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# ORSA – An international requirement



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## 1. EXECUTIVE SUMMARY

### 1.1 Background

The Own Risk and Solvency Assessment (ORSA) is quickly becoming a global regulatory requirement for insurance undertakings. It is one of the key elements of enterprise risk management (ERM) and numerous insurance regulators around the world are introducing ORSA requirements.

Many of the global developments stem from the International Association of Insurance Supervisors (IAIS), which requires an ORSA as part of Insurance Core Principle 16 (ICP16) on ERM, which was adopted in October 2010. The inclusion of an ORSA requirement within the ICPs has resulted in an effective worldwide requirement for an ORSA, albeit one that can vary in certain respects from country to country.

This paper compares and contrasts the IAIS requirements with the requirements applying in Europe (through Solvency II), in the US and in Australia. It also summarises the ORSA requirements applying in a number of other territories, looks at a number of common challenges facing insurers when embedding an ORSA into their organisation, and also covers potential solutions to some of these challenges. There is a large degree of consistency in the ORSA requirements applying in the various jurisdictions. There are differences but most of the key requirements and challenges are common to all jurisdictions. This greatly enhances the ability of insurance groups to apply similar techniques and methods across borders.

Almost all jurisdictions require that the ORSA process assesses the insurer's overall solvency needs, that the process includes a forward looking assessment of solvency needs and that the process and results are documented and communicated to the Board and the supervisor.

Solvency II and the Australian ORSA process place more emphasis on the role of the Board than is the case under the US requirements. The Australian and European requirements both emphasise that the ORSA is the responsibility of the Board and the Board must take an active role in the process. The US requirements are less specific on the responsibilities of the Board but commentary in the US frequently mentions the importance of the Board as a critical driver of risk assessment and management. It remains to be seen whether this difference in emphasis will result in a different attitude towards the process in the different jurisdictions.

Solvency II requires an ORSA for every legal entity and for the group as a whole whereas the US requirements are more flexible and allow the possibility of applying the ORSA requirements in a manner that is consistent with the way the business is managed, whether on a group, legal entity or other basis. The US requirements are also subject to a more generous threshold, so that the requirements don't apply to smaller US companies. There is a threshold below which each national regulator might exempt insurers from meeting the full Solvency II regime, and therefore ORSA requirements, but it is at a much lower level than the US threshold. In Australia all regulated institutions are required to submit a report, which includes consideration of the impact of its membership of a group.

The Australian requirements are among the most advanced in terms of timing and the first submissions have already been lodged. In Europe, the preparatory guidelines will introduce an ORSA requirement during 2014 for most large European insurance companies and in the US the first reports are scheduled to be produced before the end of 2015.

## 1.2 ORSA objectives

Specific ORSA requirements vary internationally but there are certain fundamental objectives that an ORSA is intended to achieve. The ORSA should allow an insurer to:

- Assess the risks it faces
- Assess the amount of capital it requires to protect against those risks
- Document its assessment of risks and capital requirements

The ORSA is intended to assess whether the insurer's risk management and solvency position is adequate and to consider its development in the future. It should be seen as a fundamental part of the risk management system of the insurer. The objective is that the ORSA should be linked to the insurer's business planning process and act as a key management tool in the development of the insurer's strategy and risk and capital management.

Typically, insurers have freedom to achieve these objectives and there is no prescribed methodology. In addition, many of the territories explicitly state that the processes should be proportionate to the nature, scale and complexity of the risks inherent in the insurer's business. This lack of prescription is deliberate in that the ORSA is intended to be the insurer's *own view* of its risks and solvency position. Therefore, the insurer should have freedom to decide how best to assess its risks and to calculate the capital required to protect against those risks.

## 1.3 Key challenges

### 1.3.1 Embedding a coherent process

It should be noted that many insurance undertakings, especially in the more developed insurance markets, will already have many elements of the ORSA in place through existing risk management systems and capital planning processes. Therefore, one of the challenges posed by ORSA is that of bringing together existing processes into one coherent process. Insurers also face a challenge in fully embedding the ORSA and in demonstrating that the principles have been complied with. The best way to achieve this is by making the ORSA accessible, understandable and robust in terms of time to run and the questions that can be answered.

### 1.3.2 Calculation complexities

One technical challenge that ORSA poses to insurers is the requirement to produce a multi-year projection of the insurer's balance sheet and capital requirements in a range of scenarios. Projecting future economic balance sheets can be extremely complex and resource intensive, requiring extremely sophisticated modelling and processes. The challenge of producing these projections should be evaluated relative to the fact that the determination of the insurer's balance sheet and capital requirements on a given date is often a significant challenge, in itself.

The approach should be proportionate to the nature and complexity of the insurer's business so that smaller, less complex insurers are more likely to adopt simplifications and approximations in the production of these projections. Simplifications might also be considered appropriate in projecting simpler lines of business. Insurers using such simplified approaches will face a challenge in demonstrating the appropriateness of such approaches and in quantifying the materiality of any approximations or simplifications.

Many of the other challenges associated with the ORSA are the same challenges insurers face in ensuring that their ERM framework is operating effectively. Insurers usually face a significant challenge in articulating risk appetite and ensuring consistency with their risk tolerances and limits, and in demonstrating a robust approach to stress and scenario testing (SST).

### 1.3.3 Risk profile and risk appetite

Undertakings often struggle to properly identify and fully understand their underlying risk profile, which is a key building block of the ORSA. Similarly, articulating risk appetite and embedding risk appetite throughout the company is a significant challenge that many insurers have struggled with. Risk appetite needs to be translated into risk tolerances, which in turn need to be translated into risk limits that can be observed by the business units. Many insurers find it difficult to reconcile high-level risk appetite statements with their specific risk tolerances for various risks and with the risk limits that the business units have to observe.

### 1.3.4 Stress and scenario testing

SST is typically a key component of the ORSA. It allows an insurer to explore extreme scenarios in order to investigate their impact on the insurer and allows the insurer to consider potential management actions that could be used. The determination of such scenarios can be very challenging. Insurers need to ensure that any such scenarios are fully thought through and are internally consistent. Boards and regulators are likely to challenge insurers to demonstrate that the scenarios are comprehensive and have covered all of the material risks to the insurer.

## 1.4 Potential solutions

There are a variety of solutions that companies can employ to address the key challenges involved in embedding ORSA requirements into the organisation. These techniques and approaches vary in the degree to which they meet these challenges. The approaches we cover in this paper include the use of proxy modelling and complex systems analysis techniques.

### 1.4.1 Proxy models

The use of a proxy model is something that is growing in popularity as a means of addressing the challenge of projecting future balance sheets and capital requirements. A number of different proxy approaches have been applied in the insurance industry. Developing such proxy models is technically challenging but gives insurers the ability to produce results quickly (once the initial development is completed) and to explore different scenarios within a reasonable timeframe. There is a need to balance accuracy and action and insurers need to be able to produce results within a sufficiently short time frame in order to allow the results to be used in the strategic decision making process. Proxy models can also assist with continuous monitoring of the solvency position as changes in the external environment and other key drivers occur.

### 1.4.2 Complex systems analysis

Complex systems analysis can assist in understanding business performance and risk through the identification of the underlying interactions and relationships that exist and potentially evolve under different operating environments. Furthermore, this approach assists in understanding the mechanisms that drive uncertainty in the business.

Causal models of this nature can be used to connect high level risk appetite statements with detailed risk limits. Risk limits can be used as one of the key inputs that combine with the various other risk factors to produce outcomes. This allows the insurer to vary the limits until the risk return profile that emerges is consistent with the insurer's risk appetite. Similarly, causal models of this nature can be used to vary the underlying risk factors and processes, in isolation or combination, in order to examine various different stress tests and scenarios. The paper outlines what is meant by a complex systems analysis and how such an approach can be applied to the challenges companies face both in articulating and embedding risk appetite as well as in carrying out SST.

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## 2. INTRODUCTION

### 2.1 Development of ORSA

With the arrival of ORSA as a global regulatory requirement for insurance undertakings, it has become one of the key elements of ERM.

Many of the global developments stem from the IAIS, which requires an ORSA as part of ICP 16 on ERM, which was adopted in October 2010. The IAIS represents insurance regulators and supervisors of more than 200 jurisdictions in 140 countries, covering 97% of the world's insurance premiums. The inclusion of an ORSA requirement within the ICPs has resulted in an effective worldwide requirement for an ORSA, albeit one that can vary in certain respects from country to country.

Another important influence is the Solvency II equivalence requirements, where the supervisory regime applying in countries outside the EU can be assessed as equivalent to the EU solvency regime. Equivalence results in the third country being treated as if it were an EU member state for some supervisory purposes. As an example, reinsurers operating in countries deemed equivalent for reinsurance supervision, might be considered as equivalent to European reinsurers. This is an important consideration for reinsurers and, therefore, for countries with a large number of reinsurers who are active in the EU. The ORSA is a key part of the Solvency II framework and therefore any country that wants to be considered equivalent needs to have a process that addresses the same issues.

The ORSA concept emerged from the development of the European Solvency II regulations, which in turn was strongly influenced by the introduction by the UK insurance regulator, the Financial Services Authority (since renamed as the Prudential Regulatory Authority), of the Individual Capital Adequacy Standards (ICAS), which required insurers to evaluate their own risks and report the associated capital requirements.

The European Insurance and Occupational Pensions Authority (EIOPA)<sup>1</sup> initially defined the ORSA as *the entirety of the processes and procedures employed to identify, assess, monitor, manage, and report the short and long term risks a (re)insurance undertaking faces or may face and to determine the own funds necessary to ensure that the undertaking's overall solvency needs are met at all times.*

This paper outlines the requirements applying in some of the principal territories in which insurance business is written and compares and contrasts these requirements. It also highlights the key challenges posed by the ORSA, both technical and non-technical, and some of the possible ways of addressing these challenges.

### 2.2 Outline of paper

- Section 3 defines the ORSA and outlines some of its key objectives.
- Section 4 outlines the IAIS ORSA requirements.
- Section 5 outlines the European Solvency II ORSA requirements.
- Section 6 outlines the US ORSA requirements.
- Section 7 outlines the Australian ORSA requirements.
- Section 8 compares the IAIS/European/US/Australian requirements.
- Section 9 summarises ORSA requirements in a number of other territories.
- Section 10 outlines some common challenges and potential solutions.

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<sup>1</sup> Formerly CEIOPS – Issues Paper on Own Risk and Solvency Assessment (ORSA) May 2008



## 3. WHAT IS THE ORSA INTENDED TO ACHIEVE?

### 3.1 What is an ORSA?

Specific ORSA requirements vary internationally but there are certain fundamental objectives that an ORSA is intended to achieve. The ORSA should allow an insurer<sup>2</sup> to:

- a. Assess the risks it faces
- b. Assess the amount of capital it requires to protect against those risks
- c. Document its assessment of risks and capital requirements

Therefore, the ORSA encompasses both the process undertaken to assess the insurer's risks and capital requirements and the documentation required to demonstrate the process itself as well as the outcomes of the process. The details of the documentation required vary from territory to territory but there is substantial consistency in the requirements regarding the process required to assess risks and determine capital requirements.

The details of ORSA requirements vary from territory to territory but we can identify certain ideals that the ORSA is intended to achieve and certain principles regarding the operation of the ORSA process.

Typically insurers have freedom to achieve these objectives and there is no prescribed methodology. In addition, many of the territories explicitly state that the processes should be proportionate to the nature, scale and complexity of the risks inherent to the insurer's business.

This lack of prescription is deliberate in that the ORSA is intended to be the insurer's *own view* of its risks and solvency position. Therefore, the insurer should have freedom to decide how best to assess its risks and to calculate the capital required to protect against those risks.

The ORSA is intended to assess whether the insurer's risk management and solvency position is adequate and to consider its development in the future. It should be seen as a fundamental part of the risk management system of the insurer. The objective is that the ORSA should be linked to the insurer's business planning process and act as a key management tool in the development of the insurer's strategy and risk and capital management.

It should be noted that many insurance undertakings, especially in the more developed insurance markets, will already have many elements of the ORSA in place through existing risk management systems and capital planning processes. However, the ORSA is a key component in ensuring that risk management is linked with capital management and strategic planning.

There are a number of key objectives that the ORSA should address, as follows (each of which is outlined in further detail below):

- Allocate Board responsibility
- Facilitate own risk assessment
- Facilitate own solvency assessment
- Ensure an appropriate forward-looking perspective
- Be used as a key management information tool
- Enhance internal and supervisory understanding
- Provide a group-wide assessment
- Ensure a continuous process
- Ensure adequate documentation

<sup>2</sup> We use the term *insurer* to represent insurance or reinsurance undertakings. The terms undertaking and insurance undertaking are also used in this paper.

### 3.1.1 Board responsibility

The ORSA is generally seen as the responsibility of the Board and so it is the Board's responsibility to ensure that the insurer's processes and procedures are sufficient to assess the insurer's risk and solvency requirements and that this assessment is documented. The Board is also responsible for ensuring that the insurer does not take on more risk than the capital base allows. The ORSA is intended to act as a key tool in ensuring that this does not happen.

### 3.1.2 Own risk assessment

The ORSA is intended to represent the insurer's assessment of the risks it faces. Therefore, the ORSA needs to document the insurer's risk management framework and the outputs of the risk management system become an integral part of the ORSA. The ORSA and the insurer's risk management framework overlap significantly and the ORSA can be considered to cover every element of enterprise risk management. Documenting the insurer's risk management framework might also highlight any weaknesses that exist, especially if independent review is part of the process.

The strength or weakness of the insurer's existing risk management framework is likely to be a key determinant of the extent of work needed to meet the ORSA requirements.

The following elements of the risk management framework form key parts of the ORSA, given the overlap between ORSA and the risk management framework:

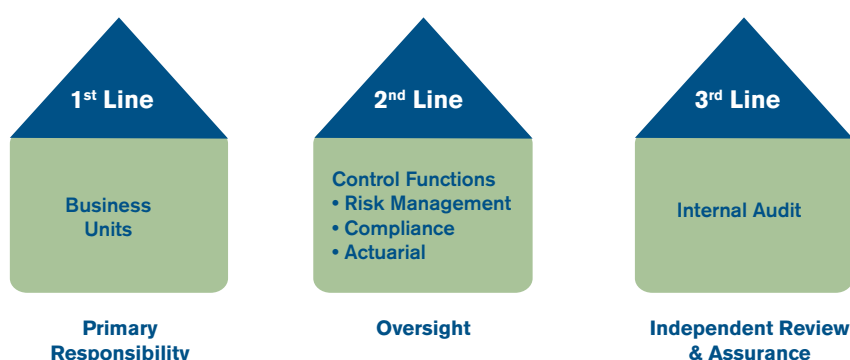
**FIGURE 1: RISK MANAGEMENT FRAMEWORK**



The ORSA should encompass all reasonably foreseeable and relevant material risks faced by the insurer. It should summarise those risks and outline the insurer's assessment of those risks. Ideally this assessment would be undertaken quantitatively but it might also include qualitative assessments, especially for risks where quantification can be difficult.

The ORSA also typically describes the insurer's risk governance and internal control system. Many insurers adopt a *three lines of defence approach* as illustrated in the diagram below (Figure 2) and the ORSA should document the approach that is taken within the insurer.

**FIGURE 2: THREE LINES OF DEFENCE**



### 3.1.3. Own solvency assessment

The ORSA is intended to summarise the solvency position of the insurer and the capital required to protect against the risks faced by the insurer. It is intended to represent the insurer's view of the capital required and it therefore gives the insurer the freedom to decide the most appropriate measure, time period and confidence level to use when considering the capital required to back the risks. However, it is also necessary to consider regulatory capital requirements and therefore the solvency assessment covers both the regulatory capital requirements and the capital required by the insurer's economic capital model, if applicable.

There might be differences between the insurer's economic capital requirements and regulatory capital requirements and, if so, the insurer needs to analyse and reconcile these differences.

Even though it might not be necessary to hold capital for every risk, the insurer needs to consider the interaction of risk management and capital management. The insurer must also determine the extent of financial resources needed, given its risk appetite and business plans. Further, the insurer should identify which risks are mitigated by capital and which are mitigated by management actions only.

Stress and scenario testing is likely to generate useful information regarding the insurer's current solvency position and the volatility of the solvency position. The ORSA should contain information on such testing. Reverse stress testing is also valuable in identifying what level of stress would result in the insurer not being able to meet its regulatory requirements or other internal targets.

As part of the ORSA process, the insurer should also assess the quality and quantity of financial resources available to it, relative to its needs. This requires consideration of the insurer's ability to raise new capital in various scenarios.

In most cases supervisors have stated that the ORSA shall not serve to calculate a capital requirement but that insurers should instead outline how they are addressing any capital issues or risks highlighted by the ORSA and how they will manage their business to ensure compliance with capital requirements or to address any risk issues.

### 3.1.4 Forward looking assessment of solvency needs

The ORSA is intended to allow the insurer to understand the impact of its business plans on its risk and solvency position. Therefore, it should project its future risk and solvency position allowing for planned levels of new business. It should then consider any key sensitivities of the capital position of the undertaking in relation to external and internal factors such as markets, economic conditions and demographic experience. The time horizon used in these projections should correspond with that used in the insurer's business plan, so typically is between three and five years.

The insurer will generally have freedom to determine the most appropriate method of projecting risks and solvency requirements but the ORSA is intended to be a key tool that will allow the insurer to better understand the potential emergence and development of risks in different scenarios and the associated solvency requirements in those scenarios.

This forward looking assessment should place greater emphasis on new business plans and product development and pricing than is typically considered in regulatory requirements at present. Indeed, the latter are sometimes based on the ideal that the insurer is able to transfer at time 0 its liabilities to another insurer, and therefore assume run-off.

These projections would typically cover the insurer's solvency balance sheet and capital requirements, and also economic balance sheet and capital requirements. There might be other aspects of the insurer's risk appetite that it would also wish to project, in order to more fully assess its future risk profile relative to its risk appetite.

