

Embedding Solvency II into Business as Usual for General Insurance

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Embedding Solvency II into Business as Usual for General Insurance

1. Executive Summary

This paper has been prepared by the Embedding Solvency II into BAU Working Party as an introduction to the subject for actuaries who are involved with general insurance undertakings.

Although Solvency II is not a new subject for general insurance actuaries, and considerable actuarial resources have been used to help general insurance undertakings to implement and comply with the Solvency II regime, it is only now that fundamental actuarial and operational management questions are being raised regarding the post-Solvency II world. Once Solvency II has been embedded within the general insurance undertakings, how will the business be run and business decisions be taken, and to what extent will it be “business as usual”?

The working party has considered the embedding of Solvency II issues that are likely to be faced and it has concluded that there is a diversity of views; there is no unique solution. Each company will have its own corporate culture, governance, history, track record, management depth and resource availability. We have, therefore, attempted to address the “business as usual” related issues by means of considering a series of case studies, each of which represents a fictitious general insurance undertaking. Each of these case study companies has taken a different approach to the implementation and embedding of Solvency II principles although there are similarities regarding some of their high level risk management concepts and processes.

Although the case study companies considered by the working party have all “fully implemented” their ERM framework around two years ago, and have each been trying hard ever since to implement Solvency II principles throughout their day to day business operations, it is clear that much more needs to be done. Besides the ERM framework, in order to ensure the sufficient embedding of the risk awareness and management approach into day-to-day activities, it has been recognised that there still need to be changes in behaviours. It is apparent that their organisational cultures need to mature and that this will take time. In summary, it is anticipated that their Solvency II regime(s) will take longer to reach the required level, which may defer their regulatory approval(s).

For some general insurance undertakings, the more **risk averse companies**, “business as usual” in a Solvency II world will mean a large set of compliance requirements, in order to ensure that they can demonstrate such compliance to the regulatory authorities. Risk aversion may in practice become the order of the day, together with a **‘box ticking’** corporate culture and mentality to help them try and ensure that they are inconspicuous. Their ERM focus may also have a **‘box ticking’** tendency and mentality, with little attention being to ERM tracking, measurement and monitoring, as the organisation progresses over time with its ERM implementation.

At the opposite end of the risk aversion spectrum, there will be other general insurance undertakings, the more **entrepreneurial and innovative companies**, where “business as usual” will mean significant expertise and **“calculated aggressive risk taking in their chosen fields of endeavour”**. Risk and opportunity management will be the order of the day, with an enterprise based corporate culture. Their ERM focus is likely to include ERM tracking, objective measurement and monitoring, as the organisation progresses over time with its ERM implementation.

The majority of general insurance undertakings will be somewhere along the risk aversion spectrum, with neither a ‘box ticking’ mentality, nor the courage to be blatantly ‘entrepreneurial and innovative’, based on risk and opportunity management principles.

We have noted the seriousness of the recent FSA communications on Solvency II updates and the importance they now attach to effective ERM and corporate governance. For example, the recent “Dear Firm” letter, dated 24th July 2012, entitled **“Solvency II update for IMAF firms”**. In

particular, we have noted the additional feedback on the potential use of expert judgement and its application as an important operational management process.

We have concluded that the embedding of Solvency II into BAU will for many general insurance undertakings be characterised by several themes, including:

- (a) Their organisational readiness in respect of the post-Solvency II environment, especially with respect to stress tests and shock scenarios.
- (b) Their documented and other (regulatory) evidence that Solvency II really has been embedded in business as usual.
- (c) Their enterprise risk management culture, especially with regard to measurement, tracking and monitoring.

Our general conclusion is that the embedding of Solvency II into BAU will result in a diversity of responses, ranging from “no perceptible change” to “calculated aggressive risk taking in their chosen fields of endeavour”. There is no “One Size Fits All” and much will depend on the corporate culture and the quality of the senior management team and the available resources, as indicated by our three Case Studies.

A key conclusion from our three case study companies A, B and C is that there is no obligation for a general insurance undertaking to have a full internal model.

- Company A has a full internal model that performs well and the Board of Directors is satisfied that its internal model will help it to survive and thrive.
- Company B does not have an internal model, but performs well and the Board of Directors is satisfied that its approach. It is well capitalised, understands its business well and has a relatively advanced risk management framework.
- Company C has a partial internal model that performs well and the Board of Directors is satisfied that its partial internal model has many advantages over its previous full internal model. It is well capitalised, understands its business well and has fully embedded ERM principles.

We have also concluded that, with Solvency II into BAU, stress test and shock scenarios reporting will be of great interest to the Board of Directors, many of which will require formal reports (at least annually) that demonstrate that the general insurance undertaking is likely to be resilient to such stress tests and shock scenarios.

We reserve judgement on whether the embedding of Solvency II into BAU for general insurance undertakings will enhance the financial performance of the UK regulated general insurance undertakings and their global competitiveness. We also reserve judgement on the extent to which the embedding of Solvency II will be in the interests of their personal and corporate customers.

2. Introduction

- 2.1. This paper has been prepared by the Embedding Solvency II into BAU Working Party as an introduction to the subject for actuaries (and perhaps also non-actuaries) who are involved with general insurance undertakings. The working party was established in October 2011 at the General Insurance Conference and Convention 2011.
- 2.2. The working party interpreted the overall concept of 'embedding of Solvency II into BAU' as mainly related to building well-functioning corporate governance and enterprise risk management structure. It also interpreted the embedding of Solvency II to only happen in the next three to five years. Hence the paper examined a hypothetical Solvency II world for general insurance undertakings in the year 2015.
- 2.3. The working party has considered the embedding of Solvency II issues that are likely to be faced and concluded that there is a diversity of views and that there is no unique solution. Each company will have its own corporate culture, governance, history, track record, management depth and resource availability. We have, therefore, attempted to address the "business as usual" related issues by means of considering a series of case studies, each of which represents a fictitious general insurance undertaking.
- 2.4. The three case study companies have taken a different approach to the implementation and embedding of Solvency II principles. Some of these differences were inevitable, given the relative size, scale, resources, track record and experience of the case study companies. Other differences were the result of a different corporate mentality, especially towards their perceived value of enterprise-wide risk management principles.
- 2.5. The Solvency II implementations of the three case study companies have fundamental differences in their modelling approaches (see below), that have materially influenced their governance structures, their BAU activities and operational performance, as well as resulting in their apparent diversity of views on BAU in a post-Solvency II world.
 - Company A – Full Internal Model
 - Company B – No Internal Model
 - Company C – Partial Internal Model
- 2.6. Although Solvency II is not a new subject for general insurance actuaries and considerable actuarial resources have been used to help general insurance undertakings to implement and comply with the Solvency II regime, it is only now that questions are being raised regarding the post-Solvency II world. Once Solvency II has been embedded within the general insurance undertakings, how will the business be run and business decisions be taken, and to what extent will it be "business as usual"?
- 2.7. The working party has taken as read the recent actuarial writings (in the U.K.) on enterprise risk management for general insurance (and other) undertakings and the relevance of Solvency II to the effective enterprise risk management of a general insurance undertaking. The essence of these writings is that enterprise risk management is a Board level responsibility, that the lead must come from the top management team, and that it is an iterative process with as many adaptive feedback loops as are required to gain credibility and the confidence of the decision makers within the organisation.
- 2.8. The working party has taken as read the recent actuarial writings on Solvency II and its proposed implementation, according to the various EU and national regulatory authorities.

- 2.9. The subject of Solvency II technical provisions was discussed recently at a sessional research meeting of the Institute and Faculty of Actuaries, the question being “What Actuaries will be doing differently?”¹.
- 2.10. The role of the Actuarial Function under Solvency II was the subject of the GIRO 2011 conference paper², references to which have been made in several places in this paper.
- 2.11. The case study companies have a diversity of commercial interests, histories and backgrounds, as indicated in **Table 1** below.
- 2.12. To test the resilience of the various case studies ERM frameworks we applied different shock scenarios and tried to evaluate their impact qualitatively and quantitatively. The quantitative side focused on deterministically observing possible/immediate changes on the balance sheet. The construction of a balance sheet required that the working party examine the asset structure of similar real life insurance companies. This was important to allow an understanding of how asset values and hence capital were affected. Profit & Loss accounts were also constructed. The two quantitative metrics examined were change in surplus and change in profit. The qualitative analysis considered possible consequences and subsequent management action post stress scenarios. It also looked at what areas of the business or processes became important during stress and how they can be improved.
- 2.13. The stress scenarios considered were varied trying to encompass as many differing types of issues. The various scenarios were later narrowed down to three encompassing main drivers of risk generally in the general insurance world. the stress scenarios characteristics are described below:
 - a. Macroeconomic shock – this is external to the company but systemic to the market
 - b. Binary risk – long term sustained systemic type events affecting reserves adversely like Asbestos claims.
 - c. Mass lapse scenario – which is directly related to the company’s reputation and business undertakings

Please refer to the **Appendices 1, 2 and 3** for the full descriptions of **Company A, Company B** and **Company C** in the three case studies respectively.

Table 1 overleaf compares the main characteristics of the three case study companies.

Table 1 - Company Comparisons

#	Description	Company A	Company B	Company C
1	Location, size and number of staff	London subsidiary of a large European parent, medium size with 1,000 staff.	UK only general insurance undertaking, with London HQ and Manchester staff.	UK subsidiary of German parent, 5 UK sites, medium size with 3,000 staff.
2	Lines of business	London market commercial risks (property & casualty)	UK based home insurance direct / affinity business.	Diversified personal lines and commercial insurer
3	Credit rating	S&P: AA- , partly due to reliance on parent for capital as and when required.	S&P: A+ . Credit rating difficulties due to the absence of an internal model.	S&P: BBB , partly due to reliance on parent for capital as and when required.
5	Profitability	Well capitalised by parent, good profitability.	Well capitalised	Mixed in recent years, with pressure on private motor
6	ERM	ERM fully implemented, rated as Excellent by S&P.	ERM fully implemented, rated as Strong by S&P.	ERM fully implemented, rated as Strong by S&P.
7	Corporate Governance	Dictated by European parent.	Dictated by Board of Directors.	Dictated by German parent, three lines of defence model
8	Asset Mix	Euro Gilts, Bank Deposits, Equities.	Sterling Gilts, Bank Deposits, Equities	Euro Gilts, Bank Deposits, Greek sovereign bonds.
9	Distribution Channels	Primarily intermediated.	Direct Sales and some Affinity Groups.	Direct sales, affinity groups, intermediated sales.
10	Internal Model ?	Yes, Full model	No	Yes, but Partial model only

3. Conclusions

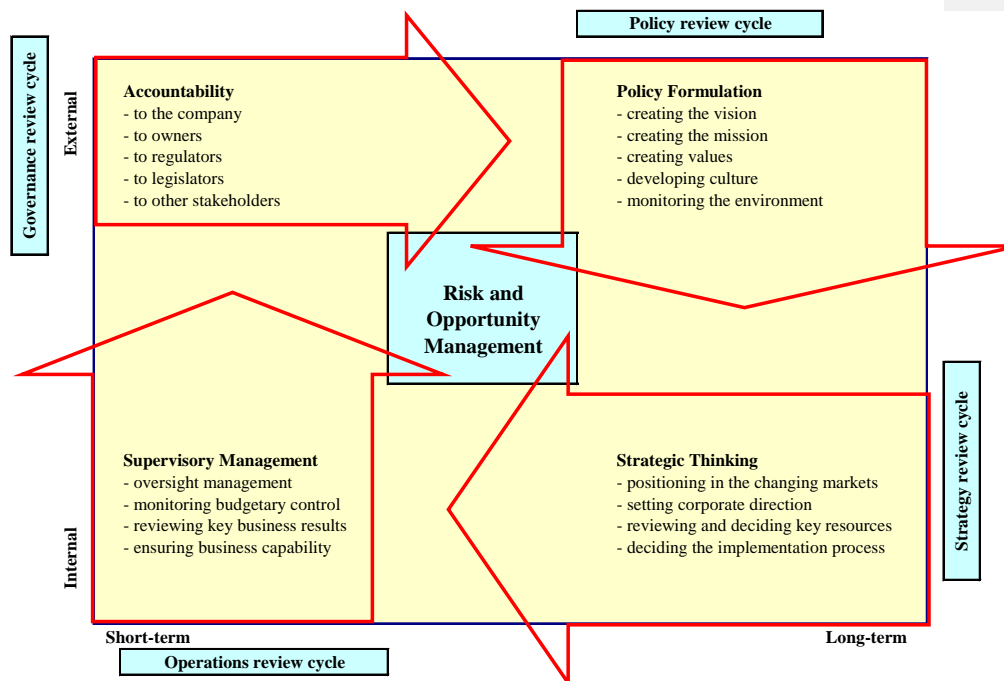
The principal findings are listed below.

The specific case studies conclusions are included in sections 5, 6 and 7.

3.1 Solvency II for Enterprise Risk Management

Solvency II is essentially concerned with effective and risk-based enterprise risk management for the insurance industry, which includes general insurance undertakings.

Chapman ³ describes the process of ERM (enterprise risk management), which is essentially one of risk and opportunity management, as impinging ‘on the four main functions of Boards; policy formulation, strategic thinking, supervisory management and accountability and their respective control cycles’.



Source: Adapted from Garratt ⁴.

The embedding of Solvency II into “business as usual” for general insurance undertakings is likely to include the embedding of effective ERM principles. This has previously been considered as part of a recent sessional meetings paper of the Institute and Faculty of Actuaries on *Enterprise Risk Management from the General Insurance Actuarial Perspective* ⁵.

The embedding of Solvency II into “business as usual” for short-term health insurance undertakings is also likely to include the embedding of effective ERM principles. This has previously been discussed as part of a recent sessional meetings paper of the Institute and Faculty of Actuaries on *Enterprise Risk Management for Health Insurance from an Actuarial Perspective* ⁶.

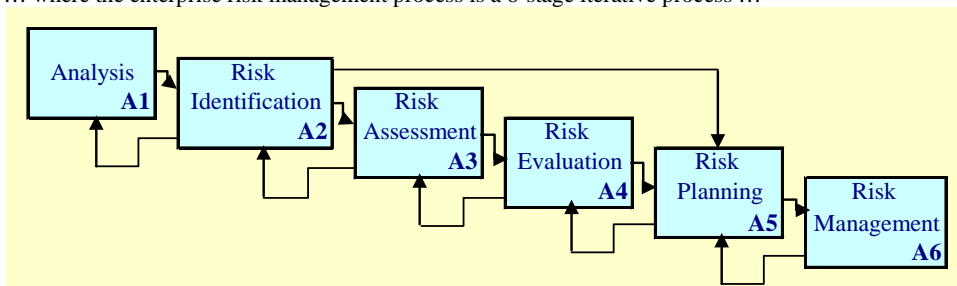
3.2 Solvency II for Corporate Governance within ERM Framework

The Chapman ERM framework develops an ERM corporate governance model which has five elements, starting with the Corporate Governance function:

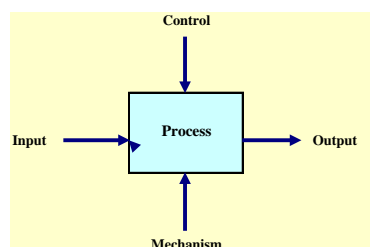
- Corporate governance (Board oversight)
- Internal control (sound system of internal control)
- Implementation (appointment of external support)
- Risk management process (incremental phases of a 6-stage iterative process).
- Sources of risk (internal and external).



... where the enterprise risk management process is a 6-stage iterative process ...



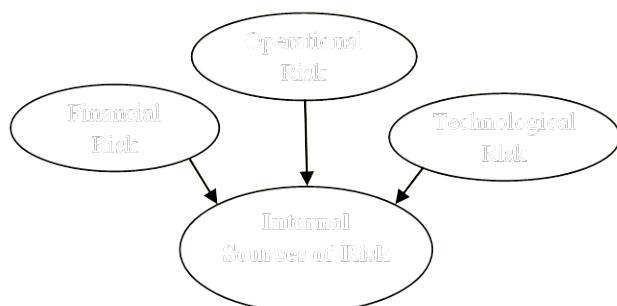
Each of the 6 processes has inputs, outputs, control and mechanisms. The modes of data connectivity can be charted using the IDEFO (Integration Definition for Function Modelling) process mapping.



Source: Institute and Faculty of Actuaries paper “Enterprise Risk Management for Health Insurance from an Actuarial Perspective”⁵.

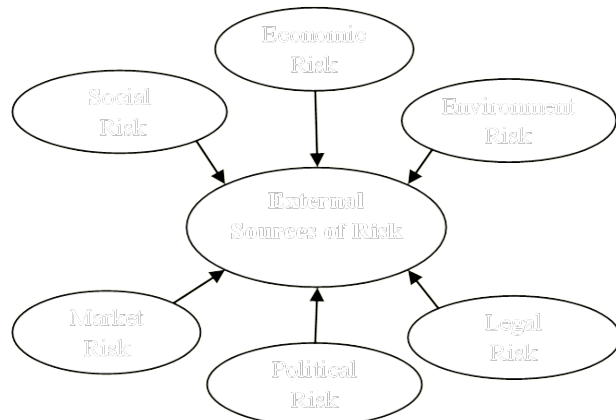
3.3 Solvency II for Internal and External Sources of Risk

The case study companies will need to consider the typical internal sources of risk.



The case study companies will also need to consider the typical external sources of risk, which occur at sub-national, national, regional and global/international levels. These sources of risk are largely exogenous to the insurer such as demographic trends however some factors may be influenced by the insurer or its peers (e.g. regulation which addresses market and consumer issues). External sources of risk include the economic, natural/physical, political, legal and regulatory environments, market structure and conditions, legislation and socio-demographic and cultural factors. These factors create sources of risk and opportunity; single factors can have relative pre-eminence or factors can interact and create a series of unpredictable and volatile shocks to the organisation which may contradict all past lessons learned by the organisation.

Some typical internal sources of risk are illustrated below.



Source: Institute and Faculty of Actuaries paper “Enterprise Risk Management for Health Insurance from an Actuarial Perspective”⁵.

3.4 ERM - Management and Measurement

ERM management and measurement over time (including tracking and monitoring) is an important subject and will help to characterise an organisational readiness for embedding Solvency II into BAU. A useful tool for this may be peer group comparisons against a ERM maturity index, which should indicate the organisation is really embedding ERM into BAU and, thereby, achieving steady progress towards ERM excellence.

3.5 Solvency II – Risk Appetite

The case study companies recognise that their risk appetite is linked to the level of target returns, which influence their disposition to take risks and may be affected by:

- (a) Normal business conditions, which are essentially those conditions where the strategic and business plans hold. Based on this definition, ‘normal conditions’ may include a financial downturn, in cases where the Company’s business plans cover a period of economic downturn or adverse business cycle.
- (b) A scenario of a catastrophic event which could occur once every 200 years, whereby the risk tolerance levels start from the current balance sheet (and business plans) and a ‘1 in 200’ stress test is applied. They set the amount of loss that the company one is willing to accept and the conditions under which it expects it to occur starting from a ‘normal’ position.

3.6 Solvency II – Role of Internal Models

There is a diversity of views on the value and cost effectiveness of internal models. The 3 case study companies have fundamental differences in their modelling approaches (see below), that have influenced their governance structures, their BAU activities and their performance.

- Company A – Full Internal Model
- Company B – No Internal Model
- Company C – Partial Internal Model

3.7 Solvency II for Internal Audit Function

As a consequence of embedding Solvency II into business as usual, the internal audit function has become a more important function at both group and solo level. In our case study companies, a group internal audit function has been established at the top level of the group.

The Group Internal Audit function has to be objective and independent of all operational functions on solo and group level (including the risk management function).

- a) The group internal audit function at least annually produces a written report on its findings to be submitted to the administrative, management or supervisory body of the subsidiary and the ultimate parent undertaking. The report covers any deficiencies with regard to the efficiency and suitability of the internal control system, as well as major shortcomings with regard to the compliance with internal policies, procedures and processes. It includes recommendations on how to remedy inadequacies and addresses any past points of criticism.
- b) The tasks of the group internal audit function include the harmonisation of the auditing standards within the insurance group and the examination and evaluation of the group internal control system. Moreover, the group internal audit assesses the proper functioning of the internal auditing units of the individual undertakings of the group.

3.8 The minimum that the Internal Auditor needs to know about Solvency II

As an experienced Internal Auditor, he/she also needs to become familiar with their embedded Solvency II processes and ensure that he/she complies with the associated reporting requirements (see **Section 3.7**). Provided that the Internal Auditor complies with these reporting requirements, there are no specific Solvency II external requirements that require compliance. Therefore, the minimum that the Internal Auditor needs to know about Solvency II and “get away with it” is “very little”, albeit that they will be under greater scrutiny.

In summary, there is not much the Internal Auditor needs to do for Solvency II. However, there are a number of implications from other Solvency implementation requirements, such as:

- greater emphasis on risk management
- encourages a multi-disciplinary approach

- Solvency II incentivises “best premium / risk profile” combination
- shift to more risk based pricing
- shift to ‘best estimates’ with explicit margins to provide a confidence interval

... and so companies may therefore have internal requirements.

3.9 Solvency II and the Role of Actuaries in future

We examined the future role of actuaries when Solvency II is embedded into the organisation.

Pricing Actuaries

Some members of our working party was asked to research the topic of what Pricing Actuaries need to know about Solvency II for the Institute of Actuaries Pricing Seminar on 29th June 2012 ⁷.

As an experienced general insurance Pricing Actuary, he/she needs to become familiar with the Solvency II processes that have been embedded within their organisation and ensure that he/she complies with the associated reporting requirements, in so far as they are relevant to the Pricing Actuary function. These will include capital modeling and capital allocation for pricing proposals, along with ERM framework and corporate governance adherence. Provided that the Pricing Actuary complies with these internal reporting requirements, there are no specific Solvency II external requirements that require compliance. Therefore, the minimum that the Pricing Actuary needs to know about Solvency II and “get away with it” is “very little”.

In summary, there is not much a Pricing Actuary needs to do for Solvency II. However, there are a number of implications from other Solvency II implementation requirements, such as:

- greater emphasis on risk management
- encourages a multi-disciplinary approach
- Solvency II incentivises “best premium / risk profile” combination
- shift to more risk based pricing

... and so companies may therefore have internal requirements.

Reserving Actuaries

As an experienced general insurance Reserving Actuary, he/she also needs to become familiar with their embedded Solvency II processes and ensure that he/she complies with the associated reporting requirements, in so far as they are relevant to the Reserving Actuary function. These will include capital management, risk assessment and stress testing for the proposed technical provisions, backed up stochastic modeling and scenario analyses where appropriate.

In respect of the Lloyd’s of London syndicates involved that underwrite general insurance business, there are some specific internal requirements that the actuarial function needs to adhere to for the setting and monitoring of technical provision. This includes both the “Technical Provisions Detailed Guidance” ⁸ and the “Guidance on the Report of the Actuarial Function” ⁹. They will also need to try and comply with the Lloyd’s of London “Technical Provisions Data: Suggestions for Allocation Methodologies” ¹⁰.

In summary, the minimum that the Reserving Actuary outside of the Lloyd’s of London general insurance market needs to know about Solvency II and “get away with it” is “very little”. In summary, there is not much a Reserving Actuary needs to do for Solvency II. However, there are a number of implications from other Solvency II implementation requirements, such as:

- greater emphasis on risk management
- encourages a multi-disciplinary approach
- shift to ‘best estimates’ with explicit margins to provide a confidence interval

... and so companies may therefore have internal requirements.

However, the minimum that the Reserving Actuary inside of the Lloyd's of London general insurance market needs to know about Solvency II and "get away with it" is "quite a bit", if they are to meet the internal requirements set by Lloyd's of London. For example:

- greater emphasis on risk management
- encourages a multi-disciplinary approach
- shift to 'best estimates' with explicit margins to provide a confidence interval
- Move towards an explicit cash flow approach with explicit inflation/discounting
- Explicit allowances for expenses and reinsurance credit risk
- Different treatment of unearned (i.e. recognition of expected profits)
- Different treatment on certain legal obligations (e.g. binders)
- Need to report on Solvency II classes which may differ from existing classes
- Tight timeframes – within 5 weeks of quarter end (3 weeks in Lloyd's syndicates)
- Input into Actuarial Opinion about quality of TPs including data
- Documentation of all assumptions being used in TPs and justification
- Accounting / Management Information, with reconciliation between them

Capital Actuaries

Capital Actuaries remain the focal point under Solvency II. The discipline emerged into the market mainly due to the evolving regulations. Capital Actuaries are at the heart of embedding effective risk management. Their role spans from modelling to understanding all parts of the business. In an internal model framework under Solvency II, their roles become more important the further the Use Test is implemented. This would imply that the outputs from the capital model are understood by management and the model is used for making decisions. For example decisions regarding risk appetite and reinsurance

Actuaries working in smaller firms

In smaller firms, general insurance actuaries sometimes need to develop a broader range of skills and competencies than is the case in larger firms. For example,

- (a) Skills and competencies in communication, business, risks knowledge;
- (b) The challenges may be greater for smaller firms, where integrating functions and resources might have to be the case (e.g. "actuary and risk manager" or "reserving and capital actuary" or "multidisciplinary actuaries").

3.10 Stress Tests and Shock Scenarios

We have considered a number of stress tests and shock scenarios, which we have applied to the three Case Studies, which are the notional companies A, B and C (see **section 4** for details). An attempt has been made to consider how each of the case study companies would be likely to respond to such shock scenarios, the focus being on their likely 'consequences' and 'management actions'.

As far as possible, the same stress scenarios and scenarios were applied to each of the case study companies. Our stress scenarios and shocks were partly based on those highlighted in a recent Bank of England paper on insurance supervision¹¹.

We have also considered stress scenarios and shocks that may be of particular interest to the shareholders and the senior management team. For example, the possibility of a negative report and/or a downgrading by the credit rating agencies.

We have concluded that, under Solvency II, stress test and shock scenarios reporting will be of great interest to the Board of Directors, many of which will require formal reports (at last annually) that demonstrate that the general insurance undertaking is likely to be resilient to such stresses.

3.11 Impact of Stress Scenarios on Balance Sheets

In respect of the first three (arguably, the most important) stress tests and shock scenarios for Companies A, B and C, their Solvency II Balance Sheets have been modeled and projected (see **Section 4.1** for details). In practice, their management actions and risk responses will be diverse and this will be reflected in their actual Solvency II Balance Sheets.

3.12 The potential use of Expert Judgement

We concur with the view that “expert judgement” is important and necessary in many aspects of internal models and should be viewed as an operational management process. However, it is important to bear in mind that the Solvency II Directive’s requirements also apply to expert judgements that are used in the internal models used by general insurance undertakings. The use made by the case study companies A, B and C of “expert judgement” where reliable data was scanty was diverse, as indicated below.

- **Company A**, with its full internal model, has made some use of expert judgement. Care was taken to ensure all instances where expert judgement had to be used were fully documented. However, some third parties have queried whether the stress tests and major shock scenarios that have been applied were sufficiently broad and robust. For example, there were instances where “expert judgement” is likely to have indicated that a wider range of stress test assumptions should have been applied.
- **Company B**, which does not have an internal model, has made extensive use of expert judgement. Although there is documentation on all instances where expert judgement had to be used, some third parties have queried whether the documentation is sufficiently complete, given the absence of a full internal model. For example, some of its major reinsurers have indicated that more due diligence is required in the absence of a full internal model.
- **Company C**, with its partial internal model, has used expert judgement in respect of the model components where a full internal model was not used. Although there is documentation on all instances where expert judgement had to be used, some third parties have queried whether the documentation is sufficiently complete. However, the Company is comfortable that sufficient challenges have been made in all instances where expert judgement was appropriate.

3.13 Business as Usual in a Solvency II World

For some general insurance undertakings, the more **risk averse companies**, “business as usual” will mean a large set of compliance requirements that they will need to adhere to ensure that they can demonstrate such compliance to the regulatory authorities. Risk aversion may become the order of the day, together with a ‘box ticking’ corporate culture and mentality to help ensure they try and become inconspicuous.

At the opposite end of the risk aversion spectrum, there will be other general insurance undertakings, the more **entrepreneurial and innovative companies**, where “business as usual” will mean significant expertise and calculated risk taking in the chosen fields of endeavour. Risk and opportunity management will be the order of the day, together with an ERM based corporate culture.

Most general insurance undertakings will be somewhere along the risk aversion spectrum, with neither a ‘box ticking’ mentality nor the courage to be ‘entrepreneurial and innovative’, based on risk and opportunity management principles.

4. Stress Test and Shock Scenarios

4.1 Case Studies Companies – Stress Tests

The various scenarios considered by the working party are outlined below. There is a diversity of views between the case study companies A, B and C. The major components and the stress test scenarios deemed necessary by the case study companies are outlined below. Scenarios 1, 2 and 3 are the only ones considered in detail by all three case studies.

Table 2 - Stress Test Scenarios

#	Stress Test Scenarios	Company A	Company B	Company C
1	Eurozone currency collapse: Euro depreciates by 50% due to fall in consumer confidence due to 'Euro collapse' or '1 Eurozone country hit'. Euro denominated assets depreciate by 50%.	Rebalancing of asset portfolio, commute Euro liabilities, raise capital by issuing debt, adjust reserves in the statutory books.	No management actions required, given small impact.	Rebalancing of asset portfolio, commute Euro liabilities, raise capital, adjust reserves, liquidate some overweigh assets and debt.
2	Binary GM Food Event: A late string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods i.e., chemicals applied in wheat leading to affect experience with all wheat products. Recent scientific discovery that chemicals in wheat cause the life threatening illness.	An increase in reserves of 20% , increase rates for liability lines, exclude liability claims arising from specified GM products, exit from US product liability risks.	An increase in reserves of 20% , increase rates for liability lines, exclude liability claims arising from specified GM products.	An increase in reserves of 20% , increase rates for liability lines, exclude liability claims arising from specified GM products.
3	Mass Lapses: (1) 50% of insurance policyholders lapse their policies and do not renew in the following year; (2) Due to court case ruling against due to conflict regarding the no. losses following a very large hurricane (i.e., dispute around the hours clause).	Diversify to other regions, offer a larger variety of products, diversification is through M&A or acquiring entire team.	Mass lapses in personal lines (e.g. household insurance) due to competitors aggressive pricing to gain market share. Diversify to other products.	Mass lapses in personal lines (e.g. private motor) due to competitors aggressive pricing to gain market share. Diversify to other products.
4	Catastrophe: Impact of extreme natural catastrophic Canadian Quake (factor in currency risk, counterparty risk, investment risk).	Diversified investment portfolio and reinsurance counterparties	Portfolio review of reinsurers to identify potential counterparty exposure	Consider reinsurance (higher) pricing issues for many years
5	Flood Shock: Consider the financial impact of UK extreme floods - Causing severe claims and operational risk.	Reinsurance claims, monitor liquidity, re-reserving exercise, investment mandates	Increase monitoring of investment and liquidity risk dashboards	Develop flood risk assessment and monitoring models
6	Reinsurance Failure-1: Impact of reinsurance gaps, due to inability to obtain reasonable reinsurance terms in absence of internal model.	Monitor emerging risks, contingency plans in place for when reinsurance unavailable	Feasibility study on if an internal model can be approved within the given timescales	Considering and reviewing the various reinsurance programmes.
7	Reserve Inadequacy: Financial impact of 10% overall reserve inadequacy	Realistic claims est., inform ratings agencies, flexible investments	Focus on how to avoid such events (e.g. better claims controls, MI)	Strengthen reserves, review reserve policy, delay growth plans
8	Aggressive Pricing: Impact of increasing the “aggressively priced” (e.g. 15% below market average) risk groups to “market average”.	Work within defined return/risk metrics, better MI, strategy for business growth	Focus on how to avoid such events (e.g. better claims controls, MI)	Develop lapse effects module to monitor potential mass lapses
9	Reinsurance Failure-2: Financial impact of reinsurance failure amounting to 20% of the overall amounts ceded to reinsurers.	Reinsurance cover, prepare for loss in profitability, keep regulators informed	Focus on how to avoid such events (e.g. better claims controls, MI)	Financial losses, review reinsurer selection processes
10	Binary Events: Impact of potential “binary events”, perhaps via a (say) 15% increase in the technical provisions, over and above those for other purposes.	Review reserving, less dividend flow, assess process for dealing with binary events	Increase premium rates, exclude future liability arising from specified GM products	Strengthen reserves, review reserve policy, monitor binary events
11	Market Risk Shock: Impact (e.g. for concentration risk and spread risk) of credit rating deterioration to below BBB.	Review risk governance, invite rating agency review	Convert ICA system into ECM tool for credit rating agencies.	ALM studies for investments, asset allocation structure

5. Case Study 1 - Company A Summary of Findings

5.1 Company A Profile Summary

The Company A case study is the subject of **Appendix 1**, which shows a detailed report on the company and its proposed approach to business as usual in a Solvency II world. This section provides an overview; for more detail, see Appendix 1.

It is a well-established London market UK multi-line insurer and reinsurer. It does not face major legacy issues with regards to its IT systems or risk governance structure. As a subsidiary of a large European parent, it is well capitalised, due the capital backing it receives from its parent. It has an AA- credit rating issued by Standard and Poor's rating agency and its ERM is scored as Excellent. It writes commercial lines business, this includes property and casualty, with an annual written premium of £2bn and has reinsurance programmes covering its lines of business.

The Company's risk framework outlines its risk principles, material risk types, risk governance, appetite and policy. This has been embedded to the overall running of the business, interacting with the strategic planning and capital management process i.e., acting as an implementation for the ORSA framework. The risk management department comprises of underwriting risk, claims risk, credit risk, investment risk, operational risk, asset liability risk, liquidity risk, concentration risk, strategic risk and reputational risk units.

Company A has a highly sophisticated risk management framework overlooked by the Risk Management Committee. The role of the risk committee is outlined below:

Committee members are the owners of the Risk Register and are responsible for identifying, measuring and monitoring risk; this includes:

- Binary risk as defined by solvency II to affect reserves
- Emerging risk (e.g. Nanotechnology, GM food or Climate Change)

The Risk management Committee is ultimately responsible for design and implementation of policies, systems and processes to ensure the following:

- Risk tolerances and appetite as set by the board are not breached
- The use of risk adjusted measures for financial targets and performance measures and seek to ensure that they are optimised and kept within expectations especially in reference to peers in the market.
- Ensuring the ERM framework is applied consistently and systematically across the company, functions and that corporate tolerances are consistent with specific risk limits
- Continuously evaluating the quality of risk controls in place and seeking to improve them and respond to internal and external changes in the business environment
- Risk management culture – articulate risk tolerances clearly and ensure transparency in communicating risk to regulator, rating agencies and internally.
- Ensuring the company passes the Use Test by ensuring that management understand the model and that management action is informed by the model. This requires that they demonstrate understanding of their risk profile.
- The ECM model is used in the risk management process –e.g. metrics, scenario testing, capital allocation etc.
- Oversight of the Catastrophe Response department and hence processes and procedures
- Establishing feedback loops to ensure improvements can be made. This includes event post mortems
- Ensuring all ERM processes and risks are fully documented and audited.

The risk management committee achieves all this through regular reporting and effective communication and collaboration of the risk management function with all other business functions.

The committee also works on best ways of evidencing the effectiveness of their ERM processes through choice of metrics and risk identification, monitoring and mitigation.

The committee aims to ensure that;

1. Top-down and bottom-up approaches are considered as much as possible for the various risks considered – especially insurance risk.
2. The committee considers short, medium and long term risks and effects of risks that occur (from financial, operational and structural points of view)
3. Use of risk adjusted measures to assess effects
4. Looks at sustained long risk emerging over a long period and short term shocks

Committee seeks to understand risk through the following methods (trend analysis, stress/scenario testing, back testing, contingency planning, problem post mortem and risk transfer)

The committee seeks to monitor risk through (Regular reporting, audits, capital budgeting and allocation, strategic asset allocation, and process feedback loops)

The committee seeks to mitigate risk through the following methods; (Management of liquidity, avoidance of risk, transfer of risk, offsetting risk - These are achieved by investment strategy, reinsurance and understanding and quantifying dependencies in the business).

The committee considers action under stress scenarios (asset disposal, difficulty in raising capital, business transfer and sale, M&A, recovery plans and reduction in business)

The company is using an approved internal model, which it built with the help of its Solvency II team. This was made up of a combination of full-time actuaries and external contractors to parameterise some of the more specific and complicated sub-modules. The company has therefore retained the talent and intellectual property in-house which proves to be an efficient way to embed Solvency II into BAU.

It has additionally considered cases where re-parameterisation may be required and for this, the contractors had maintained full documentation of the assumptions and overall process (as required by the regimes) which will allow the other actuaries to easily make any modifications or model updates. The parameters are updated at least twice a year and more frequently if necessary. They additionally licence other models to feed results into their overall internal model.

Our analysis and findings have shown that Solvency II demands the business to not only always be risk conscious in all decision making but also continuously improve processes and control systems. For Company A embedding Solvency II has been a business driven decision and the entire culture of the company has become risk-focussed. The company believes that the source of its ability to comply with Solvency II is its integrated data systems and ERM processes. Please see appendix A for full details of data and process flows. A centralised data management team dealing with all department and all reporting requirements of the business ensures Company A's success in this field.

