

GIRO Working Party

Role of the Actuarial Function under Solvency II

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Introduction

The authors of this paper set out to explore the Solvency II requirements for an Actuarial Function and how that fits with the roles actuaries perform in general insurance and reinsurance operations today.

The thinking in this paper reflects the views of the authors whose collective experience includes working in or as consultants to insurers and/or reinsurers across the general insurance market in the UK and internationally, experiencing a variety of different organisation structures and with differing use of actuaries. All the views expressed in this report are our own and not the views of our employers.

The working party members have relied on published Directive 2009/138/EC (Level 1) as the basis for understanding the requirements for the Actuarial Function. Working party members have also had access to the Draft Implementing Measures (Level 2), which were made widely available for informal industry consultation. The Level 2 is still subject to potentially material change but provides an idea of the level and direction of such guidance that has been considered to date. Supervisory Guidance (Level 3) is also being drafted and has not been available to this working party at time of drafting this report.

Despite the uncertainty of the final texts, we feel there is sufficient information to consider the role of the Actuarial Function and how this might work alongside business needs and wider Solvency II requirements. The focus of the discussion of the working party has been to examine how firms use actuaries today and to identify those practices that align with the requirements of the Actuarial Function. We have concentrated on the role, responsibilities, structure and organisation of the Actuarial Function including reporting lines and working practices with other key functions. This paper specifically considers the Actuarial Functions' responsibilities in relation to technical provisions but does not consider the technicalities of the valuations of technical provisions for Solvency II, as this is the subject of the another GIRO working party in 2011.

This document aims to do the following:

- To address each section of the Level 1, providing suggested interpretations and approaches, illustrated by examples (where appropriate) of how it might look in a number of circumstances. For example, how a large multiline insurer may respond differently to a small monoline; and
- To provide a basis for further discussion within the actuarial profession.

Summary

It is the view of the authors that whilst Solvency II sets out a list of roles and responsibilities that must be fulfilled by the Actuarial Function, the requirements do not restrict or define the structure and organisation of the Actuarial Function, subject to it being able to meet its required responsibilities. The draft Level 2 indicates that conflicts of interest and independence will need to be considered but this indication still leaves room for insurers to determine the governance structures that are most appropriate for their business.

For us as actuaries, the Actuarial Function presents new challenges, but these are based on the same skills that actuaries currently use in their day to day roles in general insurance and reinsurance. We have identified and explored and dismissed the risk that actuaries will be seen as policemen for Solvency II. The involvement of actuaries in these requirements reflects the value actuaries bring from their skills and experience and this will continue to go beyond the compliance requirement of Solvency II.

In this paper we have intended to start a discussion that can enhance our thinking on the role of the Actuarial Function and how that can work to meet Solvency II and business needs. We recommend that anyone reading this report does so in the spirit of exploring the role and expanding on our thinking. The authors would be pleased to hear your views on the challenges of establishing an effective Actuarial Function that links between Risk and Finance, cooperates with the wider business and is seen to add value. For those of you attending our GIRO workshop we look forward to hearing your views as well as sharing our own with you.

Glossary

In order to make our report more readable we have defined a number of terms and used them consistently through the remainder of this report.

Best estimate	The mean of all probability outcomes, with no margin for optimism or pessimism.
Board	This has been used to refer loosely to those ultimately responsible for setting the technical provisions. This authority will usually be delegated from the main board, often to the reserving committee.
Insurer	Solvency II applies to both insurers and reinsurers. In this paper we have tended to use the term insurer to refer to both types of company.
Level 1	This refers to the published Directive 2009/138/EC.
Level 2	This refers to the DRAFT Implementing Measures which were made available to a number of industry members for informal consultation.
Level 3	This refers to the Supervisory Guidance which is being drafted by EIOPA and has not been available to the authors.
QRT	Quantitative reporting templates expected to be required quarterly for Solvency II
RSR	Report that will be routinely requested by regulators for supervision under Solvency II
SFCR	Annual public report to be produced by all insurers and reinsurers regulated under Solvency II

Article 48 of Level 1 text

1. Insurance and reinsurance undertakings shall provide for an effective actuarial function to:

- (a) coordinate the calculation of technical provisions;*
- (b) ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions;*
- (c) assess the sufficiency and quality of the data used in the calculation of technical provisions;*
- (d) compare best estimates against experience;*
- (e) inform the administrative, management or supervisory body of the reliability and adequacy of the calculation of technical provisions;*
- (f) oversee the calculation of technical provisions in the cases set out in Article 82;*

Article 82 of Level 1

Data quality and application of approximations, including case-by-case approaches, for technical provisions.

Member States shall ensure that insurance and reinsurance undertakings have internal processes and procedures in place to ensure the appropriateness, completeness and accuracy of the data used in the calculation of their technical provisions.

Where, in specific circumstances, insurance and reinsurance undertakings have insufficient data of appropriate quality to apply a reliable actuarial method to a set or subset of their insurance and reinsurance obligations, or amounts recoverable from reinsurance contracts and special purpose vehicles, appropriate approximations, including case-by-case approaches, may be used in the calculation of the best estimate.

- (g) express an opinion on the overall underwriting policy;*
- (h) express an opinion on the adequacy of reinsurance arrangements; and*
- (i) contribute to the effective implementation of the risk-management system referred to in Article 44, in particular with respect to the risk modelling underlying the calculation of the capital requirements set out in Chapter VI, Sections 4 and 5, and to the assessment referred to in Article 45.*

2. The actuarial function shall be carried out by persons who have knowledge of actuarial and financial mathematics, commensurate with the nature, scale and complexity of the risks inherent in the business of the insurance or reinsurance undertaking, and who are able to demonstrate their relevant experience with applicable professional and other standards.

Section 1a - “Coordinate the calculation of technical provisions.”

Structure and Organisation

The wording in the Level 1 text leaves companies with a high degree of freedom as to how they structure and organise their Actuarial Function. The Level 1 text is much more focused on the overall tasks that the Actuarial Function must perform and the quality of the personnel rather than the structure and organisation. Further we have not seen any evidence to date to suggest that the Level 2 or Level 3 text will be more prescriptive in this regard. Consequently, it is appropriate for firms to consider the structure and organisation of the Actuarial Function that most effectively meets the requirements of their business, as well as the requirements of Solvency II.

The Level 1 text gives insurers flexibility to have an Actuarial Function either whose role is to be involved in all parts of the calculation of the technical provisions or whose role is limited only to elements of the calculation. The role of the Actuarial Function under Solvency II is broadly consistent with current approaches to using actuaries and statisticians to calculate technical provisions in the vast majority of insurers. We see examples in the market where insurers either use:

- A small actuarial function and outsource the calculation of the liabilities to a third party; or
- A large actuarial function that calculates and recommends the estimates of the liabilities to the Board.

There is no definition of the structure and organisation of the Actuarial Function, or even whether it is one person or a team. Whilst the responsibility of the Actuarial Function is clear, the actual underlying and preparatory tasks, that the Actuarial Function may perform in order to meet this responsibility, are not defined or restricted.

The requirements of Solvency II for the Actuarial Function could be achieved through different organisational structures. Some examples of which follow, but these are not exhaustive:

- Another party, internal or external, could conduct the underlying analysis and calculations provided that the Actuarial Function reviews and challenges the analysis and conclusions and delivers the necessary report for the Board covering all the Solvency II responsibilities;
- The Actuarial Function could conduct the analysis and calculations itself and make recommendations in the required report to the Board; or
- A combination of the above, for example, the analysis and calculations could be a combination of some underwriters/claims handlers/legal estimates, specific outsourcing of one or more category of claims, with the remainder estimated by Actuarial Function.

A key factor in any organisational structure for the Actuarial Function is that there is appropriate review and challenge through the process of reporting to the Board. The Actuarial Function may provide some of this review and challenge where the underlying analysis and calculations are conducted by another party. Where the Actuarial Function has primary responsibility for the analysis and calculations it

would be expected that others would provide challenge as appropriate including underwriters, claims handlers and the Board.

It is important to note that the technical provisions include several elements and are not limited to the best estimate of the liabilities. As the technical provisions include a calculation of the cost of capital, the calculation of the capital requirements is an underlying component of the calculation of the technical provisions.