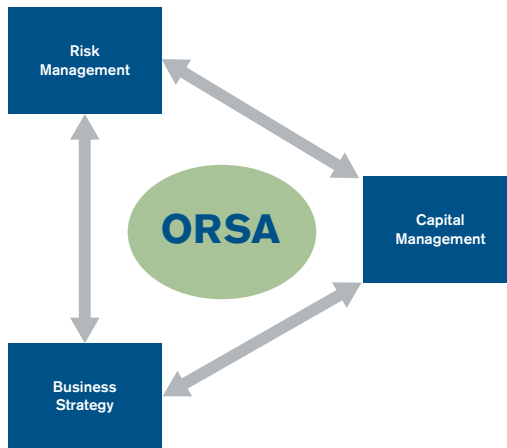
### 3.1.5 Key management tool

The ORSA is intended to be a key tool in the management of the insurer that will allow the Board and senior management to have better insight regarding risks and solvency requirements of the insurer's business plan and the overall business strategy. It is intended that the ORSA should be used in the determination of strategy and product development and also assist the insurer to develop potential management actions.

The ORSA is the key process which ensures alignment of strategy, risk appetite and capital requirements in the context of the insurer's overall risk management framework. It aims to ensure that the insurer is fully aware of the relationship between its strategy, the risks the insurer is taking in the short term as well as the medium to long term and the capital requirements arising from those risks. The ORSA is intended to ensure that the insurer's decisions are risk-based and that strategy is determined with full awareness of risk and any associated capital requirements.

The diagram below illustrates this interaction of strategy, risk management and capital management.

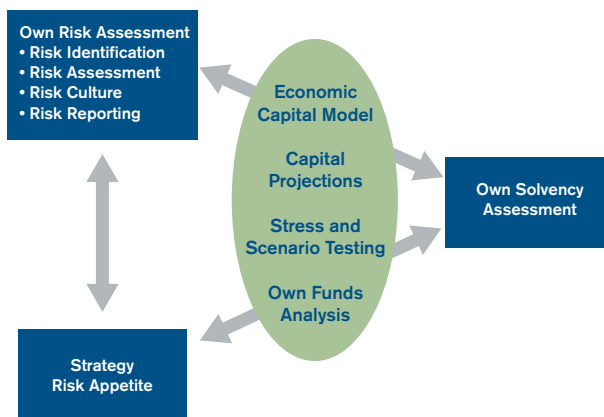
**FIGURE 3: INTERACTION OF ORSA WITH STRATEGY, RISK MANAGEMENT AND CAPITAL MANAGEMENT**



The following diagram expands the previous diagram to add some further detail regarding the tools and processes that allow the linkage of these objectives.

**FIGURE 4: DETAILED INTERACTION OF ORSA WITH STRATEGY, RISK MANAGEMENT AND CAPITAL MANAGEMENT**

**Own Risk and Solvency Assessment**



The ORSA should ensure that risk management and capital are properly taken into consideration when setting strategy and when making any key decisions that impact on the insurer including (but not limited to):

- Pricing
- Capital plans
- Strategic plans
- Setting risk appetite
- Investment policy
- Compensation aligned with risk-adjusted performance

It should also assist the insurer in developing contingency plans for possible future adverse scenarios through an enhanced understanding of how such scenarios might present themselves, the challenges they might pose and the range of actions which might best address those challenges.

### 3.1.6 Internal and supervisory understanding

The ORSA should help senior management, key staff, the Board and the insurer's supervisor to:

- Understand the current and projected risk profile of the insurer and its key drivers
- Understand the adequacy of capital available to support its business plan
- Understand any material changes to risk profile
- Understand the risks not covered by regulatory capital
- Understand the key drivers of the balance sheet
- Identify potential management actions to mitigate risk

This is, however, by no means an exhaustive list. The scope of the ORSA process should be such that it facilitates an ongoing dialogue between management and supervisors, enhancing understanding of the business on both sides.

### 3.1.7 Group assessment

An ORSA should be undertaken at the group level to assess the adequacy of the group's risk management as well as its current and likely future solvency position. The group ORSA should include all legal entities of the group and should address specific group issues such as

- Fungibility of capital
- Transferability of assets
- Potential double-counting of capital
- Intra-group creation of capital
- Any additional risks arising due to membership of the group (e.g. contagion or reputation risk)

A group ORSA provides the supervisory authority with a consolidated overview of group activities and risk exposures. This is particularly important in the case of large, complex international groups. It also allows individual entities within a group structure to more clearly see how they fit into that structure and to gain an understanding of the overall risk profile and capital needs of the group.

### 3.1.8 Frequency

The complete ORSA process should be performed on a regular basis. Most supervisors require a new assessment at least annually and following a significant change in risk profile. Events that might be considered to represent a significant change in risk profile include:

- An acquisition or divestiture of a business
- A significant change in market conditions
- A significant change to the type or level of new business

However, the ORSA should not only be seen as a compliance exercise to be run at discrete intervals. Instead, it represents an ongoing process, one output of which is generally a report summarising the outcome of the insurer's risk and solvency assessment. Given that organisations are continually changing, and that their risk profiles evolve accordingly, it makes sense that the ORSA requires regular updates so as to remain relevant to the day to day running of the business.

### 3.1.9 Adequately documented and validated

The ORSA should be appropriately evidenced and internally documented, as well as independently assessed. Some countries don't explicitly require independent assessment but this should be seen as best practice, noting that the validation could be undertaken by another independent team within the insurer. However, it should be noted that for smaller organisations, it might be difficult to find experts to perform this independent review, as they are likely to have been involved to a certain extent in the ORSA processes.

## 3.2 How to ensure that the ORSA achieves its objectives

It must be acknowledged that ORSA has not yet been fully implemented in any country and therefore it is too early to say whether the above ideals will be achieved. In particular, there is a risk that the ORSA becomes seen as a compliance reporting exercise, which is fitted around strategy rather than one which helps to determine strategy. It is also intended that the ORSA is not an exercise that is performed solely for the benefit of the regulator, but rather a continuous process to ensure that risk and solvency are key factors in the insurer's decision making.

Certain elements are required in order to ensure that the ORSA operates in the intended manner and that it doesn't become a compliance exercise with no impact on business planning. These elements include:

- Planning and organisation
- Training
- Communication
- Culture

The ORSA development project needs a clear plan to outline what it is intended to achieve and a clear allocation of responsibilities in order to determine how different functions will interact during its development and on an ongoing basis.

It is important to identify and engage with all key stakeholders sufficiently early in the development period in order to ensure that these key individuals are supportive of the concept and plan. It is, of course, equally important to continue to engage with these stakeholders throughout the process in order to ensure that it continues to meet their needs and expectations.

It is very important that there is sufficient Board and staff training to outline the objectives of the ORSA and the potential advantages that could accrue if it is used in the right manner. It is also important to communicate the significance attached by regulators to the ORSA. Little value will accrue from the process if it becomes seen as a compliance exercise that is produced by the financial reporting team and is not used throughout the insurer. Regulators will be also keen to see this use demonstrated as part of the supervisory review process.

Culture is a key component of risk management, and hence a key component of the ORSA. It is important that the Board promotes the ORSA concept and ensures that sufficient weight is placed on the process and results. It is the Board's responsibility to make sure that the ORSA is used in business planning and to influence decisions. Insurers need to understand their existing culture, monitor it on an ongoing basis and consider methods to enhance it where appropriate. Aspects contributing to risk culture include Board leadership and communication and risk-based performance measurement (sometimes including remuneration).

In summary, the ORSA can only achieve its objectives if there is genuine stakeholder buy-in coupled with a recognition that ORSA can be a genuinely useful tool for running the business rather than being yet another compliance box to be ticked.

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## 4. IAIS ORSA REQUIREMENTS

### 4.1 Main IAIS requirements

The IAIS outlined their ORSA requirements in Insurance Core Principle 16 (ICP16) on Enterprise Risk Management, which was adopted in October 2010. The main ORSA requirements are summarised below:

#### 4.1.1 Assessment of overall solvency needs

Every undertaking should undertake its own ORSA and document the rationale, calculations and action plans arising from the assessment. The ORSA should be supported by an effective overall ERM framework.

The ORSA should encompass all reasonably foreseeable and material risks, including, at a minimum, underwriting, credit, market, operational and liquidity risks and additional risks arising due to membership of a group.

The undertaking should determine the overall financial resources needed to manage its business given its risk tolerance and business plans. It should base its risk management actions on consideration of its economic capital, regulatory capital requirements and financial resources. It should assess the quality and adequacy of its own capital resources to meet regulatory capital requirements. The ORSA should also consider the issue of recapitalisation, especially the ability of capital to absorb losses on a going-concern basis and the extent to which different capital instruments may facilitate or hinder future recapitalisation.

#### 4.1.2 Forward looking assessment

The insurer should distinguish between current capital needs and its projected future financial position, having regard to its business strategy.

The insurer should also undertake a continuity analysis, looking at its ability to continue in business, as well as the risk management and financial resources required to do so over a longer time horizon than is typically used to determine regulatory capital requirements. The continuity analysis should address a combination of quantitative and qualitative elements in the medium and longer term business strategy of the insurer and include financial projections of its future financial position and analysis of its ability to meet future regulatory capital requirements.

In addition to these requirements, the insurer should be able to demonstrate an ability to manage its risk over the longer term under a range of plausible adverse scenarios. Capital management plans and capital projections are key to its overall risk management strategy. These should allow the insurer to determine how it could respond to unexpected changes in markets and economic conditions, innovations and other factors. The insurer should also apply reverse stress testing to identify scenarios that would be likely to cause failure and the actions necessary to manage these risks.

#### 4.1.3 Role of the Board

Responsibility for the ORSA rests at the top of the insurer's organisation, with the Board and senior management.

#### 4.1.4 Use of the ORSA

ICP16 suggests that the use of continuity analysis will allow an insurer to link its current financial position with future business plan projections and also to help ensure its ability to maintain its financial position in the future. In this way the insurer further embeds its enterprise risk management into its ongoing and future operations.



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#### 4.1.5 Frequency of performance

An insurer should undertake an ORSA on a regular basis and following significant changes in risk profile.

#### 4.1.6 Group requirements

An insurance group should perform its ORSA to assess the adequacy of the group's risk management and current, as well as likely future, solvency position. Key group-wide factors to address include multiple gearing, intra-group creation of capital and reciprocal financing, leverage of the quality of capital and fungibility of capital and free transferability of assets across group entities.

Multiple gearing occurs when an insurer invests in a capital instrument that counts as regulatory capital of its subsidiary, its parent or another group entity. In effect, the same capital is used twice to cover regulatory requirements.

Intra-group creation of capital can arise from reciprocal financing between members of a group. Reciprocal financing may occur if an insurer holds shares in or makes loans to another legal entity, which in turn holds a capital instrument that counts as regulatory capital of the insurer holding the shares or making the loans.

Leverage arises where a parent, issues debt or other instruments, which are ineligible as regulatory capital and down-streams the proceeds as regulatory capital to a subsidiary.

Excess capital above the level needed to cover an insurer's capital requirements may not always be available to cover losses or capital requirements in other entities within the group, due to operational or legal limitations. Examples given by the IAIS include exchange controls, surpluses in participating funds of life insurers which are earmarked for the benefit of policyholders, and rights that holders of certain instruments may have over the assets and liabilities of the legal entity. Therefore, the group needs to consider questions of fungibility of capital and free transferability of assets.

#### 4.1.7 Reporting to supervisors and disclosure

Supervisors should undertake reviews of the insurer's risk management processes and financial condition, including the ORSA. The output of the ORSA should serve as an important tool in the supervisory review process.

#### 4.1.8 Documentation required

Insurers should document the rationale, calculations and actions arising from the ORSA.

#### 4.1.9 Proportionality

The IAIS recognises that the assessment should be appropriate to the nature, scale and complexity of the undertaking's risks.

#### 4.1.10 Independent review

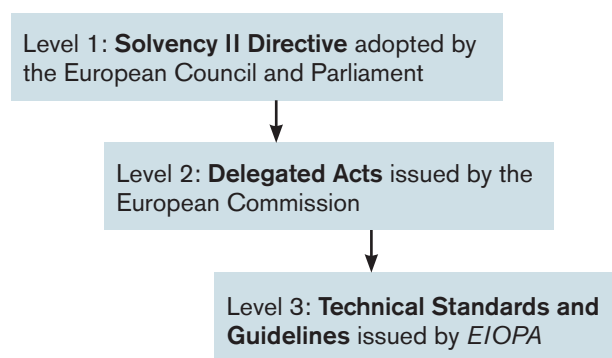
ICP16 states that, where proportionate to do so, effectiveness should be assured through internal or external independent review by a suitably experienced individual, such as a Chief Risk Officer, who reports directly to, or is a member of, the Board. However, it would seem that for many insurers the Chief Risk Officer might not be sufficiently independent to perform such a review.

## 5. EUROPEAN ORSA REQUIREMENTS

### 5.1 Solvency II legislation

Solvency II requirements, and therefore ORSA requirements, are outlined at three levels:

**FIGURE 5: THREE LEVELS OF SOLVENCY II AND ORSA REQUIREMENTS**



The Solvency II directive was adopted in December 2009<sup>3</sup> but will be amended by Omnibus II, which is currently being debated in an attempt to resolve some key issues following the Long Term Guarantees Assessment (LTGA), which was undertaken in early 2013. The Level 2 Delegated Acts and additional standards and guidelines cannot be published until the Directive is agreed but there has been pre-consultation with certain *significant stakeholders* on the Level 2 text. It is worth mentioning that ORSA has not been identified in the Solvency II Directive as a topic where Delegated Acts should be issued by the European Commission. A level 3 paper on ORSA was published in July 2012.<sup>4</sup>

The timing of the full Solvency II requirements is somewhat uncertain as the negotiations on the long-term guarantees assessment continue. The current expectation is that the Level 1 Omnibus II directive will be agreed in early 2014 and that the Solvency II regime will come into effect from January 2016, but there are some fears that this timetable will not be achieved.

EIOPA published *Guidelines on preparing for Solvency II* in September 2013, setting out its expectations that supervisory authorities would put in place important aspects of the Solvency II regime in advance of the planned January 2016 implementation date. Supervisory authorities are expected to ensure that undertakings take steps towards implementing the relevant aspects of the regulatory framework. The preparatory guidelines include an ORSA requirement,<sup>5</sup> which is based on the Level 3 paper mentioned above. The guidelines require undertakings to produce an ORSA<sup>6</sup> during 2014 and, therefore, accelerate the ORSA requirement significantly.

There is still uncertainty regarding the Pillar I aspects of Solvency II but there is a lot of information available regarding the ORSA requirements and it is difficult to see substantial changes to these requirements. It would be preferable if there were a complete and final definition of the Pillar I rules, but insurers don't have the option of waiting until the rules are fully

3 Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II)

4 EIOPA Final Report on Public Consultation No. 11/008 On the Proposal for Guidelines On Own Risk and Solvency Assessment

5 EIOPA Final Report on Public Consultation No. 13/009 on the Proposal for Guidelines on Forward Looking assessment of own risks (based on the ORSA principles)

6 This requirement is known as the Forward Looking Assessment of Own Risk (based on ORSA principles)

defined before making progress on the ORSA. Therefore, European insurers are working on implementing and improving their ORSA procedures, while trying to leave sufficient flexibility to cope with any changes to Pillar I rules that will occur before the regime comes into force.

## 5.2 Main Solvency II ORSA requirements

The main Solvency II ORSA requirements are summarised in this section.

### 5.2.1 Assessment of overall solvency needs

The ORSA should assess the undertaking's overall solvency needs taking into account its specific risk profile, approved risk tolerance limits and business strategy. The undertaking should express the overall solvency needs in quantitative and qualitative terms and complement the quantification with a qualitative description of the risks.

The undertaking should subject the identified risks to a sufficiently wide range of stress tests and scenario analyses to provide an adequate basis for the assessment of the overall solvency needs. Management actions in adverse circumstances should be taken into account.

The assessment covers all material risks, including difficult to quantify risks such as strategic and reputational risks.

The undertaking does not have to use the Solvency II basis in the ORSA, but if it does not do this then it has to explain how the different valuation basis provides better consideration of the specific risk profile, approved risk tolerance limits and business strategy of the undertaking, while complying with the requirement for a sound and prudent management of the business. It is also necessary to quantitatively estimate and analyse the impact on the overall solvency needs of the different basis.

### 5.2.2 Forward looking assessment of solvency needs

The undertaking's assessment of the overall solvency needs should be forward-looking. The undertaking needs to project its capital needs over its business planning period. The undertaking should identify and take into account external factors that could have an adverse impact on its solvency needs or own funds.

### 5.2.3 Demonstrate compliance, on a continuous basis, with the capital requirements and the requirements regarding the technical provisions

The undertaking should ensure that the assessment of compliance on a continuous basis with the capital requirements includes:

- Potential future changes in the risk profile and stressed situations
- Quantity and quality of own funds over its whole business planning period
- The composition of own funds across capital tiers and how this composition might change over the period

The undertaking should also ensure that the actuarial function provides input concerning the continuous compliance with the requirements regarding the calculation of technical provisions and the risks arising from this calculation.

### 5.2.4 Assess the significance of the deviation of the risk profile from the assumptions underlying the capital calculations

Each undertaking needs to assess the significance with which its risk profile deviates from the assumptions underlying the Solvency Capital Requirement, as calculated using either the standard formula or an internal model. Undertakings may initially assess deviations on a qualitative basis but if this assessment indicates that the risk profile deviates materially then the undertaking should quantify the significance of the deviation.

#### 5.2.5 Role of the Board

The ORSA is the responsibility of the Board and shall be regularly (at least annually) reviewed and approved by the Board. The Board is expected to play an active part in the ORSA including steering how the assessment is to be performed and challenging the results.

