

The Actuarial Profession
making financial sense of the future

Implementing the Solvency II Use Test

Ann Muldoon FIA, Friends Life

Elliot Varnell FIA CERA, Milliman

© 2012 The Actuarial Profession • www.actuaries.org.uk

Agenda

- **Introduction**
- Use Test in Regulation / Rating Agencies
 - Solvency II
 - Basel II / FINMA / S&P
- Strategic Risk Management Process
 - Risk Strategy
 - Risk Appetite
 - Risk Management Framework - System & Limits
 - Measurement - Internal Model
 - Reporting - Monitoring and Controlling Performance
- Case Study

© 2012 The Actuarial Profession • www.actuaries.org.uk

Introduction

What is the Use Test about?

Solvency II places **risk management** at the heart of the effective management of an insurer.

The **Use Test** is the process by which an insurer evidences effective risk based capital management, strategic risk management and decision-making.

Introduction

Solvency Capital Regime Change

- Internal Models represent a **profound step change** in the relationship between the supervisor and the insurance sector.

Rules Based Capital

Rules are hard coded – the number is right or wrong – clear in law

Necessary simplifications to fit a wide range of firms.

Regulatory arbitrage inevitable.

Principles Based Capital

Principles hard coded – opinion as to whether the number is right or wrong.

Model should wrap to the risk profile of the insurer.

Regulatory arbitrage should be removed

- At the heart of this change is a (evidence based) trust that needs to develop between the supervisor and the insurer to ensure that the supervisor will trust the insurer to calculate their own Pillar 1 capital and not abuse the system.
- The internal model process is about building that trust.

Agenda

- Introduction
- **Use Test in Regulation / Rating Agencies**
 - Solvency II
 - Basel II / FINMA / S&P
- Strategic Risk Management Process
 - Risk Strategy
 - Risk Appetite
 - Risk Management Framework - System & Limits
 - Measurement - Internal Model
 - Reporting - Monitoring and Controlling Performance
- Case Study

Regulation

Solvency II Use Test – Level 1

Article 120

Use test

Insurance and reinsurance undertakings shall demonstrate that the internal model is widely used in and plays an important role in their system of governance, referred to in Articles 41 to 50, in particular:

- (a) their risk-management system as laid down in Article 44 and their decision-making processes;
- (b) their economic and solvency capital assessment and allocation processes, including the assessment referred to in Article 45.

Article 44
Risk management

In addition, insurance and reinsurance undertakings shall demonstrate that the frequency of calculation of the Solvency Capital Requirement using the internal model is consistent with the frequency with which they use their internal model for the other purposes covered by the first paragraph.

Article 45
Own risk and solvency assessment

The administrative, management or supervisory body shall be responsible for ensuring the ongoing appropriateness of the design and operations of the internal model, and that the internal model continues to appropriately reflect the risk profile of the insurance and reinsurance undertakings concerned.

Regulation

Solvency II Level 2 Requirements

The Tests and Standards for Internal Model (TSIMs) are a set of technical standards for the use of the internal model that give model users, senior management and the supervisor the assurance that the internal model is trusted as a core tool for management of the business and in the generation of risk capital numbers.

TSIM1

Use of the internal model

Firms shall be able to explain the different uses of their internal model and how they ensure consistency between the different outputs where the internal model is used for different purposes.

TSIM2

Fit to the business

Firms shall ensure that the design of the internal model is aligned with their business.

TSIM3

Understanding of the internal model

The management of the firm shall be able to demonstrate an overall understanding of the internal model.

TSIM4

Support of decision-making

The internal model shall be used to support the relevant decision-making processes in the firm, including the setting of the business strategy.

TSIM5

Integration with risk management

The firm shall demonstrate that the internal model is widely integrated in their risk-management system.

TSIM6

Frequency of calculation

Firms must calculate the SCR with a frequency consistent with the use of the internal model in the firm's system of governance. The simplified calculation may be used where it can be justified that the results taken from the previous calculation of SCR would not be materially different from the results of a new calculation.

Regulation

Solvency II Use Test – Level 3

Article 120

Use test

Insurance and reinsurance undertakings shall demonstrate that the internal model is widely used in and plays an important role in their system of governance, referred to in Articles 41 to 46, in particular:

- (a) their risk management system as laid down in Article 44 and their decision-making processes;
- (b) their economic and solvency capital assessment and allocation processes, including the assessment referred to in Article 45.

In addition, insurance and reinsurance undertakings shall demonstrate that the frequency of calculation of the Solvency Capital Requirement using the internal model is consistent with the frequency with which they use their internal model for the other purposes covered by the first paragraph.

The administrative, management or supervisory body shall be responsible for ensuring the ongoing appropriateness of the design and operation of the internal model, and that the internal model continues to appropriately reflect the risk profile of the insurance and reinsurance undertakings concerned.

1. No Checklist
2. To be assessed in totality
3. Incentive to improve
4. Use the latest version of the internal model

5. Fit to business
6. Understanding the IM
14. Run IM once a year.
15. Monitor recalculation trigger
16. Applied to all PIM/IM Group entities.

Article 214 TSIM4

(Art. 120 of Directive 2009/138/EC)

Support of decision-making

Article 215 TSIM5

(Art. 120 of Directive 2009/138/EC)

Integration with risk management

7. Discourages Decision Making IM being different to SCR IM.
8. Prospective support / retrospective validation
9. Document output, alignment and deviations.
10. At least produce Economic Capital, Regulatory capital and Risk Management impact .

