and regulatory commitments. This process operates in parallel with the business planning processes, and is intended to allow the Group Board to assess capital allocation and risk exposures in light of expected performance. Five year plans are prepared and approved annually.	• Dividends and capital injections • Shareholder Value • Excess Working Capital • Capital resources split between sources • IGD Surplus • Solvency 2 Surplus Capital
Emerging Risk Process	To identify new or increasing risks which are low probability, have an uncertain outcome and which could have a significant impact on Standard Life's ability to deliver its strategy or on its key risk exposures. Extreme scenarios, which are part of this process, assist the Group Board in identifying key risks that would render the business unviable.	• Shareholder Value • Excess Working Capital • IGD Surplus
IGD Monitoring and Reporting	To enable the Group to satisfy the FSA requirement to report on capital under the Insurance Groups Directive ("IGD") and to maintain a positive surplus at all times.	• Capital resources split between sources; • Pillar 1 Capital Resources Requirements;
Setting and Monitoring Risk Appetites	To enable the Group Board to set and monitor the risk appetites of each BU. Central monitoring enables the Group Board to more effectively embed risk considerations in decisions involving allocation of capital and to ensure that the risks taken to generate returns are consistent with the capital available.	• Shareholder Value; • Excess Working Capital;
Liquidity and Contingency Funding Planning and monitoring	To enable the Group Board to set and monitor the target for the total liquid resources requirement and to set the Group's contingency funding plan.	• Working Capital • Liquidity Buffer • Cashflow Forecast • Stress Testing • Total Liquid resources
Business Unit Stress Testing	To enable business units to fully understand the risks to which they are exposed	• SLAL FCR • SCDA DCAT

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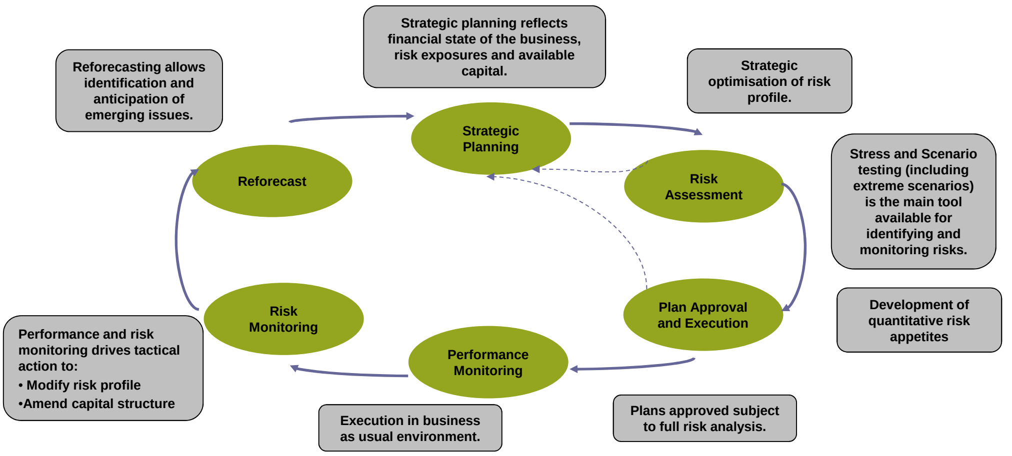
Strategic Planning Cycle

Planning process and setting of risk appetites working together, reflecting planned activity, available capital, financial strength considerations/ target rating.



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Strategic Risk Management

Consideration of Risk in Development of Business Plans

Risk considerations drive production of business plan based on assessment of Group financial strength and target credit rating

- Proposed business plan sets out how Shareholder value, Shareholder value at risk, Excess Working Capital and excess working capital at risk vary under specified univariate and combined stresses
- Also consider impact of downside and severe downside scenarios
- Business Plan complemented by more detailed paper proposing risk appetites
- Aim to ensure we have sufficient capital to deliver strategic objectives under a wide range of financial conditions
- Clear link established between target capital, risk exposures and appetites, linked to shareholder objectives
- Impact of specified stresses supplemented by consideration of extreme scenarios that would render the business unviable: done for individual business units and for Group
- **Risk and reward considered together**
- **Involvement of Group ERMC and Risk and Capital Committee in agreeing stresses and scenarios**

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Strategic Risk Management
Solvency II and Risk Appetite Framework

- Solvency II aims to align regulatory capital with management and measurement of economic risk exposures
- Solvency II available capital is similar in concept to shareholder value
- Solvency II capital requirements are similar in concept to shareholder value at risk
- The opportunity exists to align risk and capital metrics