It would seem that one objective of the Actuarial Function under Solvency II is to ensure the appropriate level of oversight and challenge in the process used by insurers to set technical provisions, by individuals with relevant skills and experience. That is, it is the responsibility of the Actuarial Function to ensure the right process is carried out to estimate technical provisions, rather than carry out the calculation. For most firms we anticipate that the Actuarial Function will be defined by the breadth of its roles and responsibilities and the structure and organisation of the Actuarial Function will be developed to be appropriate to the scale and complexity of the business. For example, a large insurer may require its Actuarial Function to carry out all the calculations for the technical provisions. A small monoline insurer may wish to use third party assistance, but the Actuarial Function would be required to co-ordinate this calculation. In the case of the small insurer, the Actuarial Function will have the responsibility to ensure the calculation is appropriately controlled. In the case of the large insurer, conflicts of interest will need to be handled carefully.

We highlight that where key elements of the Actuarial Function are outsourced, this creates additional requirements under Solvency II, requiring firms to take responsibility for the quality and appropriateness of outsourced work and to ensure that all decisions taken off the back of such work are made with sufficient knowledge and understanding by the Board. The additional governance requirements associated with outsourcing are set out in Article 49 of the Level 1 text.

Conflicts of Interest

The draft Level 2 proposes the need for a review of the outcome of the calculation of the technical provisions. The Level 2 suggests this review could be carried out by internal audit, external audit/reviewer or by other internal functions or persons subject to there being no conflicts of interest. The aim of this requirement is to ensure that there are adequate controls around the calculation and the final decision.

There are four important parts associated with the technical provisions:

- Co-ordination;
- Calculation;
- Establishment; and
- Reviewing.

These four parts are not necessarily exclusive. The Actuarial Function must carry out the co-ordination and inform the Board. Subsequently, subject to disagreement, the Board will most likely have responsibility for the establishment or final setting of the technical provisions. It is the remaining parts, calculation and reviewing, that the Actuarial Function must ensure are appropriately controlled but for which it is not

necessarily responsible. If the Actuarial Function is responsible, then any conflicts of interest should be avoided.

Where the Actuarial Function carries out the calculation, it is unlikely to be feasible for all insurers that the Actuarial Function can carry out a review or give an overall opinion on the final decision. This would result in the Actuarial Function carrying out multiple tasks and could lead to conflicts of interest. In this case, the review may need to be carried out by another function. However, this alternative function may also need a similar skill set to the Actuarial Function so as to be in a position to deliver a robust opinion. We could see several ways around this difficulty:

- Firstly, it could be through the use of an external reviewer. This could be costly and be a significant extension of the existing audit scope.
- Secondly, the Actuarial Function in a large insurer may be of sufficient size to give its expertise to carrying out reviews and to avoid conflicts of interest. For example, a large multinational insurer can carry out regular peer reviews within its wider Actuarial Function. For example, the Actuarial Function responsible for German Motor carries out a peer review of UK Employers Liability, subject to their expertise and knowledge.
- It may also be that a strong governance process, such as the Actuarial Function reporting to a reserving committee, would create the level of independent review assumed by the Solvency II. Whether this is indeed a strong process, may depend on whether the Actuarial Function reports to the reserving committee or is an active participant of that committee.
- It may be anticipated that such an independent review may be split. For example, the internal audit function considers the effectiveness of the governance process and controls around setting the technical provisions, whilst another party, perhaps a reserving committee, reviews the Actuarial Function's recommendations on sufficiency of the technical provisions.

There is potential for many different models to be considered here and these models would vary depending on the size, nature and organisational structure of the insurer.

Section 1b – “Ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions.”

This may involve, for example:

- Contributing to the writing of the reserving policy;
- Selection of the actuarial software used;
- Devising the actuarial process for each regular / annual review;
- Selecting the appropriate actuarial analysis;
- Reviewing the actuarial analysis; and
- Back testing the results, e.g. actual versus expected analysis.

Set-up

Reserving Policy

We would expect the Actuarial Function to be involved in writing and reviewing the reserving policy along with the Board and other interested parties. In terms of ensuring the appropriateness of the methodologies and assumptions, we would expect the reserving policy to include:

- The roles and responsibilities of parties within the insurer in estimating the best estimate and making the subsequent adjustments to calculate the technical provisions for Solvency II and for local GAAP/ IFRS reporting;
- The consultations the Actuarial Function must consider having with other areas of the business (e.g. underwriters); and
- The review process for the calculation of the technical provisions, including feedback cycles with the Board.

Technology

We would also expect the Actuarial Function to be largely responsible for selecting and implementing (along with the IT department) the technology platform for carrying out the estimation of reserves. This is to ensure the model and assumptions proposed can be successfully supported by the software available.

Decisions will need to be made as to where commercial packages will be appropriate and where bespoke development will be needed. In the case of bespoke development, we would expect that the Actuarial Function would contribute towards or review and approve the design specification.

Standard Sized Company

For most companies where the reserving work is carried out in-house, we would expect the Actuarial Function to use statistical analysis to generate a first cut of the best estimate. The Actuarial Function would be responsible for:

- Selecting the split of the data most appropriate to defining homogeneous risk groups, whilst having regard to the Solvency II categories;
- Assessing the impact of combining homogenous risk groups for those groups not considered material enough to be projected separately;
- Selecting the most appropriate actuarial technique for projecting each homogeneous risk group;

- Deciding on the appropriate values for those assumptions where judgement is required; and
- Having discussions with underwriters, pricing actuaries, and other relevant parties to gain insight into the appropriateness of the assumptions used and to understand better the raw data.

Best Estimates

In a post-Solvency II world, the Level 1 text says the Actuarial Function must ensure the appropriateness of the methodologies and assumptions made in calculating the technical provisions. This suggests that the Actuarial Function must agree that the final booked technical provisions are appropriate. The current situation for most insurers is that the Board will review the reserves estimated by the actuaries, but maintains the right to amend them. This could be either because they disagree with the values of specific assumptions made by the actuaries or because they want to include a margin.

Under Solvency II, the Board cannot include any margin in the technical provisions, but they may still disagree with the Actuarial Function as to the appropriateness of assumptions. There are three scenarios:

- The Board agrees with the Actuarial Function's assumptions;
- The Board initially disagrees with the Actuarial Function's assumptions. In this case, we would expect the Board to feedback their opinion to the Actuarial Function, and for an iterative cycle of investigation and review to take place until agreement is reached; or
- The Board disagrees with the Actuarial Function's assumptions and after feeding this back and the necessary cycles of investigation and review it is decided no possible agreement can be reached.

Within our working party we have had considerable discussion around the situation where the Board and Actuarial Function cannot reach agreement. The outcome of these discussions is that we believe there are different ways to interpret which group is responsible for setting the final Solvency II technical provisions. The Level 1 text implies that the Actuarial Function is responsible for this task, since without the ability to do so then they cannot ensure that the methodologies and models are appropriate. However, despite this implication we believe that this is not the intention of Solvency II and that the responsibility for setting technical provisions will remain with the Board. In this case we would expect the Actuarial Function to discuss any areas of disagreement in its reporting to the Board, and to do this in writing. Whilst there may be different ways to interpret Solvency II, the outcome of this legislation will be a higher degree of engagement of the Actuarial Function with its board.

Link To Financial Reporting

We would expect the underlying basis used to estimate the Solvency II technical provisions (before making Solvency II specific adjustments for discounting and risk margin) to be the same as that used for estimating the reserves for the financial statements (prior to the addition of any margin). We believe it would be irrational and

add no value for the Actuarial Function to have two independent sets of underlying assumptions with one for Solvency II and the other for the financial statements.