11. Sufficient uses to inform risk management.
12. Change model to reflect the RMS.
13. Time lag between RMS and IM changes must not affect decision making.

Regulation

FSA – Statements / Reviews

4) Use test

Some firms have developed models which either include elements of *prudence*, erring on the side of caution, in their approach or which include *simplifying assumptions* to allow the quicker running and easier maintenance of the model. However, both of these features undermine the accuracy and relevance of the model for use in supporting business decision-making.

During our work with some general insurance firms, we have seen different versions of the catastrophe model being used for pricing and capital modelling, without a credible explanation for any divergence.

We have also seen examples where firms have minimised the level of interaction between the internal model team and other teams, which raises the question: how is the firm able to demonstrate that the internal model is fully embedded in the business and drives key business decisions?



14 May 2012

In May 2012 the FSA have also issued a view on the Use Test too.

They highlighted the following as undermining use:

- Elements of prudence
- Simplifying assumptions
- Isolating the internal model team.

FSA Thematic Review – February 2011

Key issues:

- Senior management understanding, oversight and governance.
- Integration of capital and risk management.
- Decision making.

Regulation

Banks and the “Internal Ratings Based” Use Test

The Use Test was a feature of Basel II.

However the regulation admits that pricing models may use a different PD and LGD as long as these are documented.

Basel II Framework paragraph 444

“Internal ratings and default and loss estimates must play an essential role in the credit approval, risk management, internal capital allocation and corporate governance functions of banks using the IRB approach. Rating systems and estimates designed and implemented exclusively for the purpose of qualifying for the IRB approach and used only to provide IRB inputs are not acceptable. It is recognised that banks will not necessarily be using exactly the same estimates for both IRB and all internal purposes. For example, pricing models are likely to use PDs and LGDs relevant to the life of the asset. Where there are such differences, a bank must document them and demonstrate their reasonableness to their supervisor.”

Basel II admits different measures – but asks for explanation of differences.

1. Banks are responsible for demonstrating their compliance with the use test.
2. Internal use of IRB components should be sufficiently material to result in continuous pressure on the quality of IRB components.
3. Demonstrating consistency and explaining differences between IRB components and internal measures can establish sufficient comfort that the first two principles are met.
4. The importance of an internal process to the bank's decision making influences the extent to which that process contributes to an assessment of use test compliance. Banks should take a holistic approach when assessing overall compliance of their institution with the use test requirements.

Some familiar principles giving banks responsibility for Use Test and the Continuous Pressure principle and holistic assessment.

Regulation

FINMA – Swiss Solvency Test - Use Test

B. Use test

In the use test an insurance company is to ensure that it applies the risk model in a suitable manner. 146

An insurance company must ensure that the exposure limits established at the company level are consistent with the risk model. 147

Senior management and the board of directors must have a sufficient understanding of the risk model, its outputs and its limitations in order to be able to gauge the implications of the risk model with regard to an insurance company's risk management and capital requirements. They must know and take into account the results of the risk model in their decision-making. 148

In justified cases, e.g. in cases in which FINMA requires the use of an internal model by an insurance company, it may grant the company a suitable period within which to embed the risk model in the company's processes. 149

Notes:

When an internal model is used in many applications within an insurance company, FINMA has compelling evidence that the insurance company has an inherent interest in the quality and maintenance of the internal model. This may impact FINMA's assessment effort and expense in its risk-oriented approach. 150

FINMA CIRCULAR 2008/44

© 2012 The Actuarial Profession • www.actuaries.org.uk

10

Solvency II is not the only Insurance Regulation with a Use Test.

- Familiar concepts:
"senior management understanding of the risk model, its output and limitations"

- Strong line taken:
"Must take account of the internal model in decision making"

Credit Rating Agency

Standard & Poor's



- We will typically consider the ECM to be credible only if the insurer is applying the ERM results, together with other measures, as the basis of its major decisions (referred to as "embedding" or the "use test" in a regulatory context). We envision that this embedding would generally be implemented through a strategic risk management process (see "Strategic Risk Management: The Upside of ERM," published July 26, 2006). We expect to request documentary evidence confirming use of ECM results, in conjunction with stated risk tolerance levels, strategic asset allocation, pricing, underwriting capacity, reinsurance buying, product design, and performance measurement. We may analyze, for example, whether the insurer's base assumptions are at a minimum consistent with the assumptions used for all of its other projection work such as reserve adequacy or cash flow testing.

S&P only see an Economic Capital Model as credible if it forms **"the basis of major decisions"** – i.e. embedded.

S&P envision embedding as forming part of a **"Strategic Risk Management Process"**

© 2012 The Actuarial Profession • www.actuaries.org.uk

11

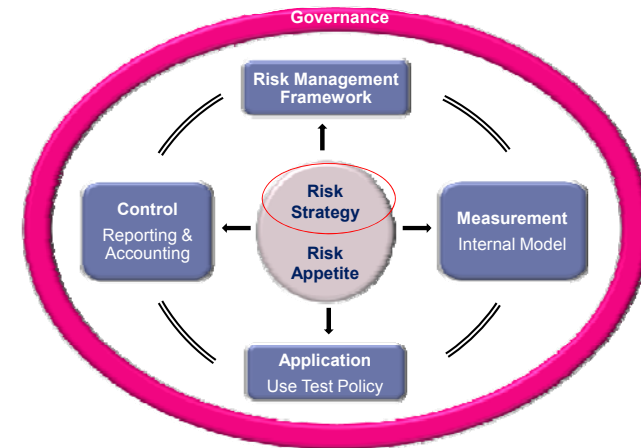
Agenda

- Introduction
- Use Test in Regulation / Rating Agencies
 - Solvency II
 - Basel II / FINMA / S&P
- **Strategic Risk Management Process**
 - **Risk Strategy**
 - **Risk Appetite**
 - **Risk Management Framework - System & Limits**
 - **Measurement - Internal Model**
 - **Reporting - Monitoring and Controlling Performance**
- Case Study