5.2 Qualitative Analysis - Consequences and Management Action Post Stress Scenarios

Summarised below are the possible consequences and management action of company A when faced with these stress scenarios.

Table 3 - Consequences and Actions - Company A

# Stress Test Scenarios	Consequences of Shock	Management Actions
1 Eurozone currency collapse: Euro depreciates by 50% due to fall in consumer confidence either due to 'Euro collapse', or '1 Eurozone country hit'. Euro denominated assets depreciate by 50%.	Consequences: (1) Reduction in capital leading to a drop in credit rating which leads to a fall in share price; (2) Debt becomes expensive due to poor credit rating; (3) Regulatory intervention.	Actions: (1) Rebalancing of asset portfolio; (2) Commute some liabilities denominated in Euros; (3) Raise capital by issuing debt; (4) Adjusting reserves in the books.
2 Binary GM Food Event: A late string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods i.e., chemicals applied in wheat leading to affect experience with all wheat products (e.g. cereals, cake, bread by certain brands). Recent scientific discovery that the chemicals in wheat cause the life threatening illness.	Consequences: (1) Need to strengthen claim reserves to allow for latent and now emerging additional liability claims; (2) Need to increase premium rates to allow for latent claims; (3) Need to tighten policy wordings; (4) Potential need to off-load some LOBs.	Actions: (1) An increase in reserves of 20%; (2) Increase rates for liability lines; (3) Strengthen policy wording for future policies to exclude liability claims arising from specified GM products; (4) Pull out of US segment of product liability entirely and engage in a Part IV transfer of remaining policies in the portfolio.
3 Mass Lapses: (1) 50% of reinsurance policyholders lapse their policies and do not renew in the following year; (2) Due to court case ruling against the company due to conflict regarding the no. losses following a very large hurricane (i.e., dispute around the	Consequences: (1) Fall in reinsurance premiums in the following year; (2) Per policy percentage expenses are higher; (3) Capital requirements reduce but not in proportion to the lapses due to the effect of diversification.	Actions: (1) Diversify to other regions; (2) Offer a larger variety of products and branch into a larger variety of LOBs to make up for the shortfall; (3) Diversification is either through M&A or acquiring an entire team – process will be slow and lead to a hit on capital.
4 Catastrophe: Impact of extreme natural catastrophic Canadian Quake (factor in currency risk, counterparty risk, investment risk).	Consequences: (1) Large losses resulting in reduction in profit (2) Strain on liquid assets in Canadian dollars	Actions: 1) Increase reserves 2) Increase required rates on Canadian business 3) Extensive cat modelling loss analysis 4) Cat response team in-house
5 Flood Shock: Consider the financial impact of UK extreme floods - Causing severe claims and operational risk.	Consequences: 1) large amount of claims as primary business relating from property to liability (including business interruption). 2) fall in investment values especially equities. 3) RI claims delay may cause liquidity issues. 3) reserve inadequacy due to super-imposed inflation from shortage of skills and labour	Actions: 1) alert and claim from reinsurance including invoking any reinstatement covers 2) Invoke process to monitor liquidity on an ongoing basis. 3) Conduct a re-reserving exercise and re-estimate claims costs 4) Review and reassess investment mandates esp with regards to big falls in value
6 Reinsurance Failure-1: Impact of reinsurance gaps, due to inability to obtain reasonable reinsurance terms in absence of internal model.	Consequences: A fully internal modelled company and part of a large parent so no concern	Actions: 1) actively monitor emerging risks and ensure all quantifiable risks are modelled. 2) buy reinsurance or have contingency in place for levels where reinsurance is not available

Table 3 - Consequences and Actions - Company A (Continued)

# Stress Test Scenarios	Consequences of Shock	Management Actions
7 Reserve Inadequacy: Financial impact of 10% overall reserve inadequacy	Consequences: 1) decline in shareholders funds and therefore available capital which may trigger some capital injection requirement 2) downgrade in credit ratings which may affect business volume 3) a need to change investment strategy which may create unnecessary expenses	Actions: 1) ensure claims estimates are put in at realistic levels (even prudent levels). 2) active communication to Group entity as well as ratings agencies to ensure business is not compromised. 3) design flexible investment strategy that can cope with tactical as well as strategic shifts
8 Aggressive Pricing: Impact of increasing the “aggressively priced” (e.g. 15% below market average) risk groups to “market average”.	Consequences: 1) exit from certain market segments due to unprofitable nature 2) gain market share from aggressive pricing 3) expenses increase due to increased business volumes 4) increase loss reserves 5) potential reinsurance increases 6) investments need to cope with extra premium flow	Actions: 1) Accept loss and work within defined return/risk metrics. The solvency fund position will decrease 2) Management to ask for better MI to monitor business movements 3) strategy changes to be communicated to all parts of the business so that resources are prepared for increased business volumes.
9 Reinsurance Failure-2: Financial impact of reinsurance failure amounting to 20% of the overall amounts ceded to reinsurers.	Consequences: 1) immediate solvency concern if current claims require reinsurance 2) increased costs to reinstate cover through other reinsurers 3) increased regulatory monitoring and possibly intervention 4) guarantee required from Group company	Actions: 1) Assess reinsurance requirements and purchase cover for expected loss 3) prepare for loss in profitability and therefore less dividends to parent company 4) keep regulators informed
10 Binary Events: Financial impact of potential “binary events”, perhaps via a (say) 15% increase in the technical provisions, over and above those for other purposes.	Consequences: 1) capital injection or atleast a reduction in available capital 2) invoke reinsurance arrangements due to increased reserves 3) risk limits may not be appropriate as the return on capital may have gone down 4) loss of credit rating	Actions: 1) reassess reserving/ claims estimate process and accept loss 2) less dividend flow to parent to maintain available capital 3) assess process for dealing with binary events and how that is communicated through the relevant departments. 4) capture and assess risk as part of risk register or emerging risks
11 Market Risk Shock: Impact (e.g. for concentration risk and spread risk) of credit rating deterioration to (say) below BBB.	Consequences: Unlikely to be an issue as large company with transparent and actively reviewed risk governance systems. If it were to happen: 1) shareholder intervention from parent 2) regulatory intervention 3) loss of corporate business where strict rules regarding the credit rating of reinsurer 4) loss of business due to reputation damage 5) capital requirements may reduce especially under S&P model	Actions: 1) review risk governance and assessment 2) work with parent company to rectify ratings agency concerns. 3) invite ratings agency to conduct review and possibly employ consultant and impletement any recommendations

5.3 Quantitative Analysis – Examining the Financial Statements Post Stress Scenarios

Only Scenarios 1, 2 and 3 were looked at here.

Projected Balance Sheets and income statements have been prepared in respect of the first three shock scenarios outlined above. The results for **Company A** are summarised below. Notes on accounts and investment split of Company A are also included in this section.

	Current Snapshot		EUR Collapse 50% Depreciation		Mass lapse 50% of Premium		GM Food 20% Reserve Increase	
			Reduction	Current Snapshot	Reduction	Current Snapshot	Reduction	Current Snapshot
Balance Sheet (Billions)								
Assets	25.00		10%	22.13	0%	23.85		24.80
Invested Assets	20.00		10%	18.00	0%	20.00		20.00
Fixed Income	15.00		10%	13.50	0%	15.00		15.00
Cash & Cash Equivalents	3.00		10%	2.70	0%	3.00		3.00
Stock & Other	2.00		10%	1.80	0%	2.00		2.00
RI Recoverables	1.00		10%	.90	10%	.81	20%	.80
Premium Held inc DAC	2.50		25%	1.88	10%	1.69		2.50
Other Assets	1.50		10%	1.35	0%	1.35		1.50
Liabilities	19.50			19.70		19.18		23.00
Reserves	17.50			17.50		16.98	-20%	21.00
Loss & LAE Reserves	12.25			12.25		12.25	-20%	14.70
UPR	3.50			3.50	15%	2.98	-20%	4.20
Other Tech reserves	1.75			1.75		1.75	-20%	2.10
Debt	2.00		10%	2.20	10%	2.20		2.00
Profit	.19		-197%	-.20	-127%	-.71	-154%	-.35
Surplus	5.69		155%	2.23	44%	3.96	292%	1.45
Income Statement (Billions)								
Gross Income	2.00		25%	1.50	50%	1.00		2.00
RI Income	.30		10%	.27	10%	.27		.30
Net Income	1.70			1.23		.73		1.70
Incurred Claims	1.40			1.40		1.40	-40%	1.96
Expenses	.20			.20	3%	.19	-20%	.24
Net Underwriting result	.10			-.37		-.86		-.50
Net Investment income	.15		25%	.11		.15		.15
Pre tax income	.25	tax		-.26		-.71		-.35
Tax	.06	24%		-.06	no tax	.00	no tax	.00
Post tax income	.19		-197%	-.20		-.71		-.35
Notes: The balance sheet figures are for illustration purposes only and should not be used in any company-specific analysis.								

Note: The balance sheet figures are for illustration purposes only and should not be used in any company-specific analysis.

Notes on Balance Sheets for Company A

Company A Investment Portfolio

Cash & Cash Equivalent	15%
Equities Hedge funds, Higher Yielding Securities	10%
Fixed Income	75%

20% of Fixed income is Index linked			
Bond Duration roughly in line with liabilities			
Fixed Income Split			
<hr/>			
Government/Agency (25%)	US Government	AA	
	Euro governments	AA	
	Agency Debentures	AA	
	Foreign Government	(AAA 37%, AA 46%, A 15%, BBB 2%)	
Structured Securities (20%)	Agency Mortgage backed Securities	A	16%
	Asset backed Securities	A	2%
	Non Agency Commercial mortgage backed	BBB	2%
Credit Securities (30%)	Corporate bonds	(AAA 10%,	21.50%
	Guaranteed Corp bonds	AA	1%
	Foreign Corporate	A	5%
	Bonds backed by foreign Govs	A	2%
	Municipal bonds	BBB	0.50%

Eurozone collapse

- Index linked Euro government bonds represent only 10% of company invested assets due to their lack of availability
- Hence very low hedge against inflation
- EUR assets represent 50% of all assets however liabilities are matched, only 10% drop in asset value occurs
- EUR denominated recoverables fall in value by 10% due to predefined slip rates
- Reserves devalued for currency (50% drop of 50% of reserves) but due to increase in uncertainty the company puts up reserves
- Profit is down primarily due to currency revaluation of premium figures
- Cost of debt is up 10% as a result of loss of earnings
- Cost of servicing debt is up - P&L change under Net Investment Income
- Premium and DAC drop by 25% (50% of 50% devaluation)
- Investment income under assets will also be depleted - P&L Changes
- Recoverables will be down much more even if reinsurers are all AA rated

Mass Lapse 50%

- The 50% reduction in gross premium which is not mirrored proportionately in expenses or reinsurance spent causes a large loss in the P&L
- Debt cost rises by 10% on the balance sheet
- UPR reserves drop by only 15% in case there's adverse selection/bias in

policies lapsed (lower LRs%)

- recoverables fall by 10% to represent recoverables halving in respect of current year only

GM Food Binary Event

- Reserves are increased by 20% across all components
- Assets rebalanced towards long tail incurring re-investment cost to P&L
- Claims cost increasing as well as claims expenses by 40% and 20% on P&L respectively
- RI recoverables should increase but the possibility of reinsurer default increases by more hence recoverables drop by 20%

5.4 Case Study 1 – Company A Conclusions

The scenarios have been looked at in isolation; however, it is apparent that they are inter-linked e.g., the main drivers of stress would be a claims related event or an economic event. These can have implications on operations, capital or financial position, firm's reputation or credit rating.

We have not considered an operational risk in itself e.g., employee fraud or embezzlement, as we would need to consider the firms' governance structure in the same level of detail as the business processes and risk management. Although regarded as independent from other risks under Solvency II, operational risk could arise from other the risk types e.g., HIH Insurance, Australia's second largest insurance company that was placed into liquidation as a result of fraud charges imposed on various members of HIH management, induced by significantly large claims.

For stresses / scenarios that cannot be assessed, we should look at similar historic events and their impact e.g., company collapse, WTC, Japan tsunami, in addition to studying companies who have managed to face and successfully tackle such events.

The assessment of these scenarios should enable firms to consider, in detail, the working of their catastrophe response team, in particular resourcing, responsibilities, powers, chain of communication.

Further, there is a need to consider how much the company is spending on risk management and catastrophe response, in addition to the day-to-day running. This splits into three components – systems, processes and human resources. It is important to stress test systems to ensure that they can cope with such scenarios and the cost implication of restoring these systems following a stress event; noting that embedding systems that are ERM and Solvency II compliant have shown to impose one of the highest costs on firms.

Processes as outlined in the appendix in the ERM process chart need to be stress-tested to ensure they work. Individuals involved must understand the entire risk management framework in order for these processes to work. The more integrated the processes and personnel the better they can work together to mitigate risk.

We have assessed the effects of three scenarios on Company A; two with immediate effects and one which is more long-term (Binary risk - GM food scenario). We decided to assess the impact of these scenarios on the balance sheet rather than simply doing a qualitative analysis. It became apparent that a snapshot view of the balance sheet may not fully represent reality especially in the long-term GM food scenario; however it gave us a starting point towards quantifying the possible financial impact of these scenarios. We also tried to incorporate short to medium term second order effects in the post stress balance sheets.

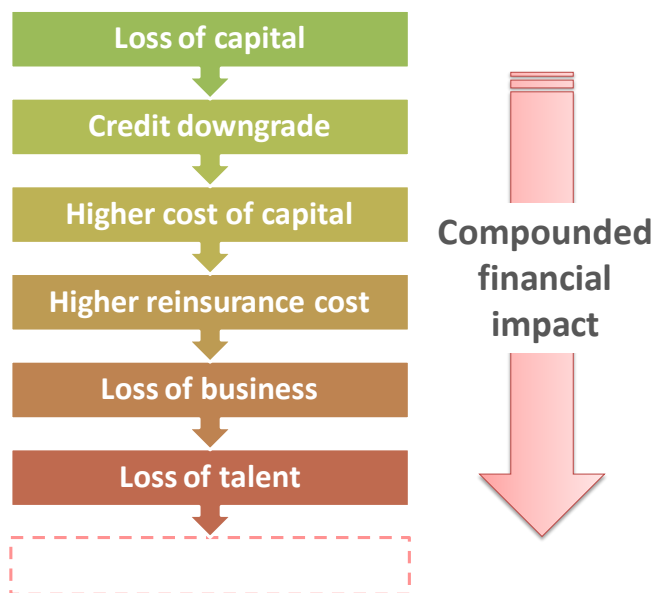
The balance sheet exercise allowed us to examine second order financial impacts. It also highlighted the importance of financial testing and back testing. Although we tested only one severity on various components of the balance sheet e.g., 20% of reserve increase, we should ideally test a range of severities for each scenario.

Given that the main metric we wanted to assess our impact on was the capital figure, the stress scenarios all produced comparatively large enough surplus deficits to send the company into liquidation. Hence those scenarios could imply ruin for company A. However even if the magnitude of capital depletion was much smaller and the company was able to stay in business (as assumed in this example due to parental backing) the second order effects of damaged reputation and rating downgrade would exacerbate the deficit.

The GM food scenario produced the largest effect on the balance sheet from a capital perspective. This was surprising as we expected a more gradual effect due to the long term nature and uncertainty associated with latent claims. It was wrongly expected that the immediate snapshot would not change much and that this scenario would allow the risk committee time to reformulate their investment strategy to hedge this type of systemic risk. This would include thinking about both assets and liabilities related to this business.

Eurozone collapse and GM food scenarios are both examples of systemic issues that the company cannot be fully prepared for. This is because the second order effects will not be known to the company. Examples include not being able to collect from reinsurers hit by the same crisis, or incurring loss due to asset downgrades. What we found however is that a company specific scenario like the mass lapse is no easier to deal with as it also has its uncertainties. For example the bias possibly created if certain more profitable segments of business were to lapse, leaving less profitable business to run on a smaller capital base. In addition the company specific scenario seemed to create the least impact on the balance sheet post stress.

As a high level risk mitigation measure to such extreme events, the company should identify different thresholds for company deficit. They should look at what their options are and possible management actions at different thresholds of capital depletion. For example, does 10% reduction in assets in Eurozone collapse scenario imply 2 steps downgrade by S&P? What implications does that have on the cost of debt? Management additionally needs to consider the inter-linking of consequences and the compounded financial impact of loss of capital that follows. This is illustrated in the diagram below:



The one issue that Company A and many undertakings, including the regulators, will struggle with is what happens if an 'unknown – unknown' shock event is presented to the company. In this instance the easy answer would be that a well-functioning risk management system would be able to deal with the issues presented. Our assessment is that an event could still blind-side an otherwise well managed

company. In order to mitigate this effect in a normal environment the management and board may put into place contingent actions; prudent risk measures (e.g. purchase greater reinsurance amounts or set aside prudent loss reserves). These are already well understood in the marketplace and possibly currently in place.

Embedding Solvency II into Business as Usual is a large task for any company. In our initial assessment of Company A and how it was setup, we felt that it was a strong, conservative and risk focussed organisation. After comparing it to other companies in the market (e.g. company B and C), we felt that the company still had lots of areas where risk processes can be improved on.

An area that Company A may struggle to deal with is the number of concurrent processes and data flow. If the risk governance system is followed to its utmost, there is a risk that the Company may miss out on opportunity because of length of time taken to complete a review and redesign (e.g. new products approval, M&A opportunities). There is also a risk that the process becomes so complex that a lot of people in the company do not understand it.

The essence of risk management is process and every process implies standardisation of some kind. When handling these shock scenarios, management actions and consequences tend to be tailored and specified. One conclusion was that the company needs to consider as wide a range of shock scenarios as possible. In Addition the company must study historic events and their implications.

Overall, we feel that Company A is in a good place but pragmatism will be the key in Business as Usual. There will be conflict between demands of the business and demands of the regulators in protecting policyholder interests but both of these will need to be balanced.

To go beyond the scope of this paper one should look at the group implications or parental influence. In scenarios where capital reduction would destroy the company the parent may then choose to recapitalise, rebrand, restructure, sell or liquidate. The course of action will depend on aspects like post shock share valuation, reputation and economic environment.

An important consideration would be doing post-mortems on real stress events. Albeit they would be smaller events than our stress scenarios, the company needs to examine its handling of such events. This will allow it to continually improve its risk management framework. In a world of Solvency II BAU companies can only have top governance and risk management structures if they can demonstrate that they are continually reassessing their frameworks to respond to events and changing business environments.

6. Case Study 2 - Company B Summary of Findings

6.1 Company B Profile Summary

The Company B case study is the subject of **Appendix 2**, which shows a detailed report on the company and its proposed approach to business as usual in a Solvency II world. This section provides an overview; for more detail, see Appendix 2.

It is a medium sized company writing home insurance business through affinity groups and some direct sales. It also aims to provide niche cover (e.g. fine arts and affinity member requirements). The company was set up in 2003 and consequently its IT systems and risk governance framework doesn't have any legacy issues. There is no parent group. Company is well capitalised, has an A+ credit rating issued by Standard and Poor's and currently employs 300 staff.

There is no overseas exposure, as the book is entirely focussed on the UK market. For extreme events, it has significant reinsurance programmes in place. Only the attritional type losses hit the company's net loss ratio. The internal audit function is not well developed.

The Company's risk framework outlines its risk principles, material risk types, risk governance, appetite and policy. This has been embedded to the overall running of the business, interacting with the strategic planning and capital management process i.e., acting as an implementation for the ORSA framework. The risk management department comprises of underwriting risk, claims risk, credit risk, investment risk, operational risk, asset liability risk, liquidity risk, concentration risk, strategic risk and reputational risk units.

The firm's core BAU risk management functions form part of its risk principles with an aim to be embedded in the firm's day-to-day activities. These include:

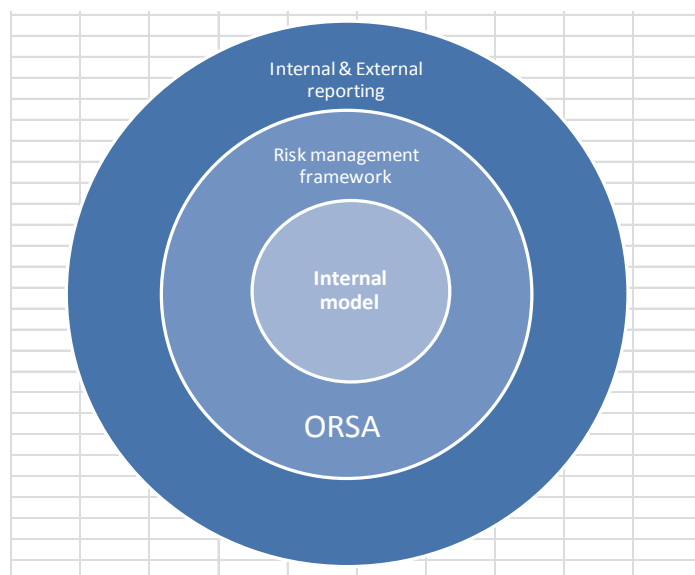
- Regular reporting on underwriting activities, catastrophe management, investments monitoring
- Inputs into planning for capital as well as capital allocation.
- Development of risk policies and monitoring their adherence
- All business written is peer reviewed and strict underwriting guidelines exist

The Company decided not to build an internal model and instead use the standard formula for SII compliance for the following reasons:

- (i) The medium term cost of building the internal model (systems change, kernel building, education etc.) seemed excessive given the capital savings gained by using an internal model approach. The company was set up in 2003 – so although most of the systems were up to date, they don't necessarily align with SII requirements. The company felt the alignment costs were arbitrary.
- (ii) The risk profile is simple – one line of business.
- (iii) Although the company was only set up in 2003 and therefore doesn't have any legacy type issues with data, adequate volume of data continues to be a problem for Company B. It would have therefore been difficult to meet statistical quality standards.
- (iv) Some of the covers are niche (e.g. fine art) – again validation of internal model would not have been accurate or practical as a number of pricing/reserving assumptions are derived using expert judgement.
- (v) The company considered the resource constraints. It felt that the market was artificially inflated with contractors/consultants – and didn't see much use of permanent employees post SII implementation.
- (vi) The company believes it has a strong risk management framework exists, but one that doesn't fit well with an internal model. The Key Risk Indicators (KRIs) are developed independently from the actuarial/capital framework and are currently working well. However, they would not

meet the Use Test requirements had company B decided to go down the (partial) internal model route.

Solvency II framework for Company B is best demonstrated by the diagram and explanation below:



1. Article 45 requires that Company B has the ability to understand its own financial condition and solvency position. This is irrespective of the solvency position as set out by the standard formula.
2. As Company B is using a standard formula for setting solvency capital, a key role of the ORSA process therefore is to align and validate the standard SCR to Company B's own risk profile.
3. A starting point for the ORSA process is therefore the generation of the standard formula capital – illustrated by the inner circle in diagram above (note: the “internal model” here refers to not just the calculation method but the data and governance framework that exists around calculation of pillar 1 capital).
4. The Risk management framework obtains an independent quantitative capital assessment (using company's former ICA model framework). This is supplemented by qualitative risk assessment – in particular for non-quantifiable risks (such as reputation risk).
5. The gaps between the standard formula capital and the independent assessment are explained using company's risk management framework.
6. Prior to internal/external reporting of ORSA a number of management actions are considered for risks that are significant for Company B. The risks are then classified into four categories:
 - a. Accept risk
 - b. Manage risk
 - c. Transfer risk
 - d. Terminate risk/portfolio

6.2 Qualitative Analysis - Consequences and Management Action Post Stress Scenarios

Summarised below are the possible consequences and management action of company B when faced with these stress scenarios

Table 4 - Consequences and Actions - Company B

Stress Test Scenarios	Consequences of Shock	Management Actions
1 Eurozone currency collapse: Euro depreciates by 50% due to fall in consumer confidence either due to 'Euro collapse', or '1 Eurozone country hit'. Euro denominated assets depreciate by 50%.	Consequences: 1. Limited Impact of Euro default Due to minimal exposure to Euro. 2. Well matched assets to liabilities limit exposure.	Actions: None required given small impact
2 Binary GM Food Event: A late string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods i.e., chemicals applied in wheat leading to affect experience with all wheat products (e.g. cereals, cake, bread by certain brands). Recent scientific discovery that the chemicals in wheat cause the life threatening illness.	Consequences: 1. Reinsurance premiums increase across all insurance sectors in the following year 2. Leading to increase in premiums which are hard to justify to customers 3. Per policy percentage expenses are higher	Actions: 1. Increase Premium rates 2. Strengthen policy wording for future policies to exclude liability claims arising from specified GM products
3 Mass Lapses: Impact of a mass lapse shock of 25% in personal lines due to competitors promoting loss leaders (e.g. household insurance).	Consequences: 1. Surplus at the end of the year relatively stable. 2. Per policy percentage expenses are higher 3. Profits will continue to deteriorate and expenses will take longer to align with lower volumes. 4. Capital requirements reduce but not in proportion to the lapses due to the effect of diversification	Actions: 1. Company must make difficult decision as to whether to adopt high growth strategy or realign as a smaller entity. 2. Offer a larger variety of products and branch into a larger variety of LOBs to make up for the shortfall 3. Diversification is either through M&A or acquiring an entire team – process will be slow and lead to a hit on capital
4 Catastrophe. Earthquake of magnitude 7.5 hits West coast of Canada: (a) Significant impact to business and residential districts in Vancouver (earthquake not expected in this region); (b) Port/harbour damaged, restricting movement of goods/vessels; (c) Forestry suspended as key machinery is damaged.	Consequences: (1) Canada is outside of Company B's portfolio, so no direct impact. However, a number of key reinsurers affected, raising concerns that: (a) Counterparty default risk may increase; (b) Property catastrophe reinsurance rates may harden.	Actions: (1) Portfolio review of reinsurers to identify potential counterparty exposure. (2) Approach reinsurance market to seek re-pricing for next year's renewal. (3) Considered purchasing additional reinsurance layer but did not proceed due to cost and materiality
5 Flood Shock: UK Extreme Floods. Flooding in central England due to prolonged periods of rain; (a) A number of stately homes affected; (b) Remote villages shut off; (c) Impact on residential properties currently unknown. Assume total loss for areas affected with flooding.	Consequences: (1) Severe financial impact, as this is core of business for Company B; (2) Quota share and aggregate excess of loss reinsurance exhausted. Unlikely to exceed stop loss layer; (3) Severe strain on liquidity; (4) Initial estimates suggest the SCR is very likely to fall below 110% (internal management buffer) and could dip below 100%; (5) Claims department resources stretched, increasing risk of accepting false claims.	Actions: (1) Review reinsurance dashboard for any potential lines that are not yet exhausted; (2) Increase monitoring of investment and liquidity risk dashboards; (3) Claim settlement in instalments; (4) Review business plans for expected future cashflows; (5) Consider plans to submit to regulator in case initial estimates of losses turn out to be optimistic. Plan of action for future: (6) Review and re-design risk dashboards, as the current claims dashboard was ineffective as a risk assessment tool in extreme situation (not detailed enough and the MI were

irrelevant); (7) Monitor liquidity risk more closely.

Table 4 - Consequences and Actions - Company B
(Continued)

Stress Test Scenarios	Consequences / Causes of Shock	Management Actions
6 Reinsurance Failure-1: Inability to obtain reasonable reinsurance in absence of full internal model. (a) Individual XL reinsurance for stately homes not available at reasonable terms, as the reinsurer struggles to understand the pricing and risk associated with company B's portfolio of stately homes. Reinsurer claims internal model would have assisted; (b) Current terms cede 40% of gross premium but net loss ratio is only 5% lower than gross; (c) Unable to reduce cover on primary risks, as unsuitable for policyholders.	Consequences: Current dilemma: (1) Accepting unfavourable reinsurance terms significantly hits the net income forecasts in future business plans - almost not practical; (2) Without reinsurance purchase company B risks losing its client portfolio to competitors.	Actions: (1) Authorise a feasibility study to check if an internal model can be approved within the given timescales - no immediate impact though; (2) Review ORSA report with alternative reinsurers to see if that helps reinsurer understand the business; (3) Consider co-insurance arrangement with a major supermarket who is looking for a joint venture and is willing to provide additional capital; (4) Conduct a review of reinsurance scorecard – as inconsistencies between the scorecard and the SCR capital were key reasons why the management did not pre-empt this scenario.
7 Reserve Inadequacy: Financial impact of 10% reserve inadequacy due to off-system claims (Operational Risk).	(a) Provisions held at best estimate, so not likely to find any surplus margins; (b) Significant impact on current year's profitability.	(a) Accept loss, as company is well capitalised; (b) Currently OpRisk register focused on mitigating actions should such event happen. Going forward company will instead focus on how to avoid such events (e.g. better claims controls, MI).
8 Aggressive Pricing: Impact of increasing the "aggressively priced" (e.g. 15% below market average) risk groups to "market average".	Consequences: (1) Provisions held at best estimate, so not likely to find any surplus margins; (2) Significant impact on current year's profitability.	Actions: (1) Accept loss, as company is well capitalised; (2) Currently OpRisk register focused on mitigating actions should such event happen. Going forward company will instead focus on how to avoid such events (e.g. better claims controls, MI).
9 Reinsurance Failure-2: Financial impact of reinsurance failure amounting to 20% of the overall amounts ceded to reinsurers.	Consequences: (1) Provisions held at best estimate, so not likely to find any surplus margins; (2) Significant impact on current year's profitability.	Actions: (1) Accept loss, as company is well capitalised; (2) Currently OpRisk register focused on mitigating actions should such event happen. Going forward company will instead focus on how to avoid such events (e.g. better claims controls, MI).
10 Binary Events: Financial impact of potential "binary events", perhaps via a (say) 15% increase in the technical provisions, over and above those for other purposes.	Consequences: 1. Reinsurance premiums increase across all insurance sectors in the following year 2. Leading to increase in premiums which are hard to justify to customers 3. Per policy percentage expenses are higher	Actions: 1. Increase Premium rates 2. Strengthen policy wording for future policies to exclude liability claims arising from specified GM products
11 Market Risk Shock: Credit rating downgraded to BB due to: (a) Rating agency feels there is inadequate risk governance; (b) Lack of internal model means the rating agency is unable to fully understand the company's risk profile.	Consequences: (1) Future shareholder funds uncertain as investors less likely to provide capital; (2) Existing shareholders demand higher capital return; (3) Reputation risk that policyholders choose not to renew; (4) Reinsurers not willing to provide adequate protection.	Actions: (1) Authorise project to convert the legacy ICA system into an ECM tool for benefit of rating agencies; (2) In the meantime, the management has authorised an external consultant to provide opinion on its capital position – and then re-apply for credit rating; (3) The consultant to also review company's documentation – to ensure that it is sufficiently detailed and transparent.

6.3 Quantitative Analysis – Examining the Financial Statements Post Stress Scenarios

Projected Solvency II Balance Sheets have been prepared in respect of the first three shock scenarios outlined above; **Company B** projections:

Scenario 1

	Base Snapshot		EUR Collapse 50% Depreciation Reduction Snapshot			
	31/12/2014	31/12/2015	31/12/2014	31/12/2015	31/12/2014	31/12/2015

Balance Sheet

Assets	900	935			875	851
Invested Assets	500	535			475	463
Fixed Income	350	350	7%	20%	325	280
Cash & Cash Equivalents	125	160			125	158
Stock & Other	25	25			25	25
RI Recoverables	50	50		25%	50	38
Premium Held inc DAC	150	150			150	150
Other Assets	200	200			200	200
Liabilities	550	550			550	482
Reserves	375	375			375	307
Claim Reserves	90	90		15%	90	77
Best estimate Liability	275	275		20%	275	220
Other Tech reserves	10	10			10	10
Other Liabilities	175	175			175	175
Surplus	350	385			325	369

Income Statement

Year 2015

Gross Income	400				400	
RI Income	50				50	
Net Income	350				350	
Incurred Claims	140				140	
Expenses	175				175	
Net Underwriting result	35				35	
Net Investment income	15		15%		13	
Pre tax income	50				48	
Tax	15				14	
Post tax income	35				33	

Euro depreciates by 50% due to fall in consumer confidence either due to:
Euro collapse
One Eurozone country hit
Assets that are Euro denominated depreciate by 50%

Impact on Balance Sheet / Profit and Loss

EUR assets represent 14% of fixed interest and 50% of 14% = 7%
Other fixed assets in GBP but these fall in value over the year as yield increases due to second order effects
Reserves initially unchanged but SII discount rate recalculated mid year and GBP interest rate increases
(although less than Euro) due to second order effects. SII reserves reduced
Limited Impact on P and L
Investment income under assets will also be depleted - P&L Changes

Scenario 2	Base Snapshot		Binary GM Food Event			
	31/12/2014	31/12/2015	Reduction		Snapshot	
	31/12/2014	31/12/2015	31/12/2014	31/12/2015	31/12/2014	31/12/2015
<u>Balance Sheet</u>						
Assets	900	935			893	923
Invested Assets	500	535			500	530
Fixed Income	350	350			350	350
Cash & Cash Equivalents	125	160			125	155
Stock & Other	25	25			25	25
RI Recoverables	50	50	15%	15%	43	43
Premium Held inc DAC	150	150			150	150
Other Assets	200	200			200	200
Liabilities	550	550			550	569
Reserves	375	375			375	394
Claim Reserves	90	90		-5%	90	95
Best estimate Liability	275	275		-5%	275	289
Other Tech reserves	10	10		-5%	10	11
Other Liabilities	175	175			175	175
Surplus	350	385			343	354
Income Statement	Year 2015					
Gross Income	400				400	
RI Income	50				50	
Net Income	350				350	
Incurred Claims	140		-5%	-5%	147	
Expenses	175				175	
Net Underwriting result	35				28	
Net Investment income	15				15	
Pre tax income	50				43	
Tax	15				13	
Post tax income	35				30	

Scenario

A string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods
i.e., chemicals applied in wheat production leading to adverse experience with all wheat products such as cereals, cake, bread etc.
Recent scientific discovery that the chemicals in wheat cause the life threatening illness

Impact on Balance Sheet / Profit and Loss

Reserves are increased by 5% across all components due to second order effects

Claims expenses and inflation increase on P&L
RI recoverables should increase but the possibility of reinsurer default increases by more hence recoverables drop by 20%
15% drop in capital would mean a drop of the rating of the company

Scenario 3

	Base Snapshot		Mass lapse 50% of Premium			
	31/12/2014	31/12/2015	Reduction		Snapshot	
	31/12/2014	31/12/2015	31/12/2014	31/12/2015	31/12/2014	31/12/2015
Balance Sheet						
Assets	900	935			900	816
Invested Assets	500	535			500	498
Fixed Income	350	350	0%	0%	350	350
Cash & Cash Equivalents	125	160	0%	0%	125	123
Stock & Other	25	25	0%	0%	25	25
RI Recoverables	50	50	0%	15%	50	43
Premium Held inc DAC	150	150	0%	50%	150	75
Other Assets	200	200	0%	0%	200	200
Liabilities	550	550			550	431
Reserves	375	375			375	256
Claim Reserves	90	90	0%	25%	90	68
Best estimate Liability	275	275	0%	35%	275	179
Other Tech reserves	10	10			10	10
Other Liabilities	175	175			175	175
Surplus	350	385			350	385
Income Statement	Year 2015					
Gross Income	400		25%		300	
RI Income	50		15%		43	
Net Income	350				258	
Incurred Claims	140		25%		105	
Expenses	175		3%		170	
Net Underwriting result	35				-17	
Net Investment income	15				15	
Pre tax income	50				-2	
Tax	15				-1	
Post tax income	35				-2	

Scenario

50% of policyholders lapse their policies and do not renew in the following year
Due to court case ruling against Company A due to conflict regarding the numbers of claims refused

Impact on Balance Sheet / Profit and Loss

Mass Lapse 50% has most impact on P&L
The 50% reduction in gross written premium leads to a 25% reduction in Earned Premium as most policies are annual.
Premium reduction is not mirrored proportionately in expenses or reinsurance premium. Some terms of Reinsurance are largely fixed for the year.
UPR reserves drop by only 35% as concerns over anti selection means that full 50% drop may not be prudent
recoverables fall by 10% to represent recoverables halving in respect of current year only
Claim Reserves have longer tail and take longer to fall to 50%.

