Solvency II Practical Review

by the Institute & Faculty of Actuaries Solvency II Practical Review Working Party

February, 2019

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Executive Summary

The Solvency II Practical Review Working Party was established early 2017 in order identify and evaluate the key practical implications of Solvency II. This was a well-timed initiative following the Treasury Select Committee's inquiry on possible modifications for Solvency II post Brexit. As part of this process, we launched a survey to gather opinion from the market on the issues posed by Solvency II. It gave us valuable insight into the sorts of concerns practitioners have, allowing us to focus our efforts on the areas of greatest interest, such as the Risk Margin, Model change, and Model validation, while still addressing the numerous complexities and subtleties within the technical provision calculation and Standard Formula SCR calculation. Other issues tackled include lack of guidance around the allowance for PPOs in the Standard Formula, no standard definition for ENIDs, problems with using premium as a risk measure, among others. The issues worth reporting on were those that either caused *unintended market behavior*, *overly onerous calculations* or led to *capital levels that were non-reflective of the underlying risk*. The paper suggests possible solutions and where possible analyses the pros and cons of each. The single issue that brings together these elements is the Risk Margin, which is perceived to be impractical and has the effect of creating a competitive disadvantage. Reforming the Risk Margin would this seem to be a priority for the post-Brexit regulatory regime.

Contents

1 Top Practical Issues Considered

Technical Provisions

Risk Margin	Inappropriateness of the design of the Risk Margin Inappropriateness of the 6% Cost of Capital (CoC) calibration Sensitivity to interest rate movements Incentives for poor Asset-Liability Management (ALM) Macro-prudential implications Procyclical effects No diversification allowed at Group level
ENID (Events Not In Data)	There is no standard definition for ENID – and ENID is not specifically defined in the Solvency II regulations
Validation	Non-Uniformity across the industry – the approach for validation is company-specific leading to disparity in approach and the level of standards that are being met
Expenses	Potential limitations in expense cash flow estimation
Expected Future Profit	Clarification around the guidance needed

Capital

Internal model change	Some firms have been discouraged to update their model on a regular basis, which prohibits them from being able to maintain the live model on a regular basis and make use of model outputs for risk management or to support wider business decisions
Currency risk	The calibration described above does not reflect the true nature of currency risk faced by undertaking and disincentives good currency risk management of holding capital buffers in foreign currencies to match potential risks and exposures
Premiums as a risk measure in the Standard Formula	Continuing soft market conditions: The soft market conditions means that, year-on-year, as premium rates fall, so does the capital required to protect against losses, amongst other issues
Calculation of catastrophe (CAT) risk within the Standard Formula	The factors used to calculate CAT risk are intended for an average firm, therefore, firms that have a high concentration of risks located in a certain area will have their CAT risk over/ under estimated
Allowance for PPOs (periodic payment orders) **within the Standard Formula**	The Standard Formula does not particularly allow for the material risks associated with PPOs, resulting in an underestimation bias of the required capital
Operational risk	The general market view is that the operational risk module is too simplistic and unsophisticated

2 Introduction

On 1 January 2016, Solvency II went live across the European Union (EU), the culmination of almost a decade of work by EU regulators and insurance industry practitioners. One year on from the go-live date, this Working Party is motivated by a need to reflect on experience, and also to provide a platform for suggesting practical improvements to make to the legislation now that experience has been gained. The work is focused on the non-life section of Solvency II, although certain issues considered may also influence the life section. We therefore seek to address questions listed below which form the issue types considered in the paper:

- Is Solvency II operating as intended?
- Is Solvency II unambiguous and interpreted consistently?
- Are there any unintentional side-effects of Solvency II?
- Are there parts of Solvency II which deliver little value for money?

The Working Party is also motivated by the Brexit vote and the resultant Treasury Select Committee inquiry into Solvency II[1]. The inquiry was set up in September 2016 to help the government plan for a post-Brexit regulatory regime. Views from many stakeholders were requested and the Institute and Faculty of Actuaries (IFoA) has already issued a response.

This Working Party also intended to respond but unfortunately, due to the general election, the inquiry closed to new responses on 3 May 2017, leaving limited time to respond. The Working Party intends on responding to future inquires.

Structure of the Paper:

The structure of the paper allows easy identification of the key issues and aims to ensure the reader can quickly navigate to those that are of particular importance. Therefore, each sub-section describes the issue, followed by a proposed solution where available. Thinking points have been provided for cases where there is no clear solution.

3 Survey Results

Outcome

The survey (more detail below) gave us a valuable insight into the sorts of concerns practitioners have. It allowed us to focus our efforts on the areas of greatest interest to practitioners, such as the risk margin, model change, and model validation, while still addressing the numerous complexities and subtleties within the Technical Provision (TP) calculation and Standard Formula Solvency Capital Requirement (SCR) calculation where we can add value by clarifying the current regulation and in some cases where necessary suggesting modifications to it. Our report focuses on the named areas mentioned above but also addresses many deficiencies that may affect only a small section of the market but with great impact.

The results also make clear the widespread concern that exists in the market about the volume of reporting introduced by Solvency II and whether this represents good value for effort and cost. We have addressed this issue in our report and propose some solutions.

[1] https://publications.parliament.uk/pa/cm201719/cmselect/cmtreasy/324/32402.htm

3.1 Detailed survey results

Background

The Working Party's survey of practitioners in the general insurance (GI) Market was carried out online between 24 April 2017 and 23 June 2017. The survey was publicised through multiple channels, including the IFoA's website, the IFoA's GI newsletter, and The Actuary magazine. Over 120 responses were received from a wide cross-section of the market.

The survey was commissioned to:

- Understand a broad spectrum of practitioners' views.
- Identify additional areas for improvement that would otherwise not be considered.
- Validate our choice of areas to improve.
- Respond to the Treasury Committee Inquiry into Solvency II.

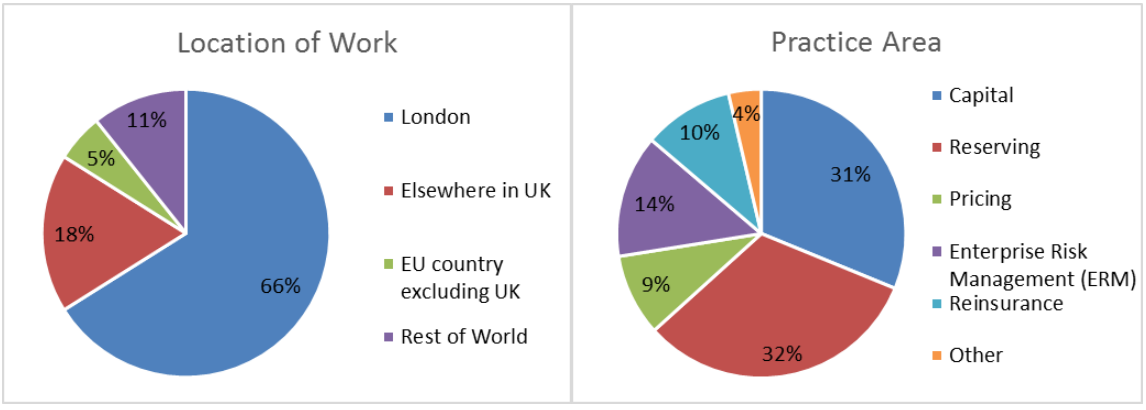
In order to meet these objectives, the survey had four parts, described further below.

- **Part I** considered the respondents: where they worked, what area of work they specialised in, what type of firm they worked for, and their role in that firm.
- **Part II** asked respondents to put forward their top three practical improvements they would make to Solvency II. This aimed to get an unbiased view of the key areas for concern and gave respondents scope to freely record their opinions.
- **Part III** then asked respondents to rank the areas for improvement chosen by the Working Party.
- **Part IV** considered specific issues raised in the Treasury Committee Inquiry.

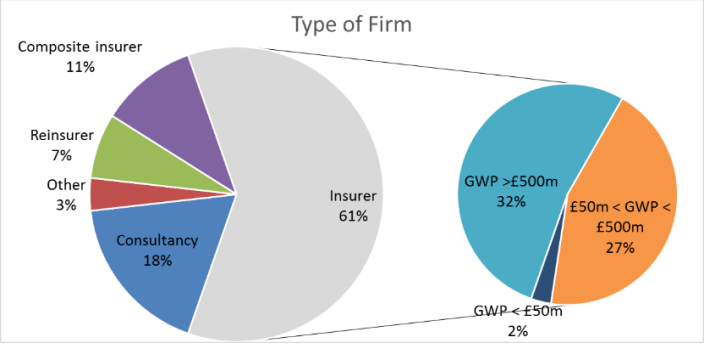
The key themes from the survey are summarised below. These set the scene for the rest of our report.

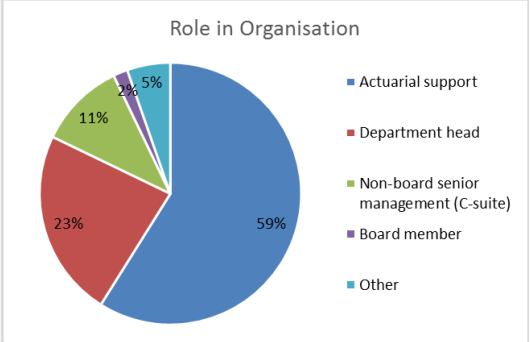
Part I – Respondents

The survey had a wide cross-section of respondents which allowed us to fulfil the aim of understanding a broad spectrum of practitioners' views. The charts below demonstrate the range of responses.