#### 5.2.6 Use of the ORSA

The undertaking should take the results of the ORSA and the insights gained from the process into account for, at least, the system of governance (including medium term capital management), business planning and product development.

#### 5.2.7 Frequency of performance

The ORSA shall be performed regularly, at least annually, and without any delay following any significant changes to risk profile. The frequency should be determined by the undertaking itself taking into account its risk profile and the volatility of its overall solvency needs relative to its capital position. The undertaking should justify the adequacy of the frequency of assessment.

#### 5.2.8 Group requirements

An ORSA must also be conducted for the group as a whole. All of the entities that fall within the scope of group supervision should be included, i.e. insurance and non-insurance undertakings, both regulated and non-regulated, inside and outside of the EEA. It is possible to have a single ORSA document for the group instead of having separate documents for all insurance entities within the group. However, the single ORSA document for the group does not exempt the subsidiaries from the obligation to conduct an ORSA in respect of each individual legal entity.

The group ORSA needs to address:

- The identification of the sources of own funds within the group if additional funds are required
- The availability, transferability and fungibility of own funds
- Any planned transfers within the group
- Alignment of individual strategies with group strategy
- Specific risks that the group could be exposed to, including contagion risk, intra-group transactions and concentrations, interdependencies within the group, currency risk and risks arising from the complexity of the group structure.

#### 5.2.9 Reporting to supervisors and disclosure

The undertaking shall inform the supervisory authorities of the results of each own risk and solvency assessment. The ORSA will be reviewed by the supervisory authority as part of the Supervisory Review Process and will form part of the dialogue between the undertaking and the supervisory authority. The results of the ORSA are not publicly disclosed.

#### 5.2.10 Documentation required

A number of documents are required including:

- ORSA policy
- A record of each process
- An internal report, communicating results and conclusions internally to relevant staff
- A supervisory report

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The ORSA policy should include:

- A description of the processes and procedures in place to conduct the ORSA
- Consideration of the link between risk profile, risk tolerance limits and overall solvency needs
- Information on:
  - How, and how often, stress tests, sensitivity analyses or reverse stress tests are to be performed
  - Data quality requirements
  - Frequency and timing for the performance of the ORSA and the circumstances which would trigger the need for an ORSA outside the regular timescales

The record of each process should include:

- Individual risk analysis
- Link between risk assessment and capital allocation process and how risk tolerance limits are taken into account
- Explanation of how risks not covered with own funds are managed
- A technical specification of the approach used for ORSA assessment
- Any changes to the approved internal model (if applicable)
- A range of overall solvency needs over a one-year period and at end of business planning period
- Conclusions from the assessment of continuous compliance
- Explanation of any differences identified between the risk profile and the assumptions underlying the calculation of capital requirements
- Action plans arising
- A description of internal/external factors taken into account
- Details of planned management actions
- A record of the challenge process of the Board

#### 5.2.11 Proportionality

Proportionality is recognised and it is stated that the undertaking should have processes in place which are proportionate to the nature, scale and complexity of the risks inherent in the business.

#### 5.2.12 Independent review

Independent review is not specifically required under Solvency II but would be likely to give additional comfort to Board members and supervisors. Undertakings are likely to have to consider and address this issue and larger, more complex undertakings, in particular, will be expected to have undergone thorough independent review.

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## 6. US ORSA REQUIREMENTS

### 6.1 NAIC legislation

In September 2012, the National Association of Insurance Commissioners (NAIC) adopted the Risk Management and Own Risk and Solvency Assessment Model Act (Model Act) applicable to large segments of the US life, health and property and casualty insurance industries. Though rating agencies have routinely assessed company risk management capabilities, this Model Act is the first attempt by US regulators to impose enterprise risk management functional and reporting requirements on domestic insurers. It provides that, beginning January 2015, each insurer not exempt must conduct an ORSA annually, prepare an ORSA Summary Report and provide it to its lead state commissioner and, upon request, to the domiciliary state regulator.

A driving force behind the adoption of the ORSA Model Act is the desire of the NAIC to achieve equivalence of the US Solvency system with that of Solvency II. Furthermore, adoption of the Act brings the U.S. into compliance with ICP16. The United States agreed with the G-20 nations to participate in the Financial Sector Assessment Program (FSAP), the next assessment of which is expected to be conducted in 2014. Compliance with IAIS Core Principles is an important factor in the FSAP.

All US insurers and insurance groups are subject to the ORSA requirement. However, an individual insurer will be exempt from the requirements of the Act if its annual direct and unaffiliated assumed premium is less than \$500 million and, if it is a member of an insurance group, the group's annual direct and unaffiliated assumed premium is less than \$1 billion. All other insurers must maintain a risk management framework, conduct an ORSA and, if requested, file an ORSA Summary. An insurer that does not qualify for an ORSA exemption but which is part of a group that does qualify for an exemption must still comply with the requirement to complete an ORSA.

The NAIC ORSA Guidance Manual provides companies subject to the ORSA requirement with guidance necessary to develop their ERM processes and reports. Because each insurer's ORSA and ORSA Summary Report will be unique, the Manual's guidance allows for appropriate discretion and latitude rather than being prescriptive.

### 6.2 Main NAIC ORSA requirements

The main NAIC ORSA requirements are summarised in this section.

#### 6.2.1 Group requirement

The NAIC ORSA reporting requirement is defined at the insurer group level. The analysis should be conducted in a manner that is consistent with the way in which the business is managed, whether on a group, legal entity or other basis. The commissioner may request additional information to map the results to an individual insurance legal entity.

#### 6.2.2 Frequency of ORSA

Insurers shall regularly, no less than annually, conduct an ORSA but also if there are any significant changes to the risk profile of the insurer.

#### 6.2.3. Documentation

Insurers shall submit an ORSA Summary Report upon request, and no more than once a year, to the lead state commissioner. This report shall be signed by the group's chief risk officer or other executive having responsibility for the oversight of the insurer's enterprise risk management process. The signer attests that the insurer actually applies the enterprise risk management process described and quantified in the ORSA Summary Report.

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Section 1 of the ORSA Summary Report should describe the insurer's enterprise risk management framework, including:

- Risk culture and governance
- Risk identification and prioritisation
- Risk appetite, tolerances and limits
- Risk management and controls
- Risk reporting and communication

In addition to the ORSA Summary Report, the insurer shall internally document the ORSA results.

#### **6.2.4 Risk management framework**

Under this new regime, enterprise risk management will, for many U.S. companies, become a much more significant governance issue and the basis for additional regulatory oversight. Boards and senior managements must become intimately familiar with their companies' ERM processes and the contents of their ORSA Summary Reports. The NAIC ORSA Guidance Manual, which implements the Model Act, requires that a copy of the ORSA Summary Report be provided to the insurer's board of directors or a designated committee, and that the ORSA Summary Report must be signed by the insurer's chief risk officer.

The Board and senior management will be concerned that the ORSA Summary Report adequately demonstrates the strengths of their ERM framework, including how well it satisfies the guidelines in the Guidance Manual for the relative risk of the insurer. Insurers will be able to determine the sophistication of their ERM framework and analysis. Insurers with ERM frameworks judged by regulators to be appropriate to their risk profile may not require the same scope or depth of review during examinations as those judged to have inadequate ERM frameworks.

The Model Act requires that insurers maintain a risk management framework to assist with identifying, assessing, monitoring, managing and reporting on its material risks.

#### **6.2.5 Insurer assessment of risk exposures**

Section 2 of the ORSA Summary Report should provide a high-level summary of the quantitative and/or qualitative assessments of risk exposure in both normal and stressed environments for each material risk. This process should consider a range of outcomes using risk assessment techniques that are appropriate to the nature, scale and complexity of the risks.

The risk assessment should consider the impact of stresses on capital but the regulators recognise that there is no one standard set of stress conditions that each insurer should test.

The analysis should be conducted in a manner that is consistent with the way in which the business is managed.

#### **6.2.6 Group assessment of risk capital**

Section 3 of the ORSA Summary Report should describe the group assessment of capital, within which aggregate available capital is compared against the various risks that may adversely affect the enterprise. Insurers should consider how the assessment is integrated into the insurer's management and decision making culture, how the insurer evaluates its available capital and how risk capital is integrated into its capital management activities. A significant amount of flexibility is permitted in relation to the definition of risk capital with economic, rating agency and/or regulatory frameworks mentioned as examples.

The assessment of group capital adequacy should also consider:

- The elimination of intra-group transactions and double-gearing
- The level of leverage, resulting from holding company debt
- Diversification credits and restrictions on fungibility of capital
- Contagion risk
- Liquidity risk

#### **6.2.7. Prospective solvency assessment**

Section 3 of the ORSA Summary Report should describe how the insurer combines the qualitative elements of its risk management policy with the quantitative measures of risk exposure in determining the level of financial resources needed to manage its current business and over a longer term business cycle.

The insurer's capital assessment process should be closely tied to business planning. Therefore, it should have a robust capital forecasting capability that supports its management of risks over the planning time horizon in line with its stated risk appetite. If the insurer does not have the necessary available capital to meet its current or projected requirements then it should describe the management actions it will take to remedy any capital concerns.

### **6.3 Industry preparedness**

#### **6.3.1 Pilot projects**

The Guidance Manual was originally developed by the ORSA Subgroup of the NAIC Financial Condition Committee and adopted by the NAIC in November 2011. This was followed by the ORSA Feedback Pilot Project during 2012 in which 14 undisclosed companies voluntarily attempted to comply with the ORSA so that the ORSA Subgroup could measure the effectiveness and clarity of the Guidance Manual. Based on the results of the Pilot Project and the adoption of the Model Act, revisions and clarifications to the manual were adopted in March 2013.

Due to the success of the 2012 ORSA Feedback Pilot Project, another pilot project was planned for 2013 with several modifications from 2012. A major change was that only volunteers that agreed to provide unredacted and complete ORSA Summary Reports were accepted. This change was considered necessary because three of the fourteen companies submitted reports, which were missing whole sections and two reports only contained a framework. Only nine reports were deemed complete.

The ORSA Subgroup has responsibility for ongoing maintenance of the Guidance Manual. The Guidance Manual may be updated annually.

#### **6.3.2 Milliman survey**

In a March 2013 Milliman survey of US life insurers expected to be subject to NAIC ORSA requirements, participants were found to be in various stages of preparation.

Eighty percent of participants did not currently prepare a report materially similar to the required ORSA report. This result is consistent with observations from the 2012 ORSA Feedback Pilot Project. The ORSA Summary Reports submitted by 14 volunteer companies, presumably better prepared than average to comply with NAIC ORSA reporting requirements, were judged to have numerous deficiencies.



Another question asked about current compliance with NAIC ORSA process and reporting requirements. Almost 40% consider themselves to be ready or have the components in place for compliance. The components identified as most difficult to implement related to establishing risk appetite (over one-third had no risk appetite statement), tolerances and limits and to issues around risk aggregation and allocation. By far, the risks judged most difficult to assess involved strategic, reputational and operation issues. Approximately 25% of respondents indicated that planning for NAIC ORSA compliance had required their companies to recognise risks that had not previously been addressed. Most respondents do not plan to add staff, but do plan to redeploy staff. Many expect to add or enhance systems and software.

Respondents generally expect compliance with NAIC ORSA requirements to have only marginal beneficial effects on their companies.

US insurers are worried about disclosure of sensitive and proprietary information to regulators who may share that information with the NAIC and third-party consultants. US regulators have recognised those concerns and devoted a very large part of the Model Act to confidentiality of submitted material. Even so, the survey suggests companies expect to limit the amount and detail included in ORSA reports due to concerns regarding confidentiality.

## 7. AUSTRALIAN ORSA REQUIREMENTS

### 7.1 Main APRA requirements

#### 7.1.1 Overview

The Australian Prudential Regulation Authority's (APRA) capital adequacy framework for regulated insurance institutions has recently been updated to a modern risk based framework that is consistent with the approach adopted under Solvency II. These standards went through a relatively short drafting and QIS process that spanned a few years, before becoming formal prudential standards governing insurance institutions that took effect as at January 2013.

APRA's capital adequacy framework for a regulated institution is based on a three-pillar approach, similar to Solvency II and Basel III.

Four key principles underpin APRA's Pillar 2 supervisory review of capital adequacy:

- Each regulated institution must have an Internal Capital Adequacy Assessment Process (ICAAP), approved by its Board. This is equivalent to an ORSA.
- APRA will review and evaluate a regulated institution's ICAAP and take supervisory action if it is not satisfied with the quality of the ICAAP.
- Each regulated institution must operate above its Prudential Capital Requirement (PCR) and in accordance with the framework of target capital levels and trigger points it has established in its ICAAP. APRA will adjust the PCR where there are prudential reasons to do so.
- APRA will intervene at an early stage if a regulated institution's capital shows any signs of falling below the PCR and will require remedial action if capital is not maintained or restored.

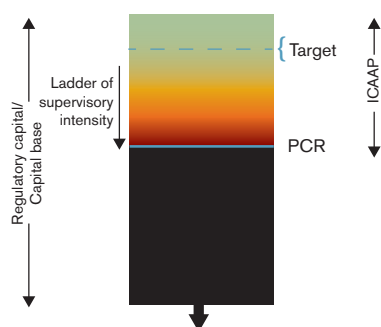
The intensity of APRA's supervisory attention will increase as the regulated institution's capital level approaches the PCR, which is referred to as the ladder of supervisory intensity, as shown in the diagram. The PCR is the regulatory minimum and any breach of the PCR can be expected to generate immediate supervisory action. A regulated institution that breaches the PCR will therefore need to take immediate steps to address this breach if it is to avoid explicit intervention by APRA.

Capital adequacy also depends heavily on the way a regulated institution monitors and manages its capital position and its risks. APRA therefore considers its supervision of a regulated institution's capital management and risk management to be of utmost importance.

#### 7.1.2 Board ownership

Under the capital standards, each regulated institution must have an ICAAP that has been approved by its Board. The standards require the Board to be actively engaged in the development and finalisation of the ICAAP and the oversight of its implementation on an ongoing basis. APRA expects a number of things from Boards with respect to the ICAAP. They must:

- Robustly challenge the assumptions and methodologies behind the ICAAP and the associated documentation.
- Understand and to be able to explain the key aspects of the ICAAP and why it is considered appropriate for the institution
- Be responsible for the risk appetite of the institution and for ensuring that the institution has an appropriate risk management framework



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In addition to this, APRA expects the ICAAP to be integrated into the decision-making processes of the regulated institution and considered in strategic and business planning.

### **7.1.3 Risk appetite and risk management framework**

An ICAAP involves an integrated approach to risk management and capital management, based around assessing the level of, and appetite for risk in the regulated institution and ensuring that the level and quality of capital is appropriate to that risk profile. APRA expects these processes of risk and capital considerations to have clear linkages, and be consistent with one another and with the business planning process. The process needs to be embedded in the institution's operations and be key inputs into decision-making.

APRA expects that the risk appetite and risk management framework of a regulated institution will address all material sources of risk for that institution. This will include risks that are covered by specific regulatory capital requirements and risks that are not, regardless of whether those risks can be quantified.

Since a regulated institution is required under the capital standards to have an appropriate ICAAP in place at all times, it follows that material changes in its risk profile or risk appetite would prompt a reconsideration of capital needs and a review of the ICAAP.

### **7.1.4 Requirements for the ICAAP**

#### **Risk coverage**

APRA expects that the ICAAP will consider all risks to which the regulated institution is exposed. For insurers, this includes asset risk, credit risk, asset/liability mismatch risk, insurance risk, asset concentration risk, insurance concentration risk, liquidity risk, operational risk, strategic and reputational risks, and contagion risks. Other risks may be relevant for individual regulated institutions and, if so, will ordinarily be considered in the ICAAP. The ICAAP will ordinarily have regard to the potential impact of volatility in any assumed correlations between and within risk categories, as these are a potential source of material capital volatility.

#### **Proportionality**

Under the capital standards, the ICAAP of a regulated institution must be appropriate for its size, business mix and complexity. Each institution's ICAAP will be tailored to the circumstances of the institution. For more complex institutions, appropriately sophisticated processes are expected; for simpler institutions with limited product offerings and simple investment structures, simplified approaches may suffice. The complexity or otherwise of an institution's ICAAP will be expected to reflect the Board's and senior management's view of the institution's functional complexity.

#### **Forward-looking capital management**

Prudent practice is to ensure that capital management is forward-looking, having regard to changes in strategy, business plans, operating environment and other factors that might impact on the risk profile of the institution and the capital resources available. In addition to changes in business plans and operating environment that have been anticipated by the regulated institution, the institution will also typically consider how it could react to unanticipated changes. External factors such as a period of strong economic growth can be relevant considerations to take into account.

#### **Group ICAAP considerations**

Where relevant, a regulated institution's ICAAP will also typically take into account the risks to which that institution is exposed due to its membership of a broader corporate group. These risks can include contagion risks, counterparty risks, reputational risks and risks related to operational dependencies such as shared functions and systems. Assessment of capital

resources at a group level will need to have regard to the transferability of capital between group entities in a range of market conditions.

#### **Documenting the ICAAP**

The capital standards require a regulated institution to document its internal processes for assessing capital adequacy in an ICAAP summary statement and an ICAAP report. Under the capital standards, the processes documented in the ICAAP must be those that are actually used by the regulated institution.

#### **7.1.5 Setting the target levels of capital**

The capital standards require a regulated institution, as part of the ICAAP, to set capital targets based on its own assessments of its capital needs. Capital targets will have regard to, but not be set solely by reference to, regulatory capital requirements. Both the quantity and quality of capital will ordinarily be assessed by the institution. An institution will typically consider both bottom-up (for example, by summing capital amounts for individual risks) and top-down (for example, by stress testing of the overall capital position) perspectives on the adequacy and composition of its capital.