Notes on Balance Sheets for Company B

Company B Investment Portfolio

Cash & Cash Equivalent		25%
Equities Hedge funds, Higher Yielding Securities		5%
UK Government Fixed	50%	
Euro Government AAA	5%	
Euro Government BBB	5%	
Other UK Corporate Bonds	10%	
Fixed Income		70%

20% of Fixed income is Index linked

Bond Duration roughly in line with liabilities

Fixed Income Split

Government/Agency (25%)	US Government	AA	
	Euro governments	AA	
	Agency Debentures	AA	
	Foreign Government	(AAA 37%, AA 46%, A 15%, BBB 2%)	
Structured Securities (20%)	Agency Mortgage backed Securities	A	16%
	Asset backed Securities	A	2%
	Non Agency Commercial mortgage backed Securities	BBB	2%
Credit Securities (30%)	Corporate bonds	(AAA 10%, AA 20%, A 50%, BBB 10%)	0.215
	Guaranteed Corp bonds	AA	1%
	Foreign Corporate	A	5%
	Bonds backed by foreign Govs	A	2%
	Municipal bonds	BBB	0.50%

Eurozone collapse

Index linked Euro government bonds represent only 10% of company invested assets due to their lack of availability
Hence very low hedge against inflation
EUR assets represent 50% of all assets however liabilities are matched, only 10% drop in asset value occurs
EUR denominated recoverables fall in value by 10% due to predefined slip rates
Reserves devalued for currency (50% drop of 50% of reserves) but due to increase in uncertainty the company puts up reserves
Hence drop in reserves is only 20%
Cost of debt is up 10% as a result of loss of earnings
Cost of servicing debt is up - P&L change under Net Investment Income
Premium and DAC drop by 25% (50% of 50% devaluation)
Investment income under assets will also be depleted - P&L Changes
Recoverables will be down much more even if reinsurers are all AA rated
Rating is most definitely going to fall
Goodwill will reduce asset value further
Share valuation will reduce
13% drop in capital
Profit is down primarily due to currency revaluation of premium figures

Mass Lapse 50%

The 50% reduction in gross premium which is not mirrored proportionately in expenses or reinsurance spent causes a large loss in the P&L
Debt cost rises by 10% on the balance sheet
UPR reserves drop by only 15% in case there's adverse selection/bias in policies lapsed (lower LRs%)
recoverables fall by 10% to represent recoverables halving in respect of current year only
The magnitude of capital reduction here probably spells ruin for the company! Unless there's outside intervention

GM Food Binary Event

Reserves are increased by 20% across all components
Assets rebalanced towards long tail incurring re-investment cost to P&L
Claims cost increasing as well as claims expenses by 40% and 20% on P&L respectively
RI recoverables should increase but the possibility of reinsurer default increases by more hence recoverables drop by 20%
15% drop in capital would mean a drop of the rating of the company
Balance sheet effect will be over several years. It is unlikely that the company would take the full hit on one go on the reserves, nor is it likely that the company would truly fully understand the liabilities fully in the first year regardless of prudence

6.4 Case Study 2 – Company B Conclusions

A key conclusion that is implied from our investigation of Company B is that there is no obligation for a firm to apply for an internal model. Company B is well capitalised, understands its business well and has a relatively advanced risk management framework. The use of standard formula initially resulted in an increase in required capital in respect of catastrophe risk – as this is where the company's risk profile differs from that assumed in the Standard Formula. However, purchase of high quality reinsurance mitigated the additional capital requirement.

The firm has however started suffering from propensity of reinsurers to provide coverage – this was highlighted by the reinsurance failure scenario. The reinsurers can have bias towards firms with internal models because it is easier for the reinsurers to understand the business (quantification). Where they feel uncertain, they can be selective in providing cover.

A number of stress scenarios were considered to test resilience of Company B's capital availability and risk management framework. With the exception of reinsurer failure (mentioned above) the observation was that the firm is generally resilient to such scenarios. This was mainly due to the nature of the business of the firm – niche products and simple corporate structure.

Generally Company B has a strong risk management framework, but not necessarily one that fits the Solvency II framework. The role of the internal audit and data governance are key areas where there are differences. Company B did not feel it was necessary to address these differences as it did not feel they were of major concern:

- The IT and Data systems are relatively new and well defined.
- The firm has a simple business structure and so the Internal Audit requirement is limited
- It heavily promotes integrity to its employees and feels that strong integrity can lead to less fraud

Given the conclusions from various scenarios, it is evident that having a risk management framework that is inconsistent with the one recommended by the Solvency II legislation is not necessarily a risk. Indeed, the conclusion here is that it is more important that senior managers and the Board understand a firm's risk management framework, as opposed to having a very complex structure which satisfies the regulation but is not understood by senior managers.

An interesting observation coming out of the scenario analysis for Company B was the nature of management actions. Given the lack of internal model, it was not always quick to analyse the financial impact of an emerging risk. The firm therefore relied heavily on qualitative risk assessments and agreed on management actions that are easier to monitor and implement on a qualitative basis. The ECM tool does exist for ORSA and rating agency purposes, but it is not fully parameterised and therefore not used extensively.

7. Case Study 3 – Company C Summary of Findings

7.1 Company C Profile Summary

The Company C case study is the subject of **Appendix 3**, which shows a detailed report on the company and its proposed approach to business as usual in a Solvency II world. This section provides an overview; for more detail, see Appendix 3.

Company C is a diversified medium size personal and commercial lines insurer. It is the UK subsidiary of an insurance based in Germany. As the UK subsidiary, it has a modest level of capitalisation. It has a **BBB** credit rating issued by Standard and Poor's rating agency. It has around 3,000 staff and operates through 5 major sites in the UK. Its profitability has been improved near market average after a difficult recent period. It is now offering competitive products aiming for a further increase of its market share on all lines. It has had mixed profitability in recent years, with some good years and some weak years, relative to its competitors. This may have partly due to its trying to increase market share irrespective of the underwriting cycle.

The Corporate Governance framework for the Company is based on **“Three Lines of Defence”** model (see below), which is embedded within the organisational structure and reporting lines in order to enforce an effective internal control system, as per the Solvency II consultants recommendations. Its ultimate supervisory body is the Board of Directors. Reporting to the Board of Directors is both structured (through planned meetings) and regular reporting and ad hoc as required.

The Business Functions of the Company through their Head / Senior Managers have the responsibility for the implementation of the approved strategy in their business functions. They report directly to the General Manager / CEO with regards to their day-to-day duties. In order to minimize the probability of a potential conflict of interest and preserve their operational independence, the key control functions have additional direct reporting lines to the Board of Directors or the Board Committees. These additional reporting lines are implemented in order to ensure that these functions have the ability to escalate important issues directly to the Board of Directors. Consequently, the Risk, Compliance and Actuarial Functions have a reporting line to the Risk and Reserving Committee.

The Company's **Risk Management Framework** (consisting of Risk Principles, Key Risks, Risk Governance, Risk Appetite and Risk Policy) is an embedded part of the business and tries to interact with the strategic planning and capital management process. It is also the guiding framework for the implementation and operation of the ORSA process as per Solvency II consultants.

Risk limits are established at three levels within the Company; aggregate level (including minimum solvency ratio of 150%), risk category level and exposure level limit. The Company follows the COSO Integrated ERM framework with support as needed by its parent company.

The Company recognises that it is required to carry out back-testing and to validate its technical provisions. This includes requiring an independent third party to validate the technical provisions that are recommended its reserving actuaries. Where data is scanty, use is made of expert judgement and dealing with the issues arising a diversity of views from such experts.

Data management includes data validation, which is becoming an increasingly important requirement as Solvency II is embedded throughout the organisation. For example, although data should be reconciled with the audited figures, how close is close enough? Also, to what extent can and/or should the organisation rely upon a third party to validate the data used by Company C?

The actuarial team receives data from the data management team, in addition to the underwriting team, reinsurance departments, investment, and the pricing actuaries.

The actuarial team is required to carry out back-testing of its recommended technical provisions and to prepare reports on the results, which are then peer reviewed by an independent third party. In

practice, there is a close working relationship with the independent third party and many technical discussions on data validity / reliability and the appropriate actuarial methodologies.

Risk management is a continuous process that is used in the implementation of the Company's overall strategy and allows an appropriate understanding of the nature and significance of the risks to which it is exposed, including its sensitivity to those risks and its ability to mitigate them. In order to ensure the appropriate coordination of the Company's aggregate strategy for risk with the policies and procedures implemented by each risk-taking function, the Company has put in place a Risk Management Policy Framework that sets the overarching principles for the identification, assessment, monitoring and control of risks. This framework undergoes frequent review by the Risk Management Function and is adjusted to the overall risk profile and risk appetite of the Company, also taking into account any endogenous or exogenous factors and leading industry practices.

The strategic component for each risk sets the environmental parameters, constraints and targets, in which risk management is performed within the Company. These parameters that are related to policies, people and systems are set and monitored at the highest level within the Company.

The Board requires a suite of stress tests to be performed and reported on annually, including:

1. Reserve Inadequacy
2. Aggressive Pricing.
3. Mass Lapses
4. Reinsurance Failure
5. Binary Events
6. Market Risk Shock

Enterprise Risk Management

Company C recognises that ERM is paramount and is interpreted as Risk and Opportunity Management. The CRO is responsible **for ensuring that the ERM is embedded throughout the organisation and that it is used for day-to-day** operational decision making. The ERM framework supports Solvency II embedding into BAU

Risk Appetite

The 'risk appetite' of the Company is defined as the level of risk exposure or the level of potential adverse impact of an event that the Company is prepared to take or maintain in a given period. The risk appetite is the size and types of risk that the Company is willing and able to take to achieve its mission, vision and business goals.

Company C has quantified its risk appetite using risk measures that are based on the VAR (value at risk) methodology. The risk appetite is reflected by establishing a sound framework of mitigation techniques. For example, insurance, risk limits, reporting of operational risk events, set up and monitoring of KRIs. Qualitative limits have been set for areas where the application of quantitative limits is not possible for the monitoring of Operational Risk.

Risk Limits and Tolerances

Company C manages its risk appetite through a set of **risk limits**. These are set, not such that they are likely to be fully used, but rather so that limited exceptions are reported. The limits are established at 3 levels: (a) aggregate level looking at the overall risk profile; (b) risk category level that sets the aggregate risk appetite at the risk level for each of the key risk categories; (c) exposure level limits for each risk. As part of the monitoring process, limits or tolerances for each category of operational risk are set and reviewed. Limits are defined through a collaborative effort from senior management and the Risk Management Function. The Risk Metrics (e.g. KRIs) used are measurable metrics or indicators that track exposure or loss and provide a measure of the Company's risk profile.

Risk Bearing Capacity

Within Company C, the risk bearing capacity acts restrictively towards the risk appetite, which in turn influences significantly the risk profile. The Company's risk bearing capacity is defined as the amount of financial resources (own funds) after applying certain limitations (subtractions), which can be used to absorb losses that could arise due to the risk profile of the Company, while at the same time they are used to achieve its business goals. The financial resources are classified into capital tiers according to their ability to absorb losses, the deferment or non-payment of the obligation (taxes, outstanding capital amounts or dividends) and their maturity (indeterminate or specific).

Capital Modelling

Company C uses ALM (Asset Liability Model) methodologies to determine and to monitor its capital requirements on a regular basis. ALM examines all risks requiring the coordination of the Company's assets and liabilities. The risks that are significant in terms of their economic value and which are managed and mitigated in the ALM risk framework include Market Risk and, more specifically, (a) Interest rate risk including variations in market credit spreads; (b) Equity, Property and other asset value risk; (c) Currency Risk; (d) related Credit Risk:

Investment Risk and Strategy

The Board of Directors and the Investment Committee define and review the investment strategy of the Company, taking into account the financial environment and macroeconomic factors, its solvency position and the material risks that the Company is exposed to. The investment strategy considers multiple investment horizons (short term and long term) and forms part of the business strategy documentation. Its decision to invest in specific securities is taken by the Investment Committee based on the risk appetite in the Company.

Embedding Solvency II into BAU

Although Company C initially acquired an approved internal model, it did so by hiring external consultants to get it through the approval process with no real effort applied into embedding the model into BAU. Consequently, the Company now uses a **Partial Model**, where some modelling components are calculated via Standard Formulae and/or in-house developed Excel spreadsheets.

Company C used external consultants to deliver its internal model but then moved on to investing in its own human resources (rather than consultants) to manage the business operations. The consequent partial internal model performs well internally but it is anticipated that this might in due course raise some regulatory queries.

However, Company C is comfortable with the approach that it has taken, especially its heavy human resource investment in qualified employees to replace the external consultants and enable the Board of Directors and the senior management team to move forward with more confidence. It is considered that there will always be scope and room for innovative and enterprising companies such as Company C that have effective ERM but with only a partial internal model.

Company C has noted the seriousness of the recent FSA communications on Solvency II updates and the importance that they now attach to effective ERM and corporate governance in their IMAP pre-application and model approval processes. In particular, the "Dear Firm" letter "**Solvency II update for IMAP firms**", dated 24th July 2012¹².

For example, Company C is comfortable that it has addressed, via its heavy investment in qualified human resources (rather than its previous reliance on external consultants), the recent FSA concerns on the potential inappropriate use of expert judgement. For ease of reference, these potential concerns are shown below as extracts from **Annex A** of the recent FSA communication .

FSA additional feedback on the use of Expert Judgement

- 1. We recognise that expert judgement is important and necessary in many aspects of internal models and should be viewed as a process. It is important to bear in mind that the Directive's requirements also apply to expert judgements that are used in the model. In this regard, we have found instances of expert judgement being used without the corresponding governance around it.*

Examples include:

2. *The inability of some firms to articulate the materiality of the assumptions derived from expert judgements, particularly where a model is not yet sufficiently developed to produce the required results.*
3. *The reasons for coming to a decision not being clearly documented. We believe this is essential so that knowledge generated in the assumption-setting process is not lost and the conclusion can be shown using evidence and challenged. This is particularly relevant where there is a wider range of plausible answers and/or the decision made has material implications for the firm's internal model.*
4. *Evidence that experts have made decisions without the benefit of relevant information from elsewhere in the firm, thereby calling into question the validity of the decision made. For example, data analysis has been conducted relating to a risk without a detailed understanding of the actual exposures or how the underwriting or claims management practice has evolved over time.*
5. *A lack of evidence of effective challenge that might address biases in expert judgement such as the anchoring of assumptions. This part of governance is particularly important as, by its very nature, expert judgement is difficult to validate, and benchmarking is often the only validation tool considered by firms. In several cases we have not been able to find evidence that alternatives were considered, or assessed objectively.*
6. *No explicit links to the validation of the internal model, e.g. identifying triggers that would result in additional validation. More generally, validation has focused on statistical tests and has not provided evidence to support the qualitative expert judgements made.*
7. *Some firms have attempted to set up a framework to govern the exercise of expert judgement, but are not following it during model development. This poses problems for validators and supervisory review. It also stores problems for the future maintenance of the model as there is a danger of incorrectly anchoring in assumptions.*
8. *We remind firms that while proportionality does apply for the application and validation of expert judgement and its governance, it does not mean that requirements do not need to be met.*

7.2 Qualitative Analysis - Consequences and Management Action Post Stress Scenarios

Summarised below are the possible consequences and management action of company C when faced with these stress scenarios.

Table 5 - Consequences and Actions - Company C

# Stress Test Scenarios	Consequences of Shock	Management Actions
1 Eurozone currency collapse: Euro depreciates by 50% due to fall in consumer confidence either due to 'Euro collapse', or '1 Eurozone country hit' (e.g. Greece, Cyprus, Spain, Portugal). 50% depreciation in Euro denominated assets.	Consequences: (1) Reduction in capital leading to a drop in credit rating which leads to a fall in share price; (2) Debt becomes expensive due to poor credit rating; (3) Regulatory intervention; (4) Exit of Greece from Eurozone, followed, perhaps, by Italy, Cyprus, Spain and Portugal.	Actions: (1) Rebalancing of asset portfolio; (2) Commute some liabilities denominated in Euros; (3) Raise capital by issuing debt; (4) Adjusting reserves in the books; (5) Liquidate assets in high risk sovereign bonds (e.g. Greece, Italy, Cyprus, Spain, Portugal).
2 Binary GM Food Event: A late string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods i.e., chemicals applied in wheat leading to affect experience with all wheat products (e.g. cereals, cake, bread by certain brands). Recent scientific discovery that the chemicals in wheat cause the life threatening illness.	Consequences: (1) Need to strengthen claim reserves to allow for latent and now emerging additional liability claims; (2) Need to increase premium rates to allow for latent claims; (3) Need to tighten policy wordings.	Actions: (1) An increase in reserves of 20%; (2) Increase rates for liability lines; (3) Strengthen policy wording for future policies to exclude liability claims arising from specified GM products.
3 Mass Lapses: Impact of a mass lapse shock of 25% in personal lines due to competitors promoting loss leaders (e.g. private motor).	Consequences: (1) Reputational losses, maybe due to fraud or otherwise; (2) Results in extra capital requirement for mass lapse shock.	Actions: Developing a more detailed internal/partial lapse module model to be monitoring lapses (and more detailed KRIs for this were developed within the ERM system).
4 Catastrophe: Impact of extreme natural catastrophic Canadian Quake (factor in currency risk, counterparty risk, investment risk).	Consequences: Natural disasters, with insurance losses partly caused by inadequate insured exposure monitoring.	Actions: Assess financial impact (e.g. insurance losses) on reinsurers from Catastrophe events, as reinsurers losses can lead to higher reinsurance premiums.
5 Flood Shock: Consider the financial impact of UK extreme floods - Causing severe claims and operational risk.	Consequences: Natural disasters, with insurance losses partly due to insuring property risks on flood plains.	Actions: Improvements in the way flood risk is assessed and managed (Australia for example is highly exposed in those issues and its approaches could be useful). Consider whether an additional reinsurance layer is needed.
6 Reinsurance Failure-1: Impact of reinsurance gaps, due to inability to obtain reasonable reinsurance terms in absence of internal model.	Consequences: Reinsurance failure to cover cat event loss due to unanticipated losses in the region for the reinsurer.	Actions: Consider the co-insurance options, including: (1) reviewing our reinsurance optimisation model; (2) considering alternative reinsurance programmes; (3) improving the risk monitoring processes.
7 Reserve Inadequacy: Financial impact of 10% overall reserve inadequacy	Consequences: Increasing cost (plus IBNR) of several large bodily injury claims for prior years and increasing inflation for legal claims.	Actions: Strengthening reserves, delaying further international expansion, reviewing reserving policy, reviewing ALM strategy and ALM policy.

Table 5 - Consequences and Actions - Company C (Continued)

#	Stress Test Scenarios	Consequences of Shock	Management Actions
8	Aggressive Pricing: Impact of increasing the “aggressively priced” (e.g. 15% below market average) risk groups to “market average”.	Consequences: Lessons learned from aiming for increased market share (e.g. private motor insurance) to gain a short-term competitive advantage.	Actions: Understanding that aggressive pricing policies have a negative effect on profitability. In the context of low investment returns, it was understood that pricing discipline is essential to preserve profitability, which initiated / forced the company to tighten up acceptance procedures and increase tariffs.
9	Reinsurance Failure-2: Financial impact of reinsurance failure amounting to 20% of the overall amounts ceded to reinsurers.	Consequences: Catastrophe insurance losses for reinsurance market, with some smaller reinsurers becoming insolvent.	Actions: Review reinsurance panel criteria to exclude potentially high risk reinsurers.
10	Binary Events: Financial impact of potential “binary events”, perhaps via a (say) 15% increase in the technical provisions, over and above those for other purposes.	Consequences: Natural disasters, plus some “black swans”.	Actions: Review reinsurance policy to minimise exposure to “binary events” and “black swans”.
11	Market Risk Shock: Impact (e.g. for concentration risk and spread risk) of credit rating deterioration to (say) below BBB.	Consequences: Reputational damage losses.	Actions: Urgent discussions with credit rating agencies, leading to action plans to try and improve credit rating over the next 3 years.

7.3 Quantitative Analysis – Examining the Financial Statements Post Stress Scenarios

Projected Solvency II Balance Sheets have been prepared in respect of the first three shock scenarios outlined above; **Company C** projections:

Balance Sheet Company C

	Snapshot		Reduction	EUR Collapse 50% Depreciation		Reduction	Mass lapse 50% of Premium		Reduction	GM Food 20% Reserve Increase	
	31/12/2014	31/12/2015		Snapshot	31/12/2014		31/12/2015	Snapshot		31/12/2014	31/12/2015
Balance Sheet											
Assets	1,800	1,870	10%	1,538	1,469	0%	1,760	1,481		1,780	1,698
Invested Assets	1,000	1,070	10%	900	794	0%	1,000	721		1,000	918
Fixed Income	350	350	15%	298	298	0%	350	350		350	350
Cash & Cash Equivalents	250	320	10%	225	157	0%	250	-30		250	168
Stock & Other	400	400	15%	340	340	0%	400	400		400	400
RI Recoverables	100	100	10%	90	90	10%	90	90	20%	80	80
Premium Held inc DAC	300	300	25%	225	225	10%	270	270		300	300
Other Assets	400	400	10%	360	360	0%	400	400		400	400
Liabilities	1,100	1,100		1,064	1,064		1,018	1,018		1,250	1,250
Reserves	750	750		714	714		668	668		900	900
Loss & LAE Reserves	180	180	20%	144	144		180	180	-20%	216	216
UPR	550	550		550	550	15%	468	468	-20%	660	660
Other Tech reserves	20	20		20	20		20	20	-20%	24	24
Other Liabilities	350	350		350	350		350	350		350	350
Debt	0	0	10%	0	0	10%	0	0		0	0
Surplus	700	770		474	405		743	463		530	448
Check		70		-227	-68	#	43	-280	#	-170	-82
Income Statement	Year 2015										
Gross Income	800		25%	600		50%	400			800	
RI Income	100		10%	90		10%	90			100	
Net Income	700			510			310			700	
Incurred Claims	280			280			280		-40%	392	
Expenses	350			350		3%	340		-20%	420	
Net Underwriting result	70		-	120		-	310		-	112	
Net Investment income	30		25%	23			30			30	
Pre tax income	100	tax	-	98		-	280		-	82	
Tax	30	30%	-	29		no tax	-		no tax	-	
Post tax income	70		-203%	68		-	280		-	82	

Notes on Balance Sheets for Company C

Company C Investment Portfolio

Cash & Cash Equivalent	25%
Equities Hedge funds, Higher Yielding Securities	40%
Fixed Income	35%

20% of Fixed income is Index linked

Bond Duration roughly in line with liabilities

Fixed Income Split

Government/Agency (20%)	US Government	AA	
	Euro Governments	AA	
	Agency Debentures	AA	
	Foreign Government	(AAA 40%, AA 40%, A 15%, BBB 5%)	
Structured Securities (5%)	Agency Mortgage backed Securities	A	3.0%
	Asset backed Securities	A	1.0%
	Non Agency Commercial mortgage backed Securities	BBB	1.0%
Credit Securities (10%)	Corporate bonds	(AAA 10%, AA 20%, A 50%, BBB 10%)	8.0%
	Guaranteed Corp bonds	AA	0.5%
	Foreign Corporate	A	0.5%
	Bonds backed by foreign Govs	A	0.5%
	Municipal bonds	BBB	0.5%

Scenario 1: Eurozone currency collapse

Euro depreciates by 50% due to fall in consumer confidence either due to:

- Euro collapse
- One Eurozone country hit

Assets that are Euro denominated depreciate by 50%

Consequences:

1. Reduction in capital leading to a drop in credit rating which leads to a fall in share price
2. Debt becomes expensive due to poor credit rating
3. Regulatory intervention

Management actions:

1. Rebalancing of asset portfolio
2. Commute some liabilities denominated in Euros
3. Raise capital by issuing debt
4. Adjusting reserves in the books

Scenario 2: Mass lapse

50% of reinsurance policyholders lapse their policies and do not renew in the following year

Due to court case ruling against Company regarding the numbers of losses following a very large hurricane
i.e., dispute around the hours clause

Consequences:

1. Fall in reinsurance premiums in the following year
2. Per policy percentage expenses are higher
3. Capital requirements reduce but not in proportion to the lapses due to the effect of diversification

Management actions:

1. Diversify to other regions
2. Offer a larger variety of products and branch into a larger variety of LOBs to make up for the shortfall
3. Diversification is either through M&A or acquiring an entire team – process will be slow and lead to a hit on capital

Scenario 3: Binary GM food event

A late string of liability claims emanating from court rulings due to life-threatening side-effects caused by GM foods

i.e., chemicals applied in wheat leading to affect experience with all wheat products such as cereals, cake, bread by certain brands

Recent scientific discovery that the chemicals in wheat cause the life threatening illness

Management actions:

1. An increase in reserves of 20%
2. Increase rates for liability lines
3. Strengthen policy wording for future policies to exclude liability claims arising from specified GM products
4. Pull out of US product liability entirely and engage in a Part IV transfer of remaining policies in the portfolio

7.4 Case Study 3 – Company C Conclusions

The scenarios have been looked at in isolation; however, it is apparent that they are inter-linked. For example, the main drivers of stress would be a claims related event or an economic event. These can have implications on operations, capital or financial position, firm's reputation or credit rating. It is also expected that some (or many) of the real world correlations under stresses scenarios are higher than the corresponding modelled correlations.

We have not considered the operational risk issues in detail and how they might be quantified for the general insurance undertaking envisaged in the case study Company C. However, a good starting point for operational risk issues and their quantification would be the 2004 sessional meetings paper of the Institute and Faculty of Actuaries on the subject¹³.

It was felt that some components of the Company C capital partial internal model need revision. For example, in order to capture better risk profile of the company, in relation to reserve underwriting risk and the lapse underwriting risk segment. This was understood as a result of the Eurozone and Mass Lapses stress tests results.

The reinsurance stress tests carried out by Company C raised the following issues:

- (a) how appropriate are the 'external' (given not developed internally) reinsurance catastrophe models, given data and other info Company C provides to modellers?
- (b) how well understood are these models and reinsurance program given Company C's risk profile and actual exposures?

When the management looked at the stress tests results and considered management actions as a whole, it was decided that some more work might be needed at the communication and relevant information exchange between the various operational business functions of **Defence Line 1** and **Defence Line 2**.

Furthermore, the communication and culture change issue will always be areas where more improvements and efficiencies will be possible. For example, given some of the management actions indicated are related to **Asset Liability Modelling** and **Key Reporting Indicators**, it was decided by the senior management team that the Company C Asset Liability Modelling policies and the associated Risk Tolerance Limits should in future be reviewed more frequently (e.g. quarterly).

Company C believes that being a well-managed company is a key driver of good safety management. It also believes that organisation learning from major losses/stress tests should influence/improve management programmes. It believes that organisations that understand and manage and integrate risk properly will perform a lot better, and that a pragmatic approach and qualitative assessments should always add value to any quantitative model assessments.

A key conclusion for Company C is that there is no obligation for a firm to have full internal model. Company C has a partial internal model that performs well and the Board of Directors is satisfied that its partial internal model has many advantages over its previous full internal model.

Company C is well capitalised, understands its business well, has an advanced ERM framework that is embedded throughout the business. It has excellent corporate governance and decision making processes. It believes in ERM and relies upon for its senior management decision making processes. It is reasonable comfortable with external events, whatever they may be. It has carried out a comprehensive range of stress tests and shock scenarios and it is comfortable that it would be able to survive and thrive as the future unfolds.

Overall, we feel that Company C is in a good place but pragmatism will be the key in Business as Usual. There will be conflict between demands of the business and demands of the regulators in protecting policyholder interests, but both of these will need to be balanced.

Appendix 1

Case Study: Company A

Background

Company A is a well-established London market UK multi-line insurer and reinsurer. The firm was set up in the year 2000 and therefore, it does not face major legacy issues with regards to its IT systems or risk governance structure. As a subsidiary of a large European parent, Company A is well capitalised, due the capital backing it receives from its parent. It therefore has an AA- credit rating issued by Standard and Poor's rating agency. This company's ERM is scored as Excellent by S&P.

Current operations

The firm currently employs 1000 staff, operating in 6 major cities, with the head office in London.

It writes commercial lines business, these include property and casualty. The total amount of annual premium written from these lines is £2bn. It additionally has reinsurance programmes covering various lines of business.

Company A's profitability has been consistent, outperforming the market average for all lines of business. As a result, it aims to increase its market share in these lines.

Governance structure

Company A has been administered by a Board (Board of Directors). On January 2011, the Board was comprised of 10 members appointed by the Shareholders' Meeting. The key role of the Board is to determine the orientation of the company's activities and ensure their implementation.

The Board has appointed a Vice-Chairman to act as a Lead Independent Director who has a number of specific powers. These include supervising the contribution of the independent directors to the Board's deliberations and acting as their spokesperson with the Executive management.

The Board benefits from the work of four special Committees that review specific matters and report to the Board. These include the Audit Committee, the Finance Committee, the Ethics & Governance Committee and the Compensation & Human Resources Committee.

The Executive Management comprises the Chairman and Chief Executive Officer and a Deputy Chief Executive Officer. A Management Committee and an Executive Committee also support the operational management at Group level.

Risk Management Framework

The Company's risk framework outlines its risk principles, material risk types, risk governance, appetite and policy. This has been embedded to the overall running of the business, interacting with the strategic planning and capital management process i.e., acting as an implementation for the ORSA framework.

The risk management department comprises of underwriting risk, claims risk, credit risk, investment risk, operational risk, asset liability risk, liquidity risk, concentration risk, strategic risk and reputational risk units. The department reports directly to the Board and has the following key objectives:

- Define established standards that comply with Solvency II regulations and more importantly to embed best practice risk management throughout the firm
- Allocate roles, responsibilities and ownership to the Board, senior management and staff
- Promote a consistent and effective use of the Risk Management framework

- Define and communicate Risk Management processes and procedures to the Board of directors and to the organisation
- Favour an effective ERM Policy to be used by the management
- Enhanced integration of Risk, Finance and Actuarial by producing a consistent assessment of risks and capital requirements

The Risk Management Committee

Has senior management representatives from all divisions and is chaired by the CRO. The risk management department is hence reporting into the committee.

Owners of the risk register and are responsible for identifying, measuring and monitoring risk; this includes:

- Binary risk as defined by solvency II to affect reserves
- Emerging risk (e.g. Nanotechnology, GM food or Climate Change)

The Risk management Committee is ultimately responsible for design and implementation of policies, systems and processes to ensure the following:

- Risk tolerances and appetite as set by the board are not breached
- The use of risk adjusted measures for financial targets and performance measures and seek to ensure that they are optimised and kept within expectations especially in reference to peers in the market.
- Ensuring the ERM framework is applied consistently and systematically across the company, functions and that corporate tolerances are consistent with specific risk limits
- Continuously evaluating the quality of risk controls in place and seeking to improve them and respond to internal and external changes in the business environment
- Risk management culture – articulate risk tolerances clearly and ensure transparency in communicating risk to regulator, rating agencies and internally.
- Ensuring the company passes the Use Test by ensuring that management understand the model and that management action is informed by the model. This requires that they demonstrate understanding of their risk profile.
- The ECM model is used in the risk management process –e.g. metrics, scenario testing, capital allocation etc.
- Oversight of the Catastrophe Response department and hence processes and procedures
- Establishing feedback loops to ensure improvements can be made. This includes event post mortems
- Ensuring all ERM processes and risks are fully documented and audited.

The risk management committee achieves all this through regular reporting and effective communication and collaboration of the risk management function with all other business functions.

The committee also works on best ways of evidencing the effectiveness of their ERM processes through choice of metrics and risk identification, monitoring and mitigation.

The committee aims to ensure that;

1. Top-down and bottom-up approaches are considered as much as possible for the various risks considered – especially insurance risk.
2. The committee considers short, medium and long term risks and effects of risks that occur (from financial, operational and structural points of view)
3. Use of risk adjusted measures to assess effects

4. Looks at sustained long risk emerging over a long period and short term shocks

Committee seeks to understand risk through the following methods (trend analysis, stress/scenario testing, back testing, contingency planning, problem post mortem and risk transfer)

The committee seeks to monitor risk through (Regular reporting, audits, capital budgeting and allocation, strategic asset allocation, and process feedback loops)

The committee seeks to mitigate risk through the following methods; (Management of liquidity, avoidance of risk, transfer of risk, offsetting risk - These are achieved by investment strategy, reinsurance and understanding and quantifying dependencies in the business).

The committee considers action under stress scenarios (asset disposal, difficulty in raising capital, business transfer and sale, M&A, recovery plans and reduction in business)

Core BAU Risk Management Functions

The firm's core BAU risk management functions form part of its risk principles with an aim to be embedded to the firm's day-to-day activities. These include:

- Regular reporting on underwriting activities, catastrophe management, investments monitoring
- Inputs into planning for capital as well as capital allocation.
- Development of risk policies and monitoring their adherence
- All business written is peer reviewed and strict underwriting guidelines exist

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- Regular reporting on underwriting activities, catastrophe management, investments monitoring
- Inputs into planning for capital as well as capital allocation.
- Development of risk policies and monitoring their adherence
- All business written is peer reviewed and strict underwriting guidelines exist

Data Management:

Company A has a senior manager overlooking the data management process, who ensures that:

- All claims and underwriting data feeds to the data management team
- Data management team performs data quality checks
- The consistency and validity of data is conducted by the actuarial, risk and underwriting teams.
- The data quality sign-offs are conducted by the individual teams
- They provide data quality sign-off before it is used for analysis

Actuarial:

The actuarial team receives data from the data management team, in addition to the underwriting team, reinsurance departments, investment, and pricing actuaries:

- This information is received by the actuarial team on regular and consistent basis
- Parameterisation process is updated once a year with quarterly reviews
- Changes are recorded and models are fully documented and capital modelling process is peer reviewed or audited
- Model is used for capital allocation and thus pricing as well as reinsurance program placement
- Testing viability of new lines of business
- Stress scenario and back testing which informs the risk-register that is managed by the risk committee
- Model is used for quantification of asset and credit risk, business planning and inform reinsurance purchase, and asset and liability management, portfolio optimisation, marginal benefit analysis
- Model is used to construct or refine risk appetite and regular outputs from the model are discussed at risk committees

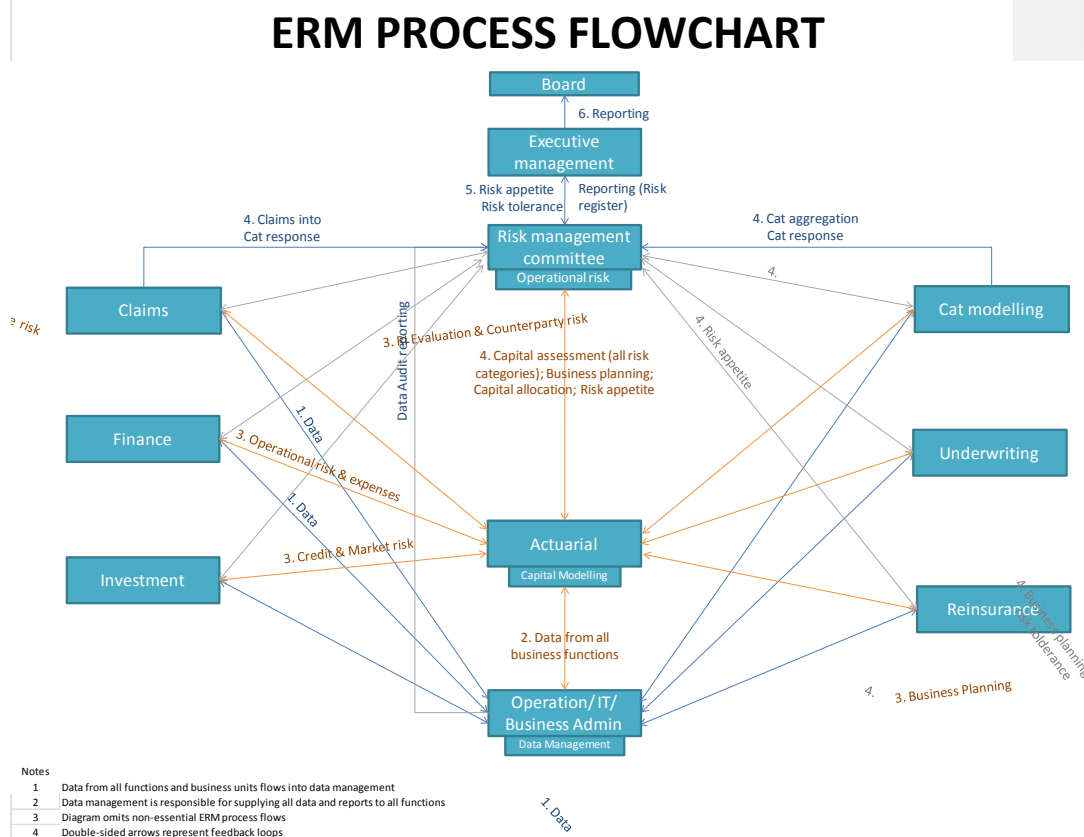
Embedding Solvency II

The company has an approved internal model, built with the help of its Solvency II team. This was made up of a combination of full-time actuaries and external contractors to parameterise some of the more specific and complicated sub-modules. The company has therefore retained the talent and intellectual property in-house which proves to be an efficient way to embed Solvency II into BAU.

It has additionally considered cases where re-parameterisation may be required and for this, the contractors had maintained full documentation of the assumptions and overall process (as required by the regimes) which will allow the other actuaries to easily make any modifications or model updates. The parameters are updated at least twice a year and more frequently if necessary. They additionally licence other models to feed results into their overall internal model.

Nevertheless, the CRO with the help of the risk management team, and key function departments have to devise an overall plan/ implementation process to ensure that Solvency II is successfully embedded into BAU. They therefore need to explore efficient ways to successfully achieve and measure this.

Below is an outline of how company A's ERM processes.