© 2012 The Actuarial Profession • www.actuaries.org.uk

12

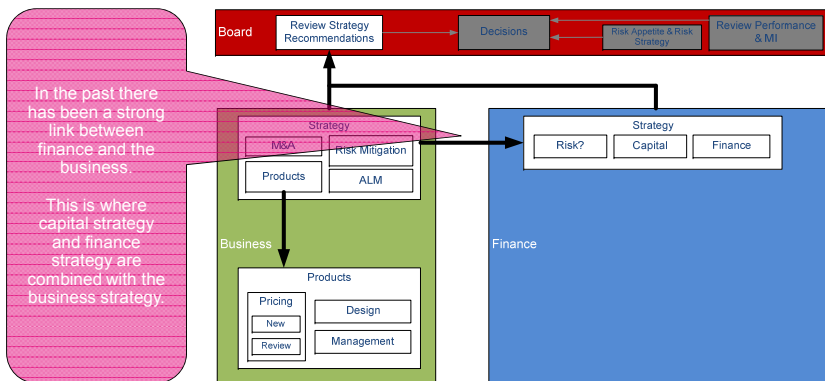
Strategic Risk Management Process Putting the Use Test into Context



© 2012 The Actuarial Profession • www.actuaries.org.uk

13

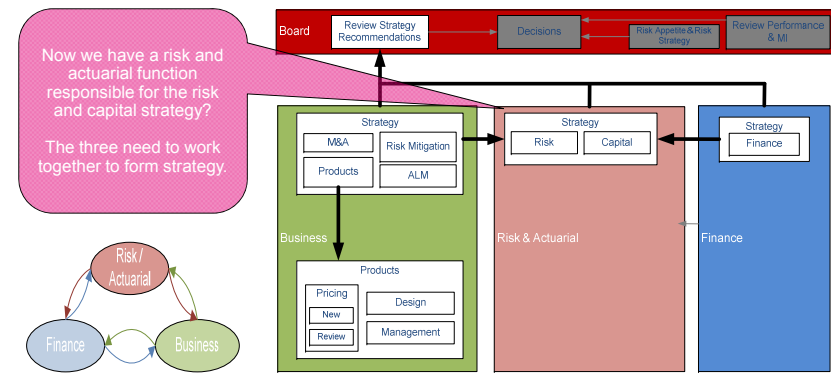
Strategic Risk Management Process Risk and Capital Strategy (ORSA)



© 2012 The Actuarial Profession • www.actuaries.org.uk

14

Strategic Risk Management Process Risk and Capital Strategy (ORSA)

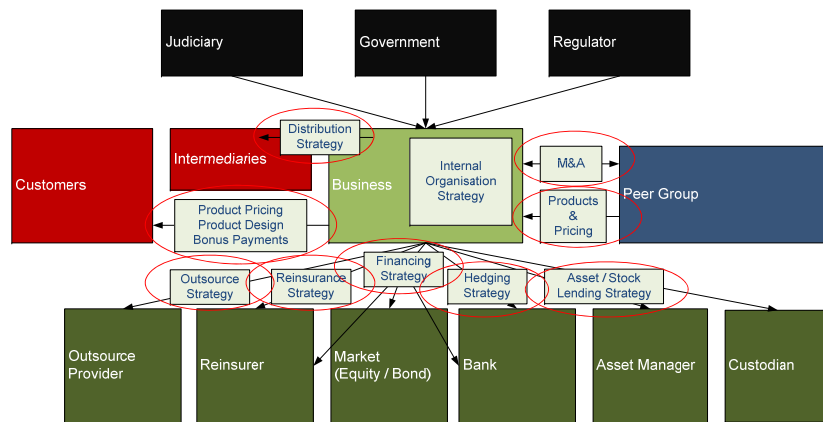


© 2012 The Actuarial Profession • www.actuaries.org.uk

15

Strategic Risk Management Process

What needs to be on Risk & Actuarial Radar?

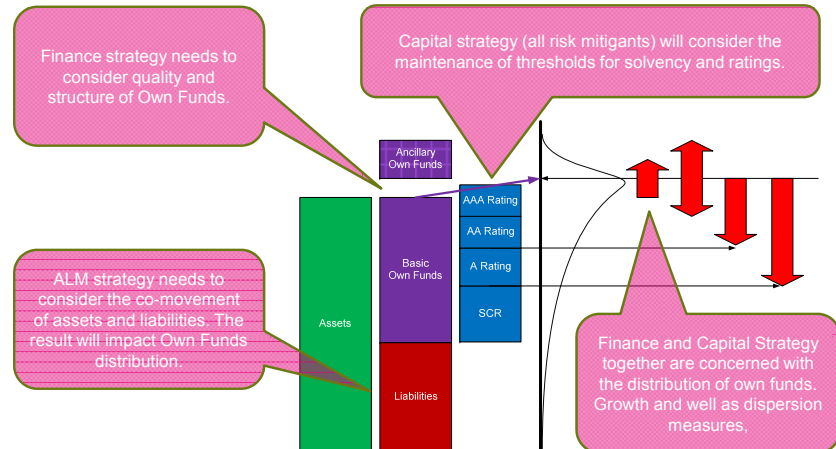


© 2012 The Actuarial Profession • www.actuaries.org.uk

16

Strategic Risk Management Process

Capital / Finance Strategy (Optimisation)