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Strategic Risk Management
Solvency II and Risk Appetite Framework

- Risk and Capital Targets should be set by reference to a range of defined stress events after which the Group and all subsidiaries can meet their regulatory capital requirements
- Our aggregate risk appetite from a capital perspective will be defined by the level of stresses we seek to withstand and still cover our Solvency Capital Requirement (ie have capital to meet a further 1 in Y year stress event)
- This will define a target level of capitalisation rather than a minimum capitalisation level – the level of capital will fluctuate above and below the target level
- A range of stresses can be defined covering univariate equity & property, credit, interest rate stresses together with combined stresses involving the above

- **Easy for Senior Management to understand and aligns closely with FSA stress testing exercises**

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Emerging Risks

- Emerging Risk Definition:

"A new or increasing risk that is low probability, has an uncertain outcome, and which could have a significant impact on Standard Life's ability to deliver its strategy or on its key risk exposures"

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Emerging Risks

- Emerging risk framework identifies potential future events that could impact key risk exposures and that could have a significant impact on strategy delivery; for example energy price volatility could affect market risk
- External environmental screening helps to capture these potential future events
- Early warning indicators identified to indicate increasing probability of events
- The risks identified as part of this process inform the annual business planning cycle and are used to support stress and scenario testing that help to determine Standard Life's capital requirements
- The risks on the central emerging risk register will inform Standard Life's extreme scenario analysis programme

Emerging Risks: Extreme Scenario Analysis

- The business is unviable if any of the following happen:
  - It has insufficient capital to cover its pillar 1 or pillar 2 capital requirements
  - Its shareholder value falls below 0
  - It has insufficient liquid resources to meet its liabilities as they fall due
- We have no requirements to support the business through short-term funding (unlike banks) and consequently do not view an inability to raise future finance or pay sub-debt coupons as rendering the business unviable
- We have assumed that the inability to pay dividends would not render the business unviable
- We have assumed that the inability to sell new business does not render the business unviable

Emerging Risks: Extreme Scenario Analysis

- When considering the results of the analysis the ERMC and Risk & Capital Committee considered the following questions for each scenario:
  - Is the scenario one that would have a materially larger impact on Standard Life than its peers?
  - Are we comfortable in taking the management actions assumed in the particular circumstances?
  - Is the risk sufficiently remote that we are comfortable with the exposure?
  - Is the exposure consistent with the strategy of the business and qualitative risk appetite statements?
  - Does the business or strategic plan need changed in any way in light of the results? he business is unviable if any of the following happen:

Extreme Scenario Analysis: Does it Matter?

A Life Company AFH Perspective

- Current AFH responsibilities
- Interaction with risk function (in regulation)
- What I look for, as AFH, from stress and scenario testing
- How I achieve it, in conjunction with Risk
- Interaction with risk function in practice

Current AFH requirements

SUP 4.3.13R

- An actuary appointed to perform the actuarial function must, in respect of those classes of the firm's long-term insurance business which are covered by his appointment :

1) **advise** [on material risks to meeting policyholder liabilities or capital requirements]
2) **monitor … and inform** [if concerned over meeting liabilities (both in-force and NB) or capital requirements (including in "reasonably foreseeable circumstances")]
3) **advise** [on valuation methods and assumptions]
4) **perform** [statutory valuation] "in accordance with the methods and assumptions determined by the firm's governing body"
5) **report** [to firm's governing body on results of statutory valuation]

Interaction with CF 28

CF 28 as per SUP 10.8.1R (current)

- The *systems and controls function* is the function of acting in the capacity of an *employee* of the *firm* with responsibility for reporting to the *governing body* of a *firm*, or the audit committee (or its equivalent) in relation to:
  - (1) its financial affairs;
  - (2) setting and controlling its risk exposure (see SYSC 3.2.10 G and SYSC 7.1.6 R);
  - (3) adherence to internal systems and controls, procedures and policies (see SYSC 3.2.16 G and SYSC 6.2).

Risk assessment (SYSC 3.2.10G)

(bold is my emphasis)

1) Depending on the nature, scale and complexity of its business, it may be appropriate for a firm to have a **separate risk assessment function** responsible for **assessing the risks** that the firm faces and **advising** the governing body and senior managers on them.
2) The organisation and responsibilities of a risk assessment function should be documented. The function should be adequately resourced and staffed by an appropriate number of competent staff who are **sufficiently independent** to perform their duties objectively.
3) The term 'risk assessment function' refers to the generally understood concept of risk assessment within a firm, that is, the function of **setting and controlling risk exposure**. The risk assessment function is not a controlled function itself, but is part of the systems and controls function (CF28).