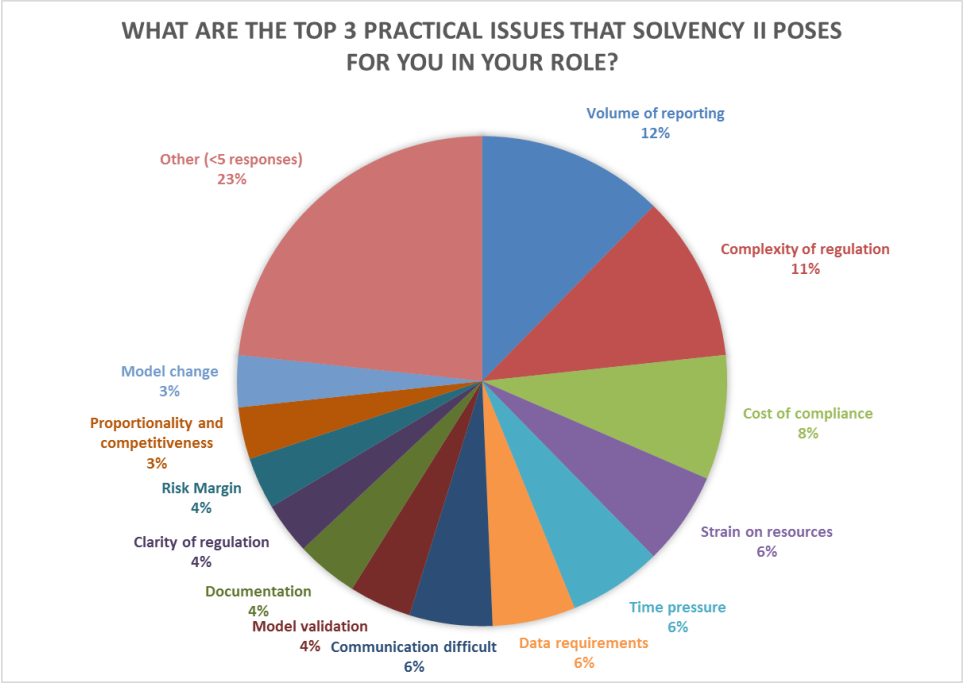
While most respondents worked in London, we received many responses from elsewhere in the UK and overseas. Respondents were from a range of practice areas and a range of firms (both in terms of type and size). Respondents were also across a range of levels / seniority.





Part II – Top 3 Improvements

Part II asked respondents for the top three practical improvements they would make to Solvency II, for them personally, and for the market as a whole. The top responses chosen are shown below.



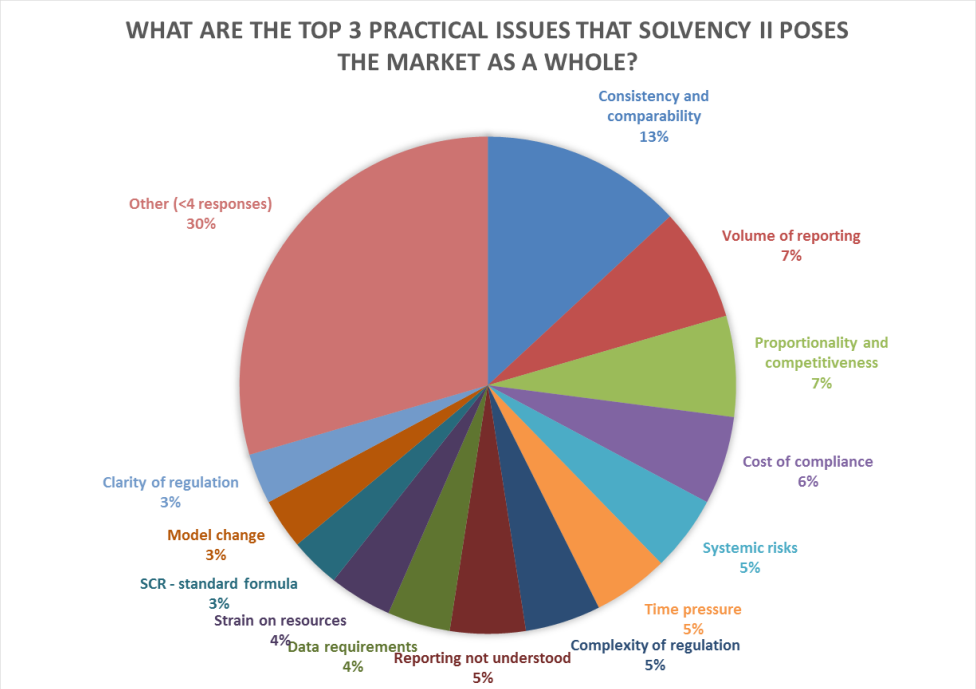
The chart shows that **Volume of reporting** is the number one concern.

Complexity of regulation, cost of compliance, strain on resources, time pressure, and data requirements fill out the next 5 places. From here onwards, **communication difficulties** are a common theme, with respondents noting difficulties in communicating Solvency II results, documenting their processes, and interpreting the regulation.

Model validation, risk margin and **model change** are the top single issues noted by respondents. **Proportionality and competitiveness** also comes through as a concern. Many respondents noted that

the practical pressures of Solvency II are preventing them from adding value to their organisation. The "Other" category contains the issues mentioned by fewer than 5 people.

The responses confirmed the direction of investigation for the Working Party and provided impetus for further investigations in key areas, such as **model validation, risk margin,** and **model change.**



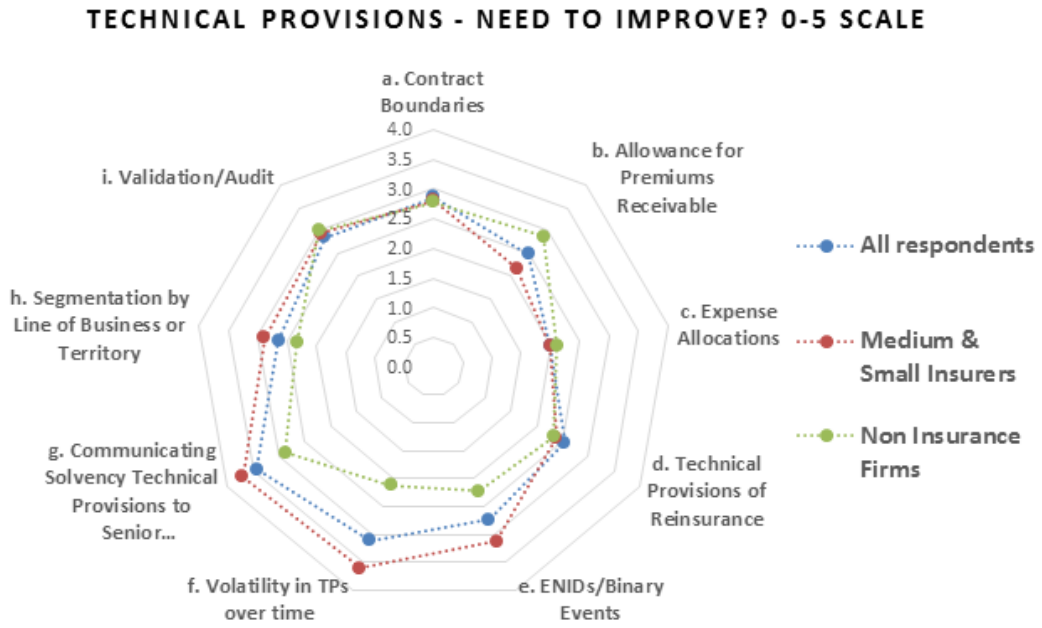
The question for the market as a whole encouraged respondents to think beyond their own personal involvement with Solvency II and consider the wider impacts of the legislation. Some new issues therefore came to the fore, such as **consistency and comparability, proportionality and competitiveness, systemic risks introduced by Solvency II, and the view that Solvency II reporting is not well understood.**

At the same time, many of the previous responses remain, such as **volume of reporting, cost of compliance, time pressure, complexity of regulation, data requirements, and strain on resources.** We hope that the practical improvements suggested in our work will mitigate the concerns above.