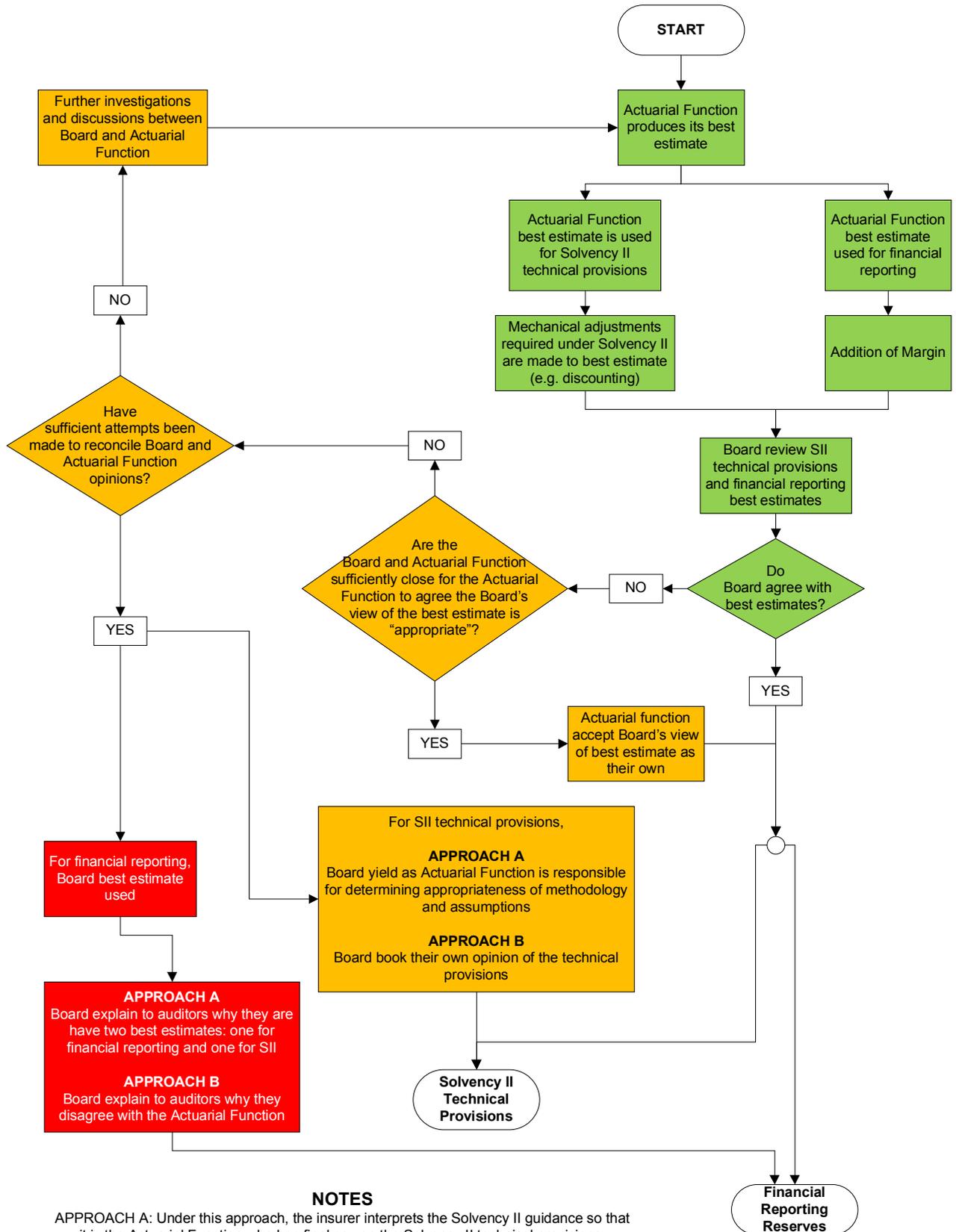
In the case above where the Board and the Actuarial Function cannot reach agreement on the appropriateness of the methodology and assumptions used to set the Solvency II technical provisions, there is likely to be a need for a clearer division between adjustments made for margin for financial reporting purposes, and adjustments where the Board disagree with the Actuarial Function's methodology or assumptions (if relevant). In the case of the latter, auditors are likely to want to understand why the disagreement exists and the potential impact on the reserves.

Validation

Once the technical provisions have been established, back testing should be considered to validate the methodology and assumptions used. This might take the form of an actual versus expected analysis. Where significant deviations are found to exist, the reasons for the differences should be investigated and remedial actions carried out to improve the methodology and assumptions used. There will be many instances where actual experience is different to expected purely due to the volatility of the underlying experience. The degree of deviation that should be considered significant will vary from insurer to insurer and from class to class. It will also be important to test for any patterns in the deviations, for example consistent under- or over- estimating.

The diagram below summarises the authors views on the decision making process between the Actuarial Function and the Board.

Actuarial Function And Board Reserve Estimation



NOTES

APPROACH A: Under this approach, the insurer interprets the Solvency II guidance so that it is the Actuarial Function who has final say on the Solvency II technical provisions.

APPROACH B: For this approach, the insurer interprets the Solvency II guidance so that it is the Board who has final say on the Solvency II technical provisions.

Companies with Outsourced Reserving Functions

For some companies, usually smaller entities, the employment of an internal team to calculate the reserves may not be possible or desired. In these cases, they may use an external reserving entity to estimate their Solvency II technical provisions (and financial reporting reserves). In such circumstances, the internal Actuarial Function may comprise of just one individual, who may not be an actuary by training (although this individual would need to have appropriate skills and experience described later in this report). They may have additional roles within the company and consideration should be given to the potential for conflicts of interest.

The Actuarial Function of the insurer would still be responsible for assuring the sufficiency of the best estimate and subsequent adjustments to evaluate the Solvency II technical provisions. In addition, it would be responsible for:

- Setting the scope for the external reserving entity;
- Supervising the work performed by the external reserving entity; and
- Reviewing, challenging and approving the results.

As well as the review and feedback cycle that would need to exist between the Actuarial Function and the Board, an additional cycle would be needed between the external reserving entity and the Actuarial Function.

This suggests that the use of the external reserving entity as a “black box”, where the data is sent out and the answers received without detailed knowledge of the methodology and assumptions, would not be appropriate. The Actuarial Function would need a detailed understanding of the work performed and the assumptions made. This may be a challenge for some small entities where there are no internal staff with sufficient knowledge of actuarial techniques.

The scope of work for the external provider may also include appropriate testing of the valuation of the technical provisions including back testing (actual versus expected) and sensitivity testing of assumptions. This would all require review and challenge by the in house Actuarial Function.

Section 1c – “Assess the sufficiency and quality of the data used in the calculation of technical provisions.”

Under the Solvency II proposals, responsibility for the coordination of the calculation of the technical provisions includes an assessment of the sufficiency and quality of data. Article 82 states that “...insurance and reinsurance undertakings have internal processes and procedures in place to ensure the appropriateness, completeness and accuracy of the data used in the calculation of their technical provisions.”

Most actuaries will rely on data supplied internally, based on adequate and appropriate internal controls to assess the completeness and accuracy of that data. Actuaries then have to assess whether the data is fit for the purpose for which it is being used. For example, are there enough data points to use for the planned model or methodology to give a statistically credible result and is the data provided of a sufficient standard that results based on that data can be considered to be reliable. It is not sufficient for the Actuarial Function to be satisfied the data is accurate and complete, but it must also be appropriate, for example, the Actuarial Function should consider whether the basis under which the data has been constructed is consistent over time or has been affected by anomalies that will distort the actuarial analysis.

The extent of the actuaries’ responsibilities for the data is not explicitly stated. It is not feasible or appropriate for the Actuarial Function to be involved in every step of the process, from data entry and processing to the data required for actuarial analysis. There will need to be input from many teams within the undertaking, for example IT, claims and underwriting. We do not believe that it is the intention for the actuaries to audit the data or oversee an audit process. Rather we understand that the Actuarial Function, as a key user of the data, is well placed to assess:

- The general data quality; and
- The impact of any data deficiencies relevant to the assessment of technical provisions and the setting of underwriting policy (including pricing and decisions on reinsurance strategy).

We believe that it is appropriate for the Actuarial Function to place reliance on internal data processes, Risk Management reviews and Internal Audit assessments on data quality to the extent that these apply to data accuracy and completeness. Nevertheless, the Actuarial Function would need to determine the limitations of all such activity compared with the reliance placed on the data for the purpose of fulfilling the responsibilities of the Actuarial Function. We discuss this further later in this section.

Data Quality Policy

Each insurer will be expected to have and maintain a Data Quality Policy under the Solvency II regime and this should provide guidance as to the undertaking’s appetite for data shortcomings. However, it may also be appropriate to assess the data against the Actuarial Function’s own view of the quality required for the tasks undertaken by the Actuarial Function, allowing for the materiality of any deficiencies. Whilst these two assessments may correspond in many cases, there is clear potential for divergence between the two assessments. For example, an insurer may have very limited appetite for data deficiencies, whereas for some data items, any shortcoming may not be

material to key results or decisions. Conversely, where an undertaking's Data Quality Policy allows for a level of data deficiency, the results of calculations undertaken by the function are likely, in some circumstances, to be very sensitive to changes in data.

Consideration In Assessing Data

The level of controls and checks currently applied to the data may satisfy the Actuarial Function that the data is accurate, with adequate processes and documentation to show appropriateness. For many undertakings, however, the current situation may be inadequate, either due to a lack of controls and checks or due to a lack of documentation and recording of the processes carried out. Within such undertakings, substantial time may need to be devoted to improving and/or documenting the data input and data flows. In many cases this should be advantageous to the organisation. Where there is a lack of evidence of validation and control there is clear potential for data to be deficient. The process of carrying out and documenting appropriate checks should highlight errors in the data and, in time, improve the data reliability.