Flowchart Explanation

All Business and departments are subject to internal audit and compliance processes

1. Data management department:

- This is part of the Operations/ IT/ Business Administration department.
- Incoming business and claims data channelled through internal systems feed into the data management department.
- Data management department collects the data, ensures data quality, validity, consistency, performs checks, audits and obtains sign offs from the various data owners.
- Data management department further provides management information and reports to all departments.
- Actuarial and capital modelling department receives the signed off data.
- Similar arrangements exist for all other departments

2. Data flow to Actuarial department:

- The following data sent to Actuarial and Capital modelling departments (sign off obtained from departments shown in brackets):
 - Triangles and claims (Claims)
 - Investment assumptions and assets information (Investment)
 - Reinsurance data (Reinsurance)
 - Expenses assumptions (Finance)
 - Catastrophe modelling data (Catastrophe)
 - Business planning and policy data (UW)
 - Information regarding operational risk/binary risk (Risk Management)

3. Data Flow from Actuarial department:

- Following output from the capital model – Underwriting Risk (Business planning), Reserve risk, Credit Risk/Counterparty Risk, Market risk, Operational Risk.
- This capital model output sent to the various departments concerned – Claims, Finance, Investment, catastrophe modelling, Underwriting, and Reinsurance.
- Feedback loops* exist for testing different assumptions for all data items, regarding all risk categories mentioned, including stress and scenario testing.

4. Data Flow from/to Risk Management Department and hence Committee

- Results from actuarial, catastrophe and are communicated back to the risk management function to inform:
 - Business planning, which includes ensuring diversification
 - Risk appetite /tolerances, including reinsurance and catastrophe strategy, which is also a function of investment strategy
 - Capacity/rate monitoring
 - Catastrophe aggregations
 - Back testing and reverse stress testing
 - Managing post catastrophe response (includes claims information)
- Feedback loops* exists for all above (iterative and updatable process)

5. Data Flow from Risk management Committee to Executive management

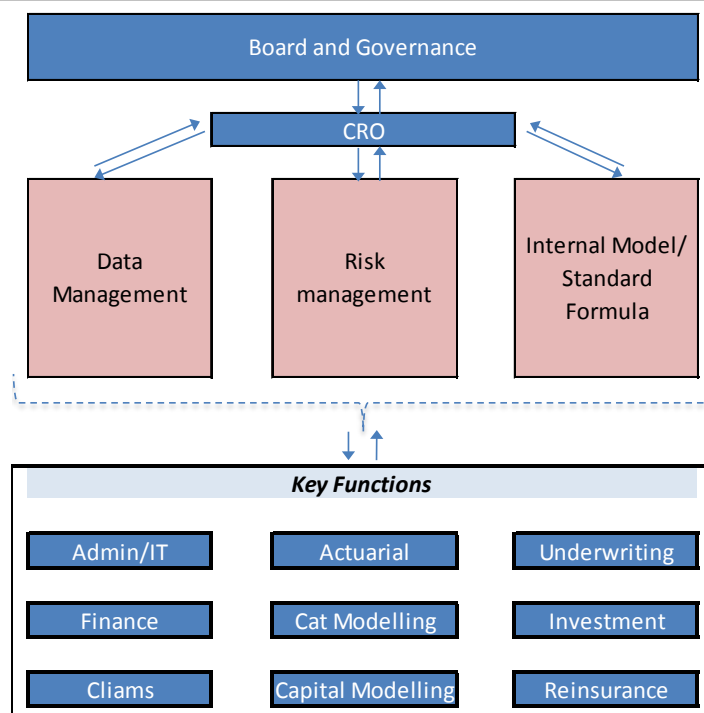
- On obtaining and analysing results from the data flows/processes above, including stress and scenario testing, the risk management committee will undertake the following processes:
 - Risk Appetite/Tolerance setting, includes feedback loop* to Reinsurance, Capital modelling, Catastrophe modelling, Underwriting, Investment, Finance & Claims departments.
- Address Operational Risk:
 - Measure/assess intangible asset risk, including feedback loop* to actuarial and capital modelling
- Decide on items to manage the company Risk Register
- Set and review catastrophe response process

6. Report to the Board:

- The Executive management reports the findings to the Board
- Public disclosure, which is the Board's responsibility, is discussed, including a feedback loop* between the Board and Executive management

*Note: Double-sided arrows indicate feedback loops

Solvency II Governance Framework

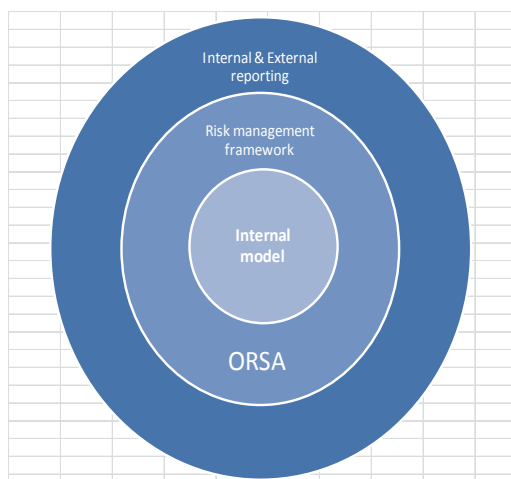


Explanation

1. Feedback loop exists here to reassess processes

2. Should include catastrophe response under Risk management

ORSA Process



Explanation

1. All internal reporting is part of the ORSA at this company
2. All key functions mentioned in this appendix are part of the internal model process (including pricing) encompassing the ORSA processes.

CORE FUNCTIONS – Company A

Below are notes on how Company A's core functions would look like under Solvency II BAU in the future.

1. Enterprise Risk Management

- As described by the risk committee and risk department above

2. Operational Risk

- The Operational Risk function is part of the risk management department and is responsible for identifying and managing operational risks
- This function includes the catastrophe response process
- Also responsible for business continuity planning in case of failure of internal processes or in case of external shocks

3. Internal Audit

- The internal audit function is independent of all business functions except the Compliance department which advises the administrative, management or supervisory body on compliance with applicable laws and regulatory requirements
- The audit function regularly examines and audits internal processes and reports to the board

- This department and the audit committee are responsible for ensuring proper business conduct and processes and ensuring staff education in these matters including matters of ethical business conduct
- This department is also responsible for ensuring that employees and specialists of various areas are fit and proper for their roles and have the right level of competency, training and qualifications for their jobs. This encompasses the same Solvency II requirement.

4. Underwriting

- Tight underwriting controls and automatic capture of underwriting guidelines in the underwriting systems. E.g., on capacity monitoring and underwriting authorities including automated manager sign offs
- Control on the types of business written
- The underwriting system is integrated with catastrophe management systems and pricing systems therefore all aggregations are monitored live
- Strict wording version control on contracts
- Automated peer review process of the information is conducted once the risk is finalised on the various systems; special reviews are conducted for large risks
- Systems should operate across all entities and enable aggregation of information (especially capacity info) across the group to ensure risk appetite/tolerances are not breached
- Special underwriting processes should be in place for large placements
- Multi-disciplinary teams discuss the risks before any terms/placements are issued

5. Actuarial Pricing

- Actuarial pricing, including that done out of spreadsheets, would feed into the integrated systems that capture (a) technical pricing; (b) exposure information; (c) link to underwriting and catastrophe modelling systems
- Actuarial would perform rate change calculations

6. Catastrophe Modelling

- Similar high level integration between their systems, underwriting systems, actuarial and catastrophe aggregation systems
- Data management teams would do regular capture and clean-up of data coming from those three functions and produce reports on:
 - Technical to market price
 - Rate change calculations
 - Aggregation and capacity monitoring
 - RDS numbers re-calculations
 - Policy information
 - Cleaned up data would feed to the various data owners to obtain sign offs e.g., rate information must be discussed with underwriters and actuaries
- The reports generated would be discussed in various regular reporting meetings and further checked at a portfolio level
- The data will also be used to inform actuarial and risk management committee

7. Capital Modelling

- Capital modelling department would include actuaries and systems and IT individuals capable of maintaining the ECM and ensuring seamlessness of reporting processes, documentation of

work and integration of systems (i.e. inputs of model versus outputs) – inputs are catastrophe data, parameterisation data, reserves, economic assumptions etc. and outputs are the various reports needed internally and for the regulator.

- The number of actuaries will stay the same, the increasing demands of solvency II were offset by the synergies and IT advances in Company A post implementation of ERM.
- Refer to ERM diagram for processes

8. Reinsurance

- The outwards reinsurance function includes two actuaries from the capital modelling team who fully understand and use the ECM for various reinsurance options.
- Discussions on these begin at board level and risk committee and the outwards reinsurance team executes strategy by modelling the options considered and assessing their viability at the risk committee level.
- Inwards reinsurance technicians are part of the data and internal operations team with strong links to the finance team.
- They also report to the risk committee and the info is used to inform the model

9. Reporting

- Is done by all departments. The data used is managed by the data management team and reports are either internal or external. No one reporting team exists.
- The reporting function is ever expanding and a lot of resource goes to it post implementation of Solvency II
- The reporting function relies heavily on sophisticated documentation system which allows easy updates, peer reviews, authorisation and publishing of information across the company.

10. Reserving

- Actuarial reserving expanded to encompass technical reserves and financial reporting. The capital modelling team takes parameterisation assumptions from Reserving.
- Long tail scenario and stress testing for technical provisions is done in the reserving team.
- All reserve related documentation for Solvency II is handled by the reserving team.

11. Data

- Data management team is described above. Handles all data through centralised, auditable and integrated high tech systems. Data feeds in to the team and is pushed out in useful formats and reports to the rest of the company
- The team is responsible for getting regular reports out for all committee and divisional meetings of the company hence is a very large team with sub teams representing each data producing function (UW, RI, Claims, Investment, Finance, Operations)

12. IT and Operations

- IT and Operations as above

13. Claims

- Claims systems include links to policy and aggregation systems. Claims department has strong links with individuals involved in Catastrophe Response stress and scenario testing

14. Finance

- The finance function is responsible for all internal and external reporting of financial information across the company. The Finance function report to the CFO (Chief Financial

Officer) of the company. It is responsible to produce results on an annual basis that are reported to shareholders, the annual report and reporting to regulators.

- The Finance function has been given responsibility to report on both the IFRS and Solvency II basis. It is also a core function that has responsibility for all Pillar 3 requirements under Solvency II. The results are collated on a quarterly basis.
- The head of the Finance function also holds positions in the Finance Committee, Risk committee and Investments Committee.
- The Board also engages the services of external auditors. The auditors engage the Finance function to carry out their duties.

15. Investment

- The investments function is in-house. All investment decisions are made by the Investments team, headed by the CIO (Chief Investments Officer) with a team of specialists in the main asset categories. The CIO reports to the CEO of the company.
- The investment mandate is approved by the Board annually. Investment decisions and risks associated by them are reported to both the Investments Committee and the Risk committee (both sub-committees of the Board) quarterly. Tactical asset allocation changes are approved by the Risk Committee.
- The Board engages external investments consultants to offer advice on the market directions and recommendations of investment strategy.
- Market risk is monitored by the Risk function and it reports these to the Investments Committee, the Risk Committee and the Board on a quarterly basis. Credit Risk is actively monitored by the Risk function and reported to the Board and sub-committees on a quarterly basis. Limits on counterparties are set by the Risk Committee and the CIO is responsible for ensuring that the investment decisions are within these limits. The CRO has responsibility to change the limits on an ad-hoc basis without Risk Committee approval.
- The actuarial function provides a liability cash flow profile to the Investments function on a quarterly basis.

Appendix 2

Case Study: Company B

Company profile

1. Background

Company B is a medium sized company writing home insurance business through affinity groups and some direct sales. It also aims to provide niche cover (e.g. fine arts and affinity member requirements). The company was set up in 2003 and consequently its IT systems and risk governance framework doesn't have any legacy issues. There is no parent group. Company B is well capitalised and has an A+ credit rating issued by Standard and Poor's rating agency.

2. Current Operations

It currently employs 300 staff, operating in London and Manchester, with the head office in London. This is broadly split into 100 operations, 25 finance, 75 Sales, 30 Actuarial, 5 risk and 65 other. It has a steady book of business, writing a total of £400m annual premium. The growth plans are modest and there are no immediate concerns over the premium volume falling. Company B's profitability has been consistent, outperforming the market average for all lines of business. Outperformance is attributable to new IT systems, lack of any legacy issues and writing niche products. There is no overseas exposure, as the book is entirely focussed on the UK market. For extreme events (Subsidence and flooding) the company has significant reinsurance programmes in place. Only the attritional type losses hit the company's net loss ratio.

3. Governance structure

Company B is administered by a Board of Directors. In January 2015, the Board was comprised of 10 members. The key role of the Board is to determine the orientation of the company's activities and ensure their implementation.

The Board has appointed a Vice-Chairman to act as a Lead Independent Director who has a number of specific duties. These include supervising the contribution of the independent directors to the Board's deliberations and acting as their spokesperson with the Executive management. The Board benefits from the work of two special Committees that review specific matters and report to the Board. These are the Audit Committee and the Finance Committee.

The Executive Management comprises the Chairman and Chief Executive Officer and a Deputy Chief Executive Officer. The new CEO has a background with a firm that had a fully embedded internal model and is keen on similar implementation at Company B. His reasons are:

- It helps attract good staff and business.
- He has seen the benefits first hand – senior managers can rely more on the internal model and therefore feel "comfortable" making decisions.
- There is plenty of cheap labour around – the model will not cost as much as the original plans of 2009.
- The pitfalls of internal model implementation are widely known and no significant iterations of legislation are envisaged.

The internal audit function at Company B is not well developed.

4. Risk management framework

The Company's risk framework outlines its risk principles, material risk types, risk governance, appetite and policy. This has been embedded to the overall running of the business, interacting with the strategic planning and capital management process i.e., acting as an implementation for the ORSA framework.

Comment [G1]:

Comment [G2]:

The risk management department comprises of underwriting risk, claims risk, credit risk, investment risk, operational risk, asset liability risk, liquidity risk, concentration risk, strategic risk and reputational risk units. The department reports directly to the Chief Risk Officer (CRO) and have the following key objectives:

- Define established standards that comply with Solvency II regulations and more importantly to embed best practice risk management throughout Company B
- Allocate roles, responsibilities and ownership to the Board, senior management and staff
- Promote a consistent and effective use of the Risk Management framework across Company B
- Define and communicate Risk Management processes and procedures to the Board of directors and to the organization
- Favour an effective ERM Policy to be used by the management
- Enhanced integration of Risk, Finance and Actuarial by producing a consistent assessment of Company B's risks and capital requirements. However, this objective is an aspiration for Company B.

There are not many legacy issues and Company B believes that its risk management framework was cutting edge in 2003.

Core BAU risk management functions:

The firm's core BAU risk management functions form part of its risk principles with an aim to be embedded in the firm's day-to-day activities. These include:

- Regular reporting on underwriting activities, catastrophe management, investments monitoring
- Inputs into planning for capital as well as capital allocation.
- Development of risk policies and monitoring their adherence
- All business written is peer reviewed and strict underwriting guidelines exist

Data management:

Company B has a senior manager overlooking the data management process. The manager ensures that:

- All claims and underwriting data feeds to the data management team
- Data management team performs data quality checks
- The consistency and validity of the data is conducted by actuarial, risk and underwriting teams.
- The data quality sign-offs are conducted by the individual teams
- They provide data quality sign-off before it is used for analysis

Actuarial:

The actuarial team receives data from the data management team. The data received is in consistent format to that received by the underwriters, reinsurance department, investment, and pricing actuaries.

The actuarial team currently manage the company's ORSA process. The ORSA framework uses the legacy ICA model and relevant processes as its core capital assessment and stress testing tool. Key highlights of the capital assessment and stress testing are as follows:

- The data is received by the actuarial team on a regular (monthly) and consistent basis
- Parameterisation process is fully updated once a year with partial quarterly updates

- Changes are recorded
- Models are fully documented
- Capital modelling process is peer reviewed or audited internally. No external review has taken place on company's capital assessment model

The model has the following uses:

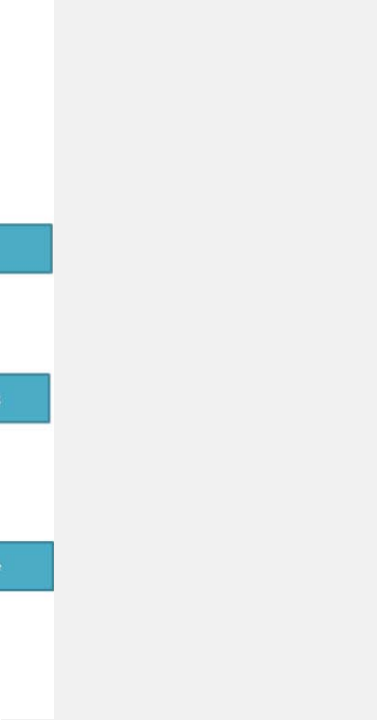
- Own Solvency Assessment and SCR validation
- Capital allocation and thus pricing as well as reinsurance program placement/(optimisation)
- Testing viability of new lines of business
- Stress scenario and back testing which informs the risk-register that is managed by the risk committee
- Model is used for quantification of asset and credit risk, business planning and inform reinsurance purchase, and asset and liability management, portfolio optimisation, marginal benefit analysis
- Model is used to monitor and refine risk appetite (where necessary)

Regular outputs from the model are discussed at risk committees

5. Embedding Solvency II

Company B decided not to build an internal model and instead use the standard formula for SII compliance for the following reasons:

- (i) The medium term cost of building the internal model (systems change, kernel building, education etc.) seemed excessive given the capital savings gained by using an internal model approach. The company was set up in 2003 – so although most of the systems were up to date, they don't necessarily align with SII requirements. The company felt the alignment costs were arbitrary.
- (ii) The risk profile is simple – one line of business.
- (iii) Although the company was only set up in 2003 and therefore doesn't have any legacy issues with data, adequate volume of data continues to be a problem for Company B. It would have therefore been difficult to meet statistical quality standards.
- (iv) Some of the covers are niche (e.g. fine art) – again validation of internal model would not have been accurate or practical as a number of pricing/reserving assumptions are derived using expert judgement.
- (v) The company considered the resource constraints. It felt that the market was artificially inflated with contractors/consultants – and didn't see much use of permanent employees post SII implementation.
- (vi) The company believes it has a strong risk management framework exists, but one that doesn't fit well with an internal model. The Key Risk Indicators (KRIs) are developed independently from the actuarial/capital framework and are currently working well. However, they would not meet the Use Test requirements had company B decided to go down the (partial) internal model route.



All Business and departments are subject to internal audit and compliance processes. A brief description of the role each department plays in the ERM framework is as follows:

The data management department is part of the Operations/IT/Business Administration departments. Incoming business and claims data are channelled through internal systems feed into the data management department.

- collect the data
- ensure data validity
- perform checks for consistency
- carry out audits and obtains sign offs from the various data owners

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5.2. Data flow to Actuarial department:

The following data is sent to the Actuarial department – for claims reserving purposes, SCR standard formula calculation and use in the quantification assessment provided to risk management in respect of ORSA (sign off obtained from departments shown in brackets):

- Paid and Incurred claims data – in triangular format (Claims)
- Investment assumptions and assets information (Investment)
- Reinsurance policy and claims data (Reinsurance)
- Expense assumptions (Finance)
- Business planning and policy data, including planned written premiums (UW)
- Information regarding operational risk/binary risk (Risk Management)

The data is provided three days from close of month. On a quarterly basis the data is reconciled to the internal accounts and risk management's KRIs.

5.3. Data Flow from Actuarial department:

Following output from the capital model:

- Underwriting Risk (Business planning)
- Reserve risk
- Credit Risk/Counterparty Risk
- Market risk
- Operational Risk
- Stress test output
- Economic and Solvency II balance sheets

This capital model output is sent to the following departments (and is also available on the company's wiki site*):

- Risk Management
- Claims
- Finance
- Investment
- Underwriting
- Reinsurance

Feedback loops exist for testing different assumptions for all data items, regarding all risk categories mentioned, including stress and scenario testing.

5.4. Data Flow from/to Risk Management Department and hence Committee

Results from actuarial department are communicated to the risk management function to inform:

- Business planning, which includes ensuring diversification
- Risk appetite /tolerances, including reinsurance and catastrophe strategy, which is also a function of investment strategy
- Capacity/rate monitoring
- Back testing and reverse stress testing

Feedback loops exists for all above (iterative and updatable process)

5.5 Data Flow from Risk management Committee to Executive management

On obtaining and analysing results from the data flows/processes above, including stress and scenario testing, the risk management committee will undertake the following processes:

- Risk Appetite/Tolerance setting, includes feedback loop to Reinsurance, Capital modelling, Underwriting, Investment, Finance and Claims departments

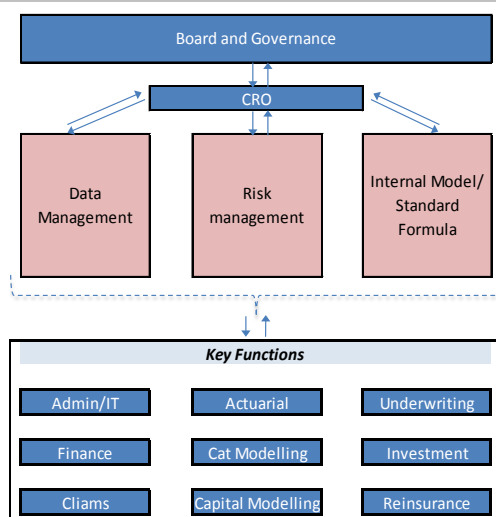
Address Operational Risk:

- Measure/assess intangible asset risk, including feedback loop to actuarial and capital modelling

5.6 Report to the Board:

- The Executive management reports the findings to the Board
- Public disclosure, which is the Board's responsibility, is discussed, including a feedback loop between the Board and Executive management

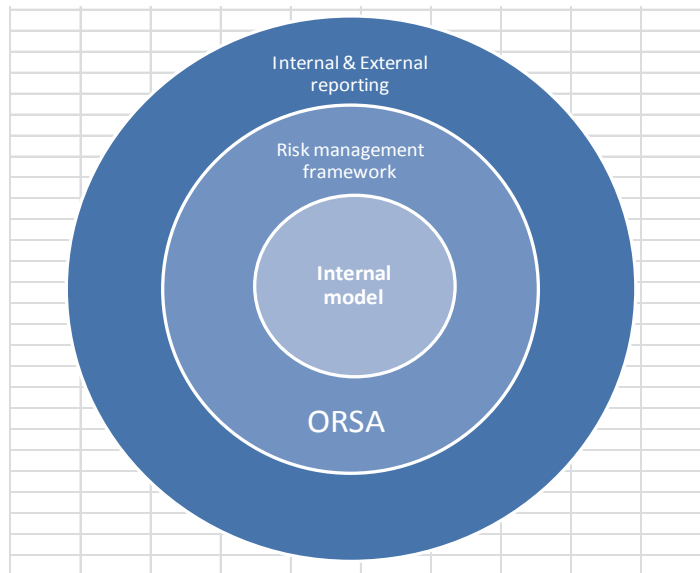
6. Solvency II Governance Framework



Explanation

1. The Board has the overall responsibility for Governance. It delegates its mandate to the Chief Risk Office (CRO) (via the CEO who is part of the Board in the framework above).
2. The CRO holds a key position in the Solvency II framework. The key mandate of a CRO includes:
 1. Assist the Board with daily risk management
 2. Oversee the Risk management system
 3. Overview of the corporate risk profile
 4. Detailed reporting and advice (expert judgement) on Strategic risk
 5. Provide key Performance Indicators/analysis as requested by the Board
 6. Identify and evaluate Emerging risks
3. In order to deliver its mandate, the CRO has accessibility to the Data management, the Risk management and the Internal Model framework. These are supported by key functions as appropriate.

7. ORSA process



Explanation

7. Article 45 requires that Company B has the ability to understand its own financial condition and solvency position. This is irrespective of the solvency position as set out by the standard formula.
8. As Company B is using a standard formula for setting solvency capital, a key role of the ORSA process therefore is to align and validate the standard SCR to Company B's own risk profile.
9. A starting point for the ORSA process is therefore the generation of the standard formula capital – illustrated by the inner circle in diagram above (note: the “internal model” here refers to not just the calculation method but the data and governance framework that exists around calculation of pillar 1 capital).
10. The Risk management framework obtains an independent quantitative capital assessment (using company's former ICA model framework). This is supplemented by qualitative risk assessment – in particular for non-quantifiable risks (such as reputation risk).
11. The gaps between the standard formula capital and the independent assessment are explained using company's risk management framework.
12. Prior to internal/external reporting of ORSA a number of management actions are considered for risks that are significant for Company B. The risks are then classified into four categories:
 - a. Accept risk
 - b. Manage risk
 - c. Transfer risk
 - d. Terminate risk/portfolio

CORE FUNCTIONS – Company B

1. Enterprise Risk Management

- The CRO has overall responsibility for the design and maintenance of the ERM framework. The framework encompasses quantitative risk assessment tools, defined guidelines for risk management and specific committees to review and monitor key risks.
- Although the Solvency II framework has not been the key driver for Company B's ERM framework, good risk governance practice and ambition has ensured that the framework is consistent with the governance requirements as set out for Solvency II.
- The framework captures key risk activities and interactions of the entire organisation, as well as key aspects of major counterparties.

2. Operational Risk

- The Operational Risk function allocates Operational Risk to the following categories
 - People
 - Process and Systems
 - External Events
 - Reputational Risk
 - Regulatory Risk
 - Regulatory Risk – Key Mitigants
- The quantification of operational risk involves two elements:
 - A bottom up assessment across all functional areas where risk values are determined using a qualitative approach based on relative estimates and a scoring mechanism to measure the severity and likelihood of occurrence.
 - A top down view of severe or catastrophic 1-in-200-year operational risk events. These are reviewed for materiality by a technical expert group who also agree the severity of the risk scenarios before gaining acceptance by the Risk and Capital Committee.
- The risk appetite of the Company is reflected by establishing a sound framework of mitigation techniques e.g. insurance, reporting of operational risk events, set up and monitoring of Key Risk indicators and limits. These measures aim to interpret the risk appetite of the Board and embed it into the operations of the Company. Qualitative limits have been set for areas where the application of quantitative limits is not possible for the monitoring of Operational Risk.
- As part of the monitoring process, limits or tolerances for each category of operational risk are set and reviewed. Limits are defined through a collaborative effort from senior management and the Risk Management Function. Metrics, which are commonly known as Key Risk Indicators (KRIs), provide a measure of the Company's risk profile. KRIs are measurable metrics or indicators that track exposure or loss. Anything that can perform this function may be considered a risk indicator.
- The company was set up in 2003 and at this time had a market leading approach to Operational Risk. However, there has been little development since. The company is considering a complete overhaul of its Operational Risk methodology.

3. Internal Audit

- The internal audit function is partially integrated with the ERM framework and is designed to ensure that ERM is embedded throughout the organisation
- The internal audit function is designed to ensure that material errors are captured and that best practices of documentation and control are maintained throughout the organisation
- The internal audit function prepares formal annual reports for the Board of Directors.

4. Underwriting

- The underwriting is managed through disciplined application of the Underwriting manual. These include:
 - Control the types of business written
 - Ensure wording is compliant with the risk management's guidelines
 - Special reviews are conducted for large risks
- An underwriting risk committee is set up and meets quarterly to review the underwriting performance. However, it is having a few issues adapting to the new risk governance environment that it operates under. Whereas previously the key measures of performance were business volume and target combined loss ratio, the underwriting committee struggles with the concept of measuring risk through capital requirement. This has led to some review of product design – and the underwriters have not always found it easy to communicate the changes to their clients.
- Special underwriting processes should be in place for large placements

5. Actuarial Pricing

- The technical pricing has not changed significantly from the pre Solvency II world and the company still uses GLM modelling to rate products. However, the capital loading in pricing is becoming a key issue for the senior management and therefore the actuarial pricing is often faced with challenge from business in respect of this.

6. Catastrophe Modelling

- Company B does not require catastrophe modelling. Any potential risk is managed through the ERM framework and consideration for the Binary events for technical provisions.

7. Capital Modelling

(a) Primary

- Calculating Standard Formula / Internal Model SCR.
- Calculating Capital for Risk Margin
- Calculating Capital for ORSA.
 - Model design
 - Model implementation
 - Parameterisation
- Complete 5 year Capital Projections.
- Assessment of available assets /own Funds
- Group Capital Solvency
- Maintain appropriate solvency II documentation / Governance Procedures.
- Monitor SII model change policy

(b) Secondary

- Advising on Capital efficiency of products to drive overall company Strategy
- Advise on the most capital efficient company structure
- Deriving ROE
- Set Capital Requirements for Pricing
- Providing Data to Rating agency
- Oversee data policy in respect of Capital Modelling.

- Advice on Capital impacts of Reinsurance.

8. Reinsurance

The standard formula has increased Company B's overall capital requirement. It has therefore been investigating various reinsurance options to limit their overall capital requirement. The reinsurance department are now working on the following issues:

- Work with brokers to obtain adequate reinsurance cover. This task becomes tricky - since company doesn't have a stochastic model, it is not straightforward for them to provide a set of assumptions to the broker. The reinsurance placement becomes an onerous exercise with a lot of going back and forth for the broker to understand the business and provide preliminary analyses for reinsurance providers to price.
- Pricing actuaries are increasingly involved with the assumptions for reinsurance purchase/pricing. However, given their pricing models differ from standard formulae, the reinsurance department face a number of reconciliation issues

The department is now looking to purchase/develop an in-house pricing tool to deal with the above issues.

9. Reporting

Company B has switched to setting technical provisions as required under the Solvency II legislation. Key changes since implementation of SII are:

- The department is now spending more time to justify their assumptions and document any model changes. This has made the exercise more onerous, and the company are now looking to increase head count.
- By switching to best estimate provisions and a separate risk margin, focus has increased on ensuring the best estimate is not volatile. This is leading to a significant time spent on granular reserving, perhaps increasing spurious accuracy
- The year-end timetable for calculating technical provisions is now more onerous.

10. Reserving

- Actuarial reserving is now part of the reporting team. Their key responsibility is to set the claims provisions aspect of the technical provisions and calculate the risk margin.

11. Data

11.1. Introduction

- Company has not applied for an Internal Model yet. Many Solvency II Data requirements still apply but it does not have a robust enough data management process to achieve IM approval. The Board would like to improve data best practice to a level close to IM approval standard.
- The increased frequency of Solvency II reporting requires organizations to collect and prepare data faster than before.
- Company will focus on insurance risk data rather than other data related to counter party exposure, corporate debt or liquidity of assets.

11.2. Primary

- Compile a directory of data attributes used in the internal model, stating each attribute's true source, characteristics and usage
- Ensure data processing from source to model is transparent and demonstrable
- Both internal and external data must be demonstrably appropriate, accurate and complete.

- Define objective metrics for completeness, accuracy and appropriateness of data
- Establish a data policy
- Provide an audit trail when applying expert judgment

11.3. Secondary

- Continuously monitor and improve data quality management
- Use dashboards to summarize and communicate results of data quality assessments
- After completing SII data exercise, consider overview of whole company data including previously out of scope data.

12. IT and Operations

IT

- Service Design
 - Service level management
 - Capacity management
 - IT service continuity management
 - Information security management system
 - ICT infrastructure management
 - ICT design and planning
 - ICT deployment management
- Service transition
 - Change management
 - Release and deployment management
- Service Operation
 - Service desk
 - IT operations management
 - Incident management
 - Identity Management/Access and Identity Management

Operations

- Management of Claims teams
- Ensure delivery of exceptional customer experience.
- Provide contribution and support to strategic direction of the business.

13. Claims

The claims management procedures for Company B includes the following (Note the home insurance business will be similar to many companies in the market. The Niche covers will be much more specialised and procedures will be bespoke):

- Electronic registration of claims information and issuance of claim number
- Creation of claim file and Initial Claims approval/rejection
- Initial Provisions

- Setting of claims handling limits and approval limits
- Investigation of claims -Facts investigation/ Claim monitoring
- Assignment of claim assessment (by Internal Claims Assessors or External Assessors)
- Setting of claims provisions
- Claims rejections and claims recoveries
- Completion of Discharge Form
- Claims Payments
- Total loss and salvage value Claims Process
- Setting and monitoring of claims provisions
- Claims closure and archiving
- Reopening of Claims
- False Claims and Fraud
- Arbitration

14. Finance

- The finance function is responsible for all internal and external reporting of financial information across the company. The Finance function report to the CFO (Chief Financial Officer) of the company.
- The head of the Finance function also holds positions in the Risk committee and Investments Committee.
- It is responsible for producing Statutory Accounting results on an annual basis that are reported to shareholders.
- It also performs the reporting to regulators.
- The Finance function has been given responsibility to report on both the IFRS and Solvency II basis.
- Solvency II annual supervisory reporting requirements:
 - There will be two annual supervisory returns required to be made to the FSA, the Solvency and Financial Condition Report (SFCR) and Report to Supervisors (RTS). The SFCR will be a publicly-available return.
 - The SFCR and RTS will comprise a mix of qualitative and quantitative information including:
 - Executive Summary
 - Business and Performance
 - System of Governance
 - Risk Management
 - Regulatory Balance Sheet
 - Assets
 - Technical provisions
 - Other liabilities
 - Any other disclosures

- Capital Management
- Own funds
- MCR and SCR
- The option set out in Article 304 used for the calculation of its SCR
- Differences between the standard formula and any internal models used
- Non-compliance with the MCR and significant non-compliance with the SCR
- Any other disclosures
- Solvency II supervisory quarterly reporting requirements consisting of core financial and solvency information (i.e. a subset of the year end returns) such as technical provisions, premiums and claims, data on assets including investments, and own funds.

15. Investment

- The investment mandate is approved by the Board annually. Investment decisions and risks associated with them are reported to both the Investments Committee and the Risk committee (both sub-committees of the Board) quarterly.
- The Investment returns for the company have been disappointing. Key reasons for this are:
 - Company has experienced significant transaction costs relating to changing their portfolio – they have sold the inadmissible assets. This has led to crystallisation of tax liabilities
 - The new mandate requires Company to hold more cash and money market funds (liquidity requirements) – the overall rate of investment return has dropped as a result.
- The investments are managed by external fund managers.
- The terms of reference with the Investments function sets out the corridors and rules for when consultation with the Risk function is required when making new investment decisions.
- The actuarial function provides a liability cash flow profile to the Investments function on a quarterly basis.

16. Further Considerations

Company B has separate and independent pricing, reserving, capital and reinsurance optimisation models. The risk register does not directly feed into any of these models. Therefore some model inconsistency issues are present. Company B is not getting full capital relief for its reinsurance programme under the standard formula.

There are some issues when dealing with rating agencies – without an internal model they find it difficult to assign a credit rating. Company is considering entering a new product line – which falls under “Miscellaneous” category. The return on equity of this deal is low using the Standard Formula. There are also issues with overseas regulation as recently it considered expansion into the Far East. Local governments have not been warming to the proposal and insist on some sort of internal model to be in place – as most other companies have them.

Appendix 3

Case Study: Company C

1. Background

Company C has its origins in the UK, since the 1950s when it started as a small non-life and brokerage office. Its primary business was motor and home insurance lines of business.

In the 1990s it was merged with another life and non-life insurer strengthening its market share and diversified to both personal and commercial lines as well as to smaller health and medical lines. In early 2000, the Company has become the target of a takeover bid and as a result has become the UK subsidiary of its parent CentralBAU Insurance Group based in Germany.

As a subsidiary of a medium size European parent with mixed fortunes, it has a modest level of capitalisation. It has a **BBB** credit rating issued by Standard and Poor's rating agency. [Note: An obligor rated '**BBB**' has adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments.]

2. Current Operations

The Company currently with around 3,000 staff, operates through 5 major sites in the U.K. (1 in the north, 2 in the Midlands where HQ located and 2 in the south) with 14 local offices. Its profitability has recently improved to near market average, following a difficult 2-year period. It is now offering competitive products aiming for a further increase of its market share on all lines. Currently its major lines of business, in terms of gross premiums written, are the motor, fire and liability lines.

Company C's has had mixed profitability in recent years, with some good years and some weak years, relative to its competitors. This may have partly due to its trying to increase market share irrespective of the underwriting cycle.

The Company C Solvency II implementation uses a **Partial Model**. Although the Company initially acquired an approved internal model, it did so by hiring consultants to get it through the approval process with no real effort applied into embedding the model into BAU. Some modelling components are now calculated via Standard Formulae and/or in-house developed Excel spreadsheets.

3. Governance Structure

The Corporate Governance framework for the Company is based on "**Three Lines of Defence**" model (see below), which is embedded within the organisational structure and reporting lines in order to enforce an effective internal control system, as per the Solvency II consultants recommendations.