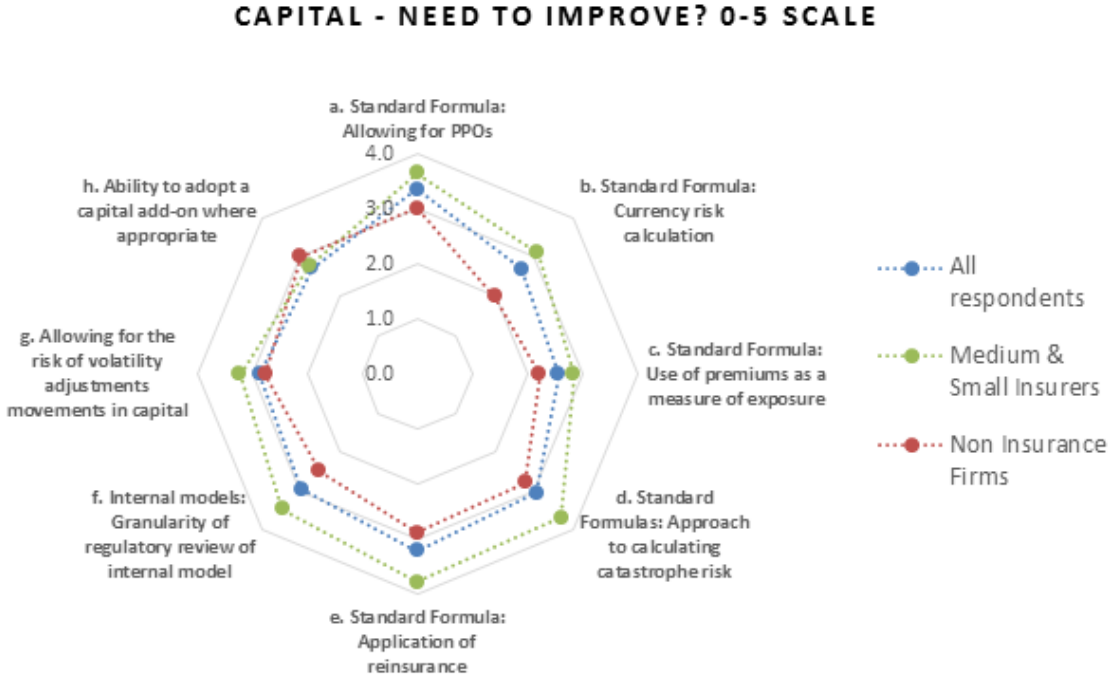
A new issue is that respondents felt the **Standard Formula** would remain an issue for the market. We address multiple deficiencies in the Standard Formula in the rest of our report.

Part III – Views on Working Party Choice of Areas

Part III asked for views on specific areas of Solvency II being considered by the Working Party.

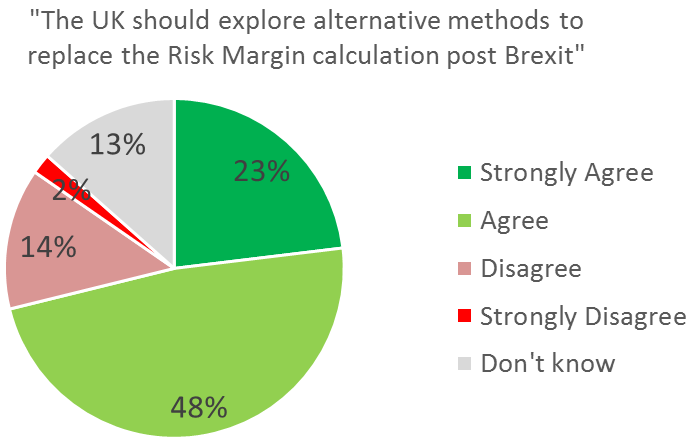


The chart shows how respondents rated each of the areas relating to technical provisions (TPs). **Communication of TPs** and **volatility in TPs over time** are the highest rated issues, and **expense allocation** is the lowest. The views of medium & small insurers and of non-insurance firms are shown separately and contrasted as we found that the views of these two groups often differed.



The chart shows how respondents rated each of the areas relating to Capital. **PPOs, regulatory review of internal models, Standard Formula reinsurance and Standard Formula CAT risk** come through as key issues at the total level. For medium and small insurers though, almost all areas score above 3, which shows that capital is a major practical concern for smaller entities.

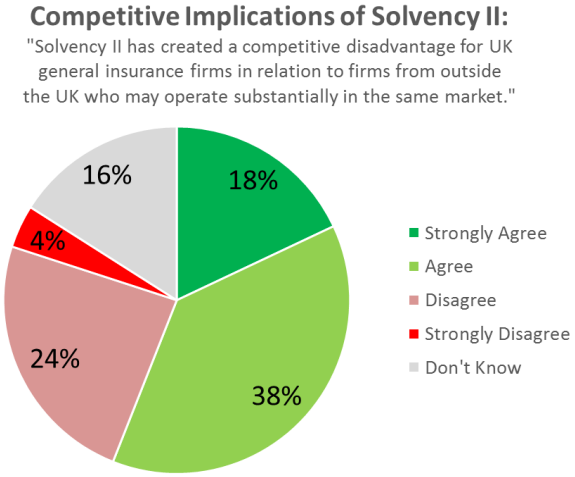
Our next question focused on the risk margin.

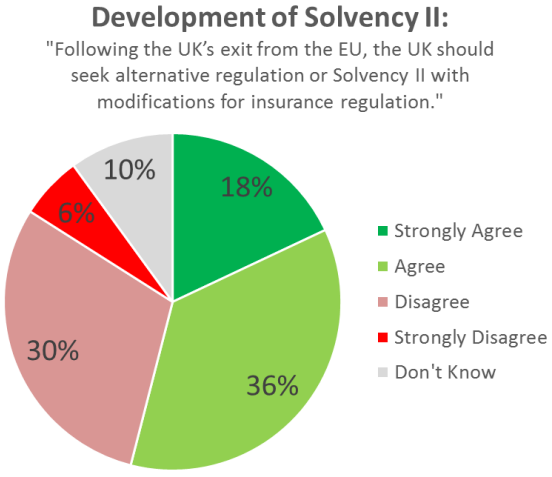


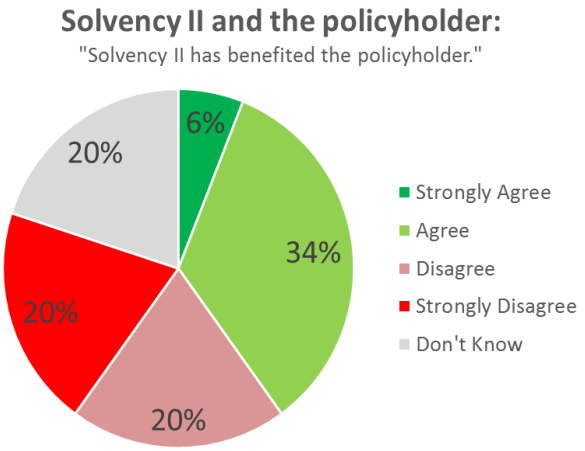
The results show that there is a very strong consensus to explore alternative methods of calculating the risk margin. We consider multiple methods in our report.

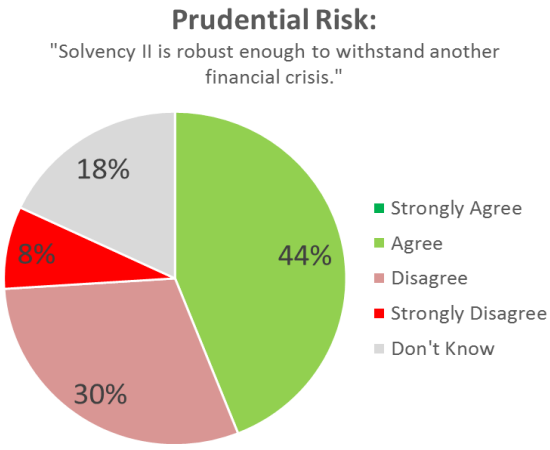
Part IV – Issues from Treasury Select Committee (TSC) Inquiry

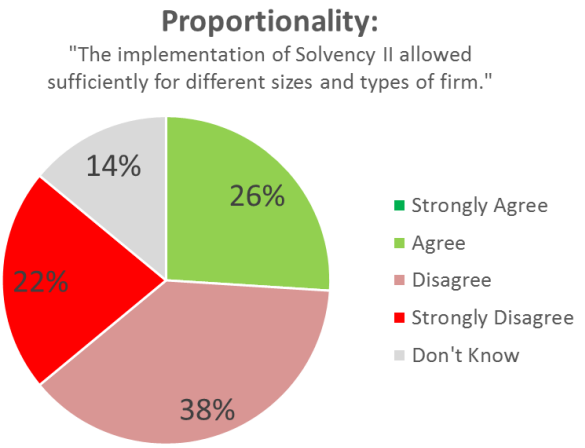
The charts below show respondents' views on a range of issues raised in the TSC inquiry

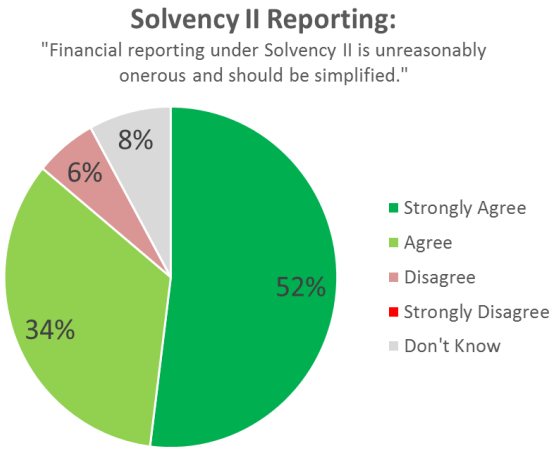












The rest of the report focuses on the issues identified by the survey, in addition to the deficiencies that may affect only a small section of the market but with great impact. (Survey outcome/ conclusion was covered at the start of section 3 page 3).