© 2012 The Actuarial Profession • www.actuaries.org.uk

17

Strategic Risk Management Process

Putting the Use Test into Context

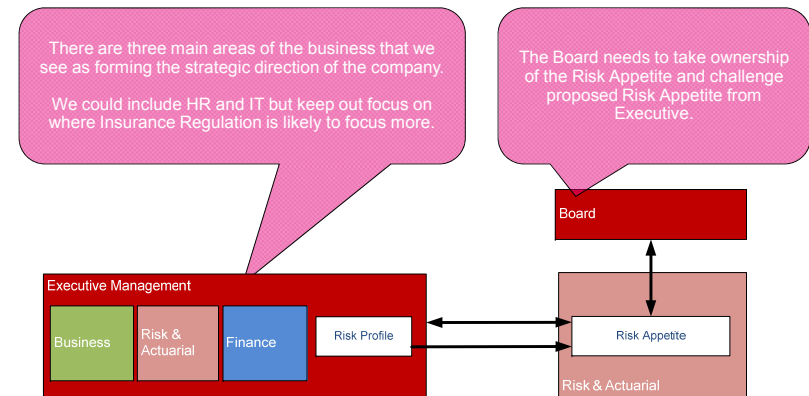


© 2012 The Actuarial Profession • www.actuaries.org.uk

18

Strategic Risk Management Process

Getting the Risk Appetite Agreed

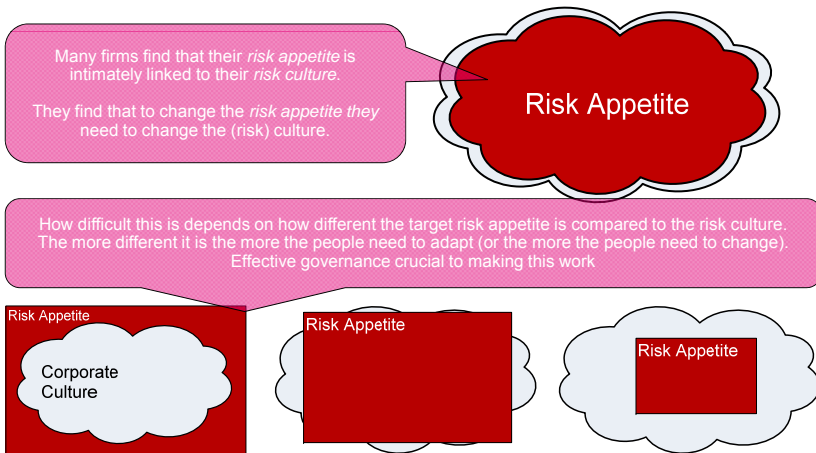


© 2012 The Actuarial Profession • www.actuaries.org.uk

19

Strategic Risk Management Process

Risk Culture (Old) → Risk Appetite → Risk Culture (New)

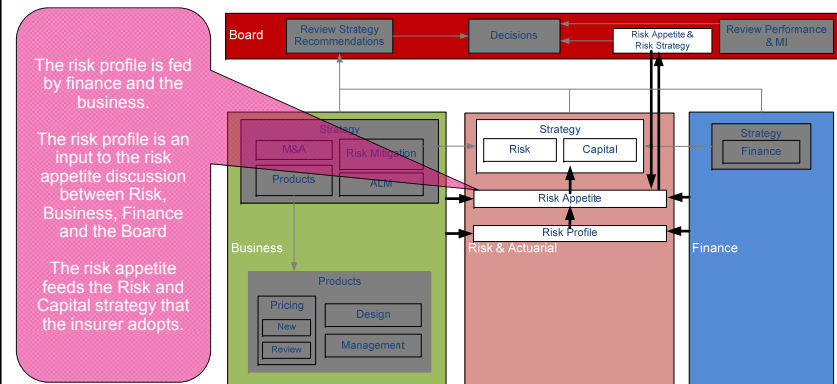


© 2012 The Actuarial Profession • www.actuaries.org.uk

20

Strategic Risk Management Process

Where Risk Appetite Fits In



© 2012 The Actuarial Profession • www.actuaries.org.uk

21

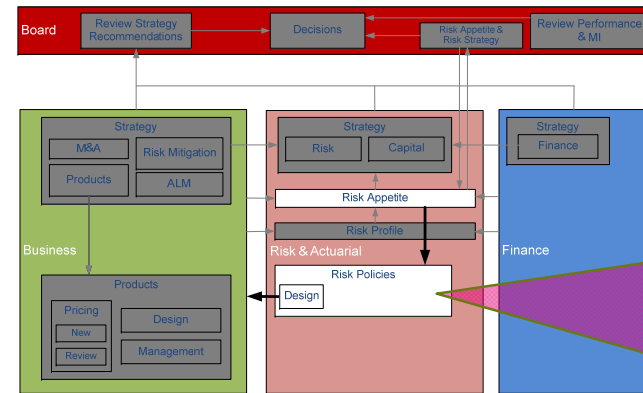
Strategic Risk Management Process Putting the Use Test into Context



© 2012 The Actuarial Profession • www.actuaries.org.uk

22

Strategic Risk Management Process Risk Management Framework - Risk Policies



To deal with less quantifiable risks and ensure that the risk appetite is made operational a set of risk policies is required.