There will be a trade off between the time and resources that the undertaking wishes to devote to such work and obtaining or evidencing the ideal data for actuarial purposes. Undertakings should be aware that uncertainty remains in actuarial projections even if "high quality" data is used and there is a limit to the extent which improvements to data adds value. Nevertheless, actuaries may see Solvency II as an opportunity to improve any data provided to them which is less than ideal for the analysis undertaken.

A particular area of difficulty may be around the historical data that actuaries require to carry out their analysis. The data input and processing can be improved for future data, but it is unlikely to be feasible to make substantial adjustments to existing data. This would particularly be the case for very long-tailed claims, for example, asbestos exposed classes. In addition, there will be instances where insurers have imperfect data, but commercial considerations mean that substantial improvements are unlikely. This may be the case for a wide variety of insurers, for example:

- Those writing binder or delegated authority business may receive claims on bordereau in bulk rather than as individual listings;
- Reinsurers are unlikely to receive full information on underlying claims substantially below their attachment point; or
- Personal lines insurers may be prevented from collecting certain exposure information.

Another aspect of the Data Quality Assessment that the insurer needs to consider relates to any external data that is used. It is more difficult to assess the quality of the external data than internal data. However, in many cases the external data will be less material to the calculations than the internal data, for example, when external loss data is used for a new class of business or a small subset of claims where internal data is sparse, but this analysis relates to an immaterial component of the total valuation. Some external data can be material to the valuation for example the use of reinsurer credit ratings to calculate expected bad debts. Depending on the materiality and

design of the reinsurance programme the use of credit ratings may be a material assumption.

Consideration needs to be given for the use of external data. If data is only being used for benchmarking internal analyses or assumptions, a lower level of validation may be deemed necessary than if the external data is being used as the main source of data for making key business decisions, such as writing a new class of business where no internal data is available. It may be possible to validate external data using the following methods:

- Validation that the data source is trusted through understanding the source of the data and its composition;
- Back-testing of the observed data against historical versions of the same external data from the same source; or
- Verification that the external data relates to equivalent exposures in the class of business or loss type being analysed.

Reporting To The Board

The assessment of data quality will need to be reported to the Board as part of the reporting process. It should be noted that this will link to other tasks performed by the Actuarial Function. For example, we anticipate a key aspect of the underwriting opinion to relate to the data provided (directly or indirectly) by the underwriters to the actuaries. Therefore, any analysis of this data will be relevant to both tasks.

We recognise that the extent of the analysis undertaken will vary widely from insurer to insurer. Two possible examples relate to a large personal lines insurer and a smaller, niche London Market company:

- The large personal lines insurer is likely to have a vast amount of data which is important to the operation of the business and a source of competitive advantage. We would anticipate that the organisation expects a high standard of data quality, with effective validation processes and controls in place to ensure accuracy and completeness. In this case the Actuarial Function may review the existing controls, potentially on a sample basis. Shortcomings in a variety of areas are likely to require prompt corrective action as data analysis is often the biggest driver of business decisions.
- In contrast, other sectors where risks are larger and have more unique features, such as in the London Market, data sufficiency is a greater problem. Risks often have less homogeneity and underlying claims experience is masked by an increased level of random fluctuation. Whilst actuaries may be able to rely on internal processes and controls for assurance of accuracy and completeness of data, there may be greater challenges to assess sufficiency and quality of data, particularly where estimates such as case reserves depend on a wide variety of different experts both internal and external to the organisation.

The authors consider that the role of the actuary in relation to assessing data sufficiency and quality is unchanged; however, the Actuarial Function has

responsibility to ensure effective communication of data issues as part of its report to the Board. We would expect the Actuarial Function's report to include:

- Any shortfall of the data relative to the Data Quality Policy;
- The impact of insufficient data or poor quality data where these data weaknesses are potentially material to the calculation of technical provisions, SCR or economic capital or may have an impact on decisions associated with underwriting policy or reinsurance strategy;
- The impact of insufficient data or poor quality data on the choice of methodologies and models compared with market best practice;
- Explanation of how judgement has been used to mitigate insufficient or low quality data;
- Recommendations for improvements to data where the improvements would materially improve the reliability of estimates and lead to better informed decision making by senior management;
- Recommendations for approaches that could be used where data cannot be improved, for example, where there is insufficient data to assess tail risks;
- Updates on any change projects in progress, completed in the last reporting period or planned for the future that will have an impact on the reliability of data used for the calculation of technical provisions, SCR or economic capital or may have an impact on decisions associated with underwriting policy or reinsurance strategy and monitoring of the quantified impact of those projects on the data.
- The Actuarial Function's view of the limitations of any internal process, controls, reviews and assessments relied on in reaching a view on data quality.

Section 1d – “Compare best estimates against experience.”

The Level 2 text requires the Actuarial Function to perform actual versus expected analyses to confirm the appropriateness of the data, methodology and assumptions used in calculating the technical provisions. This implies that comparing actual experience against expected is required at two levels:

- The comparison of actual results with expected **results**; and
- The comparison of actual values of **assumptions** with those used when setting the technical provisions.

Actual versus Expected – Results Comparison

The comparison of actual results with expected results only looks at the predictive accuracy of the combination of methods and assumptions used to estimate the technical provisions. This type of analysis can highlight both inappropriate use of methodology or inaccurate underlying data or assumptions.

Advantages:

- This analysis provides an overview as to the appropriateness of current techniques in estimating reserves;
- Actual versus expected analysis is easily explained to and understood by non-actuaries, such as the Board.

Disadvantages:

- Actual versus expected results may show no material differences though errors in the appropriateness of underlying assumptions and methods may exist but act to offset each other.

Actual versus Expected – Assumption Comparison

A comparison of the actual values of assumptions implicit in the emerging experience with those estimated when setting the technical provisions will look at the fundamental underlying assumptions which contribute to the technical provision calculations. Many of these are estimated at the outset and subsequently refined as more information comes to light. An example would include claims inflation where estimates for future years are required to predict future overall claim amounts.

Carrying out meaningful actual versus expected exercises on some assumptions will be more practical than for others. For binary events it will be difficult to perform a meaningful actual versus expected exercise on overall binary event assumptions, as a large dataset or large periods of time will be needed to collect enough data to perform the analysis. The “actual” data should theoretically contain all possible events. Actual versus expected on specific binary event assumptions, such as the ability to estimate the outcome of court cases, will be measurable. In comparison, analysis of the assumptions applying to large volumes of claims experience can provide valuable insights into emerging trends and unusual or unexpected variability.

Actual versus expected analyses may show that:

- Assumptions are being consistently over or under estimated. Future assumptions may maintain the current process of estimation with an

adjustment applied to correct for the consistent historical inaccuracy, or the method of estimation may be changed to improve the estimation;

- Assumptions are consistently and materially wrong, but are not consistent in the direction of error. This may imply a fundamental problem with the basis used of estimating the assumption and a scrapping of the current methodology in favour of a new approach.

Conclusions from actual versus expected exercises can be used as evidence of the appropriateness of the methodology and assumptions and can also help explain the impact of inherent uncertainty and trends. Such trends may indicate that it is necessary to improve the predictive capability of the Actuarial Function.

Communication and Impact of any Deviations Between Best Estimates and Experience

It is the role of the Actuarial Function to communicate differences in the actual and expected experience to management and the risk function, and the likely impacts of any differences on both the Capital requirement and the Solvency ratio.

Effect of a Deviation Between Best Estimate and Actual Experience?

Material differences in actual versus expected experience should be flagged early by the Actuarial Function. Though differences in actual and expected experience may be random around the mean / expectation, the Actuarial Function will need to show that the experience is likely or not likely to be a trend.

The cause of the experience could impact the parameterisation of the capital model as well as changing the technical provisions. If there are differences that will result in a re estimation of the technical provisions or re-parameterisation, these should be communicated by the Actuarial Function.

A revision to the technical provisions will impact the capital and solvency ratio in several ways and this will need to be discussed with management so they are aware of impacts of differences on the capital adequacy.

Consider for example, if assumptions are parameterised optimistically and require strengthening we could expect the following impacts on the capital model and solvency ratio:

- An increase in best estimate reserves;
- Re-parameterisation of the reserve and underwriting risk model;
- An increased (though not offsetting) amount of discount / investment return expected;
- An increase in the reinsurance asset applying to the best estimate gross of reinsurance reserves;
- A resulting increase in the capital requirement due to:
 - An increase in the capital requirement for reserve and underwriting risk (as best estimate reserves have increased and for re-parameterisation of the model);
 - An increase in the capital requirement for reinsurance credit risk (as the reinsurance asset has increased);

Role Of The Actuarial Function Under Solvency II

- A resulting reduction in Available Financial Resource:
 - Due to an increase in the technical provisions;
 - Offset partially by an increase in the discount;
- Overall a reduction in the Solvency Ratio.