We would like to thank Sharon Cumberbatch and Lynn Richardson and the team at the IFoA for their support in operating the survey.

4 Technical Provisions

4.1 Risk Margin – Practical difficulties and alternatives

4.1.1 Issue title & description:

Risk Margin

4.1.2 Background to issue:

The risk margin is included in technical provisions as an item designed to ensure that an insurer can transfer its insurance liability to a third party under stressed scenarios (e.g. when 1 in 200 event happens). However based on feedback received from both the 2017 EIOPA consultation paper on specific issues around Solvency II[2] and the survey results from the Solvency II Practical Review Working Party, there is a general feeling from the market (both in the UK and the rest of Europe) that the methods and assumptions are not appropriate to this aim and require review.

The risk margin calculated under the current Solvency II requirements can be material and volatile for insurers. This is particularly the case for those with long term liabilities, e.g. annuity providers. The risk margin has itself become a risk on the insurer's balance sheet and is not easy to hedge!

The following issues are raised most frequently in the EIOPA consultation paper feedback:

Inappropriateness of the design of the risk margin –The limitations in the design of the risk margin have been amplified by the current low interest rate environment. The risk margin is for many firms an unexpectedly and inappropriately large part of its balance sheet, is extremely sensitive to changes in interest rates.

Inappropriateness of the 6% Cost of Capital (CoC) calibration – Many challenged the 6% CoC calibration, arguing it is overly prudent for insurance risk only and unresponsive to the prevailing economic environment. While the 6% calibration corresponds to the cost of providing eligible own funds for BBB-rated insurers, some additional studies[3] suggest CoC in the range of 2.5% to 4.5% was more appropriate.

Sensitivity to interest rate movements – the risk margin exhibits substantial non-economic volatility in response to market movements. Given the intended function of the risk margin, we see no justification for this sensitivity based on the historic evidence of the costs of transferring business.

Incentives for poor asset-liability management (ALM) – the risk margin discourages best practice in the matching of assets and liabilities, since in spite of a well matched balance sheet, it will still be materially exposed to interest rate fluctuations. This will have a consequential adverse impact on longer-term investments of wider benefit to society.

Macro-prudential implications – the current high level of the risk margin encourages the transfer of risks that attract a substantial risk margin (such as longevity risk) to non-EU jurisdictions which fall outside the remit of Solvency II. The risk margin was designed before there was a market for longevity risk, and is

[2] EIOPA consultation paper and comments: https://eiopa.europa.eu/Pages/Consultations/EIOPA-CP-16-008-Discussion-Paper-on-the-Review-of-Specific-Items-in-the-Solvency-II-Delegated-Regulation.aspx

[3] CRO Forum Market Value of Liabilities for Insurance Firms – Implementing Elements for Solvency II (2008) http://www.thecroforum.org/wp-content/uploads/2012/10/croforummvlpaperjuly2008.pdf.

inconsistent with it. The cost of longevity risk implied by the risk margin is excessive, and an effective market in longevity risk is not as volatile as the risk margin implies. While the impact is not material yet for non-life insurers, with more and more periodic payment orders (PPOs) it could become a material risk for the General Insurance (GI) market too.

Pro-cyclical effects – In its Financial Stability Report of November 2016, the Bank of England's Financial Policy Committee concluded that the risk margin could encourage pro-cyclicality, in that insurers are encouraged to reinforce falls (rises) in risk-free interest rates by switching into (and out of) low-risk assets.

No diversification allowed at Group level – No diversification is allowed between life and non-life, and no diversification benefit between entities for the group risk margin calculation. This is arbitrary and is inconsistent with the approach adopted by International Association of Insurance Supervisors (IAIS) in the most recent Insurance Capital Standards (ICS) specifications that have been tested.

4.1.3 Issue Type:

Unintended behaviour and inappropriate balance sheet provisions

4.1.4 Proposed solution/ suggested improvement:

Consider alternative methods

Some of the limitations are addressed in the points below. However in addition to that, regulators could also consider alternative methods of similar concept from other countries/regulations, e.g. risk margin calculation used by Bermuda Monetary Authority (BMA) and the Risk Adjustment under IFRS17. Given the concepts of the risk margin and the risk adjustment are similar, it would save time and effort for insurers if these can be aligned.

Review CoC% calibration

While the current 6% CoC% is designed to represent a long term view of the cost of capital, including stressed scenarios, there is no formal regular periodic reviews of this rate. This rate should be reviewed periodically.

Proposals on how to change the CoC% calibration were made in the European Insurance and Occupational Pensions Authority (EIOPA) discussion paper[4] which is summarised below.

Reduce the CoC% calibration – few suggested that a CoC% between 2.5% and 4.5% is more appropriate because:

- In Market Consistent Embedded Value (MCEV) calculations a CoC of 4.5% is used (see Willis Towers Watson, July 2016 "Insights – 2015 Life Supplementary Reporting").

- A lower CoC can be justified as insurance risks are much more diversifiable than market risk (beta of 0 could be argued). Terken, J.J., 2012, "Determining the Cost of Equity for an Insurance Company". Thesis Executive Master of Business Valuation.

- 3% CoC currently applies to hedging programs of major insurance risks like longevity and mass lapse.

- The investment grade spread levels have been between 2 to 3 percent. This could be used as a benchmark to replace the 6% spread in CoC.

[4] Discussion Paper on the review of specific items in the Solvency II Delegated Regulation
https://eiopa.europa.eu/Publications/Consultations/EIOPA-CP-16-008_Discussion_Paper_on_SII_DR_SCR_Review.pdf

- 6% for all the markets is not consistent with weighted average cost of capital (WACC) method, which can also be used as a benchmark.

- 3% CoC if assuming a market risk premium of 6% and an insurance risk beta of 0.5, which takes into account the fact that the risk variability is lower for non-diversifiable insurance risk only. More detail can be found in the Association of British Insurer's (ABI's) response to the EIOPA discussion paper[5].

Allow for risk dependence over time
Current method makes explicit assumption that the Solvency Capital Requirement (SCR) over time is independent. Few feedback suggested a time-dependent scaling factor should be introduced, as it is not appropriate to assume independence of risks over time, e.g. a risk might not be repeatable over time. A constant 6% CoC over time doesn't reflect that insurance risk will reduce over time as the book runs off.

Link CoC with risk free interest rate
Linking CoC with the risk-free rate would help avoid risk margin volatility due to changing interest rate environments. The following formula can be used, with a floating interest rate risk element and a fixed credit risk element:

Cost of Capital = [X% * risk free rate] + [Y% fixed addition]

Swiss Re carried out a sensitivity analysis using above formula, which demonstrates that a variable CoC% has the potential to smooth the risk margin under changing interest rate environments.[6]

Allow for longevity reinsurance
Given a market of transferring longevity risk now exists, the ability to hedge longevity risk should be allowed in the risk margin calculation. This should help reduce the transfer of longevity risk to non-EU jurisdictions which fall outside the remit of Solvency II.

Allow Matching Adjustment and Volatility Adjustment in risk margin calculation
At the moment, the risk margin calculation gives no incentive for insurers to match their long term liability with long term assets. This will be solved if Matching Adjustment and Volatility Adjustment are allowed in the discount rate, rather than using the risk free rate for risk margin calculation.

Allow diversification at Group level
Diversification between life and non-life – in accordance with Article 74 of the Solvency II Directive, when calculating the risk margin an assumption is made that the life and non- life insurance obligations are taken over by two separate reference undertakings. This implies that no diversification benefit can be assumed between life and non-life insurance portfolios. We would propose that this arbitrary separation of obligations is removed, such that insurers are able to properly take into account insurance risk diversification effects when calculating their risk margin.

Diversification between entities – The risk margin at group level is calculated as the sum of the risk margins of the undertakings of the group. This implies that no diversification benefit can be assumed between different entities of a group. We would propose that this arbitrary separation of obligations is removed from the calculation, such that insurers are able to properly take into account group diversification effects when calculating their risk margin. Further analysis would be required to determine the specifics on how to allow for diversification between entities.

[5] https://eiopa.europa.eu/Publications/Comments/Comments%20received%20by%20Association%20of%20British%20Insurers_02-05-2017.pdf Q19.1 – Q19.4
[6] https://eiopa.europa.eu/Publications/Comments/Comments%20received%20by%20Swiss%20Re_02-05-2017.pdf Q19.1 – Q19.4

The above changes would be consistent with the reality of how insurance groups are managed in practice and the SCR treatment of diversification. They are also consistent with the assumption adopted by IAIS in the most recent ICS specifications that have been tested. The excessively onerous Solvency II approach creates unintended incentives for the industry to restructure their organisation in order to enable appropriate diversification and overcome artificial constraints.

4.1.5 Conclusion

The current risk margin method and assumptions require thorough review.

At the moment, the risk margin is excessive for insurers with long term risks, annuity providers especially. It also penalises GI insurers with long term liabilities, such as PPOs. The current method also incentivises poor ALM and encourages pro-cyclicality.