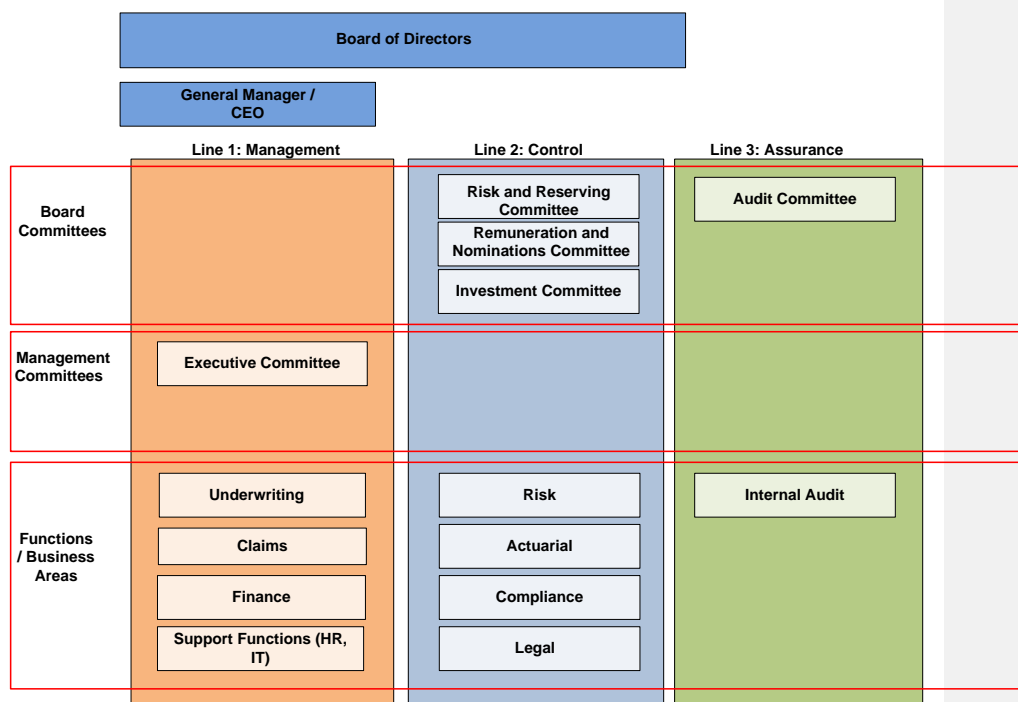
The Company's ultimate supervisory body is the Board of Directors which consists of the Chair, Vice Chair, Secretary and some senior executives. The Senior Management, through the General Manager / CEO has the day to day responsibility for the implementation of the approved strategy and reports to the Board of Directors. Reporting to the Board of Directors is both structured (through planned meetings) and regular reporting and ad hoc as required. The Company's internal audit provides independent assurance to the Board of Directors.

The Head of Internal Audit reports to the Audit Committee and to the Board of Directors. The internal audit function is administratively independent from all other functions and activities of the Company. It provides an annual written report to the Board of Directors on its findings. The report contents include any deficiencies with regard to the efficiency and suitability of the internal control system, as well as major shortcomings with regard to the compliance with internal policies, procedures and processes. It includes recommendations on the necessary remedial actions and any deficiencies in implementing the recommendations included in its previous annual reports.

The Business Functions of the Company through their Head / Senior Managers have the responsibility for the implementation of the approved strategy in their business functions. They report directly to the General Manager / CEO with regards to their day-to-day duties. In order to minimize the probability of a potential conflict of interest and preserve their operational independence, the key control functions have additional direct reporting lines to the Board of Directors or the Board Committees. These additional reporting lines are implemented in order to ensure that these functions have the ability to escalate important issues directly to the Board of Directors. Consequently, the Risk, Compliance and Actuarial Functions have a reporting line to the Risk and Reserving Committee.

4. Three Lines of Defence

The three lines of defence, as implemented in the Company, are presented in the diagram below:



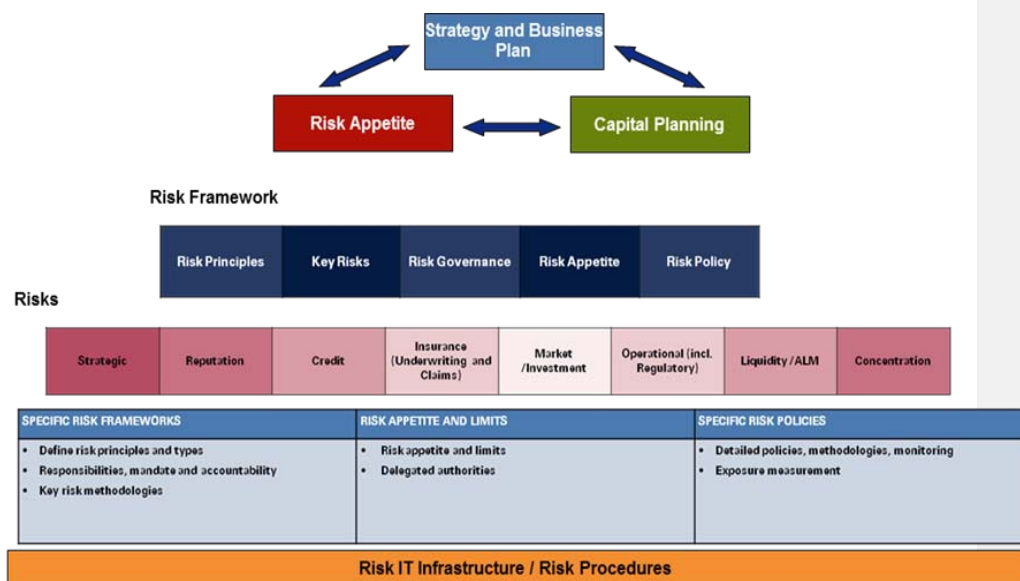
The three lines of defence are embedded within the organisational structure and reporting lines, in order to enforce an effective internal control system; the key features are:

- 1st line of defence: **Management**: This refers to the activities carried out by business line management (e.g. Underwriting, Claims, Finance, Human Resources and Information Technology).
- 2nd line of defence: **Control**: This refers to the bodies that provide control over activities of 1st line of defence (e.g., Risk, Actuarial, Compliance and Legal). There are also three Board Committees, namely Risk and Reserving Committee, Remuneration Committee and Investment Committee.
- 3rd line of defence: **Assurance**: This includes Company's Internal Audit and ultimately the Audit Committee.

The parent company undertakes a regular review of the key reporting deliverables of the Company (either for internal and external audit purposes or for statutory requirements) organises regular management meetings and other training and international events.

5. Risk Management Framework

The Company's **Risk Management Framework** (consisting of Risk Principles, Key Risks, Risk Governance, Risk Appetite and Risk Policy) is an embedded part of the business and tries to interact with the strategic planning and capital management process. It is also the guiding framework for the implementation and operation of the ORSA process as per Solvency II consultants. The risk management framework is illustrated below.



As demonstrated above by the risk framework, Risk Management is embedded within the Company's strategic and operational processes, both as a standalone framework for the management of key risks and as an input in key strategic and business processes.

The risk management framework establishes the mechanism and strategy through which the Company manages risk, taking into account its business objectives and vision, as well as its overall risk appetite. In this way, the risk strategy sets the principles for risk governance, which in turn feed into the Company's organisational structure for the forming of business functions and Committees, the assignment of roles and responsibilities and the definition of lines of reporting.

Risk is inherent in the Company's business activities and is linked to strategic and capital decisions. The Company aims through appropriate risk management, to achieve the Company's business and financial strategy without exceeding set risk tolerances and by considering internal constraints (solvency, liquidity) and external constraints set by regulators and other stakeholders. The Company Risk management framework objectives are, to provide:

1. A clearly defined and well documented risk management strategy that:
 - Sets the Company's risk management objectives, key risk management principles, overall risk appetite and assignment of responsibilities for Risk across all the activities of the Company
 - Is consistent with the Company's overall business strategy

2. Adequate written policies that:
 - Include a definition and categorisation of the material risks faced by the Company, by type, and the levels of acceptable risk limits for each risk type
 - Implement the Company's risk strategy
 - Facilitate control mechanisms
 - Take into account the nature, scope and time horizon of the business and the associated risks.
3. Appropriate processes and procedures which enable the Company to identify, assess, manage, monitor and report the risks it is or might be exposed to

6. Risk Management Functions

The Company has defined the following risk categories for mapping risk events:

- Underwriting Risk
- Claims Risk
- Credit Risk
- Investment Risk
- Operational Risk
- Asset Liability Risk
- Liquidity Risk
- Concentration Risk
- Strategic Risk
- Reputational Risk.

Risk limits are established at three levels within the Company; aggregate level (including minimum solvency ratio of 150%), risk category level and exposure level limit. The Company follows the COSO Integrated ERM framework with support as needed by its parent company.

The Company recognises that it is required to carry out back-testing and to validate its technical provisions. This includes requiring an independent third party to validate the technical provisions that are recommended its reserving actuaries. Where data is scanty, use is made of expert judgement and dealing with the issues arising a diversity of views from such experts.

The firm's core BAU risk management functions form part of its risk principles with an aim to be embedded to the firm's day-to-day activities. These include:

1. Regular reporting on underwriting activities and investments monitoring.
2. Inputs into planning for capital as well as capital allocation.
3. Development of risk policies and monitoring their adherence.
4. All business written is peer reviewed and strict underwriting guidelines exist.

7. Data management:

A senior manager has oversight of the data management process, which includes:

1. All claims and underwriting data feeds into the data management team.
2. Data management team performs data quality checks.
3. Consistency and validity of the data used by the actuarial, risk and underwriting teams.
4. The data quality sign-offs are conducted by the individual teams, which provide data quality sign-off before it is used for analysis.

Data management includes data validation, which is becoming an increasingly important requirement as Solvency II is embedded throughout the organisation. For example, although data should be reconciled with the audited figures, how close is close enough? Also, to what extent can and/or should the organisation rely upon a third party to validate the data used by Company C?

8. Actuarial:

The actuarial team receives data from the data management team, in addition to the underwriting team, reinsurance departments, investment, and pricing actuaries:

1. This information is received by the actuarial team on regular and consistent basis. The parameterisation process is updated once a year with quarterly reviews.
2. Models are fully documented and all changes are recorded. This includes the capital modelling processes, which are peer reviewed and/or audited.
3. Model is used for capital allocation, pricing and reinsurance program placement, as well as testing viability of all new lines of business.
4. Stress scenario tests and back testing, both of which inform the Risk Register that is managed by the Risk Committee.
5. Model is used for quantification of asset and credit risk, business planning and inform reinsurance purchase, and asset and liability management, portfolio optimisation, marginal benefit analysis.
6. Model is used for the estimation of the potential financial impact of “binary events”. Note: Under Solvency II, the best estimate for the technical provisions must have reference to “all possible outcomes”, which should include latent claims or very extreme high severity, low probability claims; these latent claims and/or extreme events are labelled “binary events”.
7. Model is used to construct or refine Risk Appetite and regular outputs from the model are discussed at the Risk Committee.

The actuarial team is required to carry out back-testing of its recommended technical provisions and to prepare reports on the results, which are then peer reviewed by an independent third party. In practice, there is a close working relationship with the independent third party and many technical discussions on data validity / reliability and the appropriate actuarial methodologies. For example,

- a) Precise scope of the independent review of work carried out by in-house actuaries
- b) Validation methodologies based on a set of rules
- c) Validation methodologies based on bootstrapping (i.e. non-parametric)
- d) Validation methods based on subjective assessments and industry data
- e) The validity of Solvency II standard formulae and value parameters
- f) Generally accepted actuarial reserving methodologies
- g) Stochastic versus deterministic actuarial reserving methodologies

Regarding back-testing, Company C has tried to balance its limited internal in-house actuarial resources with the expertise that is potentially available for external actuarial consultants who, although they have specialist theoretical expertise, do not have in-depth knowledge of Company C data and its validity / appropriateness for actuarial projection purposes. The management team has given considerable attention the issues, including:

- h) A framework to assess actual accruals relative to expectations (e.g. based on statistical distributions) on a granular basis (e.g. reserve segment level)
- i) Correlation assumptions in respect of assessment on an aggregate basis (e.g. Company C total), and levels between granular and aggregate (e.g. Solvency II segmentation, all Motor, all Property, all Health, all Accident)

- j) Sensitivity testing methodologies and to what extent these should be different from current practice and/r compliance with generally accepted actuarial standards
- k) Company C resource requirements that are appropriate for the expert estimation of correlation assumptions, given the Solvency II principle of proportionality

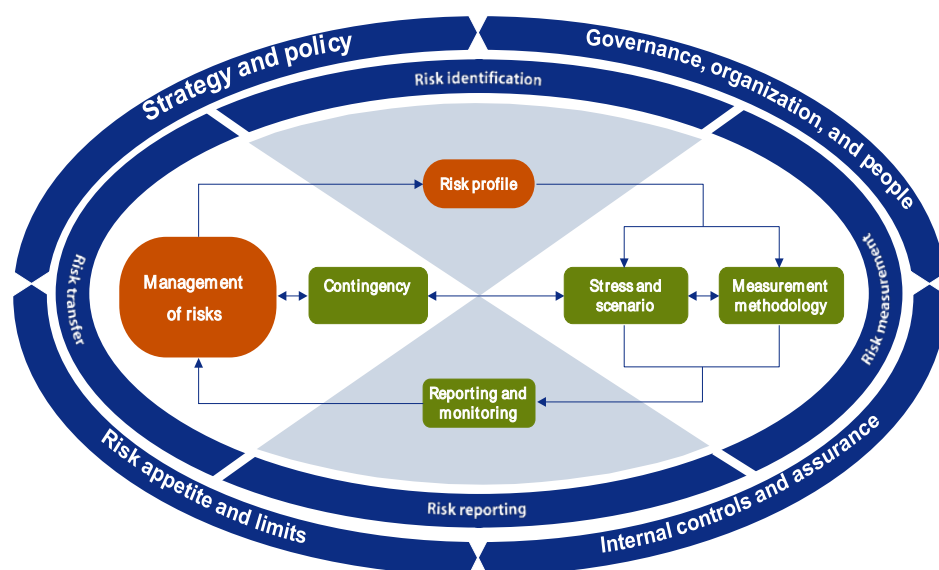
9. Risk management policy framework

Risk management is a continuous process that is used in the implementation of the Company's overall strategy and allows an appropriate understanding of the nature and significance of the risks to which it is exposed, including its sensitivity to those risks and its ability to mitigate them.

In order to ensure the appropriate coordination of the Company's aggregate strategy for risk with the policies and procedures implemented by each risk-taking function, the Company has put in place a Risk Management Policy Framework that sets the overarching principles for the identification, assessment, monitoring and control of risks.

This framework undergoes frequent review by the Risk Management Function and is adjusted to the overall risk profile and risk appetite of the Company, also taking into account any endogenous or exogenous factors and leading industry practices.

The Company manages its key risks, via dedicated risk policies that are aligned with the risk management framework illustrated below:



The framework relies on two key themes comprising of the components in the outer and inner circles:

- The strategic theme that comprises of the strategy and risk appetite and setting the governance framework for successful risk management (outer circle)
- The operational theme that comprises of the processes and procedures that take place in order to support successful risk management (inner circle)

The strategic component for each risk sets the environmental parameters, constraints and targets, in which risk management is performed within the Company. These parameters that are related to policies, people and systems are set and monitored at the highest level within the Company. They are:

- Strategy and policy for risk
- Governance organisation and people
- Risk appetite and Limits
- Internal controls and assurance

In addition to the strategy, the Company sets the operational policies and processes for the management of risk, both at the generic level as well as specifically for each risk. The operational processes are addressed in this section, and discussed in more detail in the Company's risk-specific documentation. Risk Management uses a standardized methodology, with the following stages:

- Risk Identification
- Risk Measurement
- Risk Monitoring and Reporting
- Risk Mitigation

10. ORSA process

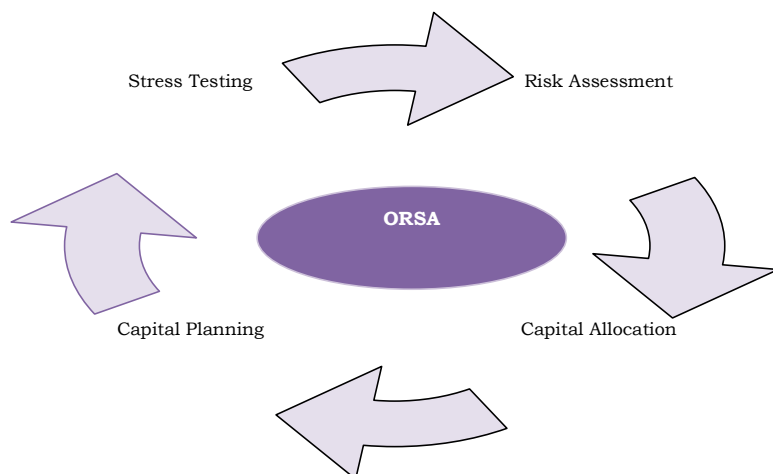
The ORSA is a component of the overall control system of the Company. This allows the management to take into account all the risks associated with the Company's business strategies and the required level of capital that the Company needs to cover such risks.

Therefore, strategic decisions such as the expansion into new markets, the introduction of new products, etc. are assessed and evaluated in the light of their effect on the Company's risk situation and risk-bearing capacity of the Company.

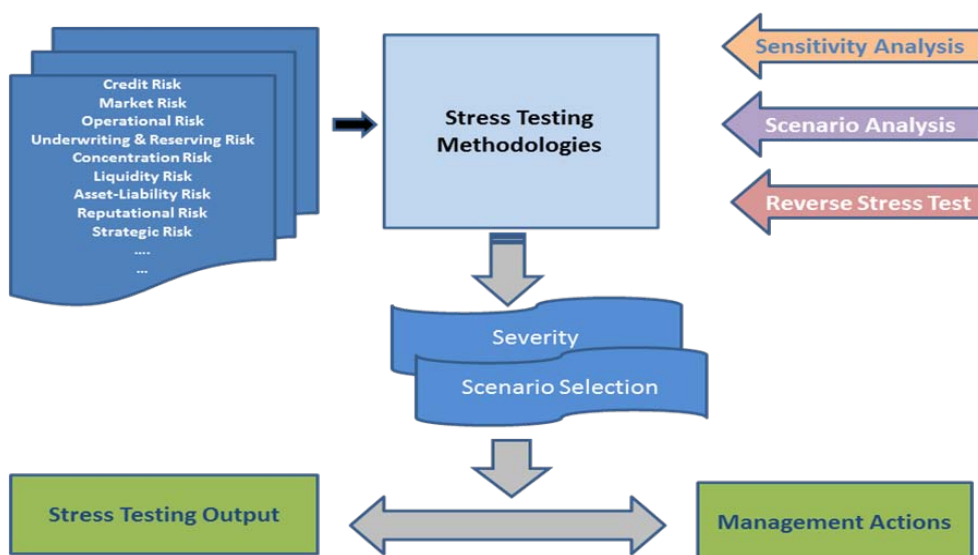
The Company follows the steps below to implement its ORSA:

1. Define the driving factors before ORSA planning. Identify and classify risks (inc. governance).
2. Assessment and measurement of material risks through different approaches (e.g. stress testing). Capital Allocation (e.g. prepare capital planning for the next 3 to years). Stress test and decide on actions in case the risks are crystallized. Communicate and document the results.
3. The ORSA process is embedded in the decision making of the Company. The results of the stress testing scenarios have to be presented to the Board of Directors or to the nominated Committee.

The ORSA process is linked to the business strategy, as illustrated below.



The following diagram represents the stress testing governance.



11. Stress Tests

The Company has carried a comprehensive series of stress tests on its capital and solvency position.

The Company has recognised that the organisation is only as strong as its weakest link. In particular, it has ensured that there is adequate back-testing of its proposed technical provisions before commissioning the second order processes, such as stress testing and independent third party reviews. The back-testing framework has included the introduction of a framework to assess actual accruals relative to expectations on a granular basis, together along assessment of the correlations assumptions that are appropriate for the aggregate basis and levels in between granular and aggregate.

The Company has also considered the possibility of “unknown unknowns”, such as “binary events”. Under current approaches technical provisions only make allowance for items that are implicitly included within the data or are “reasonably foreseeable”. Under Solvency II, however, the best estimate must have reference to “all possible outcomes”. This will include latent claims or very extreme high severity, low probability claims. These items (both latent claims and extreme events) have been labelled “binary events” and adjustment will have to be made to ensure that they are included in the technical provisions¹⁴. The Company has recognised that this will inevitably lead to an increase in its technical provisions.

Company C has taken particular note of the lessons to be learned from the paper “**Our approach to insurance supervision**”, dated June 2011, from the Bank of England Prudential Regulation Authority. Therefore, as part of its stress tests suite, it has included tests of the likely financial impacts of ‘reserve adequacy’, ‘aggressive pricing’ and ‘reinsurance failure’.

The Board requires a suite of stress tests to be performed and reported on annually; these include the following, all of which require a formal written report for the Board:

1. **Reserve Inadequacy:** Consider the financial impact of 10% overall reserve inadequacy
2. **Aggressive Pricing:** Consider the financial impact of increasing the “aggressively priced” risk groups to the “market average”. By “aggressively priced”, we mean pricing that it at least 15% below the market average.

3. **Mass Lapses:** Consider the financial impact of a mass lapse shock of 25% in personal lines, perhaps as a result of uncompetitive pricing in a “crisis economic environment” where consumer decisions are very price sensitive and some smaller competitors promote loss leading products (e.g. motor insurance) in order to gain market share.
4. **Reinsurance Failure:** Consider the financial impact of reinsurance failure amounting to 20% of the overall amounts ceded to reinsurers.
5. **Binary Events:** Consider the financial impact of potential “binary events”, perhaps via a (say) 15% increase in the technical provisions, over and above those for other purposes.
6. **Market Risk Shock:** Consider the financial impact of (say) **rating deterioration** to a credit rating level below **BBB**. Under this ‘shock’ stress test scenario, the capital requirements for (at least) concentration risk and spread risk would be adversely affected.

12. Embedding Solvency II

The Company fully implemented its ERM framework two years ago and has been trying hard ever since to implement Solvency II principles throughout its day to day business operations. However, besides the ERM framework, in order to ensure the sufficient embedding of the risk awareness and management approach into day-to-day activities, a change in behaviours and the organisational culture needs to be matured. Following a strategic review by the Board and the CEO, it has been concluded and determined that the major culture changes implied by the Solvency II regime will take longer to reach the required level and to obtain the implied regulatory approval.

Although the Company initially acquired an approved internal model, it did so by hiring consultants to get it through the approval process, with no real effort being applied into embedding the model into BAU. Consequently, the Company now uses a **Partial Model**, where some modelling components are calculated via Standard Formulae and/or in-house developed Excel spreadsheets.

The Solvency II consultants, one of the major global accounting and professional services firms, have now terminated their relationship with the Company, following a dispute with the Company regarding their billed fees for the Solvency II implementation. Although the fee request was eventually settled on a negotiated basis, without resort to litigation, the Company would prefer not to retain their previous Solvency II consultants for any future work.

The Company C Board of Directors and its senior management team have decided that their best way forward is via a heavy investment in qualified Solvency II human resources, rather than via their previous reliance on external consultants for the Solvency II implementation. Therefore, they have hired an in-house Solvency II implementation team and charged them with the embedding of Solvency II into BAU. Although they are getting up to speed, there are some gaps and these have partly resulted in the initial **Full Internal Model** now becoming a **Partial Model**.

There has also been some turnover in the internal Actuarial Services department. In particular, the Chief Actuary, who was the Solvency II lead, has now left the Company to join a major actuarial consultancy firm.

The new (replacement) Chief Actuary is new to the Company and was externally recruited from a large life and pensions insurance company. Although he is a competent senior Actuary, he has no direct experience of the general insurance lines written by the Company. He has now assembled the library of Solvency II information supplied by the previous Solvency II consultants and has obtained access to the email folders used by the previous Chief Actuary prior to his departure. He also has the Board Minute requiring an annual report on the stress test suite mentioned above.

The new Chief Actuary has accepted full responsibility for the embedding of Solvency II throughout the Company. He now needs to make it work – any bright ideas?

CORE FUNCTIONS – Company C

1. Enterprise Risk Management

- ERM is paramount and is interpreted as Risk and Opportunity Management.
- The CRO is responsible for ensuring that the ERM framework is embedded throughout the organisation and that it is used for day-to-day operational decision making.
- The ERM framework supports Solvency II embedding into BAU

2. Risk Management Function

2.1. Key Risk Categories

The Company defines key risk categories for mapping risk events into meaningful groups. The risk categories align with regulatory requirements, and with the Company's risk profile and activities and are the following:

- Underwriting risk and Reserving Risk
- Credit risk
- Investment (Market) risk
- Operational risk (includes legal and compliance risk)
- Asset Liability risk
- Liquidity risk
- Concentration risk
- Strategic risk
- Reputational risk

The Company's risk categories are further broken into sub-categories of risks that are precise, specific and mutually exclusive. These sub-categories are used for identifying and assessing existing and emerging risk exposures as part in the risk management process and are registered in the Company's risk register. The aggregation of risk exposures into the above categories creates the risk profile of the Company.

2.2. Risk Bearing Capacity

Within the Company, the risk bearing capacity acts restrictively towards the risk appetite, which in turn influences significantly the risk profile. The Company's risk bearing capacity is defined as the amount of financial resources (own funds) after applying certain limitations (subtractions), which can be used to absorb losses that could arise due to the risk profile of the Company, while at the same time they are used to achieve its business goals. The financial resources are classified into capital tiers according to their ability to absorb losses, the deferment or non-payment of the obligation (taxes, outstanding capital amounts or dividends) and their maturity (indeterminate or specific).

2.3. Risk Appetite

The 'risk appetite' of the Company is defined as the level of risk exposure or the level of potential adverse impact of an event that the Company is prepared to take or maintain in a given period. The risk appetite is the size and types of risk that the Company is willing and able to take to achieve its mission, vision and business goals. The Company quantifies its risk appetite using risk measures that are based on the value at risk (VAR) methodology.

The risk appetite is reflected by establishing a sound framework of mitigation techniques. For example, insurance, risk limits, reporting of operational risk events, set up and monitoring of KRIs

(Key Risk Indicators). These measures aim to interpret the risk appetite of the Board and embed it into the operations of the Company. Qualitative limits have been set for areas where the application of quantitative limits is not possible for the monitoring of Operational Risk.

The Company recognizes that the risk appetite is linked to the level of target returns, and thus determines its disposition to take risks both in risk terms and in terms of performance. The risk appetite of the Company is determined under the following conditions:

- (c) Normal business conditions, which are essentially those conditions in which the Company's strategic and business plans hold. Based on this definition, 'normal conditions' may include a financial downturn, in cases where the Company's business plans cover a period of economic downturn or adverse business cycle.
- (d) A scenario of a catastrophic event which could occur once every 200 years (i.e. a probability of 0.5%). The Company establishes its tolerance levels starting from its current financial position (balance sheet) and business plans, and it applies a '1 in 200' stress test to it. Therefore, the Company sets the amount of loss it is willing to accept and the conditions in which it expects it to occur starting from a 'normal' position.

2.4. Risk Limits and Tolerances

Company C manages its risk appetite through a set of **limits**. These are set, not such that they are likely to be fully used, but rather so that limited exceptions are reported. The limits are established at three levels within the Company: (a) The aggregate level looking at the overall risk profile of the Company; (b) The risk category level that sets the aggregate risk appetite at the risk level for each of the key risk categories; (c) Exposure level limits for each risk.

As part of the monitoring process, limits or tolerances for each category of operational risk are set and reviewed. Limits are defined through a collaborative effort from senior management and the Risk Management Function. Risk Metrics, which are commonly known as KRIs, provide a measure of the Company's risk profile. KRIs are measurable metrics or indicators that track exposure or loss. Anything that can perform this function may be considered a risk indicator.

2.5. Operational Risk Management

The process of risk management is capable of identifying measuring and mitigating any risk in relation to internally defined limits. With regards to the management of operational risk, the day to day management process of operational risk within the Company is composed out of four important building blocks as follows: (a) Risk Identification; (b) Risk Measurement; (c) Risk Monitoring and Reporting; (d) Risk Mitigation/Transfer

2.6. Operational Risk Procedures

Company C has implemented a rigorous set of operational risk procedures. An Operational Risk Manual exists and it is owned by the Head of Risk Management Function who is responsible for ensuring that there is a process in place for the appropriate distribution of this document and provision of training on its content to all relevant staff.

2.7. Operational Risk - Processes

- Breach of mandate (e.g. payment of claims not included within the terms of the policy)
- Incorrect/untimely transaction capture, execution, and settlement
- Failure to safeguard client assets
- Under-Reserving (Intentional)
- Under-Pricing, Under-Reserving (Unintentional)

- Compliance issues e.g. not sending the regulatory reporting on time to the supervisory authorities
- Corporate action errors
- Accounting and taxation errors
- Inadequate record-keeping

2.8. Operational Risk - People

- Unauthorised trading
- Insider dealing
- Fraud e.g. claim officer colludes with third parties to defraud the Company
- Employee illness and injury
- Discrimination claims
- Compensation, benefit, and termination issues
- Problems recruiting or retaining staff
- Organised labour activity
- Other legal issues

2.9. Operational Risk - Systems

- Hardware and/or software failure
- Unavailability and questionable integrity of data
- Unauthorised access to information and systems security
- Telecommunications failure
- Utility outage
- Computer hacking or viruses

2.10. Operational Risk - External Events

- Operational failure at suppliers or outsourced operations
- Fire or natural disaster
- Terrorism
- Vandalism, theft, robbery
- Weather

3. Internal Audit

3.1. Internal Audit Function

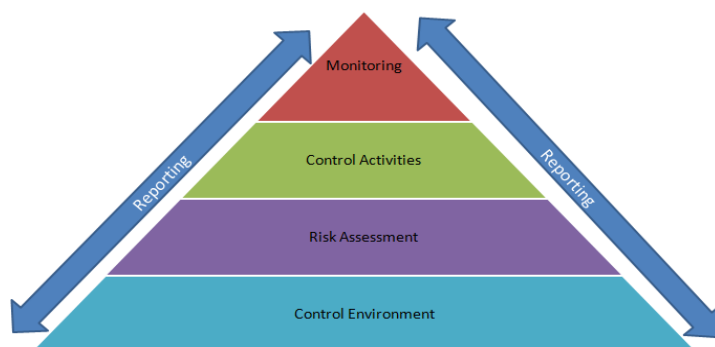
The internal audit function is integrated with the ERM framework and is designed to ensure that ERM is embedded throughout the organisation. It is designed to ensure that Solvency II is embedded throughout the organisation and it prepares formal annual reports for the Board of Directors.

3.2. Internal Control

In accordance with the standardized framework for internal control used by COSO, there are five interrelated components of effective internal control, which are discussed in the following sections:

- Control Environment
- Risk Assessment
- Control Activities
- Reporting
- Monitoring

These are described in the figure below:



3.3. Existence of policies

The Company has appropriate documented policies, procedures, techniques, and mechanisms in place for each of its business areas (e.g. Underwriting, Claims, Reinsurance, Investments etc.) and control functions (Risk, Internal Audit, Actuarial and Compliance). All relevant objectives and associated risks for each significant activity are identified in conjunction with conducting the risk identification process.

Up to date Company policies and procedures are distributed to all relevant personnel, who read and understand them. Management oversees the implementation of the Company's policies and procedures and ensure that control activities are properly applied. Monitoring personnel review the functioning of established control activities and remain alert for instances in which excessive control activities should be streamlined. They act timely on exceptions, implementation problems, or information that requires follow-up. Control activities are regularly evaluated to ensure that they are still appropriate and working as intended.

3.4. Categories of control activities

Top-Level Reviews - The Board and Management regularly review actual performance against budgets, forecasts, and prior period results. Management is involved in developing performance plans and targets and measures and reports results against those plans and targets.

Management Reviews

Head of business units and functions at all business areas review standard performance and exception reports, analyse trends, and measure results against targets on a regular basis.

Information Systems

The Company's Security manual sets the necessary procedure for an effective control of information technology and information security. Key data and programs are appropriately backed up and maintained for business continuity purposes.

Physical Control

The Company's Security manual sets the physical controls employed to secure and safeguard vulnerable assets.

3.5. Performance Measures and Indicators

The Company has established performance measures and key risk indicators throughout the organization at the entity wide, activity, and individual level. The Management periodically reviews and validates the propriety and integrity of both organizational and individual performance measures and risk indicators. Performance measurement assessment factors are evaluated to ensure they are linked to mission, goals, and objectives, and are balanced and set appropriate incentives for achieving goals while complying with law, regulations, and ethical standards.

Actual performance data is continuously compared against expected/planned goals and differences are analysed. Comparisons are made relating different sets of data to one another, the relationships are analysed and corrective actions are taken if necessary. Unexpected results or unusual trends are investigated leading to the identification of circumstances in which the achievement of goals and objectives may be threatened and corrective action is taken. Analysis and review of performance measures and indicators are used, as part of the monitoring and reporting component of the internal control framework, for both operational and financial reporting control purposes.

3.6. Segregation of Duties

Key duties and responsibilities are divided or segregated among different people to reduce the risk of error, waste and fraud. The responsibilities and duties involving transactions and events are separated among different employees with respect to authorization, approval, processing and recording, making payments or receiving funds, review and auditing. The areas of potential conflict are identified, minimized and are subject to careful monitoring by the Compliance and Internal Audit functions. The responsibilities and functions of key personnel are periodically reviewed by the senior management team. They are also reviewed by Compliance and Internal Audit function to ensure that they are not in a position to conceal inappropriate actions.

3.7. Verifications and Reconciliations

The Company has formal verification and reconciliation procedures for ascertaining the accuracy of transaction details and activities. Staff performing verification is independent of those responsible for originating the transaction or preparing the data.

4. Underwriting

4.1. Underwriting Strategy

- The Board defines and reviews the underwriting strategy of the Company taking into account the underwriting and financial environment and macroeconomic factors, the Company's solvency position and the material risks that the company is exposed to. The underwriting strategy considers multiple underwriting horizons (short term and long term) and forms part of the business strategy documentation of the Company.
- The Company's aggregate risk appetite is articulated by the Board of Directors and is documented in the relevant Risk Management Manual. The Risk and Reserving Committee, in cooperation with the RMF have the responsibility to allocate the risk appetite of the Board to risk categories and to define a set of limits that can be used to make the risk appetite operational and embedded within the firm.
- The underwriting risk appetite of the Company expresses the aggregate risk appetite of the Company in way that can be managed operationally i.e. sets tolerance levels and limits for each of underwriting risks identified by the Company.
- The Company aims to minimise the risks from underwriting activity by establishing tolerances per type of allowable exposure and also aggregate limits per type of risk. These limits aim to make explicit the risk appetite of the Board and embed it into the operations of the Company. In addition, the Company sets qualitative restrictions for the management of the underwriting, which are described in the relevant Underwriting Manual.

4.2. Underwriting Procedures

The Underwriting Procedures apply company wide and cover all areas of geographic and functional operation including all distribution channels and in cases where underwriting authority is delegated outside the Company; these procedures include:

- Application for new insurance policy
- Risk acceptance
- Application approval and acceptance limits and rejection of an insurance application
- Policy recording in the system - policy issuance, renewals, amendments
- Applications for Cover Notes for Motor Insurance
- Changes to Renewal Notices
- Policy Endorsements
- Unpaid Policies
- Cancellation procedures
- Reviews on the records in the system
- Internal Audit
- Monitoring of Performance

4.3. Underwriting Controls

Company C has tight underwriting controls, which include automatic capture of underwriting guidelines in the underwriting systems. There is underwriting capacity monitoring, which includes underwriting authority guidelines and automated manager sign-offs. There are controls on the types of business written with strict wording version control on contracts and special reviews are conducted in respect of large risks. The underwriting control systems operate across all entities and enable the aggregation of information across the group and they seek to ensure that the authorised risk appetite and risk/tolerance limits are not breached.

5. Actuarial Pricing

- 5.1. The Pricing Actuary performs regular pricing exercises using GLM (generalised linear modelling) techniques for personal lines, such as motor insurance and home insurance. For other personal lines, the Pricing Actuary would generally apply a 'burning cost' type actuarial pricing methodology.
- 5.2. The Pricing Actuary performs, as a formal service to the relevant stakeholders as and when required, any rate change calculations, sensitivity analyses and stress tests.
- 5.3. The Actuarial Pricing models and reports feed into the integrated company-wide systems that capture (a) technical pricing; (b) exposure information; (c) link to underwriting; (d) link to ERM framework.

6. Catastrophe Modelling

Company C has a limited catastrophe exposure. The Company has been using reinsurers and reinsurance brokers to perform various reinsurance and catastrophe modelling optimisation exercises, whilst ensuring that the in-house data related catastrophe exposures are carefully managed and closely monitored. The Company understand that its reinsurers and reinsurance brokers have access to the market leading proprietary catastrophe models.

7. Capital Modelling

Company uses ALM (Asset Liability Model) methodologies to determine and to monitor its capital requirements on a regular basis. ALM examines all risks requiring the coordination of the Company's assets and liabilities. The risks that are significant in terms of their economic value and which are managed and mitigated in the ALM risk framework include Market Risk and, more specifically, (a) Interest rate risk including variations in market credit spreads; (b) Equity, Property and other asset value risk; (c) Currency Risk; (d) related Credit Risk:

The Company defines its aggregate risk appetite in a way that reflects the Company's risk profile and business strategy. The risk appetite is the size and nature of risks that the Company is willing and able to take to achieve its mission, vision and business goals.

The key objectives of the Company's ALM process are to:

- Manage structural mismatches between assets and liabilities, in particular duration mismatches
- Manage dependencies between risks of different asset and liability classes
- Manage dependencies between the risks of different insurance and reinsurance obligations
- Manage the risks of off balance sheet exposures of the Company including contingent liabilities
- Manage the effect of relevant risk mitigating techniques on short, medium and long term asset liability management

8. Reinsurance

8.1. Partial model issues

The use of a 'partial model' for reinsurance calculations and modelling has increased company C's overall capital requirement. It has therefore been investigating various reinsurance options to limit their overall capital requirement. The reinsurance department are now working on the following issues: (a) Work with brokers to obtain adequate reinsurance cover; (b) The group reinsurance policies are now being reviewed, as it has been difficult to quantify group risk; (c) Pricing actuaries are becoming more involved with the assumptions for reinsurance purchase/pricing.