Risk policies include risk limit framework.

These may need to be expressed in terms of proxies to become operational.

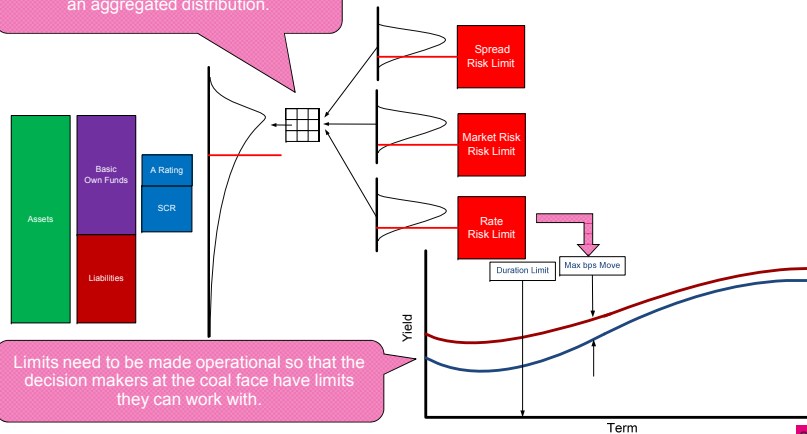
© 2012 The Actuarial Profession • www.actuaries.org.uk

23

Strategic Risk Management Process

Reversing Limits out of the Model

Quantitative Limits can be reversed out of an aggregated distribution.



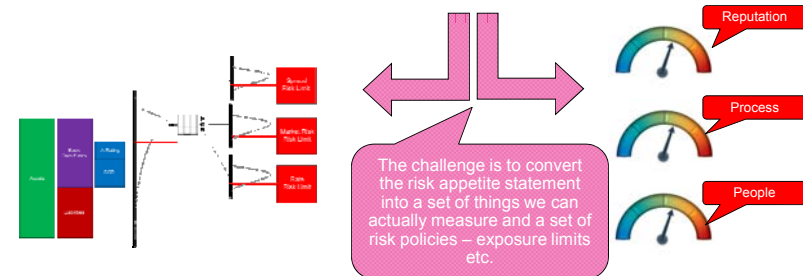
© 2012 The Actuarial Profession • www.actuaries.org.uk

24

Strategic Risk Management Process

Limit Setting

- The Board expects to maintain sufficient capital during normal conditions to retain a AA rating
- Following a 1:25 year event the Board expects to have sufficient capital to retain at least a BBB rating
- During normal conditions the planned profit will be delivered
- Following a 1:10 year event, at least 75% of the planned profit will be delivered
- No appetite for regulatory censure or other significant reputational impact



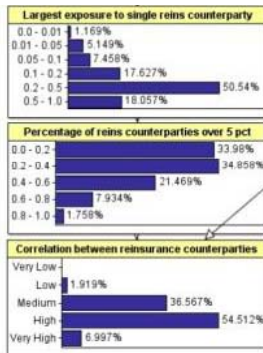
© 2012 The Actuarial Profession • www.actuaries.org.uk

25

Strategic Risk Management Process

Setting Limits with Bayesian Networks

The propagation properties of a Bayesian Network can be used to convert the high level probabilistic statements in a risk appetite into the distributions of more meaningful indicator that the business can measure and manage.