We would welcome the regulators to take into account the proposals from the market, as summarised in this paper, and revise the method and calibration that is clearer, simpler and less burdensome for insurers to implement; that produces a less volatile risk margin over time; that doesn't encourage pro-cyclicality; and benchmarks with other countries and regulations, e.g. Risk Adjustment under IFRS17.

4.2 ENID

4.2.1 Issue title & description:

Validation of Estimation of Events Not In Data (ENID) provisions

4.2.2 Background to issue:

There is no standard definition for ENID – and ENID is not specifically defined in the Solvency II regulations. The IFoA Working Party has defined ENID as 'the balancing amount required to bring the best estimate before ENID up to an amount allowing for all possible future outcomes'. The following questions/issues are considered on the practical aspects of ENID:

- How does one validate that all possible outcomes have been considered?
- How have judgements been made and challenged?
- How does one prove that an allowance for ENID is not overstated?
- Are both ends of the distribution being considered?
- Truncated distribution mean
- Transparency

4.2.3 Issue Type:

Validation of an appropriate amount of a Technical Provision component

4.2.4 Proposed solution/ suggested improvement:

The following thinking points have been considered:

1) How does one validate that all possible outcomes have been considered?

This question is almost impossible to answer positively. An argument can be constructed that not all possible outcomes have been considered. One way of considering this is by reviewing the exposures, and specifically policy limits. That can help in assessing the severity of claims. However, some cover will not have known policy limits e.g. UK bodily injury claims for motor insurance. Even if an assessment of severity can be made based on policy limits, the probability or frequency of these claims will be a matter of considerable judgement.

One way back-testing or (in)validation may be possible if an event has led to an increase in technical provisions higher than a previous ENID loading, for example.

In some cases, the only validation of the ENID loading is through benchmarking. There is always the risk that the benchmark is not appropriate for the particular insurance company, and the benchmark itself is based on other ENID loading that may have the same limitations.

2) How have judgements been made and challenged?

The estimation of an ENID loading is necessarily very judgemental. The IFoA Working Party paper has suggested bringing together those parties who understand the insurer's exposure to brainstorm possible future events that could affect the future cash flows. Such parties would potentially include underwriters, claims managers, reserving and pricing actuaries and reinsurance managers. They further note that

estimation is likely to be subjective and require significant judgement. Evidence to support decisions and assumptions made for ENID could be produced by way of minutes of discussions held and process documentation.

Evidence suggests that not enough of such discussions and challenge to judgements have been made within insurance companies. These discussions should happen more frequently and evidenced.

3) How does one prove that an allowance for ENID is not overstated?

Whatever method is used to estimate ENID, it is possible to come up with a scenario that has not been allowed for in the ENID estimation, even if the probability of occurrence is extremely low. This makes it difficult to prove that an allowance for ENID is overstated. There will be amounts that appear to be obviously too high but what would be an upper bound?

4) Are both ends of the distribution being considered?

Some insurers do not explicitly consider the very low frequency (perhaps not high severity) scenarios that would result in a favourable impact to technical provisions e.g. a sudden retrospective legislative, financial or Government impact (not impossible especially in the current global political environment).

Many practitioners believe that a decrease in TPs due to ENID is likely to be much smaller than an increase in TPs, which often is a reason for not allowing for the former explicitly.

5) Truncated distribution mean

One approach used is to assume that the pre-ENID best estimate is from a truncated distribution, from which a true mean (allowing for ENID) can be estimated using an uplift factor. It is difficult to estimate what proportion of the distribution is represented by the available data and the assumptions made. The choice of the percentile level used for the limit of the distribution that represents information which is realistically foreseeable will be highly judgemental. The results will be very sensitive to this. Once again, judgement is key. Also, when using this approach the upside tail is often not considered.

Guidance issued by Lloyd's suggests a level of realistically foreseeable events could be assumed to be a return period of 200 years so that it is consistent with capital setting. For most business, data older than 20 years can be unreliable without making additional judgements. A shorter return period is unlikely to be useful as a basis for estimating a loading for ENID, given the purpose of the ENID loading.

Other methods have been suggested to estimate ENID provisions e.g. a distribution free approach as alternatives, but the validation difficulty still remains.

6) Transparency

The ENID estimate is not always transparent e.g. if an implicit allowance is made by using more cautious estimates. This has sometimes been the case for claim types with already a high level of uncertainty e.g. asbestos claims. It may be difficult to separate the realistically foreseeable events from ENIDs, and so using more prudent assumptions, even if they allow for ENIDs appropriately, may not estimate the allowance for ENIDs explicitly. The Lloyd's guidance has suggested that this approach should be ruled out.

4.2.5 Conclusion

The working party believes that the technical provisions in respect of ENID is highly judgmental and so extremely difficult to validate. We have discussed the practical aspects to consider and issues to be aware of when estimating and validating ENID provisions.

4.3 Validation

4.3.1 Issue title & description:

Practical Implementation Issues for Validation of Solvency II Technical Provisions

4.3.2 Background to issue:

Validation was a central topic in the original IFoA General Insurance Research (Organising Committee) GIRO paper on Solvency II Technical Provisions[7]. We continue to explore the practical implications associated with validation as part of the Solvency II technical provisions valuation.

4.3.3 Issue Type:

Non-Uniformity across the industry: The approach for validation is company-specific leading to disparity in approach and the level of standards that are being met.

4.3.4 Proposed solution/ suggested improvement:

The proposed solution is a structured checklist based on Regulatory guidance that can be used as a best practice guideline to demonstrate and evidence validation for each key component of the Solvency II technical provision valuation.

The proposal features an outline for the best practice approach for the governance to be employed around validation.

Some firms may already have a comprehensive approach to validation which meets the requirements. Therefore, the proposal may introduce an additional layer of guidance. However, this is to pursue the view of a harmonised approach across the industry and across countries. The outlined proposal should provide a framework for firms to address validation of the Solvency II valuation consistently.

Validation

The validation of Solvency II technical provisions is performed as part of the valuation of Solvency II technical provisions, covering all aspects and components of the valuation.

The practical issues associated with validation were discussed comprehensively by the Institute and Faculty of Actuaries General Insurance Reserving Oversight Committees working party on Solvency II Technical Provisions in August 2013[7].

The outcome from the working party provides a robust foundation for further exploration of the practical issues that are imposed by validation of Solvency II technical provisions. We focus on particular issues that continue to be relevant with the avoidance of redefining the scope of validation and replicating the issues already discussed. This sub issue area focuses on the practical implementation of validation, more specifically the non-uniformity of validation that is observed across firms and how this may be addressed pragmatically.

Whilst we believe that most firms would have a comprehensive approach in addressing the validation requirements, this continues to be developed on a company-specific venture - reinforcing the lack of uniformity identified previously.

[7] Solvency II Technical Provisions for General Insurers by the Institute & Faculty of Actuaries General Insurance Reserving Oversight Committee's Working Party on Solvency II Technical provisions; August 2013

The proposed template forms a structured checklist to address the requirements for all stages of the valuation process outlining the artifacts required and the governance process recommended.

This seeks to address validation consistency across two key features of the valuation:

- Process
- Governance

We have consolidated information from various sources to help facilitate the design of this proposal, ensuring the template and its content reflect a robust centralised view of validation consistently across the General Insurance market and can be treated as a best practice guide.

- *Level 1 Directive*[8]
- *CEIOPS final advice for implementing measures: Technical Provisions*[9]
- *Lloyds Guidance : Solvency II Technical Provisions Guidance*[10]

The proposed structure is based on the broad categories that need to be addressed to ensure that validation of the process is complete and supported along with key considerations that would assist in the annual validation of each category.

There is an appetite to enhance this further and expand on each stage identified in detail to provide further clarity on the validation requirements and the level of granularity to be pursued.

[8] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0138
[9] https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-on-TP-Standard-for-data-quality.pdf
[10] https://eiopa.europa.eu/Pages/PageNotFoundError.aspx?requestUrl=https://eiopa.europa.eu/fileadmin/tx_dam/files/consultations/consultationpapers/CP43/CEIOPS-L2-Final-Advice-on-TP-Standard-for-data-quality.pdf

Component	Validation	Requirements	Key Considerations	Documentation of approach	Independent Peer Review	Frequency	Management Overview	Frequency	Actuarial Function Holder Review and Signoff
Data	The data on which assumptions are based should be appropriate, complete and accurate.	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 internal provisions.	Validation should be carried out at a sufficient level of granularity, at least at a HRG level.	Data quality must be documented, and the level of supporting documentation must be consistent with materiality.	The data process itself should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the Solvency II TP valuation process. This will also demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	
External Data	When based on external data, a number of checks must have been carried out.	Where assumptions are based on external data such as industry or market data, the external data source should satisfy the following criteria: Both the external data and the documentation of any assumptions or methodologies underlying the external data should be available to the insurer so that the external data source may be validated. In particular, it should be possible to assess the relevance of the data given the characteristics of the underlying insurance portfolio. Undertakings should be able to demonstrate that external data of the underwriting risk is more suitable in order to better reflect the risk profile thereof.	External data must be reviewed data to ensure reliable enough to be used, a number of checks must have been carried out.	The assumptions supporting external data must be documented, and the level of supporting documentation must be consistent with materiality.	The data process itself should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the Solvency II TP' valuation process. This will also demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	