Section 1e – “Inform the administrative, management or supervisory body of the reliability and adequacy of the calculation of the technical provisions.”

Solvency II proposes that all tasks of the Actuarial Function should be included in one report, at least once a year. Some insurers are close to this but for many, reporting by the actuarial team is piecemeal and current actuarial team responsibilities do not cover everything required by Solvency II. At the moment, some insurers are likely to be in a position to have available an annual actuarial report addressed to the Board covering recommended and booked claims reserves and a separate report covering capital assessments. For other insurers the documentation containing recommended and booked reserves may be sparser. The Solvency II requirements relating to Actuarial Function reporting goes beyond this current practice of reporting.

We anticipate that the report to the Board would need to cover:

- The governance process around the calculation of the technical provisions.
Covering:
 - A list of the key responsibilities and tasks carried out;
 - Who has signed off and what has been signed off;
 - Identify any problematic areas and give recommendations on how they can be resolved;
- The methodologies used and the basis for setting assumptions. In particular, this should cover:
 - Where a particular methodology is “special” for example:
 - Unusual techniques;
 - Detailed information on unusual limitations;
 - Sensitivities and where these sensitivities are higher than normal;
 - Assumptions that give rise to a particularly high degree of sensitivity;
- The sufficiency and quality of data. In particular, this should cover:
 - Any material data limitations;
 - Consequent impact on the reliability of the estimates;
- Comparison of best estimates against past experience. Covering:
 - Commentary on trends;
 - Other changes in the account;
- The use of micro or individual (case-by-case) approaches. Covering:
 - Limitations of the techniques used;
 - Additional uncertainty;
- An opinion on overall underwriting policy (discussed in later sections of this report);
- An opinion on reinsurance strategy (discussed in later sections of this report);
- The contribution to the risk management, covering:
 - Risk modelling in relation to the ORSA, SCR and MCR;
 - The link between the assumptions in the technical provisions and the capital models.

We discuss elsewhere in this paper the items that might be included in the underwriting and reinsurance sections. Where recommendations are made for improvements the Actuarial Function should also track the follow up of these recommendation and completion of any resulting actions.

These reporting requirements for the Actuarial Function under Solvency II appear at first quite onerous. However, the activities of the Actuarial Function are likely to be documented as they occur and the overall report would likely be a collection of the executive summaries from these documents rather than the product of the Actuarial Function having several months of “down time” to write this report.

We believe that there is scope for variation in the level of detail of these reports. We see different examples currently in practice. The most common example is for an Actuarial Function to write an annual report following the calculation of technical provisions, which it then asks the Board to review. For a large insurer, this report may be a stand alone exercise with the regular detailed documentation being kept separately.

Insurers will vary in terms of the level of detail to which the Board of Directors will consider the technical provisions. Further factors on the level of detail may include the complexity of the organisation and the governance framework in place. Many Boards will delegate some review responsibility to a reserving committee. It may be anticipated in these circumstances that the reserving committee will receive a more detailed report as per the requirements of Solvency II whilst a high level summary, covering the same key areas, will be provided to a Board of directors.

We would expect that the Board as a minimum should receive information on the key drivers of risk underlying the calculations of the technical provisions, including information on the parts of the calculation that are uncertain and the potential financial impact of these uncertainties. These sensitivities may arise from inherent uncertainty or from the calculation process due to data limitations or constraints in developing appropriate methodologies, models and assumptions. We would also expect the Board to receive an explanation of the reasons for material movements in the estimated ultimate claims costs, the impact of discounting and the risk margin.

Regulatory technical provisions may not receive as high priority as the technical provisions for financial reporting. Insurers should be applying the same level of sign-off to both but for regulatory purposes the focus may be on understanding the adjustments to the financial reporting amounts rather than a ground up understanding of the amounts reported under Solvency II, assuming such ground up understanding has been provided in relation to the financial reporting technical provisions.

Most insurers review technical provisions more often than annually. Insurers may feel that a minimum of quarterly review is necessary as under Solvency II it will be necessary to report the Minimum Capital Requirements on a quarterly basis.

Actuarial Functions may choose to spread tasks across the year and report on them as each is completed. Consequently the annual report by the Actuarial Function may be seen as a formality rather than a useful and decision making document. A more desirable approach would be to enhance normal Board reporting packs for reporting recommendations in relation to technical provisions and to include also the latest view on underwriting policy and reinsurance policy and the Actuarial Function’s contribution on risk modelling. This may result in an annual report with shorter updates for more frequent reporting on technical provisions where a full report is not

felt to be necessary. Certainly where technical provisions are revisited either half-yearly, quarterly or monthly good governance would anticipate appropriate reporting to Board.

Insurers need to decide the most effective communication to the Board ensuring all relevant information is available for decision making. Different structures will work better for different organisations. Consider, for example, where:

- A firm conducts a full review of technical provisions once a year, with quarterly updates based on monitoring actual versus expected. It may be argued that the Actuarial Function's full annual report should be produced once a year and shorter reports limited to the scope of the work done each quarter should be provided to the Board between annual reports.
- A firm staggers its technical provision reviews over the year such that part of the estimates of technical provisions are based on recent ground up assessments whilst some of the estimates are based on periodic monitoring adjustments applied to previous estimates. Reporting to the Board will need to communicate the approaches used and the impact of full assessments compared with monitoring updates on the Actuarial Function's view of sufficiency of technical provisions and associated uncertainty. The report could usefully explain to the Board why the timing of different views is deemed to be appropriate, particularly if the frequency varies for different segments of the business.

The role of the Actuarial Function in risk management and risk monitoring is not only desirable for the assessment of capital but is also relevant to assessing the sufficiency of the technical provisions. The Actuarial Function needs to comment on uncertainty and the risk model is measuring uncertainty so we would expect some correlation between the communications in relation to potential variability of the technical provisions and the output of the capital model. Ideally it would be useful if the capital model was able to produce assessments of underwriting and reserving risk at a range of confidence intervals as the Board is likely to be concerned not only about the relatively low risk that technical provisions deteriorate and erode regulatory capital but the much higher risk that deterioration in technical provisions erodes profits in future years.

The requirements for reporting in Article 48 of the Level 1 text are limited to reporting to the Board. External reporting requirements in the Report to Supervisors (RSR), Solvency and Financial Condition Report (SFCR) and Quantitative Reporting Templates (QRTs) will include reporting on technical provisions. We would anticipate that the Board will need to sign off on these external reports. In this light it would seem reasonable to expect that material factors shown in the externally reported information had already been reported to the Board via the Actuarial Function report, unless they had emerged since the last report.

The QRTs require relatively detailed information on technical provisions and adjustments to those figures period on period, which may give rise to questions. We would recommend that the scope and design of the report of the Actuarial Function

considers not only the internal needs of the business but also the potential questions that could arise in relation to the external presentation required in the QRTs.

The content of the SFCR and RSR is currently less developed but is likely to provide additional qualitative information and hence, in relation to the technical provisions, may rely to some extent on the information included in the Actuarial Function report.

Section 1f – “Oversee the calculation of technical provisions in the cases set out in Article 82.”

The Actuarial Function must have sufficient skills to:

- Decide when a case-by-case approach is more appropriate than projecting in aggregate;
- Select the appropriate alternative method; and
- Supervise and/or carry out the alternative method, as appropriate.

Case-by-case approach

The alternative approach described in Article 82 will often be dealt with on a case-by-case approach. The Actuarial Function will need to work with other specialists (e.g. claims handlers, loss adjustors and legal advisors) in order to carry out case-by-case reserving appropriately. Claims handlers are likely to be the closest to individual cases and should be able to provide insight into a reasonable level of technical provisions. The Actuarial Function will need to understand the basis on which any specialists’ estimates are made, for example whether they relate to:

- Discounted or undiscounted outcomes;
- The mean, median, mode or other basis of estimate;
- Best estimates or prudent estimates, such as not allowing for any potential third party recoveries.

As such, in many cases the Actuarial Function may need to adjust the estimates made by others, or include additional allowances, such as pure IBNR or win factors,

The collection, validation and application of data used for case-by-case methods is subject to the same approach as used for the main data set (i.e. data used for non-case-by-case approaches). In general, more care is likely to be needed with data which is not used as often as the main data set, as it is likely to be less well understood and harder to interpret reliably.

Where the calculation of the technical provisions is outsourced to an external reserving entity, the external reserving entity could perform the above tasks. The Actuarial Function will then be responsible for reviewing the decisions made and agreeing their appropriateness.