8.2. Risks arising from risk mitigation activities

The Company is exposed to various risks that arise from the use of risk mitigation techniques. The main types of risks that the Company is exposed to are counterparty default risk, concentration risk, basis risk, operational risk (including legal risk) and liquidity risk specific to the technique. Additionally the Company is exposed to the residual risks after the application of the risk mitigation techniques (i.e. the risks stemming from the retained exposure).

8.3. Use of risk mitigation techniques

The Board defines and reviews the use of risk mitigation techniques as part of the definition of the relevant strategy for underwriting, claims and investments. The Head of Finance (in respect to financial risk-mitigation techniques) and the Head of Operations (in respect of insurance risk-mitigation techniques) are responsible to ensure that various requirements are met including:

- The use of risk mitigation techniques must be supported by financial analysis prior to inception. The Risk Management Department and the Actuarial Function can offer technical assistance and advice for this purpose to the Head of Operations and the Head of Finance.
- The Company must: (a) consider multiple time horizons (short term and long term) for the use of risk mitigation techniques as part of the definition of the relevant strategy for underwriting, claims management and reserving and investments; (b) comply with the Risk Mitigation Risk Limits and with the capacity limits; (c) use only approved reinsurance brokers and reinsurers

8.4. Use of Reinsurance

Responsibility for the management of treaty reinsurance lies with the General Manager. Day to day management of Treaty and Facultative reinsurance is the responsibility of the Reinsurance Officer under the oversight of the Head of Operations.

8.5. Reinsurance and Other Risk Mitigation Risk Limits

The Company aims to minimise the risks from the use of risk mitigation activity by establishing tolerances per type of allowable exposure and also aggregate limits per type of risk. The risk tolerance levels and limits set for risks stemming from the use of reinsurance and other risk mitigation techniques as well as from residual risks are according to the relevant risk limits (e.g. credit, underwriting, sum assured).

9. Reporting

9.1. ORSA Reporting Processes

The ORSA report is the document which is submitted to the supervisory authority, explaining how the Company has implemented and embedded the ORSA process within its business, describing its risk profile and the extent of risk that is prepared to accept as well as the capital that it considers as adequate to be held against all the risks that it is exposed to. The ORSA report reflects the reality of the Company's ORSA as a discipline embedded within the business and it cannot simply be a regulatory compliance exercise.

The ORSA is a component of the overall control system of the Company. This allows the management to take into account all the risks associated with the Company's business strategies and the required level of capital that the Company needs to cover such risks. Company C follows the steps below to implement its ORSA:

1. Define the driving factors before ORSA planning
2. Identify and classify risks, including governance
3. Assessment and measurement of material risks through various approaches (inc. stress testing)
4. Capital Allocation
5. Prepare capital planning for the next 3 to 5 years
6. Stress test and decide on actions in case the risks are crystallized
7. Communicate and document the results
8. Confirm that the ORSA process is embedded in the decision making of the Company.

The above procedure is not independent from the "business as usual" process of the Company. Therefore, the Risk management function reports the Company's risks and stress tests and the Board of Directors and Management make decisions upon the results of these procedures.

9.2. Reporting Processes following Solvency II implementation

The 'reporting' process changes since the Solvency II implementation have included:

- The Actuarial Department has been working more closely with the reinsurance and the underwriting departments, as the actuaries now need to express opinions more formally (e.g. their opinions on the reinsurance and underwriting policies of the Company).
- The Technical Provisions Department has been spending more time to justify their assumptions and document any model changes.
- By switching to best estimate provisions and a separate risk margin, focus has increased on ensuring the best estimate is not volatile. This is leading to a significant time spent on granular reserving, perhaps increasing spurious accuracy.
- The year-end timetable for calculating technical provisions has become more onerous.

10. Reserving

Actuarial reserving is carried out on a deterministic basis. The approved suite of Scenarios, Stress Tests and Shocks is considered on both a deterministic basis and a stochastic basis

11. Data

11.1. Data Policy

In relation to the data used in the calculation of the technical provisions, the IT Function together with the Actuarial Function has established, implemented and maintains a data policy which covers the following areas:

- The definition and the assessment of the quality of data, including specific qualitative and quantitative standards for different data sets, based on the criteria of accuracy, completeness and appropriateness
- The use of assumptions made in the collection, processing and application of data
- The process for carrying out data updates, including the frequency of regular updates and the circumstances that trigger additional updates

11.2. Collection of data

The IT Function in collaboration with the Actuarial Function has compiled a directory of all data used in the calculation of the technical provisions, specifying the source, characteristics and usage of the data in that calculation.

11.3. Evaluation ion of appropriateness, accuracy and completeness

The Actuarial Function assesses whether the information technology systems used in the calculation of technical provisions sufficiently support the actuarial and statistical procedures.

The Actuarial Function is responsible for the coordination of the assessment and validation of the internal data. It is also responsible for the review of the integration of any relevant external data in the calculation of technical provisions, which may be appropriate for the modelling.

11.4. Data Updates

The IT Function has implemented a process for carrying out data updates with regards to the data used in the calculation of the technical provisions.

The scope of the data updates is specified according to the compiled directory of the data used in the calculation of the technical provisions which specifies the source and characteristics of the data.

11.5. Data reporting

The Actuarial Function documents appropriately any material limitations of the data in relation to the requirements of appropriateness, accuracy and completeness, including a description of whether and how such limitations will be remedied and of the functions responsible for this process

12. IT and Operations

12.1. Information Security Standard

Company C adopts the ISO/IEC 27002 Information Security standard's basic requirements as a basis for structuring the approach to information security and the documentation of the relevant information security Policy. The sections covered by ISO/IEC 27002 are the following:

- General Requirements
- Management commitment
- Definition of scope

- Inventory of assets
- Weakness and risk analysis
- Establishment of controls
- Internal audit
- Security forum
- Plan, Do, Check, Act
- Management Review
- Document Control
- Security Policy
- Organisation of Information Security
- Asset Management
- Human Resources Security
- Physical and Environmental Security
- Communications and Ops Management
- Access Control
- IS Acquisition/Development/Maintenance
- Information Security Incident Management
- Business Continuity Management
- Compliance

12.2. ISO Standard Overview

An overview of the ISO standard is depicted in the following diagram:



12.3. Information Systems Management

General Responsibilities. Within the IS management & Security governance model the following key roles and responsibilities exist:

- a) All personnel complete a basic information security education and awareness program. Employees are required to comply with all relevant policies, standards and guidelines that are defined in separate documents.
- b) Line managers are responsible for ensuring compliance with the information security policy, standards and guidelines within their span of control.
- c) Regular formal and informal information security audits of all areas of the business are conducted to confirm compliance.

13. Claims

The claims management procedures for Company C include the following:

- Claims notification and completion of Claims Form
- Registration of claims information/input in electronic system and issuance of claim number
- Creation of claim file
- Initial Claims approval/rejection; Initial Provisions
- Claims handling limits and approval limits
- Investigation of claims -Facts investigation/ Claim monitoring
- Decision for the percentage allocation of the liability (Motor)
- Assignment of claim assessment (by Internal Claims Assessors or External Assessors)
- Setting of claims provisions; Review of invoices against the assessment
- Claims rejections and claims recoveries; Completion of Discharge Form
- Application of Claim Excess
- Claims Payments; Limits and authorizations
- Claims Incurred Abroad (Green Card)
- Total loss and salvage value Claims Process (Motor)
- Setting and monitoring of claims provisions
- Claims closure and archiving; File closure
- Reopening of Claims;
- False Claims and Fraud; Arbitration

14. Finance

- The finance function is responsible for all internal and external reporting of financial information across the company. The Finance function report to the CFO (Chief Financial Officer) of the company.
- It is responsible to produce results on an annual basis that are reported to shareholders and produce an annual report. It also performs the reporting to regulators
- The Finance function has been given responsibility to report on both the IFRS and Solvency II basis. It is also a core function that has responsibility for all Pillar 3 requirements under Solvency II. The results are collated on a quarterly basis.
- The head of the Finance function also holds positions in the Finance Committee, Risk committee and Investments Committee.
- The Board also engages the services of external auditors. The auditors engage the Finance function to carry out their duties.

15. Investment

15.1. Investments Function

- The investments function is in-house. All investment decisions are made by the Investments team, headed by the CIO (who reports to the CEO), with a team of specialists in the main asset categories. Actuarial provide a liability cash flow profile to the Investments function.
- The investment mandate is approved by the Board annually. Investment decisions and risks associated by them are reported to both the Investments Committee and the Risk committee (both sub-committees of the Board) quarterly. Tactical asset allocation changes are approved by the Risk Committee.
- The Board engages external investments consultants to offer advice on the market directions and recommendations of investment strategy. The terms of reference with the Investments function sets out the corridors and rules for when consultation with the Risk function is required when making new investments decisions.
- Market risk is monitored by the Risk function and reports to the Investments Committee, the Risk Committee and the Board on a quarterly basis. Credit Risk is actively monitored by the Risk function and reported to the Board and sub-committees on a quarterly basis. Limits on counterparties are set by the Risk Committee and the CIO is responsible for ensuring that the investment decisions are within these limits. The CRO has some responsibility to change the limits on an ad-hoc basis without Risk Committee approval.

15.2. Investment Risk and Strategy

The Board and Investment Committee define and review the investment strategy of the Company taking into account the financial environment and macroeconomic factors, the Company's solvency position and the material risks that the company is exposed to. The investment strategy considers multiple investment horizons (short term and long term) and forms part of the business strategy documentation of the Company. The Company's decision to invest in specific securities is taken by the Investment Committee based on the risk appetite in the company

The following graph presents the Company's standard investment procedure which is implemented in conjunction with the policies and procedures as per the company's investment risk manual.



Appendix 4

Solvency II BAU for Groups with Centralised Risk Management

The CEIOPS final advice in respect of the Level 2 implementing measures on Solvency II for groups with centralised risk management was issued on 29th January 2010¹⁵.

The general principles underlying Solvency II for “business as usual”, in respect of a general insurance undertaking, are indicated by the following sections that we have extracted from the above-mentioned CEIOPS report.

Note: These general principles are separated out between general insurance undertaking that are perceived to operate “consistent group-wide risk management” versus those that operate “centralised risk management”.

1. Introduction

- a) It is important to differentiate between centralised risk management (CRM) on the one hand and group wide risk management including consistent implementation of the risk management in all undertakings forming part of a group on the other hand.
- b) The requirement to establish an effective risk management on the level of the group as well as the requirement to implement risk management and internal control mechanism consistently in all undertakings included in the scope of group supervision (group wide risk management) are general in scope and applicable to all (re)insurance undertakings in a group without exception.
- c) Centralised risk management is linked to a transfer of tasks relating to risk management from one company to another within an insurance group. However, a subsidiary always remains responsible for the appropriateness of its governance system including risk management at solo level, even if part of a group.
- d) The principles and requirements regarding the governance system on solo level including risk management processes and internal control mechanisms are dealt with in CEIOPS’ Advice to the European Commission on the System of Governance. The Advice on Supervision of Groups with Centralised Risk Management does not provide a conclusive advice on the group governance system, however some issues regarding group governance are considered.
- e) With regard to the opportunity to apply for a single group wide Own Risk and Solvency Assessment (ORSA) and Solvency and Financial Condition Report (SFCR) there is no difference between groups applying to be subject to the supervisory regime pursuant to Articles 238 and 239 and all other groups. In line with the Level I text, all groups can apply for a single group wide ORSA (Article 246(4)) and SFCR (Article 256), independent of the permission to be subject to the supervisory regime pursuant to Articles 238 and 239.
- f) The proportionality principle according to Article 29(3) is considered when assessing the application of a group to be subjected to the supervisory regime pursuant to Articles 238 and 239 of the Level I text. That principle applies also in case of group wide risk management.
- g) As regards changes in the group structure, CEIOPS would like to remember that applying for centralised risk management is an option for the subsidiaries within the group. Not applying for that subsection does not prevent the group to take the necessary measures to integrate that subsidiary in the centralised risk management system and to apply for sub section 6 once this is achieved.

2. Extract from Level 1 Text

- 2.1. Article 44(1)
- 2.2. Article 236
- 2.3. Article 238
- 2.4. Article 239
- 2.5. Article 241
- 2.6. Article 246(1)
- 2.7. Article 246(4)
- 2.8. Article 256(2)

3. Advice

3.1. General Principles of group-wide risk management

3.3. In the Level I text two concepts of risk management approaches are introduced. On the one hand, there is a requirement for a consistent group wide risk management as stated in Article 246 (1). On the other hand, there is the concept of centralised risk management linked to the application of Article 236 of the Level I text.

3.4. CEIOPS considers the two concepts of consistent group wide risk management and centralised risk management not opposing but rather complementary. Consistent group wide risk management has to be applied by all members of a group. If the group subjects all or part of its subsidiaries to subsection 6, this clearly constitutes an addition to an already well-functioning group wide risk management system. Furthermore, CEIOPS considers it crucial that only a well documented and transparent centralised risk management system may qualify for the application of articles 238 and 239 of the Level 1 text. Due to the heterogeneity of group structures and systems, the decision on the application has to be taken on a case by case basis in order to take into account the specificities of each applicant.

3.5. CEIOPS points out that the impact on the policyholder and the supervisory review process is a crucial element when assessing the appropriateness of the organisation of risk management. Therefore, no decision taken shall harm interests of policyholders or should result in a breach of regulatory regulations.

3.6. A summary of the requirements of consistent group wide risk management and centralised risk management is attached in a table in **Annex 1**.

3.2. Principles of Consistent Group Wide Risk Management

3.9. According to Article 246(1) of the Level 1 text the governance requirements set out with respect to solo undertakings shall apply mutatis mutandis at the level of the group. This implies that the ultimate parent undertaking is – without prejudice to its proper obligation to have in place a robust governance system at solo level – required to establish an effective system of governance at the level of the group which provides for sound and prudent management of the group business. This section does not constitute a conclusive Level II advice on the requirements of a group governance system. Nevertheless the views mentioned consecutively outline CEIOPS general view on governance issues on group level.

3.10. In addition, Article 246(1) second subparagraph of the Level 1 text requires the risk management and internal control systems and reporting procedures to be implemented consistently in all undertakings included in the scope of group supervision pursuant to points (a) and (b) of Article 213 (2) so that those systems can be controlled at the level of the group.

3.11. A “consistent” implementation means that all relevant processes and procedures are implemented coherently within the whole group. This ensures a common understanding of the needs

for functioning and reporting of risk management and enhances comparability and the quality of results. However, consistency does not mean that local or/and entity specificities should be disregarded.

3.12. Each insurance or reinsurance undertaking is required to have in place an adequate risk management system on solo level. This responsibility is not diminished by the fact, that an insurance or reinsurance undertaking is part of an insurance group according to Article 213.

3.13. It's the responsibility of the ultimate parent undertaking to ensure consistent implementation and an on-going monitoring of the risk management systems in all individual undertakings of the group. This also implies that appropriate tools and procedures enabling the parent undertaking to oversee and steer the functioning of risk management systems at solo level are in place.

3.14. A risk management system on group level (group wide risk management system) has to be suitable, effective and proportionate to the nature, structure, scale and complexity of the group's business and the risks inherent in this business.

3.15. Special focus must be given to group specific risks and interdependencies of risks, as well as to the impact of intra group transactions and risk concentrations.

3.16. Risk management is a continuous process that should be used in the implementation of the group's overall strategy and should allow an appropriate understanding of the nature and significance of the risks to which the group and its individual undertakings are exposed to.

3.17. Decisions taken by risk management on group level shall always consider the impact on the group's risk situation to ensure that group's solvency and financial situation are not jeopardized. Certainly, this applies to both, solo and group level at the same time.

3.18. In order to ensure the effectiveness and consistency of group wide risk management, the processes and procedures should be regularly - at least annually - evaluated and if necessary adjusted (e.g. if changes in the group structure take place). This is especially important if changes in the group structure take place. The set up as well as the regular evaluation of the group wide risk management should not only follow on a top down, but also a bottom up approach.

3.19. According to Article 246(1), the requirements for a system of governance shall apply *mutatis mutandis* at the level of the group. Consequently, the requirements for risk management (including the establishment of certain key functions) also apply *mutatis mutandis* at group level. In addition to that, an effective and consistent group wide risk management system should comprise at least the following:

A. Risk Management Function

3.20. The ultimate parent undertaking should provide for a risk management function at group level, which is equipped with competent personnel resources (Fit and Proper requirements) and adequate systems. The establishment and tasks of the risk management function at group level should be in line with the solo requirements as referred to in CEIOPS' Advice to the Commission on Level 2 implementing measures for the system of governance.

B. Risk Management Strategy

3.21. The ultimate parent undertaking should have a comprehensive group wide risk management strategy, which lays out the objectives and key risk management principles of the group's risk management and has to be consistent with the group's overall business strategy. This group wide risk management strategy has to be properly documented and further specified via policies which should be distributed to all relevant undertakings to ensure their implementation in day-to-day business at solo level.

3.22. Although each individual undertaking is responsible for its risk management strategy at solo level, it's the responsibility of the ultimate parent company to ensure the alignment of the individual risk management strategies with the group wide risk management strategy. Furthermore, the ultimate parent undertaking should demonstrate how the group wide risk management strategy impacts each regulated undertaking included in the scope of group supervision.

C. Adequate Written Policies

3.23. The ultimate parent company should have written policies at group level that ensure that the definition, categorisation and assessment of material risks as well as the reporting procedures are harmonised within the group. These written policies should be the basis for the written policies used by the individual undertakings on solo level as referred to in CEIOPS' Advice to the Commission on Level 2 implementing measures for the system of governance.

3.24. Harmonised policies are necessary to ensure, that the assessment, management and reporting of risks is comparable within the group and that an effective control of the risk management systems can be carried out on group level.

D. Processes and Procedures

3.25. Appropriate processes and procedures which enable the ultimate parent undertaking to identify, measure, manage and monitor the risks the group is or might be exposed to need to provide for a sufficient link with corresponding reporting processes and procedures implemented on solo level.

E. Internal Reporting

3.26. In order to ensure consistent implementation of risk management systems, the ultimate parent undertaking has to have access to all relevant information. Therefore, appropriate reporting procedures and feedback loops that ensure that information on the risk management systems of the individual undertakings is collected and monitored on group level, have to be implemented. The reporting will in particular account for risk concentration and intra-group transactions.

F. Group Own Risk and Solvency Assessment (ORSA)

3.27. The ultimate parent undertaking should develop an appropriate own risk and solvency assessment (ORSA) process³ at group level and undertake at the level of the group this assessment as required by Article 246(4) first subparagraph.

G. Emergency Planning and business continuity management

3.28. An important element of group wide risk management is adequate emergency planning and business continuity management. The main objective of emergency planning is to ensure, that essential business processes are not interrupted in a serious manner in the case of internal or external threats and that the economic existence and business continuity of the group is safeguarded. Emergency Planning includes well planned and organised procedures in order to enhance the stability and robustness of the undertaking and allows for quick and effective action in case of emergency situations. A precondition for sound emergency planning is an in-depth analysis of all business processes that are essential for maintenance of operations and an analysis of any potential impact of a default (Business Impact Analysis). Emergency planning therefore at least includes a comprehensive description of potential threats, procedural standards and guidelines as well as control mechanisms.

H. Internal Control System on group level

3.29. The group wide risk management system should be supported by a suitable, comprehensive and consistent internal control system. Internal control is a set of continually operating processes involving the administrative, management or supervisory body and all level of personnel of the individual undertakings and the group.

3.30. According to Article 246(2) of the Level 1 text this group internal control mechanism shall include at least adequate mechanisms as regards group solvency to identify and measure all material risks incurred and to appropriately relate eligible own funds to risks as well as sound reporting and accounting procedures to monitor and manage the intra-group transactions and the risk concentration.

3.31. The requirements for internal control as stipulated in CEIOPS' Advice to the Commission on Level 2 implementing measures for the system of governance should also apply at group level. In order to ensure consistency at group level and the inclusion of all relevant business areas and functions, the ultimate parent undertaking should provide a general framework for the internal control system that takes into account the scale, nature and complexity of the group and its undertakings.

3.32. Appropriate and effective group internal control mechanisms have to ensure that in particular risk concentration and intra group transactions are adequately assessed, monitored and reported, also taking into account various inter-linkages and interdependencies between group members.

3.33. In order to allow an efficient information flow and transparency of decision making processes within the group, compatible IT-systems and IT interfaces are an important basis for group internal control mechanisms.

3.34. The ultimate parent undertaking shall strengthen the internal control awareness among group members by introducing a strong control culture and demonstrating to all levels of personnel the importance of internal control.

I. Group Internal Audit

3.35. A group internal audit function should be established at the top level of the group. The group internal audit has to be objective and independent of all operational functions on solo and group level (including the risk management function).

3.36. The group internal audit function should at least annually produce a written report on its findings to be submitted to the administrative, management or supervisory body of the subsidiary as well as the ultimate parent undertaking and the group respectively. The report shall cover at least any deficiencies with regard to the efficiency and suitability of the internal control system, as well as major shortcomings with regard to the compliance with internal policies, procedures and processes. It shall include recommendations on how to remedy inadequacies and also address past points of criticism.

3.37. The principles for the internal audit function at solo level as laid down in CEIOPS' Advice to the Commission on Level 2 implementing measures for the system of governance should also apply at group level. Furthermore, the tasks of the group internal audit should include the harmonisation of the auditing standards within the insurance group and the examination and evaluation of the group internal control system. Moreover, the group internal audit should assess the proper functioning of the internal auditing units of the individual undertakings of the group.

J. Compliance Function

3.38. At solo level, a compliance function has to be set up, in order to advise the administrative, management or supervisory body on the compliance with applicable laws and regulatory requirements. This compliance also has to be ensured at group level (e.g. by establishing a group compliance function).

K. Actuarial Function

3.39. In line with the requirements for solo undertakings, a group actuarial function should be established at group level. In line with the solo requirements as laid down in CEIOPS' Advice to the Commission on Level 2 implementing measures for the system of governance, the group actuarial function has to assess the general suitability of the methodologies or underlying models for the calculation of technical provisions used within the group and ensure their consistency. Moreover, the consideration and treatment of group specific risks as far as they are related to technical provisions has to be accounted for by the group actuarial function.

L. Management of liquidity

3.40. The group should have in place a framework for the group-wide management of liquidity, taking into consideration especially situations of financial disruption and their impact on group and solo undertakings.

3.41. The framework shall include clear agreements governing the usage of excess funds, supervision of each participant's financial status and regular stress and transferability testing. Furthermore the prudent person principle shall be adhered to in a system of liquidity management (e.g. pooling of excess liquidity).

3.3. Principles of Centralised Risk Management

3.60. The application of the rules laid down in Subsection 6 implies certain benefits for insurance undertakings. A well document centralised risk management system may have a positive effect regarding the groups' standing on the market. According to CEIOPS' view, a more detailed decision making process between supervisors is one of the main benefits. Furthermore, information already gathered in the application for centralised risk management may result in a better understanding of group processes by supervisors and may therefore be considered during the group's application for the approval of an internal model.

3.61. The principal condition for obtaining the permission to be subject to the supervisory regime pursuant to Articles 238 and 239 is that risk management processes and internal control mechanisms of the parent undertaking cover the subsidiary. This is a more specific requirement than the general requirement to establish an effective risk management mechanism at the level of the group as well as the requirement to implement risk management, internal control mechanism and reporting procedures consistently in all undertakings of a group as laid down in Article 246(1) of the Level 1 text.

3.62. Consequently, the establishment of centralised risk management goes beyond the requirement of Article 246(1) of the Level 1 text according to which the risk management, internal control systems and reporting procedures must be implemented consistently so that those systems can be controlled at the level of the group. Therefore, the implementation of centralised risk management is only applicable for subsidiaries (in line with the definition of subsidiaries according to Article 13(16) of the Level I text).

3.63. In CEIOPS' view, the condition laid down in Article 236 point b of the Level 1 text is met if material tasks in relation to risk management and internal control are transferred substantially from the subsidiary to the ultimate parent undertaking. However, this explicitly does not mean, that any kind of responsibility is removed from the subsidiary.

3.64. All requirements set out in this advice must be adhered to on application and on a continuous basis while applying the relevant articles. Any significant changes have to be reported immediately to all supervisors concerned. The supervisors concerned include the group supervisor as well as the relevant competent solo supervisors.

3.65. In addition to the principles of group wide risk management, the following requirements for centralised risk management system should be fulfilled:

A. Risk Management Function

3.66. The scope of the risk management function at group level under subsection 6 is enlarged by those tasks related to risk management that are transferred from the subsidiary to the parent undertaking.

B. Risk Management Strategy

3.67. The development and implementation of a comprehensive risk management strategy at group and solo level should lie with the ultimate parent undertaking.

C. Adequate Written Policies

3.68. The ultimate parent undertaking has to set up comprehensive written policies that illustrate the risk management strategy and its implementation on group and solo level, also considering national specificities of the subsidiaries involved.

D. Processes and Procedures

3.69. The ultimate parent undertaking has to implement appropriate processes and procedures which enable it to identify, measure, manage, monitor and report the risks the group and its individual undertakings are or might be exposed to. These processes should also take into account specificities of individual solo undertakings and their impact on the solo and group risk profiles.

E. Internal Reporting

3.70. The ultimate parent undertaking should implement adequate reporting procedures to ensure a regular exchange of information with the solo insurance undertakings on all relevant issues regarding risk management. Information asymmetries between group and solo level should be avoided.

F. Own Risk and Solvency Assessment (ORSA)

3.71. The ultimate parent undertaking shall undertake the ORSA at the level of the group and at the level of all subsidiaries forming part of a group with centralised risk management at the same time, and shall produce a single document covering all the assessments as indicated in Article 250(4) third subparagraph of the Level 1 text.

G. Emergency Planning and business continuity management

3.72. Emergency Planning routines as stipulated under 3.28 have to be set up covering all solo entities subject to the subsection and the group as a whole.

H. Internal Control System on group level

3.73. According to Article 236 point b of the Level 1 text, the internal control mechanisms of the parent undertaking have to cover the subsidiary. The centralisation of risk management has an impact on the general internal control framework because of a shift of tasks. Therefore, the design and implementation of the internal control mechanism have to be adapted accordingly in order to ensure their effectiveness and well functioning.

I. Group Internal Audit

3.74. The same requirements as set out in 3.35 to 3.37 apply.

J. Compliance Function

3.75. The ultimate parent undertaking has to implement appropriate processes and procedures in order to manage the risk of non-compliance of the group and its individual undertakings. Adequate skills have to be maintained at solo-level, as the local legal framework may vary between member states (e.g. company law, tax law).

K. Actuarial Function

3.76. The same requirements as set in 3.39 have to be adhered to. Under centralized risk management tasks related to actuarial issues associated with the solo undertaking might be carried out by the group actuarial function. However, adequate actuarial skills have to be maintained at solo level, as technical provisions and methodologies used are very closely linked to local market conditions.

L. Management of Liquidity

3.77. The same requirements as set in 3.40 and 3.41 have to be adhered to. It has to be emphasised, that the disposition over its funds must be guaranteed by the parent company for every single undertaking applying subsection 6 under all circumstances.

Annex 1 – Comparison of requirements between consistent group wide risk management and centralised risk management

	Consistent group wide risk management	Centralized risk management
A. Risk management function	The ultimate parent undertaking should provide for a risk management function at group level, which is equipped with competent personal resources (Fit and Proper requirements) and adequate systems.	The scope of the risk management function at group level under subsection 6 is enlarged by those tasks related to risk management that are transferred from the subsidiary to the parent undertaking.
B. Risk management strategy	The ultimate parent undertaking should have a comprehensive group wide risk management strategy in place and ensure the alignment of the individual risk management strategies with the group wide risk management strategy. Furthermore, the ultimate parent undertaking should demonstrate how the group wide risk management strategy impacts each regulated undertaking included in the scope of group supervision.	The development and implementation of a comprehensive risk management strategy on group and solo level should lie with the ultimate parent undertaking.
C. Adequate written policies	The ultimate parent company should have written policies at group level that ensure that the definition, categorisation and assessment of material risks as well as the reporting procedures are harmonised within the group.	The ultimate parent undertaking has to set up comprehensive written policies that illustrate the risk management strategy and its implementation on group and solo level, also considering national specificities of the subsidiaries involved.
D. Process and procedures	Appropriate processes and procedures which enable the ultimate parent undertaking to identify, measure, manage and monitor the risks the group is or might be exposed to need to provide for a sufficient link with corresponding reporting processes and procedures implemented on solo level.	The ultimate parent undertaking has to implement appropriate processes and procedures which enable it to identify, measure, manage, monitor and report the risks the group and its individual undertakings are or might be exposed to. These processes should also take into account specificities of individual solo undertakings and their impact on the solo and group risk profiles.
E. Internal Reporting	In order to ensure consistent implementation of risk management systems, the ultimate parent undertaking has to have access to all relevant information.	The ultimate parent undertaking should implement adequate reporting procedures to ensure a regular exchange of information with the solo insurance undertakings on all relevant issues regarding risk management. Information

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		asymmetries between group and solo level should be avoided.
F. Own risk and solvency assessment	The ultimate parent undertaking should develop an appropriate own risk and solvency assessment (ORSA) process at group level and undertake at the level of the group this assessment as required by Article 246(4) first subparagraph. According to Article 246 (4) third subparagraph, it is also possible to have one document covering the assessment on solo and group level.	The ultimate parent undertaking shall undertake the ORSA at the level of the group and at the level of all subsidiaries forming part of a group with centralised risk management at the same time, and shall produce a single document covering all the assessments as indicated in Article 246(4) third subparagraph of the Level 1 text.
G. Emergency planning and business continuity management	The main objective of emergency planning is to ensure, that essential business processes are not interrupted in a serious manner in the case of internal or external threats and that the economic existence and business continuity of the group is safeguarded.	Emergency Planning routines as stipulated under 3.54 have to be set up covering also all solo entities subject to the subsection and the group as a whole.
H. Internal control System	The ultimate parent undertaking shall strengthen the internal control awareness among group members by introducing a strong control culture and demonstrating to all levels of personnel the importance of internal control. The group wide risk management system should be supported by a suitable, comprehensive and consistent internal control system.	According to Article 236 point b of the Level 1 text, the internal control mechanisms of the parent undertaking have to cover the subsidiary. The centralisation of risk management has an impact on the general internal control framework because of a shift of tasks. Therefore, the design and implementation of the internal control mechanism have to be adapted accordingly in order to ensure their effectiveness and well functioning.
I. Group internal Audit	A group internal audit function should be established at the top level of the group. The group internal audit function has to be objective and independent of all operational functions on solo and group level (including the risk management function). The group internal audit function should at least annually produce a written report on its findings to be submitted to the administrative, management or supervisory body of the subsidiary as well as the ultimate parent undertaking and the group respectively. The report	The same requirements as set out in 3.56 apply.

Appendix 5

Prudential Regulation Authority: Our Approach to Insurance Supervision

The Bank of England and the FSA have issued, in June 2011, a joint report on “Our Approach to Insurance Supervision”. This report includes some interesting observations on the lessons that can be learned from recent financial crises. We have used this report to inform our views on the stress scenarios that should be considered for the purposes of our case study companies, namely the notional companies A, B and C.

Relevant extracts from the joint report by The Bank of England and the FSA are shown below.

Box 1

Lessons from previous episodes of insurance distress

In setting out the PRA’s approach to insurance supervision, the Bank and the FSA have looked closely at the lessons arising from previous episodes of insurance company distress. Those cases included the problems in the London insurance market in the 1970s and 1980s; those culminating in Equitable Life’s closure to new business in 2000; the insolvencies of HIH Group and Independent Insurance Limited in 2001; and the bailout of AIG Group during the recent financial crisis.

Although some lessons are bespoke to individual cases, a number of themes recur. Some of the key lessons for prudential regulators are summarised below.

- a) The importance of the adequacy of reserves to guard against shocks in a variety of scenarios, and the ability of firms to reassess their reserves or technical provisions in the light of new information. Inadequacy of reserves was an underlying issue in the majority of cases reviewed, including the London insurance market, which struggled to meet claims from asbestos and catastrophes such as Piper Alpha and Hurricane Andrew; and Equitable Life, which did not have adequate reserves to meet terminal bonuses to policyholders.
- b) The importance of scrutinising firms’ business models, with particular attention to areas growing unusually quickly, as in the case of HIH Group and Independent Insurance. Both attracted business through aggressive pricing in order to compete for market share, but they had not set aside sufficient reserves to meet future claims. The case of Equitable Life also underlined the importance of ensuring that a firm’s business model does not run ahead of its capital-raising potential, and highlighted the importance of understanding a firm’s scope to raise further capital.
- c) The importance of strong corporate governance and, particularly, a board that provides adequate challenge to management.
- d) A full understanding by firms of the risks created by their own products and by their exposures to other areas such as reinsurance and non-insurance business (such as securities lending), including risks arising out of the activities of other group companies.
- e) The importance of consolidated supervision, and specifically, the importance of taking account of all the risk-carrying financial activities in a regulated firm and the group of which it is a part, when considering the risks posed by a firm. This was a lesson highlighted most acutely in the case of AIG Group which had become involved in activities more typically undertaken by banks (the sale of CDS and the investment of proceeds from securities lending).

Box 2

The FSA's implementation of Solvency II

For the majority of insurers, a new regulatory framework is being introduced via the Solvency II Directive. This is currently expected to come into force on 1 January 2013. Implementing the Directive is a challenge for the FSA and firms, in part reflecting the current absence of complete clarity about the full requirements of the regime. The FSA's intended approach to the implementation of Solvency II was explained at a conference in April, which set out a programme of work to be delivered before 1 January 2013.

Box 3

Proactive Intervention Framework

The PRA will establish a Proactive Intervention Framework (PIF) to encompass all the institutions it regulates. This framework will have two key purposes. First, it will support early identification of risks to a firm's viability and ensure that firms take appropriate remedial action to reduce the probability of failure. Second, it will flag actions that the authorities will need to take in advance to prepare for the resolution of a firm. This will include co-ordination with the FSCS as operator of the insurance compensation scheme. To guard against regulatory forbearance, where actions expected in a particular stage had not been taken, supervisors would report to PRA senior management.

The PIF is expected to have five clearly demarcated stages. The judgement on where to place a firm within a particular stage will be based on an assessment of the firm's viability in both current and future states of the world. There will not be a mechanical reliance on backwards-looking indicators.

The assessment of where a firm sits in the PIF will be undertaken as part of the on-going supervisory process and will reflect, among other things, a firm's expected financial strength in stressed circumstances. It will be revisited in response to specific concerns arising in the external environment in which a firm operates — for example, in response to a sectoral risk identified by the FPC (Financial Policy Committee). Firms will, as a matter of routine, be made aware of where they sit in the framework.

If the PRA judges risks to a firm's viability to be low, the firm will be in Stage 1 of the PIF. This implies a normal level of supervisory monitoring and actions. As a firm moves through each stage of the PIF, the intensity of supervisory monitoring and the intrusiveness of supervisory actions will increase, and contingency planning will be stepped up.

The table below describes how a firm might move through the PIF and the presumed actions that might be taken at each stage. The PRA's approach will be consistent with European and other international regulatory requirements, including Solvency II's 'ladder of intervention'.

Table A Stages in the PIF

Stage	Presumed actions
Stage 1 – Low risk to viability of firm Supervisors may have identified vulnerabilities in a firm's financial position or deficiencies in its risk management and/or governance practices.	<ul style="list-style-type: none"> — Firm subject to the normal supervisory risk assessment process and required to plan for stressed conditions and identify appropriate recovery actions or exit strategies. — The PRA to assess firm resolvability.
Stage 2 – Moderate risk to viability of firm Supervisors may have identified vulnerabilities in a firm's financial position or deficiencies in its risk management and/or governance practices.	<p><i>Recovery</i></p> <ul style="list-style-type: none"> — The intensity of supervision would increase and the firm would be required to reassess the appropriateness of recovery actions and exit strategies. — The PRA might set additional reporting requirements, and make use of information gathering and investigatory powers. — The PRA would review the firm's risk profile and the regulatory capital requirements and consider realigning the latter, as well as setting restrictions on the firm's activities until remedial actions have been completed. <p><i>Resolution</i></p> <ul style="list-style-type: none"> — The PRA would identify and instigate any initial contingency planning needed, potentially including information gathering and liaison with the FSCS.
Stage 3 – Material risk to viability of firm Significant threats to a firm's financial safety or soundness may have been identified.	<p><i>Recovery</i></p> <ul style="list-style-type: none"> — The firm would be required to submit a realistic recovery plan designed to address specific current problems and to initiate recovery actions in a timely manner to address the vulnerabilities identified. Actions may include: capital raising; asset disposal; business transfer or sale of the firm; and reduction of contracts. — Other actions the PRA might require may include: changes to management and/or composition of the board; limits on asset disposal/acquisition or capital distribution; restrictions on existing or planned activities; a limit on balance sheet growth; and an assessment of the effectiveness of risk transfer arrangements such as reinsurance. — At firm or PRA initiative, a firm's authorisation to carry out new business might be removed. <p><i>Resolution</i></p> <ul style="list-style-type: none"> — The PRA would intensify contingency planning for resolution. — The PRA would co-ordinate with FSCS to ensure it obtained the information necessary (including on data quality and payment systems) to evaluate continuity of cover or payout options (this will include an assessment of the potential exposure of the FSCS).
Stage 4 – Imminent risk to viability of firm The position of a firm may have deteriorated such that the PRA assesses there is a real risk the firm will fail to meet requirements for ongoing authorisation.	<p><i>Recovery</i></p> <ul style="list-style-type: none"> — In most cases, the PRA would remove the firm's authorisation to write new business. — Firm to accelerate and complete recovery actions in short-order, demonstrating to the PRA that these have mitigated the imminent risk to the viability of the firm. <p><i>Resolution</i></p> <ul style="list-style-type: none"> — The PRA, working with the FSCS, would complete all necessary actions for resolution of the firm including planning for commencement of orderly liquidation or administration and with the assistance of the insolvency practitioner in waiting.
Stage 5 – Resolution / winding-up under way	<p><i>Resolution</i></p> <ul style="list-style-type: none"> — As necessary, the PRA would trigger the appropriate insolvency process and the insolvency practitioner would work with the FSCS and PRA to effect continuity of cover and/or compensation to eligible claimants. — As appropriate, the PRA would monitor firms exiting the system.