Component	Validation	Requirements	Key Considerations	Documentation of approach	Independent Peer Review	Frequency	Management Overview	Frequency	Actuarial Function Holder Review and Signoff
Expert Judgment	Expert judgment should be justified, explained and validated.	Expert judgment should be: - back-tested with additional experience gained or any emergent information. -where possible, benchmarked by comparing it with other expert opinions, either internally (provided the expert is independent of the original expert) or externally (taking due account of any potential conflicts of interest). -Significant elements of expert judgment should be subject to a sensitivity analysis.		The assumptions supporting expert judgment must be documented, and the level of supporting documentation must be consistent with materiality.	The justification for expert judgment itself should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the Solvency II TP valuation process. This will also demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	
Assumptions	Ensure the applicability and relevance of the methods and assumptions applied.	All relevant and material assumptions should be validated and, to the extent that it is statistically feasible, for each such assumption separately.	Assumptions must be realistic. Assumptions should be derived consistently from year to year without arbitrary changes.	Assumptions must be documented, and the level of supporting documentation must be consistent with materiality.	The assumption basis and parameter calibration itself should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the Solvency II TP valuation process. This will also demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	

Component	Validation	Requirements	Key Considerations	Documentation of approach	Independent Peer Review	Frequency	Management Overview	Frequency	Actuarial Function Holder Review and Signoff
Methodology	Review the methodologies employed against alternatives, assessing the advantages and disadvantages along with the suitability of the approach adopted.	Ensure that the actuarial methods and statistical methodologies are appropriate to the nature, scale and complexity of the risks supported by the (re)insurer.		Justification underpinning the methodology employed must be documented, and the level of supporting documentation must be consistent with materiality.	The methodology employed should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the Solvency II TP valuation process. This will also demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	
Valuation	Validate the amounts of the technical provisions.	Understanding of how the cash-flows may emerge in the future and tracing any flaws in the valuation process.	Reviewed separately for each component of the Solvency II Technical Provisions.	Process guide to articulate the details of the valuation approach	The whole valuation process itself should also be reviewed and verified by someone who has adequate knowledge and skills and is independent of the process of valuation. This will demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	
Review	Regularly compare against experience the best estimate and assumptions underlying the calculations.	Testing the valuation process itself	Back-Testing - Actual vs. Expected - comparing the results of the estimation against experience	Detailed documentation to calibrate the models using experience data sets.	The refreshed data calibration should be reviewed and verified by someone who has adequate knowledge skills and is independent of the valuation process. This will demonstrate compliance with APS X2.	Annual	Challenge quantitatively and qualitatively with reasonability checks	Annual	

The above template provides guidelines and are not intended to be prescriptive. Firms to adapt these as they see fit.

4.4 Expenses

4.4.1 Issue title & description:

Estimating expenses to include in technical provisions

4.4.2 Background to issue:

When calculating technical provisions, all future expenses that will be incurred in servicing existing insurance and reinsurance obligations should be taken into account. This includes administrative expenses, investment management expenses, claims management expenses (including claims handling expenses) and acquisition expenses (including commissions).

This is a step change in terms of complexity, as for IFRS/GAAP typically only unallocated loss adjustment expenses (ULAE) are explicitly considered as a separate expense item within the technical provisions, with allocated loss adjustment expenses (ALAE) usually included as part of the projected claim ultimate amount.

It is important that the provider of the future expense amounts under each category understand the requirements of Solvency II in order to ensure appropriate expenses are included in the technical provisions.

The existing IFoA paper on technical provisions dated August 2013[11] provides good guidance on this issue. This note aims to build on that guidance in order to improve consistency of approach across the market.

4.4.3 Issue Type:

Potential limitations in expense cash flow estimation

4.4.4 Proposed solution/ suggested improvement:

The proposed solution is additional guidance notes rather than any proposed change to the requirements.

4.4.5 Conclusion

Additional notes may help clarify any uncertainties and improve consistency of interpretation across the industry.

Requirement

Article 78 from Solvency II directive:

"In addition to article 77, when calculating technical provisions, insurance and reinsurance undertakings shall take account of the following:

1.) *all expenses that will be incurred in servicing insurance and reinsurance obligations*
2.) *inflation, including expenses and claims inflation"*

Key Principles:

- The best estimate provisions should reflect all future cash flows arising from expenses that will be incurred servicing existing insurance obligations during their lifetime, including any multi-year policies.
- Future expense cash flows can be based on your own experience but should reflect what another (re)insurer might reasonably be expected to incur.

[11] Solvency II Technical Provisions for General Insurers by the Institute & Faculty of Actuaries General Insurance Reserving Oversight Committee's Working Party on Solvency II Technical provisions; August 2013

- Expense assumptions should allow for future cost increases.
- Differences in the nature of expenses mean the allocation, projection and inflation assumptions are likely to vary across expense categories.
- Different expense assumptions are also likely to be required whether they are to be used for the claims provision or premium provision.
- Some historical costs may not be appropriate for estimating the future expenses required for the ongoing servicing of the currently obliged business – e.g. marketing, sales, underwriting, one-off expenses, new business administration and some project costs.
- Expenses should be expressed in the currency they are likely to occur in but a pragmatic approach may be suitable.

Going-Concern or Run-Off Basis:
The expenses should be set on the assumption that the reference undertaking will continue to write new business. However, the expenses to be included in the technical provisions should only relate to the portion of the business to which the (re)insurer is currently obliged. This typically means the expenses involved in servicing the existing obligations will be less than a full expense load.

Where a (re)insurer is already in run-off or a decision has been made to stop writing new business, all expenses would be expected to relate to the existing obligations so including all future expenses may be appropriate in this situation.

Expense Categories
Below we discuss the typical categories of expense to consider and some possible differences in treatment between claims provisions and premium provisions. These are intended to be guiding principles and are not expected to be an exhaustive list. Individual (re)insurers should satisfy themselves that the suggested treatment is appropriate for their particular circumstances. In particular, (re)insurers in run-off will have slightly different considerations as they will need to allow for all expenses in the claims provisions.

Claim Expenses:
<u>Claims Provision:</u>

Allocated Loss Adjustment Expenses (ALAE) are typically included in claims data. However, an adjustment may be required if the allocated costs as a percentage of losses are expected to change significantly over time or if the timing of expenses is expected to be significantly different to that of claims. An example of this would be where the ALAE costs are significantly different between large and attritional claims and the mix of large / attritional claims as a percentage of total reserves is expected to vary as the claims run-off.

Approaches to setting Unallocated Loss Adjustment Expenses (ULAE) tend to vary between (re)insurers. Care needs to be taken to understand what expenses are included in ULAE to avoid any double counting or omitting of expenses in other categories.

<u>Premium Provision:</u>

ALAE are likely to be allowed for in the loss ratio assumption.

ULAE can typically be allowed for via an uplift factor to projected losses or as a percentage ratio of future earned premium. Any estimation based on historical paid-to-paid approaches needs to allow for the fact that all claims in the premium provision are unopened.

Suitable inflation assumptions should be applied to future ALAE/ULAE costs. This may require an uplift from the loadings held under other reporting metrics.

Acquisition Expenses:
Claims Provision:

Given that technical provisions are calculated on a cash flow basis it may be reasonable that all acquisition expenses on earned business have been paid by the valuation date. However, consideration should be given as to whether there is any outstanding balance due to intermediaries in line with credit terms. In practice, the amount outstanding on *earned* business tends to be quite small so one should consider proportionality before splitting acquisition expenses between earned (claims provision) and unearned (premium provision). In addition, (re)insurers should allow for any cash in-flow from claw-back or profit commissions expected on earned business.

Premium Provision:

Potentially, a component of acquisition costs on incepted business may already have been paid and would not need to be included as a future cash flow. However, care needs to be taken as to whether the acquisition expense has been incurred but not paid.

Some practical points to consider in estimating the future acquisition costs include:

1. The type of commissions as a % of premium received – regular / profit / claw-back commissions
2. Differences between renewal and new business commission
3. Differences between initial and instalment commission e.g. on multi-year policies
4. Timing of commission payments. Does it match the timing of premium receipts? e.g. if commission is paid up front but premium is received in instalments
5. Allowance has been made for all acquisition costs and not just expenses

Administration Expenses:
Claims Provision:

Administration expenses on earned business will typically have been paid already. If one is confident that all expenses related to the ongoing management of claims are included in the claims expenses the (re)insurer may decide to apply an administration expense to the premium provision only.

Premium Provision:

Where the claims costs are fully covered in ALAE and ULAE, the administration expense should only apply for the expected policy lifetime of the existing obliged business. Plan or budget expenses may be considered when setting an appropriate loading. However, consideration should be given as to the nature of the costs included in plan. Care needs to be taken to avoid double counting costs that have already been paid on existing policies – e.g. marketing, sales, underwriting or one-off projects. For support functions (e.g. Finance / IT / HR / Executive Team) an allocation between currently obliged business and new business should be estimated to ensure an appropriate loading.

Investment Expenses:
Claims Provision:

Investment expenses may need to be included if they are not already in ALAE / ULAE. Where an additional allowance is required, it should be applied for the full expected run-off of the existing claims reserves. Allowance should be made for future inflation given the potentially long duration of the claims run-off. Given the going –concern assumption it is not required to assume an increasing investment expense assumption further into the run-off.