Interaction with PS10/15

CF13 as per proposed SUP 10.8.1R

- The ***finance function*** is the function of acting in the capacity of an employee of the *firm* with responsibility for reporting to the *governing body* of a *firm*, in relation to its financial affairs.

CF14 as per proposed SUP 10.8.2R

- The ***risk function*** is the function of acting in the capacity of an employee of the *firm* with responsibility for reporting to the *governing body* of a *firm*, or its risk committee (or its equivalent) in relation to setting and controlling a *firm's* risk exposure (see *SYSC* 3.2.10G and *SYSC* 7.1.6R).

Interaction with CF14
(as set out on p35 of PS10/15 – bold is my emphasis)

- We intend that the **AFH will retain their current responsibilities** regarding assessing and reporting risks.
- We would expect the CRO to consider the work performed by the AFH in this regard and the extent to which such work might benefit from being **validated** or challenged, or **supplemented** by further work within a risk management framework.
- In performing their duties, it would be acceptable (where appropriate) for the CRO to refer to certain reports produced by the AFH rather than to seek to duplicate such work.
- The **Solvency II Directive continues to require firms to appoint an AFH**, but the position of the CRO as presented here is not likely to be impacted by the new regime.

What do I look for from stress and scenario testing?

- Needs to cover "reasonably foreseeable" events – and worse
- Needs to cover the relevant features of the insurance company liabilities

- What does "success" look like for me?
  - Being able to sleep at night!
  - Board understanding of likely evolution of the balance sheet, but also possible (less pleasant) evolution
  - Getting the numbers done (with enough time to think about them)
  - Effective collaboration (and appropriate compromise)

How do I achieve it?

- Joint agreement between Group and BU of the stresses and scenarios to use
- Additional projections and stress sensitivities selected by BU

- Leads in practice to:
  - Business planning scenarios set by Group Finance are used for "core" FCR projections, but with additional projections (e.g. risk scenarios; longer projection terms) chosen by BU
  - Group extreme stresses set by Group Risk, following input from BUs. BUs continue to identify "local vulnerabilities"
  - Monthly stress testing based on Group Capital Mgt scenarios, but with additional solvency monitor scenarios local to BU

Interaction with risk function in practice

- Joint discussion of the stresses and scenarios to use
  - Risk leads on "top down" analysis of Group Risks and Emerging Risks
  - Actuarial leads on "bottom up" balance sheet understanding

- Risk leads on risk assessment framework (including what percentile levels to test against)
- Actuarial leads on stressing methodology and selection of appropriate percentile stresses to use
- Actuarial signs off numbers to pass to Risk (and also use in FCR)

Interaction with risk function in practice
The SLAL ERM Report

- As part of our "journey" towards Solvency 2, this year's FCR work was presented in an "ORSA-like" report, covering:
  - The Group ERM Framework
  - SLAL's implementation of the ERM Framework
  - SLAL's business and its risks (the background)
  - SLAL's business and its risks (the numbers)
  - Current stress results
  - Projected solvency results

- Provided holistic view of the whole picture, in one place
- Natural consequence of having BU AFH sitting in Risk

Challenges to Embedding Stress Tests

- Group-wide challenges from local regulatory environment
- Buy-in from local businesses
- Different people keen on different metrics
- Relating to products and sales & marketing
- Relating to business strategy
- Timescales

- "Where does the ERM framework and stresses benefit the bottom line?"

Using Stress Tests Effectively to Run the Business

- Focus on potential responses to stresses
- Can't predict all stress so important to have process to follow when an actual event occurs
- Quality of discussions at Exec level
- Accountability & culture important: not tick box

- **Key is Executive Buy-In**
- **And buy-in from people whose primary focus is not risk**

Key Messages

- Don't get lost in detail of model; recognise its limitations
- Models useful for getting insights
- Focus on outputs, potential actions, and things the Board can relate to
- Make accessible to Board
- Make process as efficient as possible
- Take joined up approach across Group & Business Units and Risk & Actuarial

Final Thoughts

"Trying to explain to a Bank Board how a model works is next to impossible. No-one should present anything to a Board that can't be understood by an averagely intelligent person. Models didn't help in the crisis"

Chairman, FTSE100 Company

- The major cause of company failure is a failed business model
- Stress tests are important but key to risk management is culture and behaviour
- You can have the best models and risk management programmes in the world but ultimately risk comes down to human behaviour