A range of considerations will ordinarily be taken into account in setting capital targets including:

- The risk appetite of the regulated institution
- Regulatory capital requirements
- Internal assessments of capital needs, including those arising from the institution's business plans and strategy
- The likely volatility of profit and the capital surplus
- Dividend policy
- Where relevant, ratings agency assessments
- Access to additional capital

There is a range of approaches that institutions can use in setting target capital levels including stress testing approaches. While APRA does not require an economic capital model to be used, a more sophisticated institution may choose to use such a model as well as stress testing.

#### **7.1.6 Strategy for maintaining adequate capital over time**

A regulated institution's strategy for ensuring that adequate capital is maintained over time, will typically take account of a range of capital-generating and capital-consuming factors such as:

- The extent of organic capital growth through retained earnings
- The ability to access additional external capital of any form, including, where relevant, the ability and willingness of the major shareholders, parent company or broader group to contribute additional capital to the regulated institution
- The extent of additional capital necessary to cover planned business growth, whether organic or by acquisition
- The extent to which the institution can take action to lower its required capital

- The need to ensure adequate immediate and projected capital coverage in a wide range of market and economic conditions
- Economic capital requirements
- The impact of ratings agency assessments, shareholder expectations and market considerations on capital needs

#### 7.1.7 Trigger levels and related actions to manage the capital position

To avert capital falling below target operating levels and, in the most severe case, breaching regulatory requirements, an institution is required under the capital standards to have capital triggers in place. These triggers are intended to serve as early warning indicators and thereby provide the Board and senior management with time to rectify problems and restore capital while the institution continues to operate.

APRA expects that there will be a graduated series of triggers above the PCR to protect against breaches of the PCR and to manage capital on an ongoing basis. The sets of potential actions associated with the various triggers will vary according to the nature of the stress and, ordinarily, will increase in intensity as capital surplus reduces. APRA expects very strong immediate actions in the event of a breach of the PCR.

A range of actions may be available to a regulated institution to protect its capital position, such as slowing new business or change to investment strategy. The actions taken will typically have regard to:

- The extent to which the action would improve the capital position
- The timeframe over which the action would have effect
- Whether the action is realisable in a severely stressed scenario
- Whether there are dependencies (such as on key investors or particular markets) and relevant contingency plans
- The impact of the actions on the franchise value of the business and its ability to operate as a going concern

In addition to the actions available to a regulated institution to manage its capital position, APRA has the ability to trigger a non-viability event if it deems the institution to be in breach of certain regulatory requirements in respect of the quality and level of capital of its funds. APRA expects that a regulated institution will have in place procedures for reacting to receipt of a notice of a non-viability trigger event.

#### 7.1.8 Stress testing

The capital standards require a regulated institution to include stress testing and scenario analysis in its ICAAP. Stress testing and scenario analysis will be tailored to the individual regulated institution and its particular risk exposures. Scenarios will typically cover the full range of material risks to which the institution is exposed.

A range of approaches may be used, including:

- Scenario analysis including historical scenarios, statistically generated scenarios and hypothetical scenarios
- Sensitivity testing

- Stress testing based on statistical factors or historical experience
- Reverse stress testing designed to identify a stress scenario that would cause failure of the regulated institution
- Long-term scenarios (such as the impact of a prolonged low interest rate or low investment earnings environment) and short-term scenarios (such as market shocks and insurance events)
- A combination of scenarios (e.g., a series of less severe but more frequent events)

A regulated institution will typically make use of a range of stress scenarios in its testing program. APRA expects that stress scenarios considered will range in impact and include very severe scenarios.

#### **7.1.9 Review of the ICAAP**

The capital standards require a regulated institution to arrange for regular and robust review of its ICAAP by appropriately qualified persons who are operationally independent of the conduct of capital management. A range of reviewers may be utilised as part of the independent review process to take advantage of diverse skills and functions. For example, a regulated institution may make use of internal audit, external audit, risk management personnel or other external consultants to undertake aspects of the review.

#### **7.1.10 ICAAP summary statement**

An ICAAP summary statement is a high-level document that describes and summarises the capital assessment and management processes of the regulated institution. The ICAAP summary statement is a point-in-time summary description of the capital management processes of the regulated institution. It serves as a roadmap to the ICAAP that allows the Board and APRA to understand the capital management processes of the institution. In addition to the items required in the capital standards, the ICAAP summary statement will typically also include:

- A description of the risk appetite of the institution, including a statement of the actual appetite for risk, how it has been derived and how it is integrated with strategic and business planning, risk management and capital management
- A clear statement of the scope and coverage of the ICAAP, including its application to group entities where relevant
- A description of the key internal controls relied upon for the ICAAP
- A description of the approaches to, and processes for, risk assessments and capital allocation, and the linkages between these processes
- A description of the procedures and persons involved in approving, reviewing and monitoring compliance with the ICAAP
- An outline of the procedures and persons responsible for the ongoing implementation of the ICAAP
- A description of the approach to capital allocation including the basis on which it has been undertaken
- If allowances have been made for diversification, how these allowances have been derived

### 7.1.11 ICAAP report

The annual ICAAP report details the outcomes of the implementation of the summary statement processes over the previous year and also looks forward for at least a three-year period to illustrate expected capital outcomes. APRA's expectation is that the ICAAP report is likely to change significantly from year-to-year, while the ICAAP summary statement will be relatively stable over time.

In addition to the items required in the capital standards, the content of an ICAAP report will typically include:

- Details of planned capital management actions and other management actions impacting on the capital position with explanations of why they are being undertaken and their impact. This includes dividends, buy-backs, capital transfers, issue of capital instruments, redemptions of instruments and major asset or liability transactions that impact on the capital position.
- A description of action plans (including timeframes) if the capital projections contained in the report show a need to raise capital or take other actions to protect the capital position.
- A description of the regulated institution's current regulatory capital, including key contractual terms of its capital instruments. A description of the key areas of difference between any Additional Tier 1 Capital or Tier 2 Capital instruments and Common Equity Tier 1 Capital is likely to be useful.
- An assessment of the expected sources and uses of capital over the planning horizon assuming both expected and stressed conditions.
- An assessment of anticipated changes in the regulated institution's risk profile over the planning horizon. This will include any expected changes outlined in the institution's business plan or strategy that would be likely to have a material impact on its capital position. It will also, at group level, have regard to any proposed changes in group composition and structure over the planning horizon, and where relevant, reconciliation of economic and regulatory capital including explanation of the areas of difference and their impact on the result.

### 7.2 APRA feedback on first round of ICAAP summary statements

The main summary points arising from the APRA feedback provided by Ian Laughlin (APRA Member for Insurance) on the first round of ICAAP summary statements in early June 2013 were:

- Overall, the ICAAP summary statements were completed *reasonably well*, but there was significant room for improvement.
- Insurer size did not seem to necessarily be an indicator of better quality reports, with some large insurers not being well rated by APRA.
- Independent review and stress testing were frequently addressed poorly, as were risk appetite, risk assessment and internal controls.

## 8. COMPARISON OF REQUIREMENTS

**FIGURE 7: COMPARISON AND CONTRAST OF IAIS REQUIREMENTS AND REQUIREMENTS THAT APPLY IN EUROPE, THE UNITED STATES AND AUSTRALIA**

ISSUE	SOLVENCY II	IAIS	NAIC	AUSTRALIA
Quantitative assessment	Assess overall solvency needs quantitatively. Likely to include: 1. Calculation of Solvency II balance sheet. 2. Stress tests, sensitivity analyses, reverse stress tests, scenario analyses.	1. Determine overall financial resources needed to manage its business given its risk tolerance and business plans. 2. Demonstrate supervisory requirements are met. 3. Assess quality and adequacy of capital resources to meet regulatory capital requirements. 4. Consider issue of recapitalisation.	1. Quantitative or qualitative assessment of material risks required. 2. This may include stress tests or stochastic analyses. 3. Analyse results under both normal and stressed conditions. 4. Consider the impact of stresses on available and required capital.	Assess overall solvency needs quantitatively. Likely to include: 1. Calculation of expected capital requirements. 2. Stress tests, sensitivity analyses, reverse stress tests, scenario analyses.
Qualitative assessments	Qualitative description of the material risks.	Continuity analysis should address quantitative and qualitative elements.	Quantitative or qualitative assessment of material risks required.	The ICAAP is expected to include both quantitative and qualitative analysis.
Forward-looking quantitative assessment	Quantitative assessment must be forward-looking. Requires a projection of the insurer's balance sheet and capital requirements over the medium to long term.	Distinguish between current capital needs and projected future financial position.  Need to analyse ability to continue in business and resources required to do so over a longer time horizon than typically used to determine regulatory capital requirements.	Demonstrate it has financial resources to execute multi-year business plan.	Provide details of expected future capital requirements for at least three years, covering changes in strategy, business plans and any other factors impacting available capital resources.
Demonstrate continuous compliance with capital requirements	Need to be able to demonstrate continuous compliance with the requirements.	No specific requirement.	No specific requirement.	No specific requirement.
Deviation from assumptions underlying SCR	Assess whether risk profile deviates from the assumptions underlying the SII SCR calculation and whether deviations are material.	No specific requirement.	No specific requirement.	No specific requirement.
Role of Board	Expected to play an active part in the ORSA including steering how the assessment is to be performed and challenging the results.	The Board and senior management should be responsible.	A copy of the Summary report must be provided to the Board but the role of the Board receives less explicit emphasis than in other jurisdictions.	Board must approve the ICAAP, to actively challenge the process and to understand the results.
Use of ORSA	Need to use in at least: 1. Capital management 2. Business planning 3. Product development and design	Base risk management actions on consideration of its economic capital, regulatory capital requirements and financial resources, including ORSA.	The ORSA is intended to: • Foster an effective level of ERM, using techniques that are appropriate to the nature, scale and complexity of the insurer's risks, in a manner that is adequate to support risk and capital decisions. • Provide a group-level perspective on risk and capital, as a supplement to the legal entity view.	The ICAAP involves an integrated approach to risk management and capital management. Furthermore the ICAAP is expected to be integrated into the decision-making processes of the institution and considered in strategic and business planning.



**FIGURE 7: COMPARISON AND CONTRAST OF IAIS REQUIREMENTS AND REQUIREMENTS THAT APPLY IN EUROPE, THE UNITED STATES AND AUSTRALIA (CONTINUED)**

ISSUE	SOLVENCY II	IAIS	NAIC	AUSTRALIA
Frequency	At least annually and following significant changes in risk profile.	Regular basis and following significant changes in risk profile.	Regularly, no less than annually.	Regularly, no less than annually.
Group assessment required	Yes. Requires consideration of group-specific risks.  ORSA required for both the individual insurer and the group.	Yes. Need to consider multiple gearing, intra-group creation of capital and reciprocal financing, leverage of the quality of capital and fungibility of capital.	Yes – compare aggregate available capital against various risks. Requires consideration of group issues.  ORSA not necessarily required for every legal entity but rather should be consistent with manner which the business is managed.	Yes. Each regulated institution is required to consider group specific risks, irrespective of whether the group is APRA regulated
Timing of first submission	2014 under preparatory guidelines	N/A	2015	Effective 1 January 2013 and the first submission have already been lodged.
Exemption	Some exemptions for very small insurers. <sup>7</sup>	None	Annual direct written premium of less than \$500 million or Part of insurance group with annual direct written premium of less than \$1 billion.	None
Proportionality	The principle of proportionality is explicitly recognised in the Level 3 Guidance. Areas covered include: <ul style="list-style-type: none"> <li>• Methods used to assess solvency needs</li> <li>• Frequency of ORSA</li> <li>• Level of granularity of analyses</li> </ul>	Considered in a number of areas including: <ul style="list-style-type: none"> <li>• Independent review of effectiveness</li> <li>• Validation of internal model</li> <li>• Forward-looking continuity analysis</li> <li>• Reporting</li> </ul>	The ORSA should be appropriate to the nature, scale and complexity of the risks.	The ICAAP of a regulated institution must be appropriate to its size, business mix and complexity.
Required documentation	1. ORSA policy 2. Record of each process 3. Internal report 4. Supervisory report	No specific requirement.	1. Internal document of process and results. 2. High-level Summary report to lead state commissioner if part of a group and upon request by domiciliary state regulator	1. ICAAP Summary Statement 2. ICAAP Report
Independent review	Not specifically required in relation to ORSA but there are wider requirements in relation to governance, which would also apply to ORSA.	Where proportionate, effectiveness should be assured through internal or external independent review.	Not specifically required but must describe process for model validation.	Yes, by appropriately qualified persons who are operationally independent of the conduct of capital management.

<sup>7</sup> There is a threshold below which Solvency II, and therefore ORSA, does not necessarily apply. This exemption might be granted by the various European countries if an insurer meets a number of conditions including premium income of less than €5 million and total technical provisions of less than €25 million. Additionally, other thresholds define the market coverage for the preparatory guidelines.

There is a large degree of consistency in the ORSA requirements introduced in the various jurisdictions. Every jurisdiction requires insurers to undertake forward looking assessments reflecting the expected development of their solvency positions consistent with their business plans and also to project negative scenarios that might adversely affect the insurers. Many of the jurisdictions also require insurers to demonstrate that the ORSA has been considered when making strategic decisions. Both of these requirements should help to ensure that the ORSA is actually used in practice by companies when considering strategic decisions.

ORSA requirements outside of the jurisdictions compared in the table above vary somewhat depending upon the timing of their development. However, the extent of influence of ICP16 is noticeable with many jurisdictions introducing requirements that are quite similar to the IAIS requirements.

The table highlights that there are some Solvency II requirements that are not specifically required in Australia, the US or under ICP16, particularly the requirements to continuously assess compliance with the requirements and the requirement to assess deviations from the assumptions underlying the SCR.

Solvency II and the Australian ICAAP place more emphasis on the role of the Board than under the US requirements. EIOPA has consistently stressed that the ORSA is the responsibility of the Board and that the Board must take an active role in the process. The NAIC requirements are less specific in the responsibilities of the Board but commentary in the US frequently mentions the importance of the Board as a critical driver of risk assessment and management. Placing greater explicit responsibility on the Board should assist in embedding ORSA into the decision making of the Company and ensuring that it does not become a compliance exercise. It will be interesting to examine the attitude towards the ORSA process over time in different countries in order to consider whether this is the case or not.

Solvency II requires an ORSA for every legal entity<sup>8</sup> and for the group as a whole, whereas the US requirements can be more flexible and allow the possibility of applying the ORSA requirements in a manner that is consistent with the way the business is managed, whether on a group, legal entity or other basis. The US requirements are also subject to a threshold, so that the requirements don't apply to smaller US companies. There is a threshold below which each national regulator might exempt insurers from meeting the full Solvency II regime, and therefore ORSA requirements, but it is at a much lower level than the US threshold. Whilst only regulated institutions are required by the APRA to submit an ICAAP, regulated institutions must still consider the impact from its membership of a group entity (whether or not the group is APRA regulated).

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8 Subject to the exemption mentioned on the previous page.

## 9. ORSA REQUIREMENTS IN OTHER COUNTRIES

### 9.1 Requirements in different countries

Alongside Europe, the United States and Australia, numerous other territories are also introducing ORSA requirements. This section summarises some of these developments.

#### 9.1.1 Canada

The Office of the Superintendent of Financial Institutions (OSFI) issued draft guidelines for public consultation regarding ORSA requirements, which it is proposed will apply from January 2014. Appendix A contains more details on the requirements.

The Canadian requirements are very similar to the ICP16 requirements but perhaps place more emphasis on internal controls than some of the other countries. OSFI has also stressed that it is not sufficient for an insurer to specify an internal target based on the supervisory minimum. It states that an insurer's own assessment of its capital needs should normally be determined without undue reliance on regulatory capital requirements. Therefore, internal targets should not normally be determined by simply adding a margin on the supervisory targets but it is noted that the internal target should be above the supervisory target.

#### 9.1.2 Switzerland

The Swiss regulator (FINMA) requires insurers to calculate a risk-based capital requirement through the Swiss Solvency Test. Insurers are required to include in this report all relevant information required to assess their risk situation. They are also required to consider the applicability of the standard model to their own risk profile and company specific scenarios have to be evaluated and, if relevant, aggregated within the target capital calculation.<sup>9</sup>

The Swiss Quality Assessment<sup>10</sup> also serves to review and assess the insurers' qualitative risk management practices, including in respect of their risk management function. The Swiss Quality Assessment is a supervisory tool in which the insurer first undertakes a self-assessment in respect of corporate governance, risk management and internal control. This self-assessment is then subject to validation by the regulator. There are also guidelines on Corporate Governance, Risk Management and Internal Controls.

Therefore, Switzerland has many aspects of the ORSA already in place but additional ORSA requirements are expected to be introduced by the end of 2014, particularly in respect of forward looking assessment, with the aim of achieving full equivalence with Solvency II.<sup>11</sup>

#### 9.1.3 Singapore

The Monetary Authority of Singapore (MAS) issued MAS Notice No. 126 in April 2013 on Enterprise Risk Management for Insurers. This paper includes a requirement for an annual ORSA effective January 2014 with the first reports due by end 2014 for large insurers and by end 2015 for others. Appendix B contains more details on these requirements

9 FINMA Circulars 2008/44 and 2008/32

10 FINMA Circular RS 10/2007

11 We have not included an appendix with Swiss ORSA requirements given that there isn't a single specific ORSA requirement as such.

#### 9.1.4 Malaysia

In Malaysia an Internal Capital Adequacy Assessment Process (ICAAP) has already been implemented, effective 1 September 2012. The ICAAP requires:

- Board and senior management oversight
- Comprehensive risk assessment
- Individual target capital level
- Stress testing
- Sound capital management
- Monitoring, reporting and review of the ICAAP

Further detail is provided in Appendix C.

#### 9.1.5 Bermuda

In Bermuda, certain insurers are required to complete the Commercial Insurers' Solvency Self-Assessment (CISSA) and the Group Solvency Self-Assessment (GSSA) effective for year-end 2011. The CISSA and GSSA are Bermuda-specific ORSA processes, consistent with the IAIS guidance and the developing Solvency II requirements but also taking into account the unique characteristics of the Bermudan market. Appendix D summarises the requirements. The CISSA schedule outlined in Appendix E serves as a useful reference for insurers developing their ORSA templates because it serves as a checklist against which to compare their template.