Premium Provision:

Investment expenses need to be allowed for in the premium provision to the extent that they are not included in the ALAE / ULAE costs. Again, these costs should be included for the expected duration of the claims that will arise from the unearned business and an appropriate inflation allowance should also be included.

Reinsurance Costs:
The costs of purchasing and managing reinsurance should be allowed for in the gross provisions. Where the costs of managing reinsurance are not included in the ALAE/ULAE assumptions an allowance should be included in the claims/premium provision as appropriate.

Profit Commission:
Where this is expected to be a significant feature of the business an appropriate estimation of the expected cash flow should be made. Due to the complex relationship with future claims experience it may be difficult to estimate accurately. In this case it may be worth considering simplifying methods on the grounds of proportionality. A key consideration would be to document your approach and rationale and to maintain a consistent approach from year-to-year.

Granularity:
In principle the expense loadings should be estimated by category for each Solvency II Line of business. In practice, many (re)insurers do not have expense data at the required level of granularity to perform this allocation. Where simplifications are being used it is important to document the rationale for the simplification and perform checks, at a total level, that an appropriate expense amount has been included in the technical provisions.

4.5 Expected Future Profit

4.5.1 Issue title & description:

Potentially conflicting and counterintuitive requirements relating to consideration of expected profit in future premiums (EPIFP).

4.5.2 Background to issue:

One area of calculation of Solvency II technical provisions on which ambiguity of interpretation remains is the expected profit in future premiums, especially in general insurance. We are aware that this has arisen as a result of considering the EIOPA Guidelines on Valuation of Technical Provisions[12] in addition to the specification in the Delegate Acts (Article 260).

The Delegated Acts suggest that the EPIFP should be calculated as the impact on technical provisions if future premiums are not received, regardless of the policyholder's rights to discontinue. Under normal circumstances this would be expected to result in discontinuance of a general insurance contract and so it would be assumed that there would be no further claims arising from cover for which the premium has not been paid.

Guideline 77 of the EIOPA guidelines expands on the requirement stating that in addition to the assumption of no future premium being received it should be assumed that policies continue to be in force and no other reduction should be made to the technical provisions. This does not seem appropriate given the premium is not received, and would result in the EPIFP being equal to the future premium only.

The Working Party is aware that EPIFP was an area of significant discussion in the formulation of Solvency II and also that the interpretation may differ for life insurance business.

4.5.3 Issue Type:

Lack of consistency in approach across the market due to the ambiguity of the guidance. There is also the potential to create inappropriate provisions if the guidance is not interpreted correctly.

4.5.4 Proposed solution/ suggested improvement:

The working party considers that the reasonable interpretation of the Delegated Acts is that if future premium is not received no further claims would be paid for general insurance policies. This means the EPIFP is a distinct figure, rather than being equal to the future premium, and more accurately reflects the expected outcome for the policy. However recognising the ambiguity introduced by the Guidelines, the Working Party will raise this issue as a question for clarification with EIOPA.

[12] https://eiopa.europa.eu/Publications/Guidelines/TP_Final_document_EN.pdf

5 Capital

5.1 Internal model change

5.1.1 Background

The current focus for internal model firms has progressed from the preparation for the Internal Model Application Process to management of their Model Change and Governance process. In our recent survey a number of participants has identified internal model changes as one of the top three practical issues.

The UK regulators have released new guidance in this area (PRA SS12/16 in September 2016[13], PRA SS17/16[14] in November 2016, and Lloyd's Model Change Guidance[15] in March 2017).

Given an internal model firm's *Model Change and Governance Policy* needed regulatory approval, any changes to the policy is considered as a Major Model Change. This meant that time and efforts has to be devoted to update the policy, processes and controls, board approvals and regulatory reviews.

5.1.2 Issues

The following topics have been raised by the regulatory publications and by internal model firms at external discussion forums:

1. What is a data change and should it be in-scope or out-of-scope?
2. How should minor changes be batched together for reporting?
3. Should cumulative changes be measured in aggregate or in absolute terms?
4. What is the level of documentation and validation required for major changes?

We are aware that some firms have been discouraged to update their model on a regular basis, which prohibits them from being able to maintain the live model on a regular basis and make use of model outputs for risk management or to support wider business decisions. This unintended consequence is further exacerbated by the Prudential Regulatory Authority's (PRA's) expectation to receive and review only one Major Model Change Application a year.

5.1.3 Data Change

The PRA Supervisory Statements recognises "situations where firms consider it appropriate to exclude something from the scope of the model change policy." Lloyd's Model Change Guidance encourages the flexibility for data updates to be out of scope in the Model Change Policy.

An internal model, in particular the Calculation Kernel for SCR calculation, uses a large volume and variety of data sources. These may arise from both internal sources (for example business planning processes for business volumes, claims reserving processes for best estimate reserves) and external sources (for example credit ratings, catastrophe models, economic scenario generators).

We recognised that data changes overtime could lead to material changes in SCR. We are aware some internal model firms apply qualitative judgements on a case by case basis to suggest whether these changes should be in-scope or out-of-scope.

The definition of a data change will also benefit from further guidance on how it can be distinguished from, in particular, a risk profile change or a parameterisation change.

[13] http://www.bankofengland.co.uk/pra/Documents/publications/ss/2016/ss1216.pdf
[14] http://www.bankofengland.co.uk/pra/Documents/publications/ss/2016/ss1716.pdf
[15] file://tcspmprf01/userdata$/tlee/userredirect/Downloads/Model%20Change%20Guidance%202017.pdf

Changes in data for example volume of business or best estimate reserves between different classes of business may change the whole account risk profile without necessarily requiring updates in methodology design or model assumptions (where parameterisation process automatically adjust for volume changes).

We propose the regulators and the internal model firms should collaborate to provide further best practice guidance notes on how data changes should be defined for the purpose of Model Change.

5.1.4 Combination of changes contributing to a minor change

During regular maintenance of the model, an internal model firm needs to consider the practicality in running incremental changes through the calculation kernel, and the batching of various minor changes for the purpose of reporting model changes.

While more granular breakdown of model changes may be useful for analysis of change, it is often more practical to, for example, update all the underwriting risk gross loss parameterisation assumptions within one model run, rather than updating individual distribution parameters one at a time. This is often also in line with the modelling processes.

On the other hand, reporting all parameterisation changes across different risk categories as an "annual update" could lead to difficulties in reviewing the fundamental changes to risks contributing to the SCR.

The PRA Supervisory statement has suggested "it may be helpful for the [quarterly model change] summary to group related changes together, for example by risk area or function of the model." We agree with this suggestion and propose this should be adapted as best practice.

We propose the best practice for reporting minor changes should be on a per risk category basis, with overarching assumptions such as dependencies being reported separately, and includes all changes between the quarterly model change reporting period.

5.1.5 Cumulative minor changes measured on an aggregate or absolute basis

Model changes need to be accumulated on both an aggregate and an absolute basis starting from the latest approved internal model. The resetting of the starting point is suggested to be treated as a Major Model Change unless otherwise agreed with the PRA.

The PRA Supervisory Statements 17/16 recognises that "firms may struggle to articulate how they would define the circumstances in which a combination of minor model changes would constitute a major model change." Both PRA and Lloyd's provide some guidance on areas for considerations by internal model firms.

In our view, the use of an absolute basis may introduce unnecessary work to an internal model firm where their SCR remained relatively stable overtime and the risk profile naturally fluctuates as a result of regular updates. The unintended consequence of accumulating minor changes on an absolute basis is that some internal model firms may not carry out maintenance updates as frequently as it would like to, in order to mitigate the costs of regulatory reporting and approvals of major model change.

In addition to the above, the syndicates at Lloyd's require capital to be set on an annual basis to support the prospective year of account. By definition, this means that syndicates at Lloyd's will need to apply for Major Model Change on an annual basis regardless of whether the SCR or risk profile has changed materially in comparison to the previous year's approved model.

We propose that the PRA, Lloyd's and internal model firms should actively engage and agree on an appropriate threshold for the accumulation of changes to become a Major Model Change, particularly on an absolute basis should the absolute basis remain preferable as a regulatory trigger.

5.1.6 Documentation and Validation requirement for major model change

In our recent survey finding a number of participants has continued to identify governance and documentation requirements, and the costs associated with meeting these requirements, as one of the top three practical issues.

When companies apply for Major Model Change with the PRA, it is expected to provide the full model documentation and validation similar to the Internal Model Application Process. This requirement is an "overkill" for companies, which often leads to substantial amount of time and effort during the regulatory review.

In the PRA Supervisory Statement 17/16, PRA provides some information as to how it uses the quantitative analyses as part of model approval process but stated this is only one of the considerations during the Major Model Change assessment.

Lloyd's Model Change guidance provides helpful explanation on examples of documentation/validation requirements reasonably expected by Lloyd's when syndicates submit a Major Model Change application. An analysis of change approach is often the most practical and useful documentation and validation process for reviewing on-going changes over time.

We propose that the PRA should increase the transparency of what it expects in a Major Model Change application, and also to simplify the regulatory review process so that internal model firms are not deterred from making necessary/appropriate model changes.