© 2012 The Actuarial Profession • www.actuaries.org.uk

26

Strategic Risk Management Process

Putting the Use Test into Context

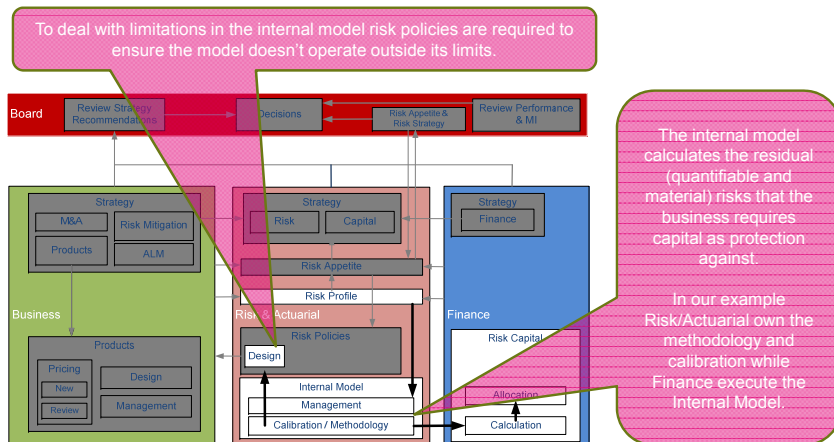


© 2012 The Actuarial Profession • www.actuaries.org.uk

27

Strategic Risk Management Process

Measurement - Internal Model

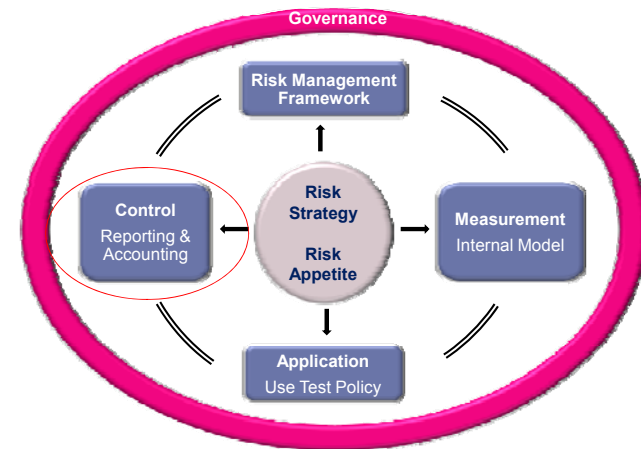


© 2012 The Actuarial Profession • www.actuaries.org.uk

28

Strategic Risk Management Process

Putting the Use Test into Context

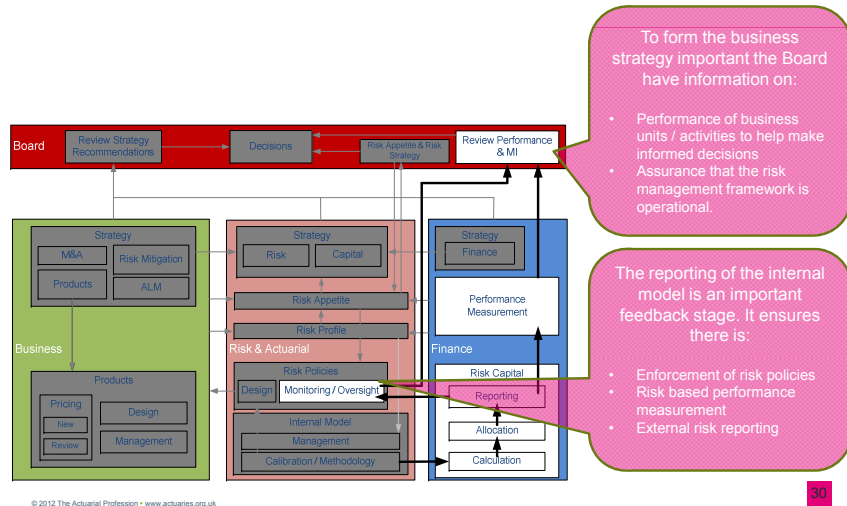


© 2012 The Actuarial Profession • www.actuaries.org.uk

29

Strategic Risk Management Process

Reporting - Monitoring and controlling performance



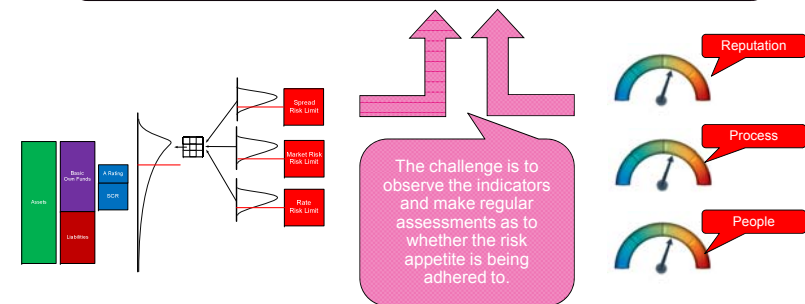
© 2012 The Actuarial Profession • www.actuaries.org.uk

30

Strategic Risk Management Process

Performance Measurement

- The Board expects to maintain sufficient capital during normal conditions to retain a AA rating
- Following a 1:25 year event the Board expects to have sufficient capital to retain at least a BBB rating
- During normal conditions the planned profit will be delivered
- Following a 1:10 year event, at least 75% of the planned profit will be delivered
- No appetite for regulatory censure or other significant reputational impact



© 2012 The Actuarial Profession • www.actuaries.org.uk

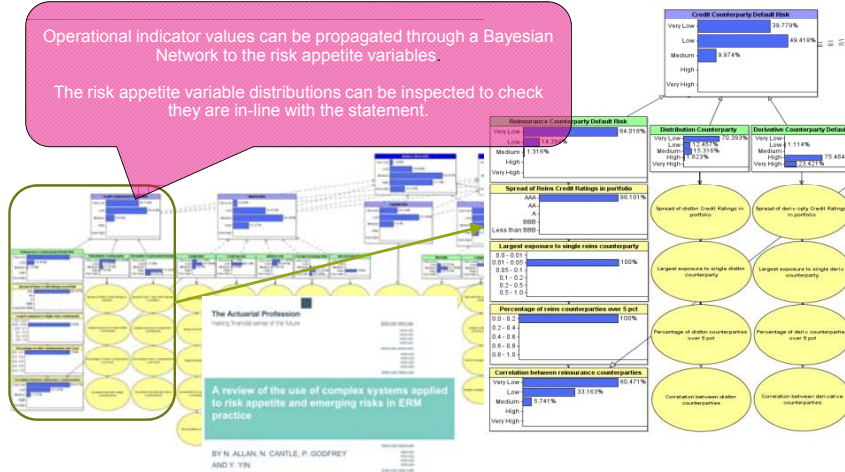
31

Strategic Risk Management Process

Monitoring Risk Appetite with Bayesian Networks

Operational indicator values can be propagated through a Bayesian Network to the risk appetite variables.

The risk appetite variable distributions can be inspected to check they are in-line with the statement.