#### 9.1.6 Other territories

Other territories such as South Africa, China and Mexico are also discussing the introduction of ORSA requirements or have already made progress in doing so.

South Africa is introducing a revised prudential regulatory regime for insurers, Solvency Assessment and Management (SAM), which includes an ORSA requirement. SAM was originally scheduled for January 2015 but this has been pushed back one year.<sup>12</sup>

In 2012, the China Insurance Regulatory Commission (CIRC) released a three- to five-year plan for enhancing its regulatory regime, based on the same three-pillar framework as Solvency II and Basel III.

The Insurance and Surety National Commission (CNSF) in Mexico has launched a project to modernise the current regulatory framework based on Solvency II. This includes an ORSA requirement under Pillar II.<sup>13</sup>

12 Financial Services Board, *Solvency Assessment and Management, 2013 Update*, <https://www.fsb.co.za/Departments/insurance/Documents/SAM%202013%20Update.pdf>

13 Aguilera-Verduzco, M., *Modernization of the Mexican Insurance Regulatory Framework: Towards a Solvency II-Type System*, PROGRES e-Newsletter, January 2013. <https://www.genevaassociation.org/media/480320/ga2013-progres56-aguilera-verduzco.pdf>

## 10. COMMON CHALLENGES AND POTENTIAL SOLUTIONS

### 10.1 Background

Many of the ORSA requirements are consistent across the globe, reflecting the common origin through ICP16 and Solvency II. This greatly enhances the ability of insurers to apply the same techniques and methods across borders. This section considers some of the key challenges relating to ORSA and outlines some potential methods of addressing these issues.

As outlined previously the ORSA is a process that links insurers' ERM frameworks with their capital management and strategic planning. Many insurance undertakings, especially in the more developed insurance markets, will already have many elements of the ORSA in place through existing risk management systems and capital planning processes. Therefore, one of the challenges posed by ORSA could consist of bringing together existing processes into one coherent process. Insurers also face a challenge in fully embedding an ORSA and in demonstrating that the principles have been complied with. The best way to achieve this is in making the ORSA accessible, understandable and robust in terms of time to run and the questions that can be answered.

Many of the other challenges associated with the ORSA are the same challenges insurers face in ensuring that their ERM framework is operating effectively. We consider some of these challenges in this section but do not attempt to cover all such issues. Insurers also face challenges in addressing the requirement to project their future solvency position in various scenarios and we consider some of the main challenges associated with this requirement.

### 10.2 Projecting balance sheets and capital requirements

#### 10.2.1 Projection of assets, liabilities and capital requirements

ORSA generally requires a multi-year projection of the insurer's balance sheet in a range of different scenarios. The insurer has the freedom to decide which scenarios should be examined and would typically include various economic and demographic scenarios.

The time horizon isn't specified but it is stated that it should normally coincide with the insurer's business planning horizon and the early indications are that a period of between three and five years will be most commonly used in practice.

Projecting future economic balance sheets can be extremely complex and resource intensive. The challenge of producing these projections should be evaluated relative to the fact that the determination of the insurer's balance sheet and capital requirements on a given date is often a significant challenge, in itself.

The approach should be proportionate to the nature and complexity of the insurer's business so that smaller, less complex insurers are more likely to adopt simplifications and approximations in the production of these projections. Simplifications might also be considered appropriate in projecting simpler lines of business. Insurers using such simplified approaches may face a challenge in demonstrating the appropriateness of such approaches and in quantifying the materiality of any approximations or simplifications.

#### 10.2.2 Projecting liabilities

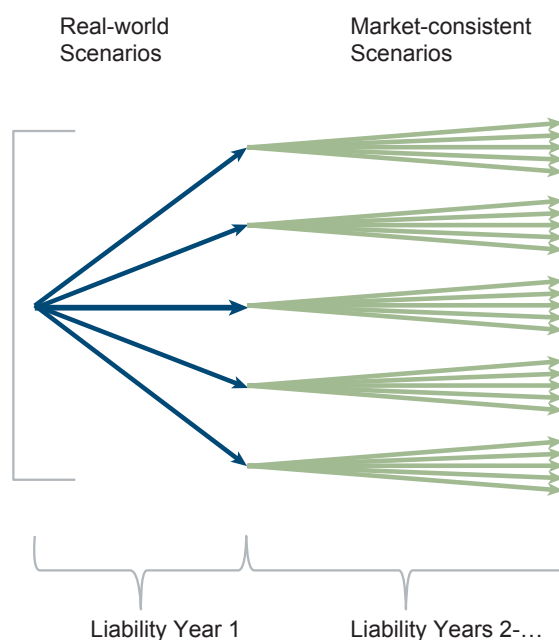
Stochastic valuations are typically required to calculate the economic value of insurance liabilities with guarantees. Therefore, a projection of the value of the liabilities at time 1 requires a real world projection of the liabilities for 1 year in the specified scenario followed by a stochastic market consistent projection of the liabilities from time 1, as illustrated in the diagram below. The valuation at time 1 needs to be calibrated to market conditions in that scenario at that point in time. Therefore, companies need to consider interest rates and volatility surfaces

prevailing at that future point in time in the particular deterministic real-world scenario and need to generate market consistent scenarios consistent with those conditions.

A market consistent valuation is required for every scenario and every future point in time at which a valuation is required. Therefore, if a company intends to project five deterministic scenarios for five years, with a valuation of the liabilities at the end of each year then this would require twenty-five projected market consistent valuations, as well as the market consistent valuation at time zero.

It might also be necessary to project a risk margin, depending upon the regulatory regime. Solvency II requires a risk margin that reflects the cost of capital on the business. Therefore, this complicates things further because it requires a projection of the development of future capital requirements for every point at which a balance sheet is required.

**FIGURE 8: REAL-WORLD PROJECTION OF MARKET CONSISTENT LIABILITY VALUATION**



### 10.2.3 Projecting assets

The projection of future balance sheets also requires a projection of the assets backing the liabilities as well as the other assets on the balance sheet. Therefore, insurers are faced with grouping existing assets, projecting these forward in a particular scenario and valuing them in that scenario at a future point in time. In addition, insurers need to consider future cash flows not yet recognised on the balance sheet and how these cash flows will be reinvested once they arise. There are numerous complexities and issues in relation to the granularity of data and the trade-off between accuracy versus complexity. Issues to consider in relation to asset projections include:

**Assets assumed to back new business.** Will the assets backing new business be invested in a similar manner to the in-force business? Even if they are then the duration of the assets may be different so the sensitivity to different factors will be different.

**Reinvestment of existing assets.** How will assets be reinvested as existing assets mature and investment income is received? The insurer needs to try to mimic its investment strategy in a manner that can be modelled, bearing in mind that the insurer might not have the ability to project all assets at the same level of detail.

**Trading rules.** The insurer needs to decide upon simplified trading rules that can be modelled. For example, will all assets be traded in proportion to their current holdings, will they be traded in a specified order or will the insurer specify a policy which will dictate trading order.

**Capital and dividend plans and impact upon investment.** The insurer needs to consider how its capital strategy will impact upon its investment strategy. As capital is received it will have to be invested and cash will be needed to make dividend payments.

**Contingent cash flows.** Some assets have cash-flows that are contingent upon certain events. In certain cases it may be very difficult to identify and model the events which trigger these cash flows.

**Rebalancing of the portfolio in certain scenarios.** It might be necessary to rebalance the portfolio in certain scenarios. This is particularly relevant given that ORSA will investigate many adverse scenarios as the treatment of assets and liabilities will need to be consistent in order to properly model the balance sheet. For example, the insurer might have to reduce risk in negative scenarios and take management action to sell equities and purchase bonds. Therefore, such a management action might need to be considered in the model and objective triggers specified which would trigger such an action.

#### 10.2.4 Projecting other balance sheet items

The projected balance sheet may be impacted by a number of items that need to be determined outside of the main balance sheet calculations, for example, payment of tax or payment of dividends. In the case of tax, in certain instances tax liabilities are determined in relation to profitability as measured in accordance with IFRS rather than measured on a solvency basis. Insurers subject to such a regime would need to be able to project profitability in accordance with this accounting basis in addition to carrying out its prudential projections.

#### 10.2.5 Projecting capital requirements

Projection of future capital requirements can be extremely difficult depending upon the methodology used to calculate capital requirements. For example, the Solvency II standard formula can require more than ten market consistent calculations of assets and liabilities following specified shocks to key parameters, depending upon the shocks applicable to different insurers. Therefore, if an insurer is examining five scenarios over a five-year projection period then it needs to calculate more than 250 market consistent valuations of its liabilities, many of which require new market calibrations. The results from these market shocks then need to be aggregated using the standard formula correlation matrices to produce the insurer's total capital requirement.

Projection of internal model capital requirements could potentially be easier because it doesn't necessarily require such a large number of balance sheet stresses, but this depends significantly upon the structure of the internal model. However, even the simplest internal model is going to pose significant challenges regarding the projection of capital requirements and the calibration of the internal model to a specific scenario and future point in time.

It should be noted that, under Solvency II, it is not strictly necessary to quantify solvency needs for each separate year of the projection period but rather that undertakings cover their prospective solvency needs for an appropriate multi-year perspective. Therefore, it might be sufficient for some undertakings to only quantify solvency needs at the end of the projection

period provided this allows the insurer to produce the Capital Management Plan required under EIOPA's System of Governance guidelines.<sup>14</sup>

#### 10.2.6 Capital structure

The projections also need to project the insurer's capital structure in order to be able to calculate the available capital resources. Therefore, the split of capital between debt/equity/retained earnings needs to be considered and allowance made for any changes in the split in specific scenarios.

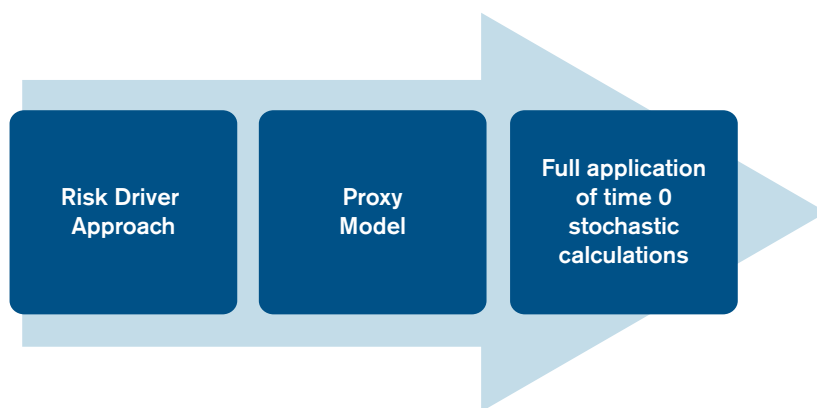
#### 10.2.7 Potential projection methodologies

Undertaking a full projection and recalculation of the economic balance sheet in a manner similar to the calculation at time 0 could prove very difficult. Therefore, some insurers are likely to consider other methods of completing the required calculations.

The approach used needs to be proportionate to the risks and complexity of the insurer in question. Therefore, smaller and less complex insurers are likely to adopt more proportionate methods but larger and more complex organisations need to adopt methods that are sufficiently sophisticated and accurate to allow the insurer to construct appropriate business plans.

The diagram below outlines a number of potential methodologies ranging in sophistication from a relatively simple approach at one end of the scale to relatively complex at the other. It should be noted that a range of approaches may be used and some insurers might use a combination of approaches. Therefore, this section is intended to illustrate the range of approaches and the varying complexities attaching rather than to definitively list all methodologies that may be used.

**FIGURE 9: PROJECTION METHODOLOGIES**



There are a number of other considerations that should also be borne in mind. One important consideration is practicality and speed. The ORSA is intended to be used in key strategic decisions of the insurer. Therefore, adopting an approach that requires a significant amount of time to produce results has major drawbacks for an insurer looking to use the projections in order to make a strategic decision, sometimes under time pressure due to a significant exogenous event.

There is also a cost issue to be considered and balanced against accuracy. Any projection involves numerous assumptions and simplifications. The projection of a balance sheet in five years' time needs to be sufficiently accurate to allow the insurer to make decisions and to test the impact of different strategies.

14 EIOPA, *Consultation Paper on the Proposal for Guidelines on the System of Governance*, March 2013.



### 10.2.8 Risk drivers

At one end of the scale risk drivers might be used by smaller and less complex insurers. These insurers might consider it proportionate to use such drivers to estimate future capital requirements by deriving a relationship between the capital requirement and risk drivers. Many different risk drivers could be used including items such as:

- Total sum at risk as a risk driver for capital requirements in respect of underwriting risk.
- Total funds under management as a risk driver for capital requirements related to future management charges, for example capital required in respect of lapse risk.
- Key interest rate levels as risk drivers for certain interest-rate-sensitive assets/products.
- Equity index levels as a risk driver for equity risk capital requirements.

When applying such drivers, the insurer will need to make decisions regarding the level of granularity required and how to aggregate the results. For example, risk drivers could be used to calculate the capital required in respect of a particular risk for the insurer as a whole or they could be applied at a more granular level and used to estimate the capital required in respect of a particular risk for a particular business unit or product.

### 10.2.9 Proxy approaches

A number of different proxy approaches have been applied in the insurance industry to the complex challenge of projecting balance sheets. Proxy approaches are generally based on finding (simpler) functions which approximate a value function but are computationally efficient and in particular can be evaluated without using Monte Carlo simulation. Proxy models are usually fitted to a set of calibration scenarios either via regression techniques or through linear algebra. The most common approaches include:

- Least squares monte carlo (LSMC)
- Radial basis functions (RBF)
- Curve fitting
- Replicating portfolio techniques

Milliman published a white paper on this topic in December 2012 called *Is Life really difficult? Observations and solutions on proxy approaches applied in the life insurance industry*.<sup>15</sup>

This paper discussed some of the issues regarding the application of such proxy models and outlined some potential solutions. The paper also discusses the need for automation and industrialisation of the existing cash-flow modelling process so that the insurer can produce the large number of sensitivities required to calibrate the proxy models.

Developing such proxy models is technically challenging but is an approach that gives insurers the ability to produce results quickly (once the initial development is completed) and the ability to explore different scenarios within a reasonable timeframe. There is a need to balance accuracy and action and insurers need to be able to produce results within a sufficiently short time frame in order to allow the results to be used in the decision making process.

As part of the ORSA, it is also necessary that the limitations and associated model errors embedded in the multi-year projections are highlighted in order to ensure that Board members understand them, as they are required to build strategies and take decisions based on them.

15 *Is Life really difficult? Observations and solutions on proxy approaches applied in the life insurance industry* Milliman white paper, December 2012.

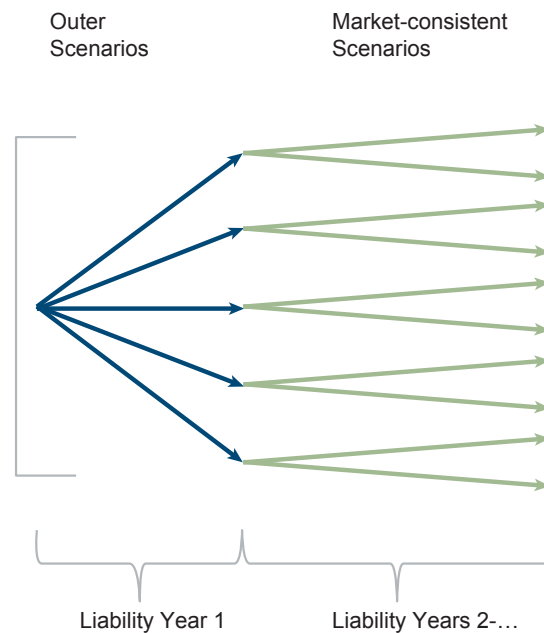
### 10.2.10 Least squares Monte Carlo

LSMC aims to determine a functional relationship between key parameters used for the evaluation of, for example, a liability. These key parameters are referred to as *risk drivers* and the quantity being estimated could be any economic measurement of the product cash flows.

The overall LSMC process can be briefly summarised as follows:

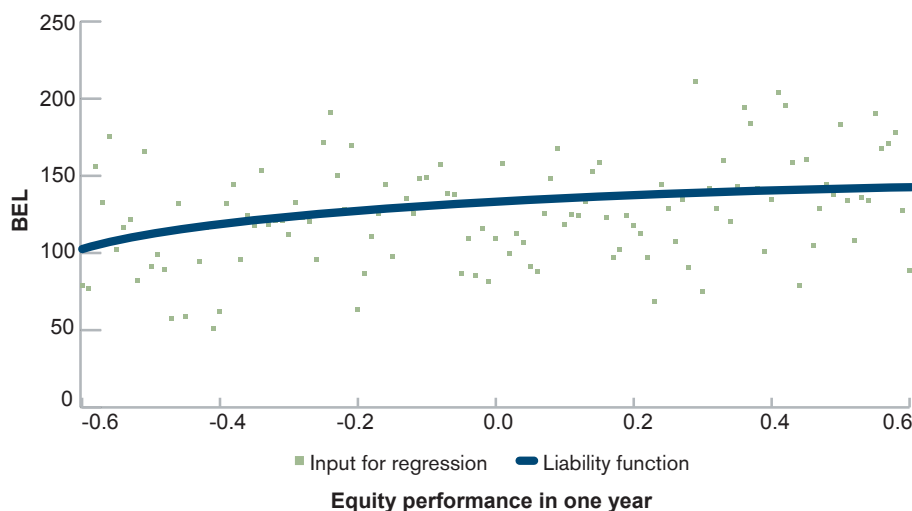
- **Step 1:** Evaluate the liabilities (or other measurement of product cash flows) for a number of different deterministic joint positions of the risk drivers at time  $t=1$  (the so-called outer scenarios) by using only a small number of valuation scenarios (so-called inner scenarios) per outer scenario. Typically this *small number* is between 1 and 10 scenarios. The liability value per outer scenario is the mean of the liability values that have been simulated using the corresponding inner scenarios. Hence any liability value itself is a very imprecise estimate for the corresponding outer position. This step basically collects a lot of (inaccurate) information concerning the relationship between risk drivers and liability values.