Section 1g – “Express an opinion on the overall underwriting policy.”

Solvency II proposes that the Actuarial Function provides an opinion on the underwriting policy. This does not mean that the function cannot be involved in any of the original decisions on this issue, but that the degree of documentation and justification will need to be higher in this situation. We believe it will be difficult to produce an independent opinion if the Actuarial Function has also taken responsibility for the formulation of the policy.

We consider that the opinion on underwriting policy needs to include an analysis of the sufficiency of premiums to cover future losses and take into account factors such as inflation, anti-selection, legal risks, changes in the market environment and any other relevant internal or external issues. It is proposed that the function will also be required to suggest improvements to be made to the policy in the future. Beyond these factors the scope of the opinion is not defined, but will be reported to the Board and should therefore be relevant to their needs.

In relation to the sufficiency of premiums, it is anticipated that in determining the adequacy of technical provisions the Actuarial Function will consider the sufficiency of premiums in relation to expired periods of cover and also consider the likely appropriateness of premiums received and due to be received in relation to policies already sold for future exposure periods. The Actuarial Function would need to conduct additional work to consider the appropriateness of the combined pricing and underwriting strategy in the light of trends in the underlying experience of the business and the expected risk profile for future underwriting.

In terms of the Actuarial Function providing information relevant to the Board's needs, we note that, whilst the SCR valuation considers one year new business, proposals in relation to the ORSA have suggested that the ORSA should include stresses to business plans over a longer time period, perhaps 3-5 years ahead. Since the future expected profits are a component of both the SCR and the output of future balance sheet stress scenarios, the Actuarial Function may be expected to express an opinion over both these timeframes and should communicate clearly the key threats to future profitability associated with the planned underwriting strategy.

In forming these views the Actuarial Function, notwithstanding the comments above with regard to independence of responsibilities for pricing and forming an opinion on underwriting, could be asked to deliver its Solvency II responsibilities in different ways. The Actuarial Function may form its view of the underwriting strategy based solely on its analysis of the relevant data and market knowledge. This leaves the Board and/or its delegated committee with responsibility to draw conclusions from the different recommendations of the Actuarial Function and the underwriting function. Alternatively the Actuarial Function may work closely with the underwriting function, understanding the day to day operations and the underwriting perspective and providing an opinion containing the actuarial judgement of the whole operation. Variations on both these approaches operate in different organisations in relation to setting technical provisions so it may be expected that similar divergence of approaches will continue under Solvency II.

Currently the degree of interaction between the underwriters and actuaries in relation to pricing and underwriting varies materially between different undertakings. The level of actuarial input into the pricing and underwriting will be particularly variable between different types of insurers. Organisation may have actuaries working directly in the underwriting function who are independent from the Actuarial Function responsible for giving the underwriting opinion or have outsourced different responsibilities to different actuarial service providers. The requirement to express an opinion will therefore present a different level of challenge for different undertakings. In many cases, however, this requirement should encourage greater communication between pricing teams, be they underwriters or actuaries, and the Actuarial Function.

The requirements relating to the underwriting opinion should align with the Actuarial Function's task of coordinating the calculation of the technical provisions. It is clear that insight is needed into the underwriting policy and its appropriateness in order to form a view on the adequacy of the technical provisions. These two requirements of the function should reinforce each other, with insight gained under each task assisting with the other.

In order to carry out the function as proposed by Solvency II, the Actuarial Function will need to have an open, understanding and cooperative relationship with their underwriters, based on mutual respect and understanding of each others values. This may be a challenge in some undertakings where this relationship is not already in place. The role of the Actuarial Function may be seen as a policeman reporting any shortcomings to the Board. This will particularly be the case where there is disagreement between the two teams and the underwriters believe that the Actuarial Function cannot add any value to the process. This significant challenge will need to be overcome as quickly as possible in order to meet effectively the proposed requirements of Solvency II.

As part of the reporting process, the Actuarial Function will need to report on the sufficiency of premiums and risk factors such as inflation, legal risk and anti-selection. In addition, suggested improvements may be reported. These may relate to the underwriting process itself, in order to improve the risk selection and pricing. Further, an important part of the underwriting process relates to the capture of information that can be used to estimate rate adequacy and the levels of exposure written. It may be appropriate to suggest improvements in the data capture or changes to the process that improve this information. This would then lead to enhanced robustness around the analyses carried out, such as technical provision calculation and business planning.

The process undertaken to form an opinion on the underwriting process is likely to vary considerably for different types of insurers. In the following paragraphs we have explored some possible scenarios that can exist but the authors recognise that every firm will have its own business model and underwriting processes and the way the Actuarial Function operates will need to be effective within the local business environment.

In the case of a large personal lines insurer where risks are typically relatively homogenous it is likely that the underwriting is carried out using rating models with little discretion applied. In this case the Actuarial Function may be responsible for

regular review and ongoing monitoring of the rating model and its parameterisation. Where this is sufficiently sophisticated it may be the case that no further analysis is required and that the insights gained can be used to assist with the calculation of technical provisions and other tasks. In some instances we would anticipate simple rating structures and in this case further analysis may be required. For example, analysis may be required to test for anti-selection, perhaps considering the change in business mix, where only a small number of rating factors are used.

For commercial lines insurers, the technical pricing information available is likely to vary considerably from insurer to insurer. Where a technical pricing model is available, the Actuarial Function may review such models in a similar way to the personal lines provider. In general it would also be important to analyse the extent that the actual premium differs from the modelled premium either on an individual risk or a portfolio basis. Where no pricing model exists the analysis would possibly be on a case-by-case basis over a sample of risks. Reference could be made to the rate monitoring system to determine the adequacy of rates to cover future costs, although the Actuarial Function would need to be aware of its limitations. In all cases the Actuarial Function will need to form a view as to how the risks (such as anti-selection and inflation) will impact the exposure to claims and expenses.

Underwriting specialist lines of business, particularly where the individual risks are large, we see some of the closest working practices between actuaries and underwriters, often with underwriters relying on tailor-made models developed by the actuaries to evaluate the expected outcomes and capital costs of each contract before reaching a conclusion on whether to write the risk, the line size and need for additional reinsurance or other risk mitigation strategies.

The authors believe that the requirement to express a view on underwriting policy was based on the fact that many firms have benefited from actuaries engaging more closely with underwriting and contributing opinions based on actuarial judgement to enhance underwriting strategy and decision making. The new requirement can present an opportunity for actuaries to become more closely engaged with underwriters, where this has not already been achieved to date.

Section 1h – “Express an opinion on the adequacy of reinsurance arrangements.”

Under Article 48 of the Directive the Actuarial Function is expected to give an opinion on the adequacy of the insurer’s reinsurance arrangements.

Rationale behind section 1h

Given the Actuarial Function’s experience in co-ordinating the calculation of the technical provisions and its close interaction with the risk function, it would seem that the Actuarial Function is well placed to give this opinion of the reinsurance arrangements. Further, reinsurance arrangements impact directly on the calculation of the technical provision and the levels of liabilities and capital requirements are a factor considered in reinsurance purchasing decisions.

We believe that there are several approaches that an insurer could adopt when establishing the objectives of its Actuarial Function.

In exploring how the Actuarial Function could meet this section of the directive it is worth understanding what the Level 1 implies by the reinsurance arrangements and what it would look like to give an opinion on these arrangements.

Decisions behind reinsurance purchasing

Insurers regularly purchase reinsurance protection to reduce the downside risk associated with underwriting and the subsequent reserving risk. Reinsurance offers protection against catastrophic losses, both natural and casualty, and allow insurers to limit exposure to higher than normal levels of inherent, model or parameter risk when seeking growth in new lines of business. Further, reinsurance is used for wider benefits such as capital efficiency.

The reinsurance purchasing levers fall into a few simple categories:

- Type of reinsurance: proportional / non-proportional
- Limit and attachment points for non-proportional; and
- Quality of reinsurance.

Proportional reinsurance could be used to limit exposure to growth areas. For example, a new Motor insurer could use reinsurance to limit its exposure to the risk that its pricing is inaccurate. Reinsurance may offer opportunities for capital-efficiency. This would benefit a monoline insurer who may not benefit from diversification in its capital models.

Non-proportional reinsurance would reduce exposure to large or catastrophe losses thereby reducing the amount of capital needed to withstand such adverse events.

There may be other considerations when purchasing other adverse development type covers.

For non-proportional reinsurance the insurer would want to make decisions on the level of cover purchased that it retains all losses relating to an event up to a certain

level (attachment point) and the overall protection is appropriate (limit). Both the attachment and limit levels would directly impact the technical provisions in terms of the level of the discounted reserves and amount of capital required to hold.