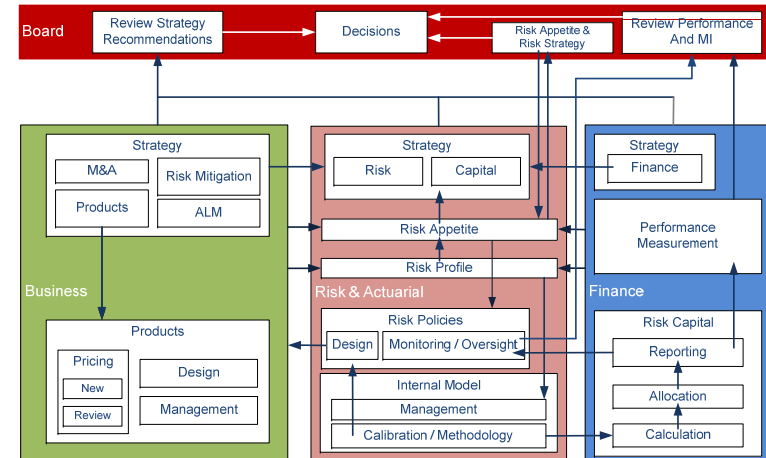


© 2012 The Actuarial Profession • www.actuaries.org.uk

32

Strategic Risk Management Process

The full picture



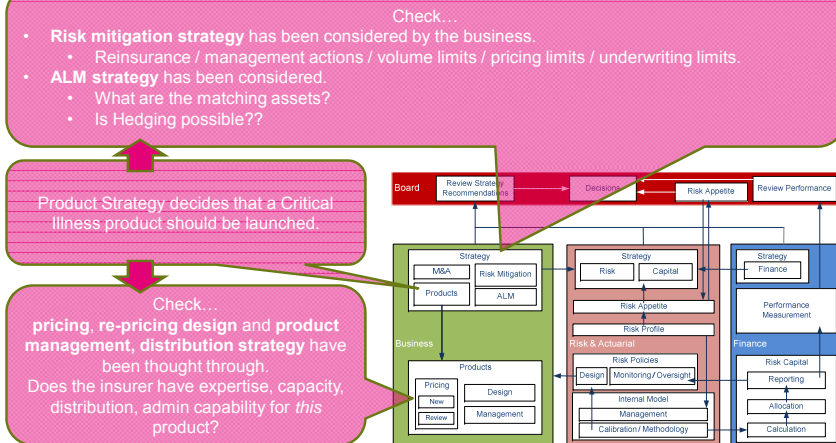
© 2012 The Actuarial Profession • www.actuaries.org.uk

33

Agenda

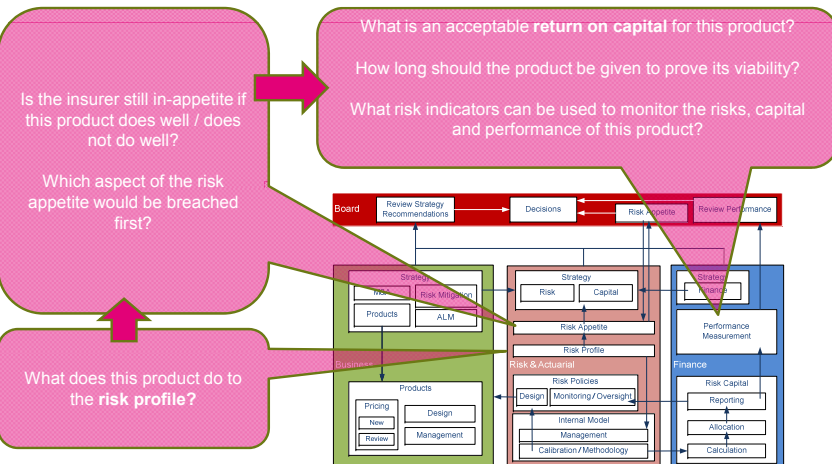
- Introduction
- Use Test in Regulation / Rating Agencies
 - Solvency II
 - Basel II / FINMA / S&P
- Strategic Risk Management Process
 - Risk Strategy
 - Risk Appetite
 - Risk Management Framework - System & Limits
 - Measurement - Internal Model
 - Reporting - Monitoring and Controlling Performance
- **Case Study**