III Risk assessment framework

34. The PRA will concentrate its resources and actions on those insurance firms and issues that pose the greatest risk to policyholders and those that pose the greatest risk to the stability of the UK financial system. The risk assessment framework for insurers will operate in a different way to banks, reflecting the PRA's additional objective to protect policyholders, the different risks to which insurers are exposed, and the different way in which insurers fail.

35. As illustrated in Figure 1, the framework will capture three key elements:

- (a) potential impact on policyholders and the financial system of a firm coming under stress or failing — for example, would the failure of a firm disrupt the income flow of policyholders, and might it (directly or indirectly) disrupt the provision of financial services to the economy as a whole;
- (b) how the macroeconomic and business risk context in which a firm operates might affect the viability of its business model — for example, its vulnerability to changes in mortality; and
- (c) mitigating factors, including risk management and governance (operational mitigation), a firm's financial strength, including its solvency position (financial mitigation), and resolvability (structural mitigation) — which together determine the safety and soundness of a firm — that may reduce the potential risk a firm poses to policyholders and to the stability of the financial system.

36. This risk assessment framework contains material, important innovations, notably the focus on potential impact as well as probability of failure, and on resolvability.

Potential impact on policyholders and the system

37. Considerable emphasis will be placed on assessing the channels for a firm's potential impact on policyholders and the stability of the system, including in times of wider stress.

38. The potential impact of a firm on policyholders will take account of its size (the number of policyholders) and the nature of the services it provides, thus capturing the disruption to policyholders were they no longer to be covered by existing policies and were there to be no substitute policies available. The assessment of impact on policyholders will differ across the different types of insurers regulated by the PRA. For example, for insurers offering annuities products, disruption to policyholders caused by any delay in receipt of, or absence of, annuity income will be taken into account. For insurers offering products such as motor or aviation insurance, the measure of impact would need to incorporate the potential disruption to motorists/air travel if they were unable to operate as usual.

39. The assessment of potential impact on the stability of the system will capture impairment to the capacity of the financial system as a whole to carry out activities important to the functioning of the economy, in particular the provision of payment services (including access to funds), credit and risk transfer.⁽¹⁾ Thus it will cover not just the impact arising from the provision of insurance services themselves, but also that arising from activities related to their insurance business (such as stock lending) and from the role that insurers play in channelling funds within the financial system. Impact will reflect an institution's size, substitutability of services and interconnectedness with other parts of the system, and in assessing impact the PRA will draw on the analysis of systemic risk undertaken in the rest of the Bank, including for the FPC.

Figure 1 The risk assessment framework

Gross risk			Safety and soundness				
1. Potential Impact	2. Risk context		3. Operational mitigation	4. Financial mitigation		5. Structural mitigation	
Potential Impact	External context	Business risks	Risk management and controls	Management and governance	Liquidity	Capital	Resolvability

(1) Consistent with the definition of financial stability described in Bank of England Annual Reports.

Risk context: external and business risks

40. Risk context will be assessed for insurers in a similar manner to banks. The PRA will consider whether and how the wider external macroeconomic and business context may affect the execution of a firm's business model in a variety of different scenarios. This will draw on the FPC's view of the macro-prudential environment, on market intelligence and other external sources, and on actions being taken by the FCA with the potential materially to affect prudential soundness. For firms operating in the Lloyd's market, the Society of Lloyd's will be an additional source of information.

41. In reaching this assessment, the PRA will require a clear understanding of a firm's business model, including the key drivers of, and threats to, its viability. The PRA will, for example, wish to understand whether the firm has expanded into innovative, non-traditional insurance activities that pose particular risk to the PRA's objectives.

Mitigating factors: safety and soundness

42. The PRA will assess factors that have the potential to mitigate the adverse impact a firm may have on policyholders and the stability of the financial system.

43. Assessing a firm's **financial strength** will be central to this. This will include assessing the level of capital held and the firm's ability to raise more; the reserving of general insurers and the adequacy of technical provisions for life insurers; profitability of underwriting (e.g. by scrutinising the claims and other performance ratios of general insurance firms); whether the firm is exposed to particular concentrations of risk (including to particular loss events or large/clustered exposures); the approach to liquidity management (including contingency planning); and the adequacy of key assumptions (for example, discount rates being applied to technical provisions and life insurance firms' longevity assumptions). In assessing financial strength, the PRA will also seek to consider whether the firm has plausible recovery actions that it could take, including in times of general market stress.

44. The quality of a firm's **risk management and governance** will also be evaluated. This will include an assessment of the adequacy, effectiveness and integrity of risk management, systems and controls, culture, governance and the competence of senior management. In reaching this assessment, the PRA will consider how the board operates and the effect that incentive and remuneration structures may have on regulatory outcomes. For insurers operating with-profits funds, consideration will be given to the firm's governance in determining distributions to policyholders, and how these are balanced with the firm's solvency.

45. To assess **resolvability**, the PRA, working with the FSCS as appropriate, will assess whether an insurer could be resolved or wound up in an orderly manner. Such an assessment would depend on the insurer's structure and activities and would take account of the consequences both for the stability of the system and for policyholder protection.

IV Supervision

46. The PRA's supervision will be delivered within an international context. Its supervisory approach will be consistent with international obligations, particularly those to be set out under Solvency II.

Approach to supervision

47. The PRA's approach to supervision will be based on forward-looking judgements, with early supervisory interventions taken, aimed at ensuring that its objectives are met. A key element of the PRA's supervisory approach will be to recognise the important role played by a firm's management, internal audit, board, shareholders, creditors and external auditor and actuary in ensuring firms are run prudently. To support that, the PRA will seek to engage in constructive dialogue with a firm's management, board, auditor and actuary. The PRA will also seek to enhance the information available to shareholders and creditors to enable them to provide an effective source of discipline over firms. The PRA's interventions will not, however, be designed to reduce risks to shareholders.

48. Across all insurers, the PRA will seek to ensure there is a reasonably high probability that policyholder claims and obligations can be met as they fall due. This will require different levels of supervisory activity across different firms.

49. All firms will be subject to a baseline level of supervisory monitoring, which will involve ensuring compliance with prudential standards for capital, liquidity, asset valuation, provisioning and reserving. At least annually, there will be a review of the risks to the PRA's objectives from a firm or its sector. The PRA will also seek to assess a firm's planned recovery actions and how it might exit the market in a way consistent with its objectives. Where appropriate, early interventions driven by the Proactive Intervention Framework (PIF) will be taken (see Box 3).

50. Beyond baseline monitoring, the nature and intensity of the PRA's supervisory approach will be commensurate with the level of risk an insurer poses to the PRA's statutory objectives. Some insurers will, due to their very size, complexity and nature of business, pose only limited risks. For such firms, the PRA's approach will be proportionate: for example, it is likely that business model analysis would be largely undertaken at the level of the sector, supported by additional work on individual firms in the event that risk crystallised. The PRA's approach will also be tailored to recognise the different risks that arise across the varied set of insurance companies it supervises, particularly taking account of the differences across life and general insurance companies.

51. For those insurers posing greatest risk to the PRA's objectives, the supervisory approach will be more intensive but still focused. This will include: evaluation of a firm's business model in order to assess the key risks in the short and medium term; desk-based analysis of a firm's financial strength; and stress testing against a range of possible future states of the world, including extreme scenarios. Supervisors will assess a firm's governance arrangements; its risk management policies and procedures; and its possible recovery options and exit strategies. ...

52. To enable the PRA to form an independent judgement of the key risks posed by a firm, its **supervisors will need to have access to accurate information**. The PRA will therefore periodically verify firms' data and risk management systems, either on-site or using third parties such as external auditors. It will, of course, remain insurers' own responsibility to ensure that they have appropriate systems in place to run their business prudently.

53. The work of firms' supervisors will be supported by in-house risk specialists (including actuaries) to deliver robust analysis, focused on key risks to the business. Senior management will oversee risk assessments and supervisory interventions for insurers, with key decisions subject to review by insurance specialists. For those firms posing the largest risk to the PRA's objectives, formal meetings between PRA senior management and CEOs will form part of this process. The results of supervisory assessments, as well as proposed remedial actions, will be subject to rigorous and independent challenge within the PRA before communication to firms.

Supervisory assessment

54. For UK firms, the PRA's assessment will cover all relevant entities within the consolidated group. To support this role, the PRA will seek to maintain effective working relationships and information flows with other relevant regulators, including the FCA and local regulators of the overseas businesses. This will be supported through Memoranda of Understanding and supervisory college arrangements.

55. The PRA's approach to the supervision of international insurers is covered in paragraphs 81 to 85.

Business risk

56. Business risks will be assessed at sectoral level and at the level of the individual firm. Supervisors will need to understand a firm's **business model** and assess its viability. To do that, they will need to understand key vulnerabilities to the business model, across a range of future scenarios. Assessing low probability risks will play a key role within this, given the nature of insurance business, and the potential for such risks to have high impact.

57. Peer analysis will form a key part of the PRA's assessment approach, highlighting where business strategies and risks may differ from those of peers in specific sectors. This will be supported by analysis of sectoral/macro risks, as highlighted by and to the FPC.

Financial strength

58. The PRA will assess a firm's financial strength to analyse the adequacy of its **solvency** position on a forward-looking basis, including in times of stress when asset valuations may become strained and the adequacy of reserves is in consequence strained. Particular emphasis will be placed on reviewing a firm's approach to **reserving**. The PRA will ensure that insurers have a robust approach to the setting of reserves and that there is appropriate and adequate oversight of reserving processes. **Underwriting** concentrations and performance will also be considered, including reviewing longevity and discount rate assumptions. Supervisors will assess whether insurers are properly funded and whether they are able to meet their obligations as they fall due.

59. **Forward-looking stress testing** may be undertaken to assess a firm's financial strength in the event of different scenarios, including extreme events. As well as reviewing the outputs of stress tests undertaken by a firm as part of its own risk management, the PRA will seek, where appropriate, to undertake its own idiosyncratic stress tests, drawing on macro scenarios provided by the Bank of England and on event-based scenarios. The PRA will also participate in sector stress tests co-ordinated by EIOPA and the IMF.

60. In addition, as part of the assessment of the viability of a firm's business model, senior management of firms will be expected to understand the potential scenarios that could put their firm's business model at risk. The PRA will seek to require firms to undertake **reverse stress testing** aimed at identifying which risks pose a real threat to the firm's business, with the firm's senior management able to explain the actions they would take to mitigate the potential impact of those risks should they crystallise.

61. A key input to the PRA's proposed assessment of financial strength will be the **mitigating actions** that firms would take when under stress. In reviewing these, consideration would need to be given to how such actions would affect policyholders' interests.

Risk management and governance

62. The PRA will pay close attention to how risks are managed within the firm. That will involve assessment of the quality of a firm's **risk management systems and controls**, including senior management oversight of capital and provisions management, the adequacy of underwriting and reserving processes, and the setting of the firm's risk appetite. Supervisors will assess to what extent risks are diversified, both in terms of assets and lines of insurance business. They will also review whether the firm has adequate **governance** and audit processes to be alert to risks to the firm or group as a whole, and the effectiveness and independence of the actuarial function. Fit and proper assessments of individuals appointed to certain functions will also be important ...

63. The PRA will require firms to have robust **risk management policies** and will expect firms' senior management to consider the risks to their business when formulating assumptions used in risk assessment and quantification techniques.

64. The PRA will also take account of a firm's **culture**, given the underlying role it plays in influencing strategy. Firms' governing bodies will be expected to embed and maintain a firm-wide culture that supports safety and soundness, and that is consistent with protecting the interests of policyholders. Beyond that, supervisors will not have any specific 'right culture' in mind when making assessments, but they will focus on whether a firm is achieving the right regulatory outcomes. Where those are not being achieved, however, the PRA will expect the governing body to reconsider culture and, where necessary, to make changes to improve regulatory outcomes.

Resolvability and resolution

65. While the PRA will seek to ensure the safety and soundness of the firms it supervises, its role will not be to ensure that no insurer fails. Insurance supervisors will therefore assess how a firm might exit the system should it fail.

66. There are a range of resolution arrangements available to insurers, including modifications to standard corporate insolvency arrangements which take account of the particular nature of insurers and their liabilities. Resolution arrangements for insurers vary in the extent to which they have been

put into practice. (For example, no significantly sized life insurance firm has necessitated compensation from the FSCS.)

67. Given the PRA's objectives, an early priority will be to consider whether there are arrangements in place which would allow all types of firms supervised by the PRA to exit while minimising the impact on policyholders. This will include ensuring the FSCS has sufficient understanding of insurers' systems so that it can maintain payments to policyholders in an insolvency, should that be needed. The PRA will consider whether and how Recovery and Resolution Plans might be introduced for insurers.

Supervisory assessment: supporting tools

68. The PRA will have a range of tools that it can draw on in order to undertake its supervisory assessment.

69. **Auditors** and **actuaries** can and should play a role in supporting prudential supervision. In particular, auditors can identify and flag to the regulator potential weaknesses in: a firm's controls and in the quality of the financial data which form the basis of management and board decisions; the prudential information used to supervise firms; and the data upon which market discipline is built. And actuaries play an important role in determining the financial soundness of firms. Full, regular and timely dialogue between auditors, actuaries and supervisors forms an essential part of supervision.

70. The PRA will draw on external auditors and actuaries, building as appropriate on the current relationship between such firms and the regulator (for example, the involvement of external parties in the pre-application process for internal models, ahead of Solvency II). In addition, the PRA will expect firm's actuarial, internal audit and risk functions to play a greater role in monitoring implementation of corrective actions required by the regulator.

71. The PRA will operate in accordance with, and seek further to develop, the Code of Practice for the relationship between the external auditor and the supervisor, which was jointly produced by the Bank of England and the FSA. The Code aims both to improve audit effectiveness and to ensure that supervisors are better informed about, and able to challenge, the firms they regulate, in order that auditors provide more robust mitigation against prudential risk in firms. The PRA will increase the level of formal and informal dialogue with auditors, at senior and working level, in an open and collaborative way. It will share relevant information, for example where it views a firm's valuations of less liquid assets or its approach to provisioning to be significantly out of line with peers, and it will encourage auditors to increase their disclosure to regulators of emerging concerns within firms. A genuine bilateral dialogue between a firm's auditors and supervisors, covering current and potential risks, will strengthen both the audit process and the supervision of firms.

72. The PRA will seek to maintain a constructive relationship with actuaries, individually and as a profession, so that the PRA understands and can critically challenge actuarial judgements. Engagement with the Board for Actuarial Standards and the Institute and Faculty of Actuaries will be an important part of this.

Use of data to inform judgements

73. Supervisory judgements will be informed by quantitative and qualitative reporting which, for firms subject to Solvency II, will include some quarterly reporting in addition to fuller annual reporting. Supervisory judgements will further be informed by firms' management information (including that within the ORSA, for those firms subject to Solvency II), financial accounting data, and market information.

74. Given their key role in peer analysis and within the PRA's information set, regulatory data submitted by firms to the PRA should be of the highest quality, given they will be a key input to the PRA's approach and will form a key input to analysis for the FPC. The PRA will put in place appropriate quality assurance mechanisms covering data submitted to it.

Particular applications of the supervisory approach and supervisory assessment

75. The application of the PRA's supervisory approach will be tailored to take account of the varied nature of the firms it supervises.

Lloyd's

76. The PRA will be the prudential supervisor of the Society of Lloyd's and managing agents that operate within the Lloyd's market. In supervising the Lloyd's market, the PRA will have regard to two principles. First, that the Lloyd's market should be supervised to the same standards as the non-Lloyd's insurance market. This means that Lloyd's policyholders should benefit from the same level of protection as non-Lloyd's policyholders. Second, that the practice of supervision and the application of rules over the various entities that make up the Lloyd's market should take place primarily at the level in the market where risk is managed.

77. To achieve this, the PRA will supervise the Lloyd's market at two levels — the Society of Lloyd's itself (which provides central functions, including the maintenance of the New Central Fund) and the managing agents (which carry out, *inter alia*, the underwriting, risk management and strategic business functions for Lloyd's members).

78. In due course, the PRA, FCA and the Society of Lloyd's will enter into new co-operation arrangements to ensure that the new regulators' interfaces with Lloyd's market discipline functions and its oversight of the market as franchisor are suitably clear. The PRA-FCA Memorandum of Understanding will cover issues relating to the supervision of Lloyd's.

Mutual insurance companies and friendly societies

79. The PRA will regulate a number of retail mutual insurance companies, friendly societies and firms with a mutual structure operating in the London Market. The vast majority of these firms are small and, in line with its general approach, the PRA will take a proportionate and risk-based approach to the supervision of these firms. This will also be aligned with the PRA's obligations to apply Solvency II requirements consistent with the nature, scale and complexity of individual firms.

80. The PRA will locate all retail mutual insurers and friendly societies within a single department within the Insurance Division so that firms' supervisors have the appropriate and relevant supervisory expertise to facilitate a consistent approach to the application of regulation and to further support the development of relationships with relevant bodies. Sectoral analysis will be undertaken so that issues and risks that are specific to the business models of mutual sector firms are identified — for example, the PRA's approach will take account of mutual insurers' ability to raise capital.

International insurers operating in the United Kingdom

81. A significant number of international insurers operate in the United Kingdom, as highlighted in Section II. The PRA's supervisory approach will be based on the principle that all insurers operating in the United Kingdom should be subject to equivalent prudential requirements. The PRA will focus on the adverse impact that an insurer might have on policyholders and the stability of the system.

82. Supervisors will therefore seek to understand the safety and soundness of entities active in the United Kingdom as well as of their ultimate parents, with a view to judging the impact on policyholders and financial stability if one or both fail. To achieve this, it will be necessary to understand the UK firm in isolation and as part of the global group across a range of issues including: the nature and scale of the firm's operations in the United Kingdom; the substitutability of its services; its solvency position and asset-liability management; barriers to resolvability; and intra-group operational and financial dependencies. The PRA will be supportive of the IAIS' ComFrame initiative to have a strengthened supervisory framework for internationally active insurance groups including improved co-operation among supervisors.

83. In the case of **UK subsidiaries of overseas insurers**, the PRA's approach will mirror that for UK insurers. The PRA will, however, seek to assess a firm's links with, and the viability of, its group as a whole. It will also seek to ensure that the subsidiary has effective local governance arrangements. Throughout its supervision of subsidiaries, the PRA will consider how much reliance it should place on the group supervision exercised by the group supervisor.

84. Approximately one third of firms operating in the United Kingdom are branches of EEA insurers (see **Table 1**). The PRA will have very limited prudential powers over such firms, but it will, proportionate to its assessment of the potential impact of each firm on its objectives, seek to understand those firms. Where appropriate the PRA will then seek to influence, through collaboration and in a supportive manner, the supervisory approach of the home state. In the case of significant UK branches of firms within a group, the PRA will engage in the relevant supervisory college. The PRA will seek to assess regularly the scale of activities undertaken by EEA branches so that it is aware of the potential impact of these branches on its statutory objectives, and it will seek to act to assure itself that those risks are being actively managed. ...

Table 1 Insurers operating in the United Kingdom

	UK Authorised	EEA Authorised	Total
General insurer (including composites)	335	301	636
Life insurer	123	70	193
Friendly society	133		133
Wholesale/commercial insurer/reinsurer	64		64
Lloyd's and Lloyd's managing agents	68		68
Total number of insurers	723	371	1,094

85. In relation to UK branches of non-EEA insurers, the PRA will have broader (although still limited) prudential powers. The PRA will concentrate on ensuring adequate protection via the setting of capital and governance requirements and focused information sharing. It may also seek to require firms to ring-fence capital.

Reinsurance

86. The PRA's approach to supervising reinsurers will be founded on the same principles as its supervision of primary insurers. However, reinsurance may give rise to a greater degree of connectivity with other parts of the financial system than is usually seen with primary insurance business. Undertaking an appropriate degree of supervision of the reinsurance business transacted in the United Kingdom will therefore be an important element in meeting the PRA's statutory objectives.

87. Reinsurance is transacted through UK-regulated vehicles (both inside and outside the Lloyd's market) and through incoming EEA branches. The PRA will seek to understand to the greatest extent feasible the activities of reinsurers operating in the UK and their potential impact on its objectives.

Supervisory interventions

88. Subsequent to risk assessment, the PRA will identify those areas where further action is required by the firm given the potential risk to the PRA's objectives. In respect of safety and soundness, the test of materiality for raising points with firms will be high. Any less significant issues that have arisen — and of which the PRA feels the firm should be aware — will be conveyed to the firm, but with the onus on the firm itself to address these, with self-certification (by the Chief Financial Officer, internal auditor or chair of the Audit Committee) that issues have been closed.

89. There will be a clear link between the PRA's assessment of risks to its objectives and the actions it will expect the firm to take in consequence. Actions will be communicated clearly, and at a senior level, to the firm. The Proactive Intervention Framework will be designed to ensure that, if a firm's position deteriorates, concerns are escalated and recovery actions and necessary contingency planning undertaken promptly (see **Box 3**).

Appendix 6

FSA: Stress and Scenario Testing

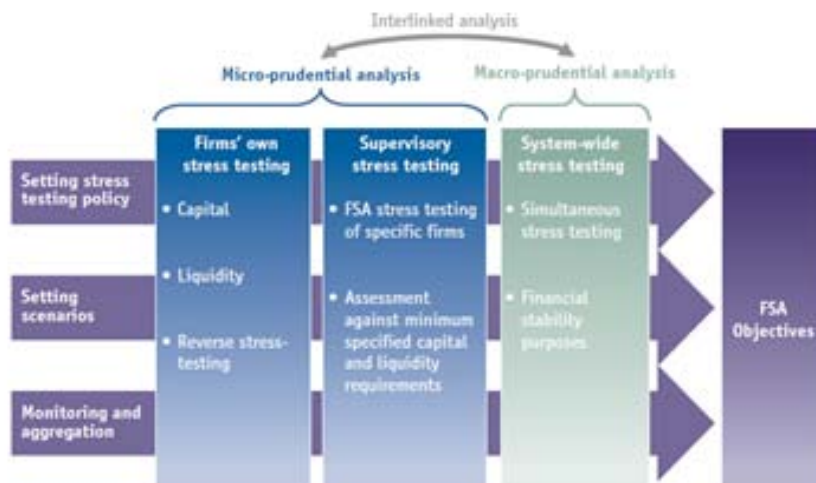
The Financial Services Authority published, in December 2009, its final guidance on stress and scenario testing¹⁶.

Some relevant extracts for general insurance undertakings are shown below.

1.1 The FSA's integrated approach to stress testing consists of three main elements:

- Firms' own stress testing. We expect firms to develop, implement and action a robust and effective stress testing programme which assesses their ability to meet capital and liquidity requirements in stressed conditions, as a key component of effective risk management.
- FSA stress testing of specific firms. The FSA runs its own stress tests on a periodic basis for a number of firms. We do this regularly for specific high impact firms and for other firms as the need arises, to assess their ability to meet minimum specified capital levels throughout a stress period.
- Simultaneous system-wide stress testing undertaken by firms using a common scenario for financial stability purposes.

1.2 The diagram below illustrates the FSA's integrated stress testing framework including the three elements described above.



1.3 These three elements are interlinked and mutually reinforcing. This Policy Statement (PS) focuses primarily on improvements we expect to see in firms' own stress testing – the first element identified above. In December 2008, we published Consultation Paper 08/24 (CP08/24): Stress and scenario testing which sets out specific measures to strengthen firms' approaches to stress testing. In addition to outlining general areas for improvement in stress testing, we formally consulted on introducing a reverse stress-testing requirement. We also consulted on clarifications of our rules and guidance in several policy areas including Pillar 2 capital stress and scenario testing (our ICAAP4 rules) and where, for BIPRU firms, internal models are used to assess Pillar 1 capital requirements. The importance of stress testing was also outlined in DP09/2, published in March 2009 simultaneously with The Turner Review, emphasising that we regard stress testing as a critical part of our regulatory architecture.

- 1.4 This PS sets out a summary of the responses received against each question raised in CP08/24, describes our final policy and includes the Handbook text that will give effect to that policy. We have provided additional comments where appropriate to explain our requirements. In particular we comment on the following aspects in some detail:
- Stress testing infrastructure: We remind firms about the importance that they establish, implement and action an effective stress testing programme. We have included an annex (**Annex 3**) outlining good practice in this Policy Statement.
 - Pillar 2 stress testing: We describe our expectations for the appropriate severity of Pillar 2 stress scenarios. We outline the role of supervisory recommended scenarios in helping firms to calibrate their own scenarios and clarify our approach to assessing the credibility of management actions in a stress scenario.
 - Reverse stress-testing: We introduce reverse stress-testing requirements for firms to identify and assess scenarios most likely to cause their current business models to become unviable. We address concerns about proportionality in relation to these requirements by describing the range of approaches that firms might take. In addition, our final policy adjusts the scope of application of the requirements for investment firms, compared with the consultation proposal.
 - Specific concerns from insurers: We have addressed in **Annex 4** a range of issues relating to insurers' stress testing, to assist their understanding of our requirements, and in particular, the capital planning stress test.
- 1.5 Accompanying this Policy Statement is a short Consultation Paper that clarifies our approach to capital planning buffers, which are set for BIPRU firms as part of Pillar 2 capital planning, in order to help firms understand better how this buffer may be drawn down during adverse external circumstances.

3. Reverse stress-testing

Scope of application

- 3.1. Our reverse stress-testing requirements will apply to all banks, building societies, insurers and some BIPRU investment firms.
- 3.2. In light of feedback we received to proposals in CP08/24 relating to the proportionality of applying quantitative stress testing standards to BIPRU investment firms, we clarify that, as with other aspects of risk management, reverse stress-testing should be implemented proportionately. So, smaller, less complex organisations would be expected to conduct less complicated reverse stress-testing, possibly more qualitative than quantitative, but larger, more complex organisations will need to conduct more extensive stress testing, which will be both qualitative and quantitative in nature.
- 3.3. We also recognise that our existing requirements on some investment firms to undertake an analysis of orderly wind down would result in them duplicating work if we were to ask them to comply with the reverse stress-testing requirements. Please see our response to question five for further details on our approach to the scope of the reverse stress-testing requirement. We will keep the segmentation criteria under review.
- 3.4. The design and results of a firm's reverse stress-test must be documented, reviewed and approved at least annually by the firm's senior management or governing body. However, we would require a firm to update its reverse stress-test more frequently in light of substantial changes in the market or in macroeconomic conditions.

Implementation timetable

- 3.5. Those firms subject to the reverse stress-testing requirement (please see our response to question five) will have 12 months from publication of this PS (14 December 2010) before the requirements become effective.

- 3.6. We believe that it would be valuable for firms to start thinking about the new requirements at an early stage and therefore we will be requesting firms to produce and send to us, an implementation plan detailing how they plan to incorporate reverse stress-testing into their current suite of risk management tools. By developing a realistic and actionable 'implementation plan', firms should be in a strong position to undertake a reverse stress-test as soon as the requirement becomes effective.
- 3.7. We plan to issue, in the first quarter of 2010, a short implementation template which we ask firms to complete and return by June 2010. We believe there is value in providing additional assistance to firms regarding the new requirements and our expectations of how they would work in practice, as they develop their implementation plans. We intend to share good practice via our website. We will provide examples of approaches to reverse stress testing and our view of how it is integrated into a firm's suite of stress tests. In addition between January and June 2010, we plan to run a series of reverse stress-testing 'surgeries' with firms.

Links between reverse stress-tests and other stresses

- 3.8. In response to questions about how different components of our stress testing requirements fit together and in particular following the recent publication of the PS on liquidity stress testing (PS09/16: Strengthening Liquidity Standards, October 2010), we have included a short section in this PS outlining potential links between Pillar 2 stress testing, liquidity stress testing and reverse stress-testing (see also Annex 6).
- 3.9. With regard to Pillar 2 stress testing, there is a clear difference between the objectives and scenarios used for capital planning stress testing under Pillar 2 and those that are identified as a result of firms' reverse stress-testing. However, we note that firms' senior management may find the analysis from reverse stress-testing, in particular, the scenario that could cause a business model to fail, to be a useful tool in assessing and challenging the content and severity of the capital planning stress scenario under Pillar 2.
- 3.10. With regard to stress testing in the individual liquidity adequacy assessment (ILAA), we see complementarities between this and reverse stress-testing. The ILAA stress that a firm is required to consider (as described in 6.23 – 6.29 in PS09/16) in order to estimate the resulting amount of outflows that it could incur and calculate the size of its liquidity buffer, is a combination of an idiosyncratic liquidity stress and a market-wide stress. The idiosyncratic stress typically arises as a consequence of well or ill-informed external perceptions about the underlying solvency of the firm, whereas the market-wide stress would crystallise as a result of external factors, independent of the particular situation of the firm.
- 3.11. When a firm is looking at liquidity scenarios that would cause its business model to fail, the market-wide ILAA stress can provide a useful insight into its reverse stress-testing analysis. Where a firm holds only enough liquidity to withstand the market-wide ILAA stress, any market-wide stress that is more severe could lead to the failure of the firm's business model. In addition, as the ILAA idiosyncratic stress typically crystallises as a result of well or ill-made market-based judgements about a firm's underlying solvency position, a firm could as part of its reverse stress-test, identify any potential weaknesses in its business model and use this as an input into its idiosyncratic stress test.

Reverse stress-test recovery and resolution plans

- 3.12. Following the recent publication of the Discussion Paper on the Turner Review Conference (DP09/4: A regulatory response to the global banking crisis: systemically important banks and assessing the cumulative impact) we have included a short section in this PS noting the synergies between the reverse stress-tests and recovery and resolution plans.
- 3.13. A recovery strategy is about the management of a firm taking actions that are aimed at preventing it from failing in circumstances where it is facing a severe stress. In order to avert failure, management may need to undertake radical options. A recovery plan details what options the management may pursue, what would need to happen for each action to be

implemented, and the risks to implementing each action. In this way a recovery plan can build on existing stress and scenario testing requirements (many of which have been clarified in this PS) and on management actions that would be taken in response to these events.

- 3.14. In a resolution plan, firms will provide the information that would be necessary for the authorities to undertake a resolution of the firm and identify the actions that would need to be taken for the authorities to resolve a failing firm in an orderly manner. Resolution in this context could include either the use of the Special Resolution Regime (SRR) tools (if applicable) or for the firm to be placed into insolvency. This is a separate process to the reverse stress-test which requires a firm to identify and assess the scenarios most likely to cause its current business model to fail and, using its results, put in place appropriate mitigating action. However, the reverse stress-test can be seen as the starting point for resolution plans, as the point at which the risks identified in the reverse stress-test crystallise may be the point at which resolution plans are required.

Annex 3

Good practice in stress and scenario testing

1. Stress and scenario testing should be an important element in firms' planning and risk management processes, helping firms to identify, analyse and manage the risks inherent within their businesses. It also serves as an effective communication tool internally to senior management as well as externally to supervisors. Incorporating a robust stress and scenario testing framework into a firm's risk management structure can add substantial value by giving senior management additional information about all risks borne by a firm, in particular, in relation to its risk tolerance and strategy in a stress.
2. The importance of stress testing was again emphasised in DP09/2, published in March 2009 simultaneously with The Turner Review, outlining that we regard stress testing as a critical part of our regulatory architecture. The FSA's integrated approach to stress testing¹⁶ consists of three main elements: firms' stress testing; FSA stress testing of specific firms; and simultaneous system-wide stress testing (see Annex 6 for more details). We see these elements as interlinked and mutually reinforcing. In this sense, whilst a robust stress testing infrastructure is essential for firms' own risk management it also facilitates firms' ability to better inform supervisory stress testing and simultaneous system-wide stress testing and allows them to better absorb the outputs and lessons learnt from these exercises such as dynamic feedback effects.
3. This annex sets out and reminds firms of our expectations regarding stress and scenario testing. It draws not only on guidance that we have issued such as the 'Dear CEO' letter issued to banks, building societies and CRD investment firms in 2006, but also on published work undertaken by international groups of supervisors including the Basel Committee on Banking Supervision (BCBS) and the Senior Supervisors Group. We are also actively engaged with the Committee of European Banking Supervisors (CEBS) in developing guidelines on stress testing and this annex covers some of the issues being considered by the Committee in the development of the European-wide guidance. Our requirements for stress testing under Pillar 2 for insurers will also be a reference point as we discuss within CEIOPS possible development of implementing measures and guidance for the Supervisory Review Process and ORSA under Solvency 2 as far as stress testing is covered. The International Association of Insurance Supervisors (IAIS) has also been developing its guidance on stress testing for insurers in light of the financial crisis.

The key messages for firms described in this annex are summarised below.

1. Board and senior management should actively engage in stress and scenario testing, taking ownership and responsibility for *establishing* an effective stress testing programme and infrastructure in the firm.

2. Senior management should take a key role in *implementing* the firm's stress testing programme by being actively involved throughout the process, including in scenario selection.
3. Senior management should take *action* as a result of stress testing and integrate stress testing outputs into the firm's decision-making process.
4. Firms should establish a stress testing programme covering all relevant levels of its business, all risk types and over a range of severities.
5. Stress and scenario testing should be undertaken on a forward-looking basis, with sufficient use of firm-wide stress testing helping firms to identify risk concentrations, assess interdependencies and understand second-order effects.
6. Firms should establish a robust stress testing infrastructure with appropriate IT systems and resources in place. The infrastructure should be periodically reviewed by senior management for its continued effectiveness.
7. Firms should have clearly documented policies and procedures to enable effective implementation and maintenance of the stress testing programme, which should be periodically reviewed by senior management.

4. The contents of this annex do not create new requirements for firms, outline specific behaviours needed to comply with our rules, nor create presumptions of breaches of our rules if not complied with. However, firms whose practice departs from that described here should be able to demonstrate how they have otherwise complied with our rules. This annex illustrates ways firms can comply with our rules and reiterates our key messages on good practice relating to stress and scenario testing, which we expect firms to have embedded in their organisations.

1. Board and senior management should actively engage in stress and scenario testing, taking ownership and responsibility for *establishing* an effective stress testing programme and infrastructure in the firm.

5. In order to ensure that stress and scenario testing is truly embedded in a firm's overall governance and risk management culture, board and senior management should actively engage in and drive the stress testing process within a firm, as it does with the firm's business strategy. Senior management should take ultimate responsibility, ownership and accountability for establishing the firm's stress testing programme. Without senior management engagement, our policy objectives in relation to stress and scenario testing cannot be achieved.
6. Firms may find it effective to delegate day-to-day accountability to an individual within the senior management of the firm such as the Chief Risk Officer or equivalent, while retaining overall responsibility for the programme. Involvement by board-level risk committees should also be considered.

2. Senior management should take a key role in *implementing* the firm's stress testing programme by being actively involved throughout the process, including in scenario selection.

7. In order for a firm's stress testing programme to operate effectively, senior management should be actively involved throughout the stress testing process, as highlighted at various points in this annex. For example, we believe that firms should devote sufficient time and resource to developing stress scenarios which is a collaborative process involving senior management, risk management staff and business unit staff. Views from economists may also be helpful, particularly when specifying key parameters used in macroeconomic scenarios. Firms should also give due attention to translating the scenarios designed effectively into specific effects on risk parameters. Senior management involvement in scenario selection is particularly important in firm-wide forward-looking stress testing, that requires judgement between individuals and, most crucially, senior management.
8. However, it is important to ensure that the extent of engagement by the firm's board should be determined by the scope and purpose of the stress testing activity being discussed. For example,

it may appropriate for the board to engage actively in firm-wide macro-level stress testing processes but limit their involvement in more granular, portfolio-specific exercises.

9. As outlined in CP08/24, before the recent market turmoil, we observed the challenges faced by risk managers in obtaining senior management buy-in to more severe and innovative scenarios. We have since observed a change in approach by senior management where they are now more willing to explore severe and challenging scenarios. We welcome this development and wish to emphasise to senior management the importance that they continue to actively engage in the scenario definition process, particularly around assessment of severity and the mapping of scenarios to individual risk drivers.

3. Senior management should take action as a result of stress testing and integrate stress testing outputs into the firm's decision-making process.