**FIGURE10: LSMC SCENARIOS**



- **Step 2:** Perform least squares regression based on the output from step 1 to determine a functional relationship between risk drivers and liability values. This step removes the remaining variance that has been left from step 1 and uncovers the true relationship between risk drivers and liability values.

FIGURE 11: INACCURATE LIABILITY VALUES AND RESULTING LIABILITY VALUE CURVE



The overall aim is to significantly reduce the number of simulations involved by first evaluating the liabilities using only a limited number of inner scenarios, with the high residual level of *noise* being removed in a second step by the least squares regression technique.

Further detail and an application of LSMC are shown in the Milliman research report *An application of least squares Monte Carlo proxy techniques to variable annuity business – A case study*.<sup>16</sup>

The accuracy of results obtained using the LSMC proxy approach (relative to using a full stochastic approach) can be verified in a practically robust and statistically sound way. The LSMC method generally requires less manual intervention than some of the alternative proxy methods and may also give valuable insights into the interplay of different risk drivers.

In general, LSMC has the following beneficial properties:

- Accuracy of calculations
- Speed of calculations
- Consistent coverage of market, credit and insurance risks
- Robust and reliable validation
- Feasibility of process automation

LSMC can be used in any situation where the complexity of liabilities necessitates a stochastic valuation approach. For example, where there are embedded options in contracts or scope for future management actions, in addition to the modelling of investment guarantees.

16 *An application of least squares Monte Carlo proxy techniques to variable annuity business – A case study*, Milliman research report, November 2013.

#### 10.2.11 Curve fitting

Whereas LSMC considers fitting a regression model to a large number of inaccurate valuations to remove the statistical sampling error, curve fitting considers a small number of very accurate calculations. At a high level, the curve-fitting process develops as follows (where, in this example, the objective is to project a best estimate liability, or BEL):

- Recalculate the BEL under a small number of instantaneous shocks. This involves running a large number of inner scenarios for each outer scenario and averaging the results of the inner scenarios at each outer scenario node point.
- Fit a multidimensional polynomial to the BEL values by regression techniques. The fitting itself requires a predetermined view about the structure of the polynomial that is used for this purpose.
- The validation of the curve fitting can only be carried out by performing out-of-sample tests where the true BEL value for an arbitrary outer scenario is derived by using a large number of inner scenarios and comparing this with the estimate produced by the curve-fitting function.

It can be shown that LSMC and Curve curve fitting essentially converge to the same answer under certain conditions. In addition, LSMC can be used for some risk drivers and Curve curve fitting for others and the two results combined. There are, of course, limitations with this latter approach (for example, it generally fails to capture interactions of the risk drivers between those modelled using LSMC and those modelled using Curve curve fitting) but it can still work well in certain circumstances.

#### 10.2.12 Radial basis functions (RBF)

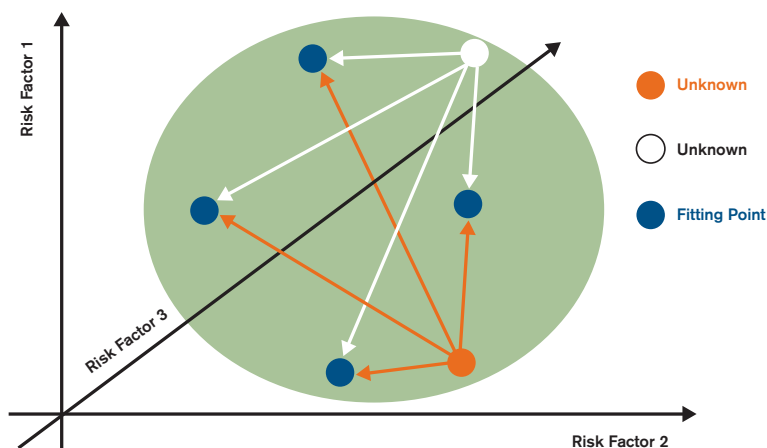
RBFs are a robust method for interpolating a multivariate, unknown function. They are a multidimensional generalisation of the idea of fitting an unknown function through a spline, and have been extensively used in a number of areas such as image processing prior to their application to insurance business.

RBFs give a method of interpolation which:

- Is independent of the precise form of the unknown function
- Can work over an arbitrary number of risk drivers
- Can work with various forms of fitting points, including randomly selected fitting points and a grid structure
- Have excellent convergence properties; selection of appropriate extra fitting points produces a progressively better fit
- Can work with many risk drivers and the volume of fitting points required can scale favourably as risk drivers are added
- Requires no prescription as to where the fitting points need to be placed; assuming that the fitting points are distinct, the linear algebra involved is guaranteed to have a unique solution

RBF interpolation regards each scenario as a point in  $n$ -dimensional space, where  $n$  is the number of risk drivers. The RBF approximation to the true liability or asset value for a particular scenario depends on what is termed the Euclidean distance between the scenario and the fitting points. The diagram in Figure 12 below illustrates the approach for three risk drivers (so in three-dimensional space) with four fitting points and two unknown points.

FIGURE 12: RBF INTERPOLATION



In order to fit the liability or asset value via RBF, it is assumed that the true value is known at a number of points. Some of these points are used as fitting points - because the RBF approach is an interpolation, the RBF approximation will equal the true value at these points. The remaining points are used for out-of-sample testing to demonstrate the adequacy of the approximation.

Further detail and an application of RBFs to calculate economic capital results for a model insurer is provided in the Milliman research report *Living with Solvency II: An economic capital perspective from recent history* published in March 2013.

### 10.2.13 Replicating portfolio techniques

The basic idea of replicating portfolio techniques is to replace the complexity of the liability calculation with a proxy portfolio of market instruments whose value closely replicates the change in the value of the (re)insurance liabilities across a range of potential outcomes. The valuation of the market instruments could be much more straightforward than the valuation of the liabilities directly, in which case the nested stochastic problem may be very much simplified.

The general process involved in finding a replicating portfolio is as follows:

- Choose a set of potential assets
- Run a range of scenarios through the liability cash flow model
- Solve for the weights in each of the assets that would replicate the liability cash flows
- Revalue the asset portfolio under the desired set of scenarios as a proxy for the liability valuation

Replicating portfolios can deal well with market risks. However, it can be more difficult to use them in relation to non-market risks, as the assets won't necessarily be sensitive to the types of non-market risk factors that drive the liabilities. It can be quite challenging to choose a good replicating portfolio, depending on the complexity of the liabilities under consideration as well as factors such as the availability of suitable assets in the market place, the liquidity of such instruments, and the level of transparency in pricing.

#### 10.2.14 Full recalculation

A full recalculation of the economic balance sheet as per the time 0 calculation may be extremely challenging and time consuming. Insurers often face significant difficulties in undertaking full recalculation in a number of different scenarios for a number of future points in time. Applying the full time 0 calculations would be extremely challenging even for those insurers which don't require stochastic calculations.

### 10.3 Ability to estimate current solvency position

Many territories require recalculation of the ORSA upon the occurrence of specific triggers, which are determined by the insurer. Implicit in this is the requirement that insurers need to be able to understand their current solvency position on a continuous basis. This is an explicit requirement of Solvency II but could be considered an implicit requirement in other territories. ORSA is intended to ensure that the insurer understands the potential development of its future solvency position at all times and to recalculate this assessment if there are significant changes in its solvency position. Therefore, insurers need to be able to understand and estimate their current solvency position.

Insurers are required to have the ability to achieve real-time monitoring of regulatory capital requirements. Therefore, there is a need for speed and ability to update quickly following significant changes to the insurer's environment. Most insurers are not in a position to produce real-time positions of their assets and liabilities and therefore need to consider other methods of addressing this requirement.

As with the projection of future capital requirements there is a range of approaches that could be used to satisfy this requirement with varying degrees of sophistication. Many insurers are developing proxy models to allow continuous recalculation of their solvency position as changes occur in the external environment and other key drivers. Such proxy models may be similar to those listed in section 10.2.7.

Using such proxy models can allow insurers to simply update market data such as equity indices, volatilities, credit spreads, inflation rates and interest curves in order to provide the most up-to-date estimate of the insurer's solvency position. Some insurers have implemented daily solvency monitoring using such techniques.<sup>17</sup>

Simpler approaches may also be considered sufficient for some insurers. For example, insurers could combine sensitivities with key risk drivers (as per section 10.2.7) in order to estimate their current solvency position. However, such approaches become less accurate when there are significant movements in multiple risk drivers.

Therefore, insurers should also consider recalculation triggers, which would result in a recalculation of a specific module or the full solvency capital requirement, depending upon the movement in certain factors. For example (in the case of Solvency II), if an insurer has a significant exposure to equity then it might be confident that it can withstand a 15% fall in equities but once equities fall below that point then it might need to recalculate the equity module of the SCR. If equities fall below a further trigger point the insurer might need to recalculate the full regulatory balance sheet and their capital requirements. The scenarios used in the ORSA projection should also be of assistance in considering triggers that would require the insurer to recalculate its overall solvency position.

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17 Charles Coatworth Jr. and Simon Frost, *Automated daily solvency monitoring: An efficient and actionable solution* November 2012.

### 10.3.1 Model industrialisation

Related to the ability to estimate the insurer's current solvency position is the insurer's ability to produce full results within a short timescale. Insurers are increasingly looking for results within ever shorter timescales and *fast closes* are becoming common. The amount of information that insurers need to produce is also increasing in line with regulatory and accounting developments.

In order to meet these shortened timescales insurers need to ensure that their models are industrialised and results produced in an automated, controlled manner. Many processes still require excessive manual intervention, require a lot of time to produce results and there is still an over-reliance on spreadsheets. Such processes run the risk of errors, result in significant resource requirements and have high costs associated with them.

Many insurers need to move to a position where models are fully industrialised and changes cannot be made without a change control process. Results need to be produced in an automated, robust manner that is fully auditable. Achieving this will allow greater time and resource to be spent analysing results and adding value from a management perspective rather than just producing the results.

## 10.4 Risk profile

Undertakings often struggle to properly identify and fully understand their underlying risk profile, which is a key building block of the ORSA. This section outlines an approach, known as complex systems analysis, which can assist in addressing this challenge. This approach is useful, not only in the identification and understanding of risk profile, but also in its application to other topics such as articulating and embedding risk appetite, reverse stress testing and the quantification of operational risk. Greater detail on this approach and an application of the approach to operational risk can be seen in the Milliman research report *Operational risk modelling framework*.<sup>18</sup> An application of the approach to reverse stress testing can be found in the paper *An application of modern social sciences techniques to reverse stress testing at the UK pension protection fund*.<sup>19</sup>

### 10.4.1 Complex systems analysis

A complex systems analysis can assist in understanding business performance and risk through the identification of the underlying interactions and relationships that exist and potentially evolve under different operating environments. Furthermore, this approach assists in understanding the mechanisms that drive uncertainty in the business. A complex systems analysis helps to enhance risk frameworks through understanding and reflecting the properties of the underlying business or system:

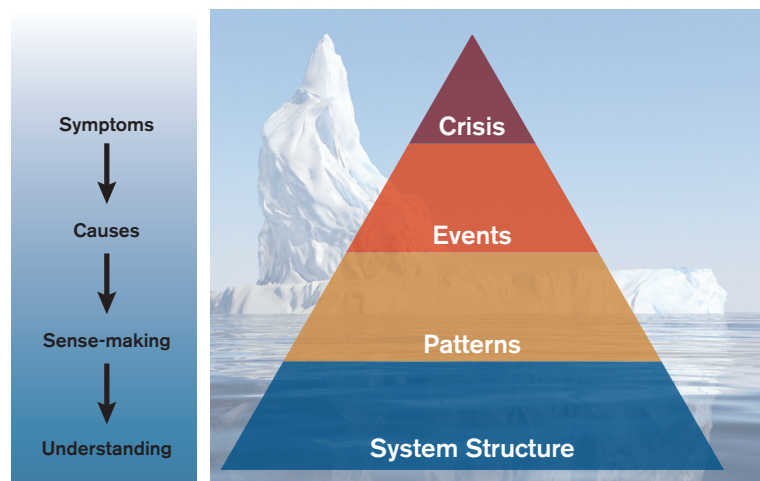
- **Holism:** A system is more than the sum of its parts and a holistic rather than reductionist approach is necessary to understand it. Outcomes arise from the interactions of various inputs and therefore need to be considered as a whole.
- **Nonlinearity:** All complex systems are characterised by nonlinear behaviour.
- **Human bias:** Companies are comprised of people that are subject to a range of biases.
- **Emergence:** Risk can be viewed as the unintended emergent property of a complex adaptive system that is subject to environmental adaption forces.

<sup>18</sup> *Operational risk modelling framework* Milliman research report, February 2013.

<sup>19</sup> Neil Cantle, Jean-Pierre Charmaille, Martin Clarke and Lucy Currie, *An application of modern social sciences techniques to reverse stress testing at the UK pension protection fund*.

Figure 13 illustrates the relationships between system structure and crisis events, using the image of an iceberg. The system structure is below the surface and, hence, not directly observable. Understanding the system structure allows us to make sense of the patterns of outcomes, which, in turn, lead to events and crises. Traditional approaches instead focus on the symptoms and top level impacts but neglect to drill down and unearth the dynamics leading to the risk event. For exercises relating to business failure, this approach requires you to directly imagine the precise circumstances of such a failure and rely upon statistical *frequentist* methods for loss estimation. However, by explicitly identifying, and subsequently modelling, the risk drivers and controls related to risk outcomes, companies are able to produce a richer and more complete view of the key areas driving capital requirements. At the same time, this deeper understanding helps to enhance risk management procedures and processes and to also shape and understand the effectiveness of its strategy.

**FIGURE 13: UNDERSTANDING HOW SYSTEM STRUCTURE RESULTS IN CRISIS EVENTS**



There are a number of tools and techniques that we can apply to help us understand the dynamics of our business uncertainties and quantify the losses they might lead to. These include cognitive mapping and Bayesian network modelling, which are described below.

#### 10.4.2 Cognitive mapping

Cognitive mapping can be used as the first step in adding transparency to the underlying complexity of the system and in eliciting the system structure. Cognitive mapping is an approach which allows insurers to reflect the complexity of the underlying system and to gain a robust understanding of the business dynamics that create uncertainty. It was developed in the early 1990s and describes how people attempt to make sense of the world using mental models, in order to predict future states of the world and how they would respond to them. Cognitive mapping involves breaking down an account of a problem into its constituent elements and combining the views of a range of stakeholders into a single consistent narrative. The process is naturally engaging for business members and is a highly efficient method for obtaining a *minimally complex* understanding of difficult situations.



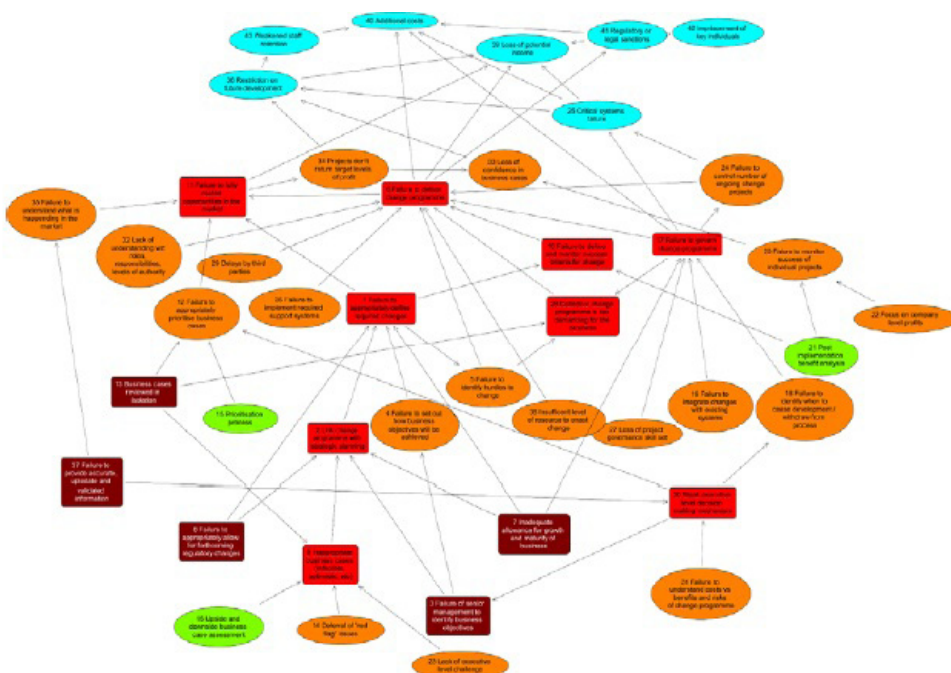
Cognitive mapping can be used to elicit expert knowledge by following an approach similar to that laid out below:

- A workshop with relevant experts to discuss business/risk dynamics with the view to capturing outcomes, risk drivers, mitigants and impacts in respect of its risk profile
- Management actions and controls are noted
- The workshop discussion is converted into a cognitive map
- The map is analysed to elicit key features and to identify gaps or inconsistencies in the narrative
- Indicators are proposed and confirmed with the experts

Objective analysis of the cognitive map then allows the narrative to be summarised in such a way that the core dynamics are revealed without the distraction of all the associated contextual descriptions. It also highlights areas that have not been particularly well described or understood – thereby giving rise to further investigation. This subset of concepts represents the key drivers of business uncertainties and provides a core for activities such as risk appetite setting, risk profile analysis, operational risk assessment and (reverse) stress and scenario testing. This process is an effective tool that enables business units, management and the Board to more easily follow, interrogate and challenge its experts' assessment and views of the risk dynamics. In addition to providing qualitative understanding this analysis also provides a base for a practical quantitative modelling framework.