Reinsurance purchasing creates additional credit risks. The size of this risk typically depends on the quality of the reinsurer and the dependency on the reinsurer for recoveries. Where attachment points are high there would be very little dependency on the reinsurer except in extreme scenarios.

Examples

Reinsurance strategy is also affected by the structure and organisation of the insurer as this will affect the acceptable risk profile and also its ability to minimise its reinsurance purchasing costs.

Large insurance company A writes many lines of business in many countries across several legal entities. As a Group insurance company there is wide access to expertise across many functions. Actuaries have traditionally been involved in pricing, reserving and capital.

Company A might limit its reinsurance arrangements to high layer catastrophe reinsurance. Company A may also benefit from a complex level intra-group arrangements to facilitate internal reporting. Both arrangements would be part of the reinsurance strategy.

In comparison, a small insurance company B writes one line of business, Motor, through a single legal entity in one country. As a small but growing insurer individuals are involved in cross functional roles. The underwriter has actuarial pricing expertise and there is one actuary who relies on external support to calculate the reserves.

Company B might want to purchase quota share reinsurance as its book grows to reduce capital requirements. It would probably also purchase excess of loss reinsurance to protect against unanticipated large claims such as larger bodily injury losses.

The reinsurance policy

In managing its risks a company would need to be clear on its reinsurance policy, which may change over time. A range of policies might include the following:

- In the extremes this could be to purchase no reinsurance or to exercise 100% cessions;
- Reinsurance policy could be set by reference to the capital it is required to hold;
- Reinsurance will support business strategy. That is, where the insurer enters a new line of business or geographic area, reinsurance will be used to support that growth; or
- Reinsurance is used to support underwriting discipline. Where underwriting needs to move outside certain parameters, reinsurance will be used to limit exposure.

Any policy might point to several different approaches and the policy might further indicate the thought process and decision making process in selecting the optimal arrangement. A policy would also contain reference to the quality of the reinsurance purchased on the premium willing to be ceded.

A further consideration would be the level of reinstatement premiums for non-proportional reinsurance.

Role of the Actuarial Function

In co-ordinating and validating the technical provisions the Actuarial Function will have access to business insight. The technical provisions calculation requires an estimate to be placed on the expected reinsurance recoveries and the risk margin. These elements require a view on the volatility of these expected reinsurance recoveries.

The Actuarial Function in its role of co-ordinating the calculation of technical provisions ensures that all risks and causes of risk have been considered in the models. As a result the Actuarial Function will have been involved to some extent with emerging risks and risk profiling to ensure these are reflected in the technical provisions

Traditional activities are likely to continue such as calculation of expected reinsurance recoveries by a reinsurance company and by considering the likelihood of default such as the reinsurance bad debt provision. However, the Actuarial Function under Solvency II needs to analyse the calculation of the bad debts rather than carry out the calculation.

The Actuarial Function should also carry out some calculations on the performance of this reinsurance against certain scenarios, for example, what would the impact be of a 1 in 200 year event on the capital? To consider this we return to the example companies described earlier in this section. For company A the consideration of an impact might extend to the assets of other legal entities across the Group. The output of such an exercise might inform the policy or strategy of reinsurance purchasing. Company B might consider increasing the limit of the protection since a significant loss might materially impact the capital available.

The Actuarial Function could use the trends and insight gained from modelling and investigating the technical provisions to model the gross and net liabilities. The reinsurance recoveries could then be tested against alternative reinsurance strategies. Key outputs for a given reinsurance arrangement/scenario would be the distribution of the net liabilities. Consequently this output could be assessed against the key VaR and TVaR percentile requirements of external and internal tests.

The key question is: what is the optimum reinsurance strategy given the insurer's policies or market strategy and regulatory constraints. Such a model should consider the cost, including reinstatements, of purchasing this reinsurance including the market pressures on reinsurance costs.

There could be exclusions to the opinion or types of reinsurance where the Actuarial Function would be less inclined to give a detailed opinion. Some reinsurance might be risk transfer from one balance sheet to another for management performance purposes. For example, captive insurers may require a fronting insurance partner but assume the risk from this partner. Whole or partial account quota shares may exist to transfer risk to centralised legal entities (intra group) to transfer risk to management teams but aligned to the decision making of these risks.

In such cases the modelling and Actuarial Function opinion would have a purpose but the emphasis of its purpose would be slightly different. Examples of an Actuarial Function opinion might consider:

- Performance of reinsurance where the reinsurer's balance sheet is small compared to the insurer and capital levels of the reinsurer are relatively light;
- For company A (described earlier in this section), assets and liabilities may interact and impact the capital availability where there is significant intra-group reinsurance and/or a group-wide reinsurance programme following a significant loss event. The change in liabilities of one legal entity following an event could have a knock on impact to assets and liabilities in other legal entities within the group of companies.

Giving the Opinion

The Actuarial Function could be expected to make statements such as:

- Reinsurance policy of the company has been correctly followed;
- Reinsurance policy is consistent the other policies of the group;
- Reinsurance policy assists the company in achieving its overall objectives;
- Identification of the exhaustion of cover or the likelihood that cover will be exhausted and what could cause this;
- Identification of gaps in the reinsurance programme or unplaced/partially placed covers and quantification of the increased risk in scenarios that impact the reinsurance programme;
- Appropriateness of the reinsurance programme to mitigate the company's reserving and underwriting risks;
- Corrections to be made where there is inconsistency and a risk of non performance;
- Comment on the impact of disputes with reinsurer; or
- Actuarial Function opinion might suggest alternative strategies and realignment of objectives.

Section 1i – “Contribute to the effective implementation of the risk-management system referred to in Article 44, in particular with respect to the risk modelling underlying the calculation of the capital requirements set out in Chapter VI, Sections 4 and 5, and to the assessment referred to in Article 45.”

Under Article 48 of the Level 1 the Actuarial Function is expected to contribute to risk management. To understand the context of this Article we need also to refer to Articles 44 and 45. We have included relevant extracts from Article 44 below:

The risk-management system shall cover at least the following areas:

- (a) underwriting and reserving;*
- (b) asset–liability management;*
- (c) investment, in particular derivatives and similar commitments;*
- (d) liquidity and concentration risk management;*
- (e) operational risk management;*
- (f) reinsurance and other risk-mitigation techniques.*

...the risk-management function shall cover the following additional tasks:

- (a) to design and implement the internal model;*
- (b) to test and validate the internal model;*
- (c) to document the internal model and any subsequent changes made to it;*
- (d) to analyse the performance of the internal model and to produce summary reports thereof;*
- (e) to inform the administrative, management or supervisory body about the performance of the internal model, suggesting areas needing improvement, and up-dating that body on the status of efforts to improve previously identified weaknesses.*

Article 45 requires firms to conduct their Own Risk and Solvency Assessment.

The draft Level 2 relating to this section mentions the need for the Actuarial Function to report on all the activities undertaken. This need is also presented in section (e) of the Level 1 text. The report should include:

- The activities and tasks undertaken;
- A description of the contribution to the risk management system;
- Identification of deficiencies; and
- Recommendation of remedies to any deficiencies.

In a similar way, the risk management function has a responsibility to co-operate with the Actuarial Function.

The key activities that the Actuarial Function may need to undertake include:

- Capturing the key risks and identifying new risks;
- Making a contribution to SCR and MCR risk assessment;
- Assisting the risk function with the internal model;
- Ensuring consistency of assumptions between the technical provisions and the capital model; and
- Assessing the data quality.

When going about these activities the Actuarial Function there is an important distinction between the carrying out of the calculations and the reviewing of the calculations and the subsequent need to avoid conflicts of interest.

Rationale behind section 1i

The Directive makes particular reference both to the risk modelling in the calculation of the capital requirements and to the ORSA assessment. Given both the skill set of the Actuarial Function and the insight gained from the technical provisions, the Actuarial Function should be well placed to meet this part of the Level 1. Risk modelling can be complex and require in depth statistical and actuarial knowledge.

Given guidance on the need to report on how the Actuarial Function contributes to the risk management, there is a range of ways in which the Actuarial Function can meet this Directive. Some insurers may elect to give responsibility of the co-ordination of the internal models to the risk function but ask the Actuarial Function to develop and maintain this model. In the same way that input from the Claims and Underwriting Function is critical to the claims reserving exercises, input from the Risk Function would be important to maintain the internal model.

Alternatively the Risk Function might own the calculation of the model and the parameters of the model itself and interact with the Actuarial Function to get its opinion. In this case it would be necessary to have the Risk Function staffed by people with the right skill sets and with people who would also be able to operate in an Actuarial Function. This approach may make it easier to avoid conflicts of interest compared to the first proposal above.