10. Stress testing should be actionable and used to support a range of decisions within a firm's business. As the main users of stress testing output, it is ultimately the responsibility of senior management to ensure that it is integrated into the firm's decision-making.
11. Firms should use stress testing output to support decisions in at least the following areas:
 - setting of the firm's risk appetite/tolerance;
 - setting exposure limits;
 - capital and liquidity planning;
 - longer term business planning and strategic decision-making;
 - assessing the consistency of risk appetite, business strategy and capital planning;
 - risk mitigation strategies; and
 - contingency planning.
12. For example, where stress testing outcomes are likely to be outside of the firm's risk tolerance, senior management may decide to respond by changing its strategy or shifting its business concentrations.
13. In order to make such assessments firms should undertake stress testing at all levels of the organisation covering group, division and individual business unit levels, so that the outputs produced are useful to support decision-making at the firm-wide level as well as at more granular levels.
14. Therefore it is critical that senior management are involved in the review, analysis and challenge process of the stress testing output and take an active role in defining credible and feasible mitigating management actions against this output. We expect senior management intervention to be proportionate, taking account of the degree of impact of the stress test on the firm's condition from both a business and capital adequacy perspective.

4. Firms should establish a stress testing programme covering all relevant levels of its business, all risk types and over a range of severities.

15. Firms should establish stress testing programmes that cover a wide scope of stress testing including at specific risk, portfolio, business unit and firm-wide levels. It should also cover individual and multi-risk types.
16. The programme should encourage risk identification and serve as a complementary and independent risk perspective for other risk management tools (e.g. VaR modelling), improve capital and liquidity management and improve communication within and outside the firm.
17. It is important that the programme be designed with input from various parties within an organisation so that the overall programme reflects a range of perspectives including sensitivity analysis, scenario analysis and stress testing on an individual portfolio basis as well as on a firm-wide basis.

18. Our expectations about firms' stress testing are based around a principle of proportionality. For example for smaller simpler firms, stress testing may primarily be an exercise in senior management judgement on a qualitative basis. It does not necessarily involve detailed modelling. However for larger more complex firms, we would expect a more structured and comprehensive approach to stress testing, incorporating all elements covered in this annex in a sophisticated way and taking a more quantitative approach to risk identification.

5. Stress and scenario testing should be undertaken on a forward-looking basis, with sufficient use of firm-wide stress testing helping firms to identify risk concentrations, assess interdependencies and understand second-order effects.

19. Firms have, at times, viewed scenario selection as a backward-looking exercise. The recent financial crisis has demonstrated the flaws in placing excessive reliance on historical data and experience. Our suggestion to firms is that they should adopt a balanced approach in scenario selection, taking into account historical data and experience, but focus their thinking on forward-looking hypothetical scenarios that cover issues and risks that may not be identified by looking solely at the past and considering how relationships between risk types may behave in future stresses.
20. We require firms to undertake a range of stress testing at various levels of granularity in their business. It can be valuable for firms to take output from individual business line stress testing and aggregate this to get a detailed firm-wide picture. However, in particular for larger more complex firms, the aggregation of individual business line stress testing results should be treated with a degree of caution. Correlations, offsetting of individual exposures and risk concentrations may not be adequately captured by simple aggregation and there may either be double-counting of risks or underestimation of the impact of a stress scenario.
21. Firm-wide stress testing should be used to identify firm-wide risk concentrations that may exist both on and off-balance sheet and should also serve to highlight interdependencies and correlations of risks in stressed situations.
22. Therefore, consideration of feedback and second-order effects is important, particularly when analysing the system-wide effects of macroeconomic shocks. Although challenging to model, feedback and second-order effects should be considered, at least in a qualitative sense, for mitigating management actions to be credible and feasible.

6. Firms should establish a robust stress testing infrastructure with appropriate IT systems and resources in place. The infrastructure should be periodically reviewed by senior management for its continued effectiveness.

23. Firms should employ IT systems, resources and procedures that would assist them in producing valuable and timely stress testing information in a useable format covering a range of metrics to senior management and other users. This principle should apply to both routine and ad hoc stress testing. High level information on the scope and outcome of the firm's stress testing programme should be provided in board risk committee or board risk reports that may be included within annual reports and accounts. The report should include the nature of the stresses used, the most significant stresses and how the significance has changed during the reporting period.
24. Risk management systems should be flexible, facilitating robust, complete and accurate data gathering across the organisation at firm-wide and more granular levels so that firms have the option to undertake stress testing at varying levels of aggregation on a targeted or ad hoc basis. It is essential that underlying data produced for stress testing purposes is good quality as it is a very important input into the process and may determine how effective a firm's stress testing is. In firms where inputs from multiple IT systems are in place for stress testing, firms should put in place a robust interface between those systems, which may involve solutions from external vendors or other parties.

25. Senior management should periodically review the effectiveness of the firm's stress testing infrastructure and should ensure that necessary steps are taken for its on-going improvement.
- 7. Firms should have clearly documented policies and procedures to enable effective implementation and maintenance of the stress testing programme, which should be periodically reviewed by senior management.**
26. Firms should develop documented policies and procedures for stress testing that are approved by senior management of the firms.
27. These policies and procedures should include the following elements:
- the types of stress testing that the firm will undertake (including those needed to meet regulatory requirements) and the objectives behind them;
 - indications of the frequency at which stress testing will be undertaken which will vary depending on the type and purpose of the stress testing. For example, it is likely that stress testing of individual risks will be undertaken on a relatively frequent basis in contrast to firm-wide stress testing that is likely to be done less frequently;
 - methodologies behind scenario selection including the role of judgement in this process;
 - records of any assumptions adopted in relation to scenario design, the firm's businesses, data quality and management actions; and
 - provisions for management oversight, review and challenge of the stress testing process.
28. Firms should note however that documenting policies and procedures does not prevent the firm from undertaking flexible ad hoc stress testing that may be required in response to emerging risk issues.
29. Senior management should regularly review the policies and procedures in place in light of changes to individual businesses and general economic conditions. They should also include an evaluation of the overall effectiveness of the stress testing programme in meeting its objectives, including how well elements of the programme are documented. Assistance from internal audit or other independent control functions may be helpful here.
30. We have created a summary table for firms in relation to the stress testing good practices outlined in this annex and wider Policy Statement. This table may be used by firms as a list of specific things they should consider and do as part of their stress and scenario testing processes.

	Item
1.	<p>Have the Board of Directors and senior management of the firm taken ultimate responsibility for establishing an effective stress testing programme and infrastructure at the firm?</p> <ul style="list-style-type: none"> • Do the board and senior management foster a culture within the firm that promotes stress testing as an important risk management tool? • Has the board and senior management taken ultimate responsibility for establishing the firm's stress testing programme and supporting infrastructure including provision of sufficient resource and investment? • Are clear accountabilities and responsibilities for stress and scenario testing assigned to individuals and/or groups within the firm?
2.	<p>Are senior management of the firm actively involved and sufficiently engaged in implementation of the stress testing programme?</p> <ul style="list-style-type: none"> • Do senior management maintain a degree of involvement and engagement at all stages of the firm's stress testing process, taking into account the scope and purpose of the stress testing activity being discussed? • Have review and challenge sessions for senior management and others been established to analyse stress testing output and agree credible mitigating management actions? Firms may consider using risk assessments undertaken by business unit staff as a check and balance for the stress testing output. <p>Is scenario selection and design a collaborative process in the firm involving representation from senior management, business unit staff, risk management staff and economists that meet on a regular basis to select and design scenarios?</p> <ul style="list-style-type: none"> • Are assumptions made and decisions taken regarding scenario selection in these meetings accurately documented and retained within the firm? • Have the scenarios designed and selected been translated effectively into specific effects on risk parameters and is there a clear process and understanding of how this should be done?
3.	<p>Are stress testing outcomes integrated into firm decision-making through senior management, business unit and risk management staff involvement?</p> <ul style="list-style-type: none"> • Are the results and information from stress testing presented to senior management and other users regularly in a useful format covering a range of metrics? • Are stress testing results discussed at relevant forums within the firm that include representation from appropriate staff including senior management as relevant?
4.	<p>Does the firm have a stress testing programme covering all relevant levels of its business, all risk types and over a range of severities?</p> <ul style="list-style-type: none"> • Are appropriate stress tests carried out on material risk types and at relevant business levels on a stand-alone basis as well as under the firm-wide stress? • Are stress tests undertaken over a range of severities including one 'appropriately severe' scenario for capital Pillar 2 purposes? • Does the firm take a proportionate approach to stress testing, taking account of the nature and complexity of the business and the risks that it faces?
5.	<p>Is the firm's stress and scenario testing undertaken on a forward-looking basis, with sufficient use of firm-wide stress testing to help identify risk concentrations, assess interdependencies and understand second-order effects?</p> <ul style="list-style-type: none"> • Is there a specific discussion of risk concentrations in firm-wide stress test results? • What assumptions does the firm make in relation to second-order effects and what analysis is used to support these assumptions? • Is the firm able to identify and make use of complementarities between the different stress tests undertaken? • Is the stress testing programme structured to enable senior management to take a comprehensive view of the firm's risks? • Where relevant, has aggregation of stress testing outputs within the firm been approached with caution, considering offsetting exposures and correlations of risks?
6.	<p>Is there a stress testing infrastructure in place with appropriate IT systems and resources to carry out effective stress testing?</p> <p>Is the infrastructure periodically reviewed by senior management for its ongoing effectiveness?</p> <ul style="list-style-type: none"> • Are IT and risk management systems producing accurate data across the firm in a useable format for stress testing purposes? • Is the firm able to present stress testing output in a useable, accessible format to circulate to senior management and other relevant staff?
7.	<p>Are clearly documented policies and procedures in place to enable effective implementation and maintenance of the stress testing programme?</p> <p>Are these policies and procedures periodically reviewed by senior management?</p>

Annex 5

List of regulatory documents relating to stress testing

Below is a list of published regulatory documents from various authorities that relate to stress testing. This list is not intended to be exhaustive.

FSA

1. FS09/3: A regulatory response to the global banking crisis – Feedback on DP09/2
2. FSA statement on its use stress tests – May 2009
3. The Turner Review
4. CP08/24: Stress and scenario testing
5. Financial Risk Outlook 2009
6. FSA Statement on regulatory approach to bank capital – January 2009
7. FSA Statement on Capital Approach Utilised in UK Bank Recapitalisation Package – November 2008
8. Insurance Sector Briefing: Risk and capital management update – September 2008
9. The FSA's internal audit review of its supervision of Northern Rock – Recommendations and Actions – March 2008
10. Stress testing thematic review – October 2006
11. DP05/2: Stress testing – May 2005

International supervisors

1. Principles for sound stress testing practices and Supervision – Basel Committee on Banking Supervision – May 2009
2. Observations on Risk Management Practices during the Recent Market Turbulence – Senior Supervisors Group – March 2008
3. Application of the Supervisory Review Process under Pillar 2 – CEBS Guidelines – Jan 2006

Industry reports

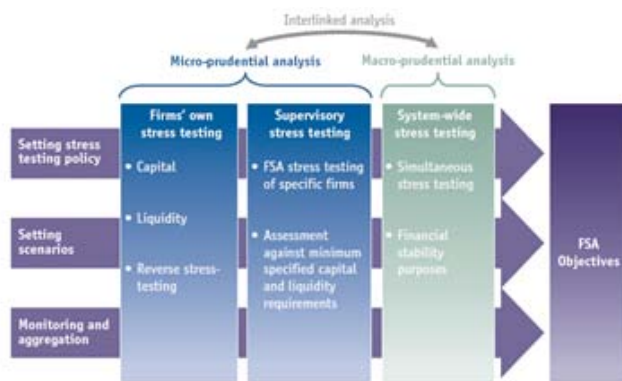
1. Why Banks failed the Stress Test – Bank of England – February 2009
2. Containing Systemic Risk: The Road to Reform – The Report of the CRMPG III – August 2008
3. Final Report of the IIF Committee on Market Best Practices: Principles of Conduct and Best Practice Recommendations – Institute of International Finance – July 2008

Annex 6

Our approach to stress testing

1. This annex sets out our overall approach to stress and scenario testing. The annex is not intended to be a detailed or exhaustive list of all of our stress testing components. However, we believe it is important to communicate our current approach and the on-going work we are undertaking on stress testing so that firms and other interested parties are aware of developments.
2. Our integrated approach to stress testing consists of:
 - Firms' own stress testing. We expect firms to improve their stress testing and develop, implement and action a robust and effective stress testing programme which assesses their ability to meet capital and liquidity requirements in stressed conditions, as a key component of effective risk management.
 - Supervisory stress testing of specific high impact firms. We run our own stress tests on a regular basis for particular firms to assess their ability to meet minimum specified capital levels and other regulatory requirements throughout a stressed period.
 - Simultaneous system-wide stress testing undertaken by firms using a common scenario for financial stability purposes.

3. These three elements are interlinked and mutually reinforcing. The diagram below illustrates our integrated approach to stress testing as described above. It also highlights the links between firms' own stress testing, supervisory stress testing, and micro-prudential analysis, all of which focus on the capital or liquidity outcomes of individual firms. Equally, it highlights links between system-wide stress testing and macro-prudential analysis as these stress tests focus on gauging system-wide impacts of stress events.
4. To support the three broad elements of our framework, the following activities are required:
 - policy setting of firms' stress testing requirements;
 - setting stress scenarios (supervisory recommended scenarios or system-wide scenarios);
 - monitoring and aggregating stress test scenarios and results.



Firms' own stress testing

5. We require firms to undertake a wide range of stress tests that contribute to the comprehensive suite of risk management processes, strategies and systems that we require firms to embed into their organisations as appropriate to the nature, scale and complexity of the risks that they bear as part of effective risk management.

ICAAP/ICAS	Reverse stress-testing	System-wide stress testing	Other
Pillar 1 <ul style="list-style-type: none"> Sensitivity analysis and scenario analysis on specific risk types Banks, building societies, insurers and investment firms 	Stress testing of firms' business model vulnerabilities <ul style="list-style-type: none"> All banks, building societies, insurers and some investment firms 	FSA macroeconomic or financial shock scenarios to assess system-wide impacts.	Firm's own stress testing programme <ul style="list-style-type: none"> Banks, building societies, insurers and investment firms
Pillar 2 <ul style="list-style-type: none"> Firm-wide stress testing Likely to be macroeconomic scenarios either developed by firms or supervisory recommended scenarios Banks, building societies, insurers and investment firms 		International system-wide stress testing initiatives	Other mandated stress tests <ul style="list-style-type: none"> Non-UK supervisors Other regulatory authorities
ICAAP/ICAS	Reverse stress-testing	System-wide stress testing	Other
Liquidity <ul style="list-style-type: none"> Stress tests for Individual Liquidity Adequacy Assessments All BIPRU firms with a carve out for some investment firms 			
Supervisory stress testing			

Supervisory stress testing

6. We recognise that our stress testing requirements are comprehensive and have grown in recent years. We note that a robust stress testing infrastructure in a firm (see Annex 3 for further details) will facilitate the effective implementation of a wide range of stress testing. We also note that the stress testing requirements above are generally complementary 'building blocks'. However, we also recognise our role in ensuring that the way in which we set these requirements should be designed to minimise any potential burden and avoid duplication.

Supervisory recommended scenarios

7. As explained in this Policy Statement, we intend to introduce supervisory recommended scenarios for firms to run from time to time. We continue to believe that ultimate responsibility for scenario selection rests with firms' senior management but our experience during the current crisis has been that there is value in supervisory recommended scenarios as a complement to firms' own scenarios.
8. We may require individual firms to run our recommended scenario as an additional input to their ICAAP/ICAS submission. However, for more general use we will formulate a wide-ranging macroeconomic scenario which reflects relevant supervisory concerns and risk tolerance to serve as an 'anchor' for firms to build around in the development of their own scenarios. The high level parameters of the scenario will be communicated externally.

Supervisory stress testing

9. Firms will be aware that we undertake our own stress testing for some firms from time to time to conduct our own analysis of firms, in addition to analysing the results of stress testing that firms undertake themselves. Supervisory stress testing requires in-house modelling capability, such as that we now have for capital and liquidity. This does of course require more data to be collected from firms. It will also involve us looking more closely at the inherent prudential and conduct risks of a firm's business.
10. We use our own analysis to determine the firm's capital position in a stress against minimum specified capital levels e.g. 4% Core Tier 1 post-stress ratio and the individual capital guidance (ICG) we have given to the firm.

Simultaneous system-wide stress testing

11. Stress testing is a particularly useful tool in macro-prudential oversight and for financial stability purposes as a means of gauging the system-wide effects of stresses and second order effects. We are continuing our work in this area to develop an exercise (separate to Pillar 2 firm stress testing and supervisory stress testing) which would involve a peer group of firms simultaneously testing against a common stress scenario.
12. The scenario designed for this simultaneous stress test may at times differ from our supervisory recommended scenario, to reflect the different objectives of the tests, the former being to observe system-wide impacts of a scenario rather than firm-specific impacts.

Monitoring and reporting

13. We recognise that under our strengthened stress testing regime, we will see significant amounts of information about individual firms and the financial system as a whole. We are committed to using this information in the best way possible to improve the quality of our work. In this context we are working to develop an effective framework to facilitate coordination and monitoring of the various strands of stress testing, including outputs and scenarios being used.

Appendix 7

EIOPA: Specifications for the 2011 EU-wide stress test in the insurance sector

EIOPA (European Insurance and Occupational Pensions Authority) has published its final report on the EU-wide stress tests for the insurance sector¹⁷. The relevant EIOPA reference document is EIOPA-FS-11/012, dated 23rd March 2011. We have used this report to inform our views on the stress scenarios that should be considered for the purposes of our case study companies, namely the notional companies A, B and C.

Relevant extracts from the EIOPA specifications report (using the EIOPA reference document numbering system) are shown below.

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10. Valuation Approach

The previous stress test exercise was based on Insurance Group Directive (IGD)/Solvency I valuation requirements. The limitations of this approach, in particular the non-comparable differences in valuation standards across Member states, were highlighted in the stress test results report to the EFC in March 2010.

In order to achieve better comparability and more realistic results, the 2011 stress test exercise will be based on future Solvency II principles. EIOPA acknowledges that there are shortcomings by referring to a framework which is seen as a testing environment and which is bound to change even whilst conducting this exercise.

However, for the purpose of gaining realistic and consistent information, EIOPA considers QIS5 specifications as being the closest proxy to the framework that should be the background for a stress test. Although the QIS5 – Technical Specifications do not represent the final Solvency II requirements, the application, as much as possible of the most recent Quantitative Impact Study valuation and calculation guidelines overcomes some of the shortcomings of the first exercise. Conducting a stress test based as much as possible on QIS5 rules will better reflect the risk profile of insurance groups and insurance undertakings thus allowing for better comparability and understanding of outcomes. However, a reasonable use of approximations and proxies is expected, given the significantly shorter time-frame envisaged for this exercise compared to a QIS exercise. In order to ensure consistency and a level playing field, the principle of such shortcuts should be addressed within the public Q&A procedure.

Participating groups and undertakings should therefore as default and, on a best efforts basis, follow the valuation approach as set out in the QIS5 – Technical Specifications and the QIS5 Q&A document and which formed the basis for the EIOPA Report on the fifth Quantitative Impact Study (QIS5) for Solvency II. Swiss insurers should follow valuation requirements in accordance with the Swiss Solvency Test.

11. Stress Test Output

The aim of the stress test is to assess either the group solvency position or the solvency position of an individual undertaking, focusing on the level of own funds (i.e. available capital) before and after the stress test compared with the Minimum Capital Requirement (MCR) as a Solvency II measure. Swiss groups will be assessed based on Swiss Solvency Test requirements.

The direct output of the stress test will be the reduction in available own funds after stress test shocks (scenarios), i.e. own funds as of end-2010 minus the change in own funds after the scenario. This will be compared to the MCR. Participants may recalculate the MCR level after the shock in each scenario, as this would more appropriately represent their solvency position. However, for simplicity reasons, the pre-stress MCR will be the default numerator (i.e. in line with the best effort basis

participants can opt for leaving the MCR unchanged post stress). The output shall include some information on the contribution of the different shocks/risks to the change in own funds.

The Solvency II - MCR is used as a benchmark which is consistent with the aim of the stress test as it is deemed to be the ultimate intervention threshold for regulatory purposes whereas a breach of the SCR allows for a more flexible approach. Swiss insurance groups should calculate their equivalent of the MCR (e.g. Threshold 3 in Circular 2008/44 SST). EIOPA provides a stress test template in Excel format, comparable to QIS exercises, which will help to minimise misinterpretation of the framework and will produce the expected outcome in a way easily controllable by participants.

12. Loss-absorbing capacity

The loss-absorbing capacity of technical provisions and deferred taxes can be taken into account in line with the QIS5 – Technical Specifications (i.e. that participants exploit the means at their hands only within the current legal boundaries. See management actions in section 16). For further details please see Section SCR 2 of the QIS5 Technical Specifications. The loss absorbing capacity should be calculated on a best effort basis using one of the options outlined in the QIS5, but taking into account any legal requirements or restrictions regarding profit sharing and taxes.

13. Unit-linked business

In respect of unit-linked business, groups/undertakings should follow the approach as per the QIS5..

14. Indirect investments

The look through principle as set out in the QIS5 applies to indirect investments.

15. Hedging

Any existing hedging or other risk mitigations (e.g. derivatives and reinsurance) can be included in the stress testing, but only insofar as the hedging instruments have been in place at the reference date or if there is a contractual agreement with a counterparty that guarantees a downward protection if predefined capital market scenarios occur. This also includes dynamic hedging where appropriate. Where possible, groups/undertakings should report the impact of the hedging on the individual stress test results. For the inclusion of potential management actions see **section 16**.

16. Management actions (post-stress)

In principle, stress test results should be calculated without taking into account risk mitigating actions (such as closing for new business) with the exception of items mentioned in section 12 (loss absorbing capacity).

However, groups or undertakings have the option to calculate stress test results without the impact of management actions (gross) and including the impact of management actions (net). If this option is exercised, both gross and net outcomes would need to be reported to the national supervisors. National supervisors will have to verify these management actions and provide an opinion whether the proposed actions are realistic.

For the purpose of considering management actions it is assumed that negative events occur six months prior to the reference date, so that groups and undertakings have time to initiate realistic actions. However, they should have due regard to the fact that during a period of crisis not all proposed initiatives would be successful (such as a fire sale of assets or the implementation of a new hedging programme).

17. Stress Test Scenarios

17.1. Introduction

This stress test framework comprises the following scenarios and modules:

For capital market and spread risks there are baseline and adverse scenarios. There is also an inflation scenario which assumes an increase in inflation and which forces central banks to rapidly increase interest rates.

In developing the scenarios due consideration was given to aligning the macroeconomic assumptions with those applied to the stress test in the banking sector, in particular the assumptions underlying the macroeconomic adverse scenario provided by ECB.

The stress test also contains a set of insurance-specific stresses which are to be applied across the baseline, adverse and inflation scenarios (see **Annex 2**).

All these stresses should be regarded as instantaneous shocks i.e. occurring on the reference date (see section 8 for further details).

Further to these stresses two satellite scenarios on long term low interest rates and sovereign risk are to be conducted (see **sections 18 and 19** respectively).

17.2. Description of baseline, adverse and inflationary scenario

Three scenarios have been chosen. The actual shocks applied to different risk factors are intended to replicate a macroeconomic scenario and a what if situation. Whilst they might appear to be remote; they are nonetheless realistic scenarios. The stress test operates with a baseline scenario, an adverse scenario and an inflationary scenario.

17.3. Interest rate, equity, property, spread risk parameters

17.3.1. Interest rate risk

The ECB macroeconomic assumptions for market risks in respect of the development of interest rates reflect an upward trend in the adverse scenario.

However, insurers are typically more affected by a decline in interest rates either because of embedded guarantees in life insurance contracts or because of lower investment returns in non-life. Consequently, the upward stress applied to banks will be used for the inflation scenario and the magnitude of this trend will be converted into a decline in the adverse scenario.

The floor of interest rate levels post the scenarios is zero.

17.3.2. Equity Risk

The ECB equity market assumptions in respect of the adverse scenario are very granular within the European Union.

In line with the current proposals under Solvency II and in order to facilitate the calculation of this stress module, a flat 15% decline for all equities in the adverse and 7.5% for the baseline scenario will be assumed by EIOPA.

17.3.3. Property risk

17.3.3.1.1. Residential property

In respect of property risk parameters the ECB has provided house price assumptions for 2011 and 2012 as a percentage deviation from the baseline scenario.

EIOPA has used the average percentage deviation for the two years 2011-2012 for the adverse scenario and the 2011 percentage deviation for the baseline scenario. It follows:

- Baseline scenario: 3.8%
- Adverse scenario: 11.6%

The stresses apply to all residential property world-wide.

17.3.3.1.2. Commercial property

Commercial property plays a significant role for insurers' investment strategy. Based on the information available³ the following stresses apply:

- For all commercial property portfolios the decline in property prices during 2008 should be considered for the adverse scenario. Based on this, it assumes a 25% decline for the adverse scenario and a 12.5% decline in the baseline scenario (See table 1 in **Annex 2**).

The stresses apply to all commercial property world-wide.

17.3.4. Spread risk

A 31.4% shock for investment grade bonds and a 38.3% shock for high yield bonds have been assumed. This has been converted from actual option adjusted spreads (based on Merrill Lynch Bond indices as of 31 Dec 2010) applying an additional increase to actual spreads for investment grade.

Change in Factors for corporate bonds and non-EU government bonds:

Ratings	Actual spreads	Increase of spreads (in percentage points) in the baseline scenario	Increase of spreads (in percentage points) in the adverse scenario
AAA	0.79%	0.125%	0.25%
AA	1.40%	0.22%	0.44%
A	1.87%	0.295%	0.59%
BBB	2.85%	0.445%	0.89%
BB	-	0.85%	1.70%
B or lower	-	1.50%	3.00%
Unrated	-	0.55%	1.10%

Change in Factors for AAA-rated covered bonds:

Ratings	Increase of spreads (in percentage points) in the baseline scenario	Increase of spreads (in percentage points) in the adverse scenario
AAA	0.10%	0.20%

Change in Factors for structured credit instruments:

Ratings	Increase of spreads (in percentage points) in the baseline scenario	Increase of spreads (in percentage points) in the adverse scenario
AAA	0.125%	0.25%
AA	0.22%	0.44%
A	0.295%	0.59%
BBB	0.445%	0.89%
BB	1.015%	2.03%
B or lower	1.69%	3.38%
Unrated	0.55%	1.10%

For deriving the adverse effect the same methodology as in the QIS5 Technical Specifications applies. The stresses should be applied to all debt instruments as specified in the aforementioned document.

17.4. Non-life insurance related stresses

Groups or undertakings should only report the greater of each the following two stresses.

The recovery or non-recovery from reinsurers refers only to external reinsurance arrangements. Intra-group reinsurance transactions can be ignored. For participating groups it is assumed that intra-group reinsurance has been eliminated as part of group consolidation.

17.4.1. Natural Catastrophe event

Groups or undertakings should calculate the largest “1 in 200” natural catastrophe probable maximum loss (PML) based on the most severe peril (e.g. flood, windstorm or earthquake). The PML is to be calculated net of reinsurance and net of tax. However, it is assumed that there is only a 70% recovery rate from reinsurers.

17.4.2. Claims reserves deficiency stress

Groups or undertakings should calculate a shortfall for all liability claims reserves (e.g. world-wide for groups). This would be based on the assumptions of 2 percentage point higher claims inflation than presumed for existing best estimate calculations. For example, where non-life insurers assume that claims costs will increase by 2% p.a. due to the impact of inflation, they would have to add a further 2% (i.e. a total of 4%) for the post stress calculations. The shortfall is to be calculated net of tax assuming that the tax burden would be reduced as a result of this event. It is assumed that the additional reserving due to higher claims inflation is not recoverable from (external) reinsurers.

17.5. Life insurance stresses

17.5.1. Mortality event stress

17.5.2. Longevity improvements

17.6. Calculation of aggregated market stresses and insurance stresses

As pointed out in section 8, market and credit risk stresses should be calculated by assuming that all adverse developments occur instantaneously and simultaneously. As regards the combination of the aforementioned stresses and the insurance stresses, participants should adjust the stress results for non-correlation. The market risk and credit risk results should be aggregated. The outcomes of the non-life and life stresses should also be aggregated; i.e. correlation structures in QIS 5 for SCR should not be applied directly to the stress outcome. However, the total results should be calculated by using a similar correlation approach as for the overall SCR calculation.

<i>i</i>	<i>j</i>	Market and Credit	Life	Non-Life
Market and Credit	1			
Life	0.25	1		
Non-Life	0.25	1	1	

18. Long term low interest rates

A separate exercise in respect of the risks of a prolonged period of low interest rates is being developed. This will be a satellite exercise to the 2011 EU-wide stress test in the insurance sector. During the consultation with industry bodies it agreed that the relevant specifications would be sent out and the results be collected at a later date.

19. Sovereign risk

The sovereign risk module for Europe is not part of the core stress test. However, results are to be calculated in a separate satellite exercise using granular assumptions (see Annex 3 and table 1). This calculation is to be compared with MCR (see principles in section 5).

The ECB macroeconomic assumptions assume an increase in government bond yields due to a widening of bond spreads. The parameters are provided for each member state of the European Union and apply to a satellite scenario. The increase is expressed as a deviation in basis points.

The increase in sovereign spreads is not assumed to have an impact of the discount rate curve (i.e. for this exercise no changes are foreseen in the valuation of the liabilities, except when the value of cash flows depend directly on the financial returns (e.g. profit sharing, financial guarantees)).

Annex 1

Example of data to be collected by EIOPA

EIOPA will provide a more detailed IT tool to lead supervisors to be used to provide the data to EIOPA.

Example: As an example, consider a lead supervisor/national authority that collects the data of four insurance groups/undertakings as follows:

	Group/ undertaking AA	Group/ undertaking BB	Group/ undertaking CC	Group/ undertaking DD
(1) Available Own funds	2.7 bn	1.3 bn	2.1 bn	1.4 bn
(2) SCR	2.6 bn	1.1 bn	1.9 bn	1.2 bn
(3) MCR	0.9 bn	0.4 bn	0.8 bn	0.5 bn
(4) ⁵ Stress test result (Δ Own funds)	-1.1 bn	-0.2 bn	-0.3 bn	-0.2 bn
(5) ⁶ Δ MCR after adverse scenario	+/-0 bn	+/-0 bn	+/-0 bn	+/-0 bn
(6) Solvency ratio before adverse scenario (= (1) / (3))	300%	325%	263%	280%
(7) Solvency ratio after adverse scenario (= ((1) + (4)) / ((3) + (5)))	178%	275%	225%	240%
(8) Solvency deficit after adverse scenario	--	--	--	--
(9) Δ Own funds after adverse scenario due to interest rate shock	-0.3 bn	-0.05 bn	-0.1 bn	-0.1 bn
(10) Δ Own funds after adverse scenario due to equity shock	-0.2 bn	-0.05 bn	-0.1 bn	-0.15 bn
(11) Δ Available	-0.1 bn	-0.05 bn	-0.05 bn	-0.1 bn

⁵ This result is computed from market and credit risk (Σ [rows 9-12]), non-life risk (max[13,14]) and life risk (max[15,16]) using the correlation matrix in 17.6.

⁶ If the participant opts to use the non-reduced MCR before stress, this line would contain no changes.

own funds after adverse scenario due to property shock				
(12) Δ Available own funds after adverse scenario due to spread shock	-0.1 bn	-0.1 bn	-0.1 bn	-0.1 bn
(13) Δ Available own funds after adverse scenario due to non-life insurance related shock (nat. cat)	-0.1 bn	-0.05 bn	-0.05 bn	-0.2 bn
(14) Δ Available own funds after adverse scenario due to non-life insurance related shock (claims)	-0.2 bn	-0.3 bn	-0.1 bn	-0.1 bn
(15) Δ Available own funds after adverse scenario due to life insurance related shock (mortality)	-0.4 bn	+/-0 bn	-0.05 bn	+/-0 bn
(16) Δ Available own funds after adverse scenario due to life insurance related shock (longevity)	-0.1 bn	+/-0 bn	-0.2 bn	+/-0 bn
Management action				

Anonymised reporting to a centralised database run by EIOPA per member would look as follows:

Lead supervisor	Country XY
Participating groups	4
Participating solo insurers	0
Aggregated available own funds	7.5 bn
Aggregated SCR	6.8 bn
Aggregated MCR	2.6 bn
Aggregated Δ available own funds after adverse	-1.8 bn

scenario				
Aggregated solvency deficit after adverse scenario (for those groups with a solvency deficit)	0.0 bn			
Aggregated solvency deficit after adverse scenario (for those solo insurers with a solvency deficit)	0.0 bn			
RANDOMLY SHUFFLED RATIOS (each line is separately shuffled)				
Solvency ratio before scenarios	325%	263%	300%	280%
Solvency ratio after adverse scenario	275%	178%	225%	240%
Contribution of interest rate shock to overall Δ available own funds after adverse scenario	25%	27%	33%	50%
Contribution of equity shock to overall Δ available own funds after adverse scenario	18%	33%	75%	25%
Contribution of property shock to overall Δ available own funds after adverse scenario	9%	17%	25%	50%
Contribution of spread shock to overall Δ available own funds after adverse scenario	50%	50%	33%	9%
Contribution of non-life insurance related shock (nat. cat) to overall Δ available own funds after adverse scenario	9%	100%	25%	17%
Contribution of non-life insurance related shock due to claims to overall Δ available own funds after adverse scenario	18%	33%	50%	150%
Contribution of non-life insurance related shock due to mortality to overall Δ available own funds after adverse scenario	0%	0%	17%	36%
Contribution of non-life insurance related shock due to longevity I to overall Δ available own funds after	67%	0%	0%	9%

adverse scenario				
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Similar tables for both baseline and inflation scenario.

Annex 2

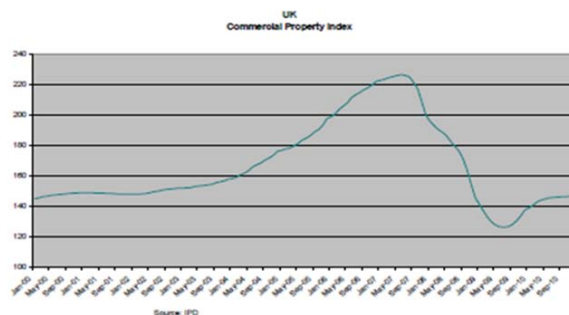
Annex 2

Summary of scenario assumptions

Risk modules		Baseline scenario	Adverse scenario	Inflation scenario
Market Risk				
Interest rate	0- 3M	-40 bps	-125 bps	+125 bps
	3M+	-20 bps	-62.5 bps	+62.5 bps
Equities		-7.5%	-15%	0%
Real estate Residential		-3.8%	-11.6%	0%
Real Estate Commercial		-12.5%	-25%	0%
Credit Risk				
Spread risk				
Investment grade		+15.7% increase in spreads	+31.4% increase in spreads	0%
High-yield		+19.15% increase in spreads	+38.3% increase in spreads	0%
Insurance risks				
Non-life Insurance related stresses		MAX [Nat. Cat.; Claims inflation] (see 17.4)		
Life Insurance related stresses		MAX [Mortality; Longevity] (see 17.5)		

Table 1 (UK IPD Commercial Property index) Base year 1987

31/12/2007	200.08762
31/01/2008	195.04143
29/02/2008	193.11896
31/03/2008	190.6156
30/04/2008	188.8008
30/05/2008	186.59393
30/06/2008	182.8933
31/07/2008	179.59669
29/08/2008	176.65472
30/09/2008	171.51501
31/10/2008	164.15515
28/11/2008	154.85162
31/12/2008	145.80977
30/01/2009	141.42688
27/02/2009	137.06471
31/03/2009	132.83481
30/04/2009	129.77034
29/05/2009	127.7399
30/06/2009	126.61912
31/07/2009	126.45647
31/08/2009	126.72383
30/09/2009	128.15916
30/10/2009	130.53827
30/11/2009	133.61293
31/12/2009	137.63043
29/01/2010	138.9827
26/02/2010	140.75037
31/03/2010	142.98921
30/04/2010	144.20108



Annex 3

Sovereign risk scenario

Risk module	Baseline scenario	Adverse scenario	Inflation scenario
Sovereign Risk			
Increased spread of government debt	None	See table 1 below	

Table 1

Basis point increase in yields⁷:

Belgium	78.0
Bulgaria	81.0
Czech Republic	34.5
Denmark	16.5
Germany	0.0
Estonia	39.0
Ireland	258.0
Greece	255.0
Spain	165.0
France	48.0
Italy	136.5
Cyprus	136.5
Latvia	55.5
Lithuania	64.5
Luxemburg	78.0
Hungary	114.0
Malta	136.5
Netherlands	22.5
Austria	24.0
Poland	67.5
Portugal	246.0
Romania	91.5
Slovenia	39.0

⁷ Envisaged sovereign risk for EU countries are ECB macroeconomic assumptions (see section 18) whereas EEA countries are assumptions similar to the EBA market risk test for long term maturities.

Slovakia	33.0
Finland	10.5
Sweden	6.0
United Kingdom	28.5
Iceland	42.0
Liechtenstein	0.0
Norway	6.0
Switzerland	0.0

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