Below is an example of the cognitive maps that are generated. This figure is intentionally too small to read the individual elements but it demonstrates how a cognitive map can become quite complex as the structure of the system is told and mapped.

**FIGURE 14: EXAMPLE OF COGNITIVE MAP**



### 10.4.3 Bayesian networks

Cognitive mapping allows us to elicit the system structure and to identify the causal drivers upon which the business outcomes are based. As mentioned above, techniques are applied (known as graph theory) to analyse and reduce the cognitive map into the essential factors required to articulate the core behaviours of the system and of the scenario being studied. This reduced structure is then used to begin the process of building the Bayesian network, a type of causal model. This translates the key drivers identified during the cognitive mapping phase into a connected set of factors which model the manner in which different business states transpire and the consequences arising from being in those states. Each risk driver (be it a process, system or event) captured by the model is assigned a series of states and then a distribution (discrete or continuous) is specified which describes which states the node is believed to be in.

As such, a Bayesian network is a probabilistic graphical model that represents a set of random variables and their conditional dependencies. By explicitly capturing relationships between variables (through links, either direct or indirect) the model captures the overall risk dynamics and dependencies through the causal connections that are built in directly as conditional probability distributions therefore removing the need for statistical dependency structures such as correlation matrices or copulas. This adds to the transparency and comprehensibility of this type of approach.

The data used in these models to parameterise the various distributions can be taken from different sources, including:

- Historical internal data
- Historical external data
- Expert judgement

Further detail on the use of cognitive mapping and Bayesian models is provided in papers on their use in risk appetite,<sup>20</sup> operational risk modelling<sup>21</sup> and reverse stress testing.<sup>22</sup>

A model of this nature has the key advantage that the explicit causal structure of the model allows the insurer to connect the outcomes directly to key business processes and risk factors. Varying the business processes and risk factors allows us to observe the variation in possible outcomes.

Using a systems approach of this nature also facilitates the following:

- Ability to make progress in situations where there is no/little data, such as when modelling extreme events
- Ability to incorporate trends and behaviours that have not yet shown up fully in the data
- Ability to capture the full range of nonlinear interdependencies
- A natural communication tool because the experts' views form part of the model
- A single consistent framework to undertake risk assessment, risk appetite, risk limits, stress testing, reverse stress testing and scenario analysis
- Ability to integrate experts' insights with data

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20 *A review of the use of complex systems applied to risk appetite and emerging risks in ERM practice* N. Allan, N. Cantele, P. Godfrey and Y. Yin, November 2011.

21 *Operational risk modelling framework* Cantele, Joshua Corrigan and Paola Luraschi, February 2013.

22 *An application of modern social sciences techniques to reverse stress testing at the UK pension protection fund* Neil Cantele, Jean-Pierre Charmaille, Martin Clarke and Lucy Currie.

- More robust identification and assessment of emerging risks
- Ability to satisfy *use test* requirements because the model is fully derived from, and embedded in, the business

### 10.5 Articulating and embedding risk appetite

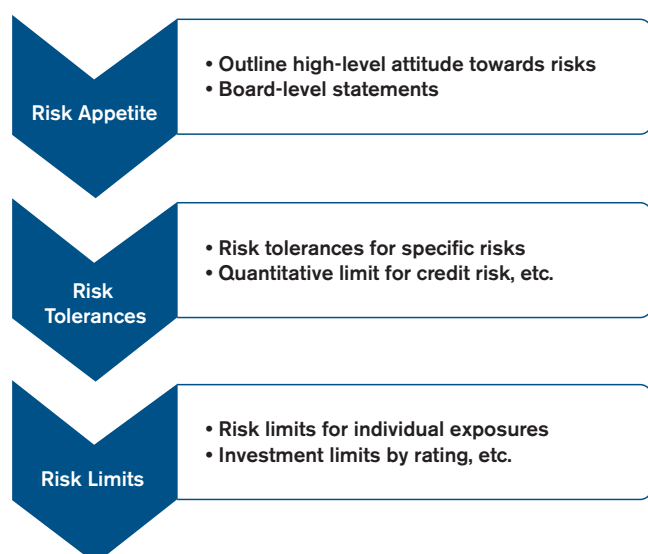
Articulating risk appetite and embedding risk appetite throughout the organisation is a significant challenge that many insurers have struggled with. Risk appetite needs to be translated into risk tolerance statements, which in turn need to be translated into risk limits that can be observed by the business units.

There are numerous different definitions of risk appetite but companies typically express risk appetite in terms of a number of key dimensions such as capital adequacy, earnings volatility or credit ratings targets. Risk appetite statements are typically Board-level statements outlining the extent of volatility or risk that the insurer is willing to bear in relation to some of its key outcomes, such as capital position or earnings.

Risk tolerances are typically top-down statements regarding the extent of specific risk that the insurer is willing to bear. Therefore, risk tolerance requires a risk measure and would typically be stated for all material risks individually. For example, the insurer might specify the extent of credit risk that it is willing to tolerate using a 99.5% Value at Risk measure over a one year time horizon. The insurer would have to produce similar statements for all other material risks to which it is exposed.

Risk limits are typically bottom-up requirements in relation to the specific requirements that the insurer requires the various business units to observe. For example, companies will typically outline credit rating limits in relation to investment in bonds, both at an individual and a portfolio level.

**FIGURE 15: RISK APPETITE, TOLERANCES AND LIMITS**



The expression of risk appetite and its translation into lower level tolerances and limits is the foundation of enterprise risk management. If the insurer's appetite for risk is not expressed clearly then it is impossible to compare the insurer's risk profile to its desired position and therefore not possible to decide upon the approach to risk.

Many insurers find it difficult to reconcile the high-level risk appetite statements with the specific risk tolerances for various risks with the risk limits that the business units have to observe in relation to credit ratings, maximum net sum at risk etc. In practice, many insurers outline high-level risk appetite statements that contain generic statements regarding risk and observation of regulations. Risk tolerances are frequently set by reference to the insurer's existing risk position, thus letting profile dictate tolerance rather than ensuring risk appetite dictates tolerance. Risk limits have often been determined, somewhat arbitrarily, at some point in the past for each individual risk in isolation without any consideration of the risk appetite more recently articulated. Insurers are then faced with a difficult task in reconciling the risk appetite with risk tolerances and with the risk limits in place.

Translating risk appetite statements into granular limits is a complex task because it requires translating multiple inputs, which flow through multiple complex interactions into multiple outputs, which need to be constrained to remain within appetite.

Many insurers have defined risk appetites but have been slow to use risk appetite in practice for making decisions. Regulators are encouraging insurers to use risk appetite when making key strategic decisions but many insurers have struggled to achieve this.

There are a number of elements required in order to embed risk appetite within the organisation and to ensure consistency between risk appetite and limits. The remainder of this section summarises some of the key required elements and in section 10.4, Stress and scenario testing, we outline an approach that can allow insurers to ensure consistency between risk appetite and risk limits.

#### **10.5.1 Clear articulation and communication of appetite**

Risk appetite needs to be clearly articulated by the Board. It needs to be translated into quantitative measures, as much as possible, so that the insurer's profile can be measured relative to appetite.

Some insurers have approached the development of risk appetite by outlining some high-level statements regarding risk and the observation of regulations and trying to ensure that the appetite expressed will have as little impact as possible on their day-to-day activities. The requirement for a risk appetite is seen as a regulatory demand or requirement and therefore insurers often opt to ensure that it doesn't say anything which might place any limit on business units. This approach is the exact opposite of what risk appetite is intended to achieve. Risk appetite is intended to outline some clear expression of what risk position the insurer wants to take and this expression should then be used to ensure that business units operate within these limits.

Risk appetite needs to be translated into risk tolerances and subsequently risk limits. Risk limits are the most granular expression of risk appetite and observation of these limits by the business units should ensure that the insurer's risk appetite is observed. Risk appetite, tolerances and limits need to be communicated to all relevant parties.

#### **10.5.2 Embedding risk appetite**

One of the key elements of embedding risk appetite is to ensure that there is a framework which allows the insurer to monitor and report its risk profile relative to its appetite and tolerances. The insurer should also have a regular monitoring and reporting process in relation to observation of risk limits.

Another key element in relation to embedding risk appetite is to ensure that performance is measured in a manner that is consistent with risk appetite. Performance should be measured on a risk-adjusted basis in order to ensure that risk is reflected in the insurer's key performance measurement metrics.

Remuneration is another key factor in embedding risk appetite and again remuneration should be linked to risk-adjusted performance, where relevant, rather than to performance that doesn't consider the extent of risk borne.

Risk appetite also needs to be a key consideration when making strategic decisions. The Board needs to be able to demonstrate that risk appetite was taken into consideration and should document this consideration.

### 10.5.3 Complex systems analysis

Causal models, as outlined in Section 10.4 can be used to connect high level risk appetite statements with detailed risk limits. Risk limits can be used as one of the key inputs that combine with the various other risk factors to produce outcomes. This allows the insurer to vary the limits until the risk return profile that emerges is consistent with the insurer's risk appetite.

Using Bayesian networks to set risk limits can capture the full complexity of interdependent relationships and the many complex interactions of multiple risk drivers giving rise to a large number of outputs. We can therefore better assess whether the risk limits that are applied at the business unit level are collectively consistent with the risk tolerances and overall risk appetite set within the business.

## 10.6 Stress and scenario testing

Stress and scenario testing (SST) is typically a key component of the ORSA. SST allows an insurer to explore extreme scenarios in order to investigate the impact of such scenarios on the insurer and allow the insurer to consider potential management actions that could be used. The International Actuarial Association recently published a paper on *Stress Testing and Scenario Analysis*<sup>23</sup> that discusses the topic in detail.

The Solvency II draft regulations define a stress test as the impact of a single adverse event and scenario analysis as the analysis of the impact of a combination of adverse events. However, there isn't any unique definition of these terms and insurers should apply a common definition within the company and ensure that this definition is understood and used consistently.

SST can be applied as instantaneous shocks to the current balance sheet or can be applied as multi-period scenarios that emerge over the business planning period. Applying instantaneous shocks to the current balance sheet is a task that is easier to achieve but most ORSA regulations require insurers to investigate scenarios that develop over the business planning period.

In theory, a stochastic approach could be used to examine potential multi-period scenarios but this can be extremely challenging given the requirement to calculate capital requirements in such a large number of different scenarios. A stochastic approach also presents Boards with a significant challenge in understanding the output and using it to make key decisions regarding strategy and capital management. It might be used by some insurers when looking at specific risks and instantaneous shocks but is less likely to be used when examining multi-period scenarios.

Therefore, insurers are more likely to consider the development of a relatively small number of deterministic scenarios that capture the key risks to the insurer. Deterministic scenarios are easier from a computational point of view and also allow much easier communication and engagement with the Board. However, the determination of such scenarios can also be very challenging. Insurers need to ensure that any such scenarios are fully thought through and internally consistent. Boards and regulators are likely to challenge insurers to demonstrate that the scenarios are comprehensive and have covered all of the material risks to the insurer.

23 International Actuarial Association, *Stress Testing and Scenario Analysis*, July 2013.

They also need to be able to demonstrate that the scenarios reflect all the various feedback loops that might occur, including management actions, both of the insurer itself and of other financial institutions.

Insurers also face a challenge in ensuring that the scenarios examined are comparable and of consistent strength, as otherwise there is a risk of presenting misleading information to the Board and regulator. If an insurer is examining a very extreme economic scenario then it could potentially be misleading to specify another scenario that examines only a relatively small shock to insurance specific risks. There would be a risk that directors could consider both scenarios equally likely and focus greater attention on the economic risks. Nevertheless, due to the short history and the low frequency of some events of interest to the insurer, it is often difficult to quantify precisely the plausibility of stress-tests.

Reverse stress testing is a valuable tool that helps insurers to understand what events could lead to the insolvency of the insurer. A reverse stress test starts from a predetermined outcome, such as insolvency, and works backwards to determine the event or combination of events that could produce this outcome. Reverse stress tests also have the advantage of allowing an insurer to explore the unthinkable because sometimes there is a bias for insurers to demonstrate that they are able to withstand negative scenarios. A reverse stress test removes this constraint and allows discussions regarding what scenarios, however extreme, would result in the insurer becoming insolvent.

Reverse stress testing creates a challenge for insurers to demonstrate that the derivation of reverse stress tests has been undertaken in a comprehensive and systematic manner. There are numerous ways in which the business might fail and when faced with numerous possibilities the temptation is to only focus on the financial events rather than also considering other factors, such as political and reputational factors, that could be equally important.

#### 10.6.1 Determining scenarios

A sufficiently wide range of scenarios addressing the most material risks should be examined. Scenarios could be developed by considering various different factors, as outlined below:

- Macro-economic factors that reflect changes in numerous variables over a number of years.
- Insurance risk factors that consider mortality, longevity, pandemics, etc.
- Company-specific factors that reflect particular aspects of the insurer. For example, there could be specific legal, regulatory or operational risks that could be particularly onerous for certain insurers.
- Historical scenarios that have been encountered in the past or seen in different markets. Such scenarios would not necessarily be used without any alteration but provide a useful method of considering wide-ranging circumstances, are easily understood and also have the advantage of credibility. Boards can easily relate to events that have actually happened and using historical scenarios also removes the debate regarding what would happen in a given scenario. The insurer might have better insight into management actions, regulatory and government interventions and feedback loops.
- Reverse stress tests.

### 10.6.2 Complex systems analysis

Causal models, as outlined in Section 10.4, Risk profile, can be used to vary the underlying risk factors and processes, in isolation or combination, in order to examine various different stress tests and scenarios.

Bayesian networks are built using Bayesian inference and, as such, are particularly useful when addressing questions related to reverse stress testing, which starts from a particular outcome and works backwards to identify what combination of inputs would produce that outcome. This allows insurers to apply a methodology that systematically captures a wide range of inputs and to systematically focus on the key reverse stress scenarios rather than arbitrarily picking the scenarios. This helps provide comfort to the Board and evidence to the regulator that the company's approach to SST provides a complete and unbiased coverage of its risk universe.

### 10.6.3 Relevant regulatory guidance

The UK Financial Services Authority (now the Prudential Regulatory Authority) published PS09/20<sup>24</sup> in order to outline good practice in relation to stress and scenario testing. Good practice identified by this document includes:

- 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.
- Senior management should take a key role in implementing the insurer's stress testing programme.
- Senior management should take action as a result of stress testing and integrate stress testing outputs into the insurer's decision making process.
- Insurers should establish an SST programme covering all relevant levels of its business, risk types and over a range of severities.
- SST should be undertaken on a forward looking basis, helping firms to identify risk concentrations, assess interdependencies and understand second-order effects.
- Insurers should establish a robust stress testing infrastructure with appropriate IT systems and resources. This infrastructure should be periodically reviewed by senior management for its continued effectiveness.
- Insurers should have clearly documented policies and procedures to enable effective implementation and maintenance of the programme, which should be periodically reviewed by senior management.

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24 *PS09/20 Stress and scenario testing*, FSA, December 2009.

The Committee of European Banking Supervisors (CEBS) (now the European Banking Authority) and the Bank for International Settlements (BIS) have both published guidelines on stress testing.<sup>25</sup> There are a number of common guidelines in these papers, including:

- Stress testing should form an integral part of the risk management framework
- Board and senior management involvement is essential
- Stress testing should be actionable
- Clear responsibilities, allocated resources and written policies and procedures should be in place
- Scenario analysis should be undertaken and it should be forward looking and dynamic
- The effectiveness of the stress testing programme should be regularly and independently assessed
- The programme should cover a range of severities, including scenarios which challenge the viability of the company

The BIS paper is focused on the banking industry but nevertheless provides very valuable insight into the weaknesses that were observed in banks' stress test programmes during the financial crisis of 2008/2009.

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25 *Principles for sound stress testing practices and supervision*, BIS, May 2009. *Guidelines on Stress Testing*, CEBS, August 2010.



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## APPENDIX A: CANADIAN ORSA REQUIREMENTS

The Office of the Superintendent of Financial Institutions (OSFI) issued draft guidelines for public consultation regarding ORSA requirements, which it is proposed will apply from January 2014.<sup>26</sup> The main purpose of the ORSA is for an insurer to identify material risks, assess the adequacy of its risk management and the adequacy of its current and likely future capital position. The main requirements are summarised in the following sections:

### Comprehensive identification and assessment of risks

Insurers should identify and address all reasonably foreseeable and material risks that may have an impact on their ability to continue operations and maintain investor / market confidence in both normal and stressed conditions and to meet policyholder and creditor obligations. This includes an economic assessment of all material risks. At a minimum it should explicitly address insurance, market, credit and operational risks.

### Relate risk to capital

The ORSA is an internal process to determine an insurer's own capital needs and should be tailored to its risk appetite and reflective of the nature of its business and activities. A number of factors should be considered, including:

- Concentrations in insurance, market, credit and other risks
- Differences in risk between significant business activities or products
- Comparison of an insurer's own capital levels (quality and quantity) with those of industry peers
- Current and desired credit agency ratings
- Planned changes in an insurer's business or strategic plans, identified changes in its operating environment and consequential changes in its risk profile

Results of single and combined stress and reverse stress tests should be considered when identifying potential risks. Stress and scenario testing should assist the Board and senior management in their risk assessment, risk management and planning.

Internal targets should not normally be determined by simply adding a margin on the supervisory targets, but internal targets must be in excess of the supervisory targets.

An insurer should maintain contingency plans and procedures that identify relevant countervailing measures and actions that could be taken to improve its solvency position.

### Board oversight and senior management responsibility

The Board is responsible for overseeing the ORSA. Management should have in place the appropriate policies, procedures, systems, controls and personnel for identifying, analysing, assessing, monitoring and measuring its risk exposures.

### Time horizon

The time horizon should be aligned with the insurer's business planning horizon.