Case Study Business Strategy



Case Study

Risk Profile, Risk Strategy, Risk Appetite, Performance Measurement

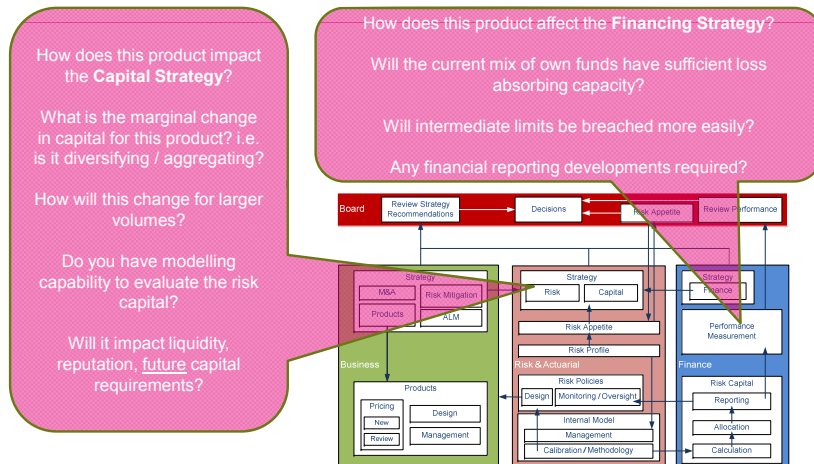


© 2012 The Actuarial Profession • www.actuaries.org.uk

36

Case Study

Capital / Finance Strategy

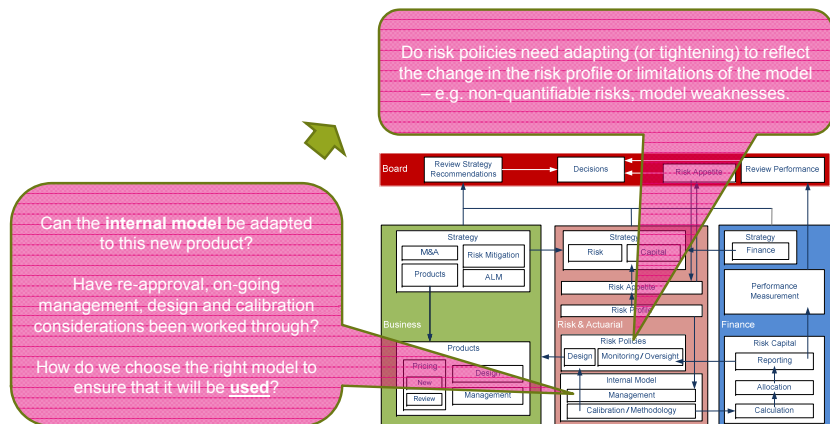


© 2012 The Actuarial Profession • www.actuaries.org.uk

37

Case Study

Risk Measurement / Risk Control



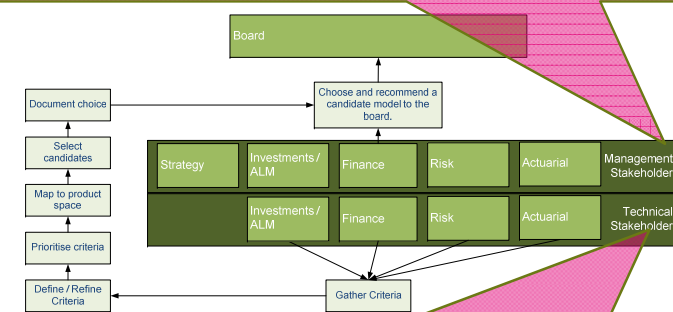
© 2012 The Actuarial Profession • www.actuaries.org.uk

38

Case Study

A Model Choice Framework

Management stakeholders review the shortlist and recommendations of their technical collages and select the model to propose to the Board – probably as part of a wider risk report on whether to enter the Critical Illness market.



Start with the key technical stakeholders and gather their criteria for a *decision making* framework. Understanding what stakeholders need to make decisions is a pre-requisite to a model that can pass the use test well.

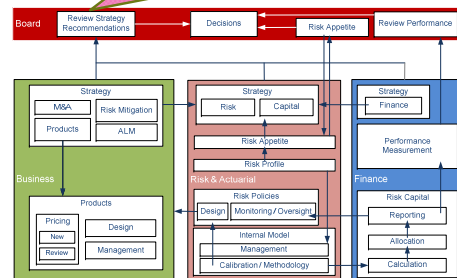
© 2012 The Actuarial Profession • www.actuaries.org.uk

39

Case Study

Forming the Board Proposal

A proposal needs to be approved by the Board. Considerations are likely to be: Risk Appetite, Insurer Ability, Market, Financing, Resilience and Capital Impact



Capital Impacts:

- Capital consumption now.
- Projected capital consumption (under different scenarios)
- Stand-alone return on capital
- Marginal return on capital.

Crucial to evidence that the internal model was used for this purpose.

What happens if the model doesn't give attractive looking figures?

© 2012 The Actuarial Profession • www.actuaries.org.uk

40

Case Study

Computer Says No ... Discuss

Board Paper Released
(with recommendation to accept + Risk report)

Why we must do this.

- It is strategically important
- We get first mover advantage
- Capital model is wrong
- Capital metric too simplistic

Why we may not want to do this.

- Capital goes up sharply
- Lowers the return on capital
- We've not done this before (operational risk, reputational risk, business risk)

Starts the debate

Effective challenge to Risk and BAU.

Pressure to improve the model.

Core Use Test Principle

© 2012 The Actuarial Profession • www.actuaries.org.uk

41

Summary

- Introduction
- Use Test in Regulation / Rating Agencies
 - Solvency II
 - Basel II / FINMA / S&P
- Strategic Risk Management Process
 - Risk Strategy
 - Risk Appetite
 - Risk Management Framework - System & Limits
 - Measurement - Internal Model
 - Reporting - Monitoring and Controlling Performance
- Case Study

© 2012 The Actuarial Profession • www.actuaries.org.uk

42

Contact Details

- | | |
|--|---|
| <ul style="list-style-type: none">• Ann Muldoon | <ul style="list-style-type: none">• Elliot Varnell |
| <ul style="list-style-type: none">• E: ann.muldoon@friendslife.co.uk | <ul style="list-style-type: none">• E: elliott.varnell@milliman.com |
| <ul style="list-style-type: none">• M: +44 (0)7850 715 946 | <ul style="list-style-type: none">• T: @RiskActuary |
| <ul style="list-style-type: none">• The information in these slides should not be interpreted as the views of Friends Life | <ul style="list-style-type: none">• LI: http://www.linkedin.com/in/elliottvarnell |

© 2012 The Actuarial Profession • www.actuaries.org.uk

43