The Risk Management System

The interaction between the Actuarial Function and the risk management system appears to be limited to the capital modelling and production of the capital requirements. There does not appear to be a mention of the role in other wider activities of the risk function such as business reviews and dealing with operational losses. The Actuarial Function should, however, contribute to internal discussions around emerging risks to ensure the model picks up and allows for new risks and risks not previously considered.

This responsibility may be different to how insurers currently operate. We see some large insurers with distinct risk and actuarial departments. In this case the actuarial department focus is on reserving, pricing and parameterising the capital model. Whilst claims reserving often has a strong feedback loop with the claims department, there is not always the strong feedback loop with the risk department for capital modelling. For example, where the risk function identifies a new risk, it may be slow to appear into the capital models.

On the other hand, some insurers operate with very close risk and actuarial departments. For some small insurers, these departments can be joined. These insurers may find it easier to meet the Solvency II requirements regarding the close interaction

between these functions but may lead to a conflict of interest when carrying out reviews.

The role of the Actuarial Function

As mentioned above there are different existing models for insurers at the moment either involving risk and actuarial being separate or combined. One obvious lever is to consider the reporting lines of the Actuarial Function.

A common approach for insurers is for the actuarial department responsible for the estimation of the claims reserves to report through to the finance function. This gives the Actuarial Function a degree of independence from the pricing, underwriting and claims. An alternative is for the Actuarial Function to report into the Risk Function. There is an advantage under Solvency II in that the Actuarial Function will have a common set of objectives as the Risk Function and therefore meet the requirements under Solvency II of contributing to the risk systems. Under such a model we may expect that the calculation of the technical provisions is preformed by the finance function.

Further the Actuarial Function is required to be involved in the ORSA and this will require close interaction with the risk function.

The Solvency II text makes a distinction between the roles of carrying out the calculation and carrying out the review. The draft Level 2 includes a requirement that if the Actuarial Function does not carry out both the review and the calculation then conflicts of interest are avoided. For a small insurer, it is hard to see how this could be achieved with a small Actuarial Function. It may be necessary in this case to extend the external audit review from a review of the technical provisions to include a review of the capital models.

A large insurer may have a reasonable sized Actuarial Function or several entities, which enable reviews to be carried out by different sub teams within the Actuarial Function.

Where the Risk Management and Actuarial Functions are one team or the Actuarial Function reports into Risk Management, it may be possible to create appropriate sub teams or to ensure that the Risk part of the Function has appropriate expertise to carry out the modelling.

Another alternative is the representation on the Board of the Chief Actuary or head of the Actuarial Function.

Section 2 – “The actuarial function shall be carried out by persons who have knowledge of actuarial and financial mathematics, commensurate with the nature, scale and complexity of the risks inherent in the business of the insurance or reinsurance undertaking, and who are able to demonstrate their relevant experience with applicable professional and other standards.”

Some consider this requirement is more relevant to Continental Europe where the actuarial qualification is less prevalent. In the UK, however, the Actuarial Function need not be performed by qualified actuaries, or indeed members of the Institute and Faculty of Actuaries.

Regulators will require insurers to demonstrate that the Actuarial Function has the relevant skills and experience to fulfil the role and it will be the role of the Board to ensure that they have a responsible Actuarial Function who can provide this assurance to the regulator.

There is no set number of individuals that the Actuarial Function should comprise of. The level of staffing will be determined by the number of people needed to complete the necessary work.

Many insurance entities currently outsource some or all of the work in estimating technical provisions. This will still be possible under Solvency II; however, it will not be permitted to outsource the Actuarial Function itself. The Actuarial Function must be staffed by employees of the insurance entity, responsible to the Board. This means the Actuarial Function cannot outsource overall responsibility for setting the technical provisions, but can outsource the work involved. Close oversight and a detailed understanding of the data, methodology and assumptions used by the entity outsourced to will be necessary to demonstrate the necessary ownership of the technical provisions.

Appropriate Knowledge and Experience

Reference is made to relevant training and experience. Whilst training is important, the huge diversity of risks, claims types and processes means that the balance of emphasis should be on relevant experience. It is unrealistic to suppose that for a large and diversified general insurance business that it is possible to recruit individuals who have experience in every type of risk or loss scenario that may emerge in the future. The members of the Actuarial Function should be responsible for deciding if they have the appropriate skills for the assessments that they need to make and, if not, to decide what course of action is appropriate to acquire the necessary skills including:

- Research and self-learning;
- Training and education (where available);
- Engagement with more experienced colleagues;
- Engagement with consultants with the relevant expertise; and
- Recruitment of an appropriately skilled individual.

In many cases, whilst a new risk or claims type may lead to a lack of relevant expertise, similarities with past experience can be combined with research and education to ensure the Actuarial Function has sufficient understanding of the new issue to apply expert judgement in assessing the sufficiency of the technical provisions.

Where an entirely new risk or claims type is identified, it would be anticipated that the Actuarial Function would develop its knowledge in a proportionate manner and communicate effectively to the Board regarding the uncertainties associated with liabilities where there is no previous experience either in the company or the wider market place.

The key component of the skill set brought by the Actuarial Function will be the ability to:

- Identify emerging trends;
- Quantify the risks; and
- Communicate these clearly to the management.

Experience at being able to identify new trends through mathematical and statistical techniques will need to be demonstrated for a high performing Actuarial Function.

For a large insurer with complex risks, it would be important to have this feature in its Actuarial Function. Where the insurer enters new markets and new risk areas, it is the experience developed in trend-spotting and the ability to understand quickly the nature of these new risks that will be important rather than the fact that the Actuarial Function has direct experience in dealing with these risks.

For a small insurer with less complex risks, it may require a less experienced Actuarial Function. In this case the risks likely to emerge for this small insurer may be fewer and more straightforward. For example, property risks are short tailed and less exposed to inflation. In which case the Actuarial Function does not perhaps need to be highly experienced in knowing what data to extract and to analyse in order to identify inflation trends or claim settlement rates compared to an Actuarial Function working in an insurer with liability risks.

Whilst the core analytical skills are important, insurers may wish also to ensure that the Actuarial Function has a certain level of direct experience in the relevant business areas. For example, an insurer writing London Market aviation business may place a high priority on having an Actuarial Function with aviation experience in addition to the core trend spotting skills as the ability to understanding and interpret market features is also important.

Actuarial Training

The authors of this paper have sought to consider the benefits of their training and professional membership and how those are relevant to the role of the Actuarial Function.

The actuarial profession provides a wide variety of support to members in various forms. The technical standards and guidance notes give us a basis within which to

work, whilst the organisation gives us a wide range of contacts from whom we can seek advice and direction when we find ourselves challenged beyond our own experience and expertise. The disciplinary procedures create boundaries that ensure actuarial opinions are respected and trusted, even when they do not necessarily coincide with the views and interests of the recipient.

The profession creates many opportunities for knowledge sharing and encourages innovation ensuring actuaries have access to current thinking and developments and enables professional debate and challenge to expand and to refine our views and thinking. Increased focus on risk based capital and market consistent valuation has led to considerable strides in the development of methodologies for measuring risk and uncertainty and as regulation and financial reporting continues to change we anticipate looking back towards the end of our careers and find that the cutting edge techniques in 2011 seem archaic and inappropriate compared with subsequent developments.

Whilst being a member of the actuarial profession provides us with such practical benefits as described above, the key value we identified as fundamental to the value of actuaries is the way we think. The authors feel that in some way our training as actuaries has created a discipline in us to always try to look at things in a different way. This manifests itself in many ways on a day to day basis: challenging our own work using different techniques to validate our initial conclusions; challenging and learning from the work of others; being willing to embrace new ideas and different perspectives and strive to understand them, all evidencing a willingness to be open minded and to grow our knowledge and think around the problems we encounter. We struggled to point to exactly where this learning came from, whether it was the exams themselves or the experience of training with other actuaries. We conclude, however, that Actuarial Function holders, whether trained as actuaries or otherwise, should demonstrate the following skills:

- An ability to solve a problem by looking at it in a number of different ways and weighing the different solutions on critical merit;
- A willingness to bring new ideas or a different perspective to the table and ability to demonstrate where this perspective reconciles or differs from the views of others;
- An openness to challenge and willingness to understand and consider merits of new ideas and innovation; and
- An ability to embrace theoretical progress and understand its benefits within the practical limitations of the real world of insurance.

Certainly none of the skills described above are unique to the actuarial profession, however, the programme of exam training and requirements for continuous professional development tends to lead actuaries to developing these skills.