### Use of the ORSA

The ORSA should be integrated into the management and decision-making process of the insurer and in the insurer's strategic, business and other planning processes.

<sup>26</sup> Draft Guideline E-19 Own Risk and Solvency Assessment issued in December 2012.

### **Frequency of performance**

The ORSA should be performed on a regular basis, at least annually and more often if circumstances warrant.

### **Group requirements**

OSFI expects an insurer's ORSA to cover the consolidated operations from the top level OSFI regulated entity. A specific ORSA is not necessarily required for every legal entity within the group.

### **Monitoring and reporting to supervisors and disclosure**

Upon OSFI's request, insurers will be required to submit a Board-approved document summarising their ORSA process. OSFI will review the insurer's ORSA, related documentation and reports to the Board, as part of its normal supervisory monitoring process. The depth and frequency of supervisory review will be proportional to the nature, scale and complexity of its activities and the risks assumed by an insurer.

### **Documentation required**

The ORSA should be formally documented in a report to the Board. The report should contain sufficient information about the process, principles, methodologies, key assumptions and overall results relative to the risk appetite, strategic and operational plans and capital management framework of the insurer.

### **Proportionality**

The insurer will determine the most appropriate approach given the nature, scale and complexity of its own risks, risk-taking activities and operating environment.

### **Internal controls and independent review**

An insurer's internal control structure is essential to the quality of the ORSA. The Board should verify whether its system of internal controls is adequate for well-ordered and prudent conduct of business. An insurer should conduct regular reviews of its ORSA process for integrity, accuracy and reasonableness.

The ORSA should be subject to periodic independent reviews. The review may be conducted by an internal or external auditor or by another skilled and experienced internal or external function.

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## APPENDIX B: SINGAPOREAN ORSA REQUIREMENTS

The Monetary Authority of Singapore (MAS) issued MAS Notice No. 126 in April 2013 on enterprise risk management for insurers. This paper includes a requirement for an annual ORSA effective January 2014 with the first reports due by end 2014 for large insurers and by end 2015 for others.

### ORSA coverage

The ORSA should encompass all reasonably foreseeable and relevant material risks, including, at a minimum:

- Insurance risk
- Market risk
- Credit risk
- Operational risk
- Liquidity risk
- Additional risks due to membership of a group, if applicable.

The ORSA shall also identify the relationship between risk management and the level and quality of financial resources that is needed and available.

### Relate risk to capital

The insurer must:

- Determine the overall financial resources needed to manage its business and to demonstrate that regulatory requirements are met
- Base its risk management actions on consideration of economic capital, regulatory capital requirements and financial resources
- Assess the quality and adequacy of its capital resources to meet regulatory capital requirements

The insurer shall clearly distinguish between current capital needs and its projected future financial position, having regard to its longer-term business strategy. The insurer shall also assess the appropriateness of its capital resources in supporting its business strategy.

### Continuity analysis and stress testing

An insurer shall undertake periodic forward-looking continuity analysis that addresses a combination of quantitative and qualitative elements in the medium and longer term and includes projections of its future financial position and analysis of its ability to meet future regulatory capital requirements.

It should analyse its ability to continue in business under a range of plausible adverse scenarios. An insurer shall also apply reverse stress testing to identify scenarios that would be the likely cause of business failure and the actions necessary to manage this risk.

An insurer shall maintain contingency plans and procedures for use in a going concern situation. The insurer shall document whether it is necessary to have a contingency plan for use in a gone concern situation.

### Frequency of performance

The ORSA must be performed at least annually.

### **Group requirements**

Insurance groups must undertake a group ORSA on an annual basis.

### **Monitoring and reporting to supervisors and disclosure**

A Tier 1 insurer shall lodge its ORSA report annually within two weeks of approval by the Board, with the first report due on or before 31 December 2014. It is also necessary to submit the Board's deliberations on the ORSA report and the Board's approval of the report.

Other insurers must submit the report every third year with the first report being due on or before 31 December 2015.

An insurer which belongs to a group may make use of the group's ORSA report, provided the required details specific to the insurer, is clearly documented in the report.

### **Documentation required**

Required to document the rationale of the decisions, considerations and assumptions made; calculations related to its decisions and action plans arising from the ORSA.

### **Responsibility**

The insurer's Board and senior management are responsible for the ORSA.

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## APPENDIX C: MALAYSIAN ORSA REQUIREMENTS

In Malaysia, an Internal Capital Adequacy Assessment Process (ICAAP) was implemented,<sup>27</sup> effective 1 September 2012. The ICAAP is a key process in the management of the insurer's business and it should be integrated with the business planning, risk management processes and operations. The ICAAP requires:

### Board and senior management oversight

Board and senior management are responsible for ensuring that the insurer maintains an appropriate level and quality of capital for its risk profile and business plan.

### Comprehensive risk assessment

Insurers must have a process in place to assess an insurer's risk profile and quality of risk management, including risks which are not included in the regulatory capital requirements.

### Individual target capital level (ITCL)

Insurers are required to have an ITCL that reflects its overall risk tolerance and appetite, set by the Board, its risk profile and risk management practices. Insurers must operate at capital levels above the ITCL at all times.

### Stress testing

The stress tests conducted under ICAAP should meet the same standards and requirements contained in the Guidelines on Stress Testing. The projection time horizon might need to be extended to cover the business planning period but should not be less than one year.

The process of generating plausible adverse scenarios should be collaborative and comprehensive.

### Sound capital management

Based on the material risks identified, insurers should assess their overall capital adequacy and develop a strategy for maintaining adequate capital levels consistent with their risk profile and business plans. As part of its capital planning, an insurer should integrate projected capital needs with its budgeting and financial forecasting processes.

Insurers are required to have a Capital Management Plan that documents the key elements of their capital planning process.

### Monitoring, reporting and review of the ICAAP

Insurers must have a process for continuous monitoring and regular review of all components of the ICAAP. Insurers should ensure that the risk and capital management processes are subject to independent review.

The insurer must maintain detailed documentation of all components of the ICAAP.

### Supervisory review

The soundness of an insurer's ICAAP will be reviewed by the regulator and evaluated against the requirements. Based on these reviews the regulator may require the insurer to take action to improve its capital and risk management processes.

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27 Insurance and Takaful Supervision Department, *Guidelines on Internal Capital Adequacy Assessment Process (ICAAP) for Insurers*.

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## APPENDIX D: BERMUDAN ORSA REQUIREMENTS

Certain insurers are required to complete the Commercial Insurers' Solvency Self-Assessment (CISSA) and the Group Solvency Self-Assessment (GSSA) effective for year-end 2011. These requirements include the following:

### **Comprehensive identification and assessment of risks**

Insurers are required to perform an assessment of all reasonably foreseeable material risks arising from operations or environment.

### **Relate risk to capital**

Insurers are required to determine the capital resources required to achieve its strategic goals and to compare these calculations to regulatory capital requirements. An explanation is required if there is a difference of more than 15% between the two figures for any risk.

### **Forward looking assessment**

A forward looking assessment of the risks faced by the insurer over its business planning period is required, as is an analysis demonstrating the ability to manage its business and capital needs in adverse circumstances and still meet regulatory requirements.

### **Board responsibility**

The Board must review policies, processes and procedures to assess its material risks and determine the capital requirement it would need to support its business.

### **Use of the ORSA**

Insurers must describe how the results of the assessment are integrated into the management and strategic decision-making process.

### **Frequency of performance**

The assessment must be performed at least annually.

### **Group requirements**

A group assessment is required.

### **Monitoring and reporting to supervisors and disclosure**

Undertakings are required to file with the Authority their most recent report, assessing material risks and the determination of both the quality and quantity of capital required to cover those risks.

### **Proportionality**

Insurers and groups are expected to have processes that are proportionate to the nature, scale and complexity of the risks inherent to their businesses in order to conduct the CSSA and GSSA.

### **Independent review**

This is required, but does not have to be external, provided that those involved in the review were not responsible for the part of the CISSA that they review.



## APPENDIX E: SCHEDULE OF COMMERCIAL INSURER'S SOLVENCY SELF-ASSESSMENT

*Insurance (Prudential Standards) (Class 3A Solvency Requirement) Rules 2011*

### Schedule IX (paragraph 6)

#### Schedule of commercial insurer's solvency self-assessment (CISSA)

The Schedule of CISSA shall provide particulars of the following matters –

- Table 8A: CISSA capital summary disclosing the insurer's own capital computations, insurer's plans for raising additional capital and contingency arrangements impacting the available capital.
- Table 8B: CISSA general questions relating to an insurer's risk management and governance program, the review and approval of CISSA, integration of CISSA into the strategic decision making process.
- Table 8C: CISSA assessment of material risks of the insurer, determining both the quality and quantity of capital required to cover its risks, the forward looking analysis and its ability to manage its capital needs and the review and approval of CISSA.

### Instructions affecting schedule IX

#### Table 8A: CISSA Capital Summary

RISK CATEGORIES	(A) CISSA CAPITAL	(B) REGULATORY CAPITAL
Underwriting risk		
Market risk		
Credit risk		
Liquidity risk		
Group, Concentration, Reputational and Strategic risk		
Other (specify)		
Total capital pre-diversification between risk categories		
Diversification credit between risk categories		
Total capital after diversification between risk categories and before operational risk		
Operational risk		
Total capital after operational risk		

Where:

- CISSA capital is the amount of capital the insurer has determined that it requires to achieve its strategic goals upon undertaking an assessment of all material (reasonably foreseeable) risks arising from its operations or operating environment
- Regulatory capital is determined by the BSCR-SME or an approved internal capital model at 99.0% Tail Value-at-Risk (TVaR) over a one-year time horizon.

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**Table 8A continued: Additional information**

1. What is the primary reason(s) (select multiple responses where applicable) for aiming at the disclosed CISSA capital amount? (select all that apply):
  - Target agency rating (e.g., A-, AA, etc)
  - Market share
  - Business expansion
  - Nature of product(s) (e.g., risk characteristics)
  - Manage downgrade risk
  - Regulatory capital requirement
  - Others: (Please provide a description)
  
2. What methodology is used to aggregate the risk categories in deriving the CISSA capital?
  - Correlation matrix
  - Linear correlations
  - T copulas
  - Gumbel copulas
  - Clayton copulas
  - Causal drivers approach e.g., inflation, cycles
  - Others: (Please provide a description)
  
3. What contingency plans are in place for raising additional capital under stress situations? (select all that apply)
  - Parental guarantees
  - Revolving letters of credit
  - Issue subordinated debt
  - Issue preference shares
  - Float additional shares
  - Capital injections from parent
  - Contingent surplus notes
  - Catastrophe derivatives (e.g., bonds, swaps and options)
  - Others: (Please provide a description)
  
4. Does the insurer have arrangements/contractual commitments to provide support, including forward purchase arrangements or guarantees, to affiliates/other companies in stressed situations? (Yes or No)

If yes, briefly describe the arrangement(s) and the aggregate exposure.
  
5. Has the insurer down streamed debt to establish equity positions (participations) or, engaged in double or multiple gearing? (Yes or No)

If yes, provide details and amount of capital.
  
6. Has debt been down streamed to establish equity positions in the insurer, or is the insurer using capital that is double or multiple gearing? (Yes or No)

If yes, provide details and amount of capital.

7. Are there any assets of a subsidiary of the insurer that are restricted for use that cannot be transferred to another subsidiary or the insurer, that were not included in the encumbered assets (both for policyholder obligations and not for policyholder obligations) reported in the Schedule of Eligible Capital ? (Yes or No)

If yes, provide:

Total restricted assets	XXX
Less: Regulatory capital requirements for members for which the assets pertain	XXX
Restricted assets in excess of capital requirements to the extent that these amounts are not included in the encumbered assets reported in the Schedule of Eligible Capital	XXX

### Instructions affecting Table 8A

- Total capital pre-diversification between risk categories shall be derived by aggregating all the risk categories prior to recognition of diversification between the risk categories (i.e., prior to *top of the house* diversification).
- Total capital after diversification between risk categories shall be derived by deducting the diversification benefit (calculated by an insurer) from the *Total capital pre-diversification between risk categories*.
- The insurer shall select the appropriate response. Where an optional attachment is provided to disclose additional information, an insurer shall include references (e.g., page number, paragraph number) of where the information can be located within the attachment.

### Table 8: BCISSA general questions

1. Is the CISSA and its underlying information integrated (i.e., considered when making key strategic decisions) into the insurer's strategic and risk management decision-making processes?

If yes, how is CISSA and its underlying information used? (select all that apply)

- Strategic planning
- Annual business planning
- Setting risk limits
- Defining risk appetite
- Evaluation of capital adequacy
- Allocation of capital to business segments and lines of business
- Capital management
- Determination of rates of return for pricing and underwriting guidelines
- Reinsurance purchase
- Determination of investment policies and strategies
- Meeting regulatory requirements
- Improving credit rating
- Improving investor relations
- Assessing risk adjusted product profitability
- Performance measurement and assessment
- Improving amalgamations and acquisition decisions
- Others: (Please provide description)

## 2. CISSA mitigation risk

This section will automatically score and aggregate the results.

- Is there a potential for the insurer to have an accumulation of losses to material lines of business outside of the property catastrophe line that will threaten the solvency of the insurer? If yes, what are the potential cause(s) of the accumulation of losses – list below? (e.g., a severe event; a series of many small events or individual claims; over-concentration of exposure to one product, one source of business, to one line; or a common cause across many underwriting years (asbestos, pollution, silicon, etc.))
- Does the insurer have absolute limitations set on individual policies or groups of policies to avoid threatening its solvency (such as limitations on a geographical basis, product basis, line of business basis, source of business basis, etc.)?
- If yes to the above, are the limitations assessed for reasonableness and effectiveness in reducing the threat to solvency?
- Does the insurer have procedures in place to assess the adequacy of the reinsurance purchased both from a severity and frequency perspective for solvency purposes, and ensure that there are no significant mismatches between the policies issued by the insurer and the reinsurance programme (e.g., that basis risk does not exist, etc.)?
- Does the insurer have access to additional capital and surplus to cover loss and loss adjustment expenses (e.g. letters of credit, parental guarantees, other contingent capital sources, etc.)?
- Are policies, processes and procedures in place that employ benchmarking and stress and scenario testing to assess, review, and approve underwriting strategies and tolerance limits?
- Are policies, processes and procedures in place to ensure that underwriting strategies are effectively aligned with risk tolerance levels?
- Are policies, processes and procedures in place to identify, evaluate, and monitor risks arising from insurance policies, and ensure compliance with risk tolerance levels?
- Are systems in place to capture, maintain, and analyse underwriting data and ensure that relevant and accurate data is used to price underwriting contracts, establish adequate reserves, and appropriately settle claims?

## 3. Related business

- What percentage of the gross premiums written cover an ultimate related policyholder?
  - Comments (optionally, the insurer may provide comments in the box below to support its responses above):
4. Has the insurer applied reverse stress testing to both identify the scenarios that could cause business failure and the required actions to manage such situations? (Yes or No)
  5. Is the CISSA process clearly documented and regularly amended for changes in strategic direction, risk management framework, and market developments? (Yes or No)
  6. How often is the information underlying CISSA discussed and reviewed by the Board of directors and chief and senior executives?

7. Have the board of directors and chief and senior executives ensured that an appropriate oversight process is in place, including an appropriate level of independent verification, whereby material deficiencies are reported on a timely basis and suitable actions taken? (Yes or No)

Optionally, the insurer may provide brief comments.

### Instructions affecting Table 8B

- The insurer shall select the appropriate yes or no response insurer shall include references (e.g., page number, paragraph number) of where the information can be located within the attachment.
- Independent verification shall be conducted by an internal or external auditor or any other appropriately skilled internal or external function; as long as they have not been responsible for the part of the CISSA process they review, and are therefore deemed to be independent in their assessment.

### Table 8C: CISSA Assessment of material risks of the insurer

The Board must review policies, processes, and procedures to assess its material risks and self-determine the capital requirement it would need to support its insurance undertaking, at least annually. Minimally, the assessment should:

- Be an integral part of the insurer's risk management framework
- Be clearly documented, reviewed, and evaluated regularly by the board and the chief and senior executives to ensure continual advancement in light of changes in the strategic direction, risk management framework, and market developments
- Ensure an appropriate oversight process whereby material deficiencies are reported on a timely basis and suitable actions taken

The insurer shall undertake and file with the Authority the insurer's most recent report (insurer-specific report) assessing its material risks and the determination of both the quality (types of capital) and quantity of CISSA capital required to cover these risks, while remaining solvent and achieving its business goals.

Minimally, the insurer-specific report should include:

- Date the assessment was completed and the insurer-specific report last updated
- A description of the insurer's business and strategy
- The identification and assessment of all reasonably foreseeable material risks, including those specified in the Insurance Code of Conduct (i.e., insurance underwriting risk; investment, liquidity, and concentration risk; market risk; credit risk; operational risk; group risk; strategic risk; reputational risk; and legal risk)
- The identification of all material risks, their relationship with one another, the quantity and type of capital required to cover the risks
- A description of the insurer's risk appetite, including limits imposed, how they are enforced, and their key performance indicators
- Assumptions and methodology used to assess and aggregate risks

- A forward-looking analysis of the risks faced by the insurer over its planning horizon and an analysis demonstrating the ability to manage its business and capital needs in adverse circumstances and still meet regulatory capital requirements
- An evaluation of whether the insurer has sufficient capital and liquidity available, including an assessment of whether capital is fungible and assets are transferable, to achieve its strategic goals over its planning horizon and any potential adverse consequences if insufficient
- A description of business continuity and disaster plans
- A description of how the results of the self-assessment are integrated into the management and strategic decision making process
- The risk measure, time horizon, and confidence level (if any) used to determine the CISSA capital

An explanation of the primary reasons for any material deviations between the CISSA capital as it pertains to the risk (if holding capital against the risk) and the regulatory capital charge for the risk, if the deviation is greater than 15%.





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