5.1.7 Conclusion

The internal model firms and regulators need to find a practical approach to yield the benefit of an evolving internal model reflecting changes to risks whilst reducing the costs associated with making these changes.

We encourage PRA, Lloyd's and the industry to continue their collaboration to refine the definition and procedures for making changes to internal model, and for the regulators to clarify the purpose of reviewing these from a regulatory perspective.

5.2 Currency risk

5.2.1 Background

Currency Risk is defined, within the Solvency II Directive[16] (Article 105, 5(e)), as the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of currency exchange rates.

The charge within the Standard Formula SCR calibration, as set out in the Solvency II Delegated Regulation[17] (Article 188), is effectively equal to the sum of the absolute values of 25% of the net asset value in each currency except the undertaking's own reporting currency. Consistent with the wider SCR, the currency risk calculation is performed in the undertaking's reporting currency based on the rates of exchange at the valuation date, the shocks applied are therefore relative to this starting rate.

The currency risk charge within each of the undertaking's non-reporting currencies is therefore derived as:

$$25\%* |(\text{Value of Assets in Currency}-\text{Value of Liabilities in Currency})|$$

The total charge is then the sum across each currency.

The calibration described above does not reflect the true nature of currency risk faced by undertakings, it generates a charge in each currency which represents the worst outcome from upwards and downwards shocks rather than basing a charge on the overall combined outcome of the worst of the upwards and downwards shocks (in a similar way to interest rate risk).

Further it disincentives good currency risk management of holding capital buffers in foreign currencies to match potential risks and exposures. This creates inappropriate capital charges for undertakings with overseas exposures who do adopt good risk management practices of matching capital buffers with exposures. This calibration therefore goes against one of the key Solvency II principles of policyholder protection as it actively incentivises poor currency risk management.

The current approach is also flawed in that it applies currency shocks to the opening balance sheet position and therefore misses the interaction between currency risk and other risks over the one year period. Further, the currency risk charge penalises firms who hold more excess capital than others as it is a total balance sheet charge on the level of net assets in each non-reporting currency.

The above calibration was implemented in the QIS5 version of the Standard Formula SCR. Following the exercise, EIOPA noted in its report[18] (page 11) that:

"The currency risk module was noted to contain counterintuitive incentives to hold assets in excess of liabilities in the reporting currency rather than in the currencies of the underlying liabilities."

Following this, the European Insurance and Reinsurance Federation (CEA) at the time, now Insurance Europe, along with industry representatives met with the European Commission and produced an alternative method for deriving the currency risk charge[19] which was assessed to meet the requirements set by the Commission at the time to:

[16] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0138
[17] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0035
[18] https://eiopa.europa.eu/Publications/Reports/QIS5_Report_Final.pdf
[19] https://www.insuranceeurope.eu/sites/default/files/attachments/Solvency_II-proposal_for_resolving_the_currency_risk_problem.pdf

- Be a single solution, applicable to solo entities and, mutatis mutandis, groups.
- Be in line with the Solvency II Directive.
- Not make the Standard Formula too complex.
- Be capable of application by small and medium-sized firms.
- Represent a "total balance sheet" approach.
- Have general support from industry.

Nevertheless, the proposed approach was not adopted in the Standard Formula calibration for implementation on 1 January 2016.

The recent review of EU Insurance Regulation by the UK House of Commons Treasury Select Committee has also emphasised, throughout its meetings, the inappropriate nature of the currency risk calculation.

The Working Party's review of Solvency II presents an ideal opportunity, to once again, raise this as a significant issue for both the life and non-life insurance industry.

5.2.2 Proposed Solutions

There are a number of alternative solutions to determining currency risk charges on insurance firm's balance sheets. As noted in the bullets above, any changes in the approach should meet certain characteristics to remain aligned with the objectives and fundamentals of Solvency II. Below we have considered a selection of (not necessarily stand-alone) options as well as some of the pros and cons of each.

1. Taking a similar approach to the current Standard Formula calibration but **uplifting the liability amounts to include a notional SCR for each currency**. I.e., 25% of the net asset value in each non-reporting currency, whereby the net asset value is the assets less liabilities *plus* the uplifts/ notional SCR. To avoid circularity with the valuation at the current valuation date, this could be done, for example, by looking at historical SCRs as a proportion of balance sheet liabilities and uplifting the current liabilities by this amount for the currency risk charge. Alternatively, the liabilities could be uplifted by a proportion, either notional or possibly related to the insurance risk charge at the valuation date.

   The charge within each currency would therefore be:

$$25\% * |(\text{Value of Assets in Currency} - \text{Value of Liabilities in Currency} * \text{Uplift})|$$

   The total charge would then be the sum across each currency.

   This is similar to an element of the approach adopted by the BMA and the IAIS's 2016 Technical Specifications for field testing of the Insurance Capital Standard.

   \+ This has the advantage of giving undertakings credit for a degree of variation in their liabilities in each currency beyond the value which is in their balance sheet at the valuation date; it therefore better captures the interaction between risks over the one-year period.
   \+ The approach is also relatively simple to implement and can apply to solo and group undertakings.

   − However, the calculation arguably goes beyond the total balance sheet approach and potentially requires additional information beyond the existing currency risk calculation.

- It could lead to further debate on the appropriateness of the method prescribed to calculate the uplift
- In addition, the approach would still apply a charge for undertakings holding capital in excess of the liabilities plus the uplifts/notional SCR.

2. **Only apply the charge to currency positions where liabilities exceed the level of assets (i.e. short positions).** This approach is more one-sided than the current currency risk implementation. For each non-reporting currency, the charge would be:

$$25\% * \max((\text{Value of Liabilities in Currency} - \text{Value of Assets in Currency}), 0)$$

The total charge would then be the sum across each currency.

This is similar to an element of the approach adopted by the BMA.

+ This avoids penalising firms who hold excess capital in certain currencies to match risks and exposure.
+ Further (assuming it is based on liabilities alone) would require no additional information beyond the current currency risk approach.

- However, in currencies where assets exceed liabilities, the currency risk charge would be zero and therefore not reflect the actual movement in the net assets were this to materialise in practice.

3. **Separately apply upwards and downwards shocks to the non-reporting currency exchange rates and take the most severe result.** The charge within each currency would therefore be equal to:

$$+/- 25\% * (\text{Value of Assets in Currency} - \text{Value of Liabilities in Currency})$$

And the total currency risk charge equal to the largest of the upwards or downwards shocks across all non-reporting currencies thereby allowing movements across currencies to offset.

This is similar to an element of the approach in the IAIS's 2016 Technical Specifications for field testing of the Insurance Capital Standard and akin to the approach used for Interest Rate risk in the current Standard Formula calibration.

+ This approach is more representative of the likely movement in exchange rates against the undertaking's own reporting currency as, in most cases, it is likely that exchanges rates move in a single direction against the undertakings reporting currency rather than move independently as the current calibration requires. This therefore allows for the likely offsetting movements against long and short positions in currencies as would occur if all positions moved in a single direction.
+ The approach does not require any additional information beyond that which is already captured in the calibration and is a 'total balance sheet approach'.

- The approach omits to consider the risk that exchange rates move in different directions over the year which could occur in practice.

- Also, the approach only looks at the opening balance sheet position and does not consider the interaction with other risks over the one-year horizon.

4. **Determine an 'optimal' allocation of assets to currencies and generate a currency risk charge on deviations from this split.** The optimal split would likely be an estimate based on the information provided for the currency risk calculation (e.g. based on the liability allocation across currencies) such that the charge in each currency would be the absolute value of:

25% * Value of Assets in Total * (Proportion of Assets in Currency – Proportion of Liabilities in Currency)

The total charge would then be the sum across each currency.

This is the approach set out by Insurance Europe as mentioned above.

+ The approach is simplistic and does not require any additional information beyond that which is already captured in the calibration and is a 'total balance sheet approach'.
+ It only generates currency risk charges where undertakings move their asset allocation across currencies away from the liability split. It therefore doesn't necessarily generate charges on surplus assets being held on foreign currencies to mitigate other risk exposures during the one-year time horizon.

- The currency risk charge generated isn't necessarily the same as the true balance sheet impact which a firm would incur were exchange rates to deviate.
- The approach assumes the liability split across currencies is representative of the risk/exposure in each territory and therefore that it is appropriate to hold capital buffers in proportion to these liabilities. This may not be the case.

5. **Apply a correlation factor across currencies to represent the likelihood that not all currencies will move at once and at the same magnitude.** This could be combined with a number of the above options. The charge in each currency could therefore be the same as any of the above suggestions but in aggregation across currencies, rather than assuming a direct sum (and therefore 100% correlation) a correlation coefficient could be introduced. This coefficient could either be the same between all currencies or vary between currencies based on historical implied correlations.

This is similar to an element of the approach in the IAIS's 2016 Technical Specifications for field testing of the Insurance Capital Standard

+ The approach is simplistic and does not require any additional information beyond that which is already captured in the calibration and is a 'total balance sheet approach'.
+ Potentially more representative of real world correlation effects across currencies assuming there is no allowance for diversification in the stress (see first negative point below).

- The selected stress (25% under the current calibration) may already allow for an element of diversification between currencies and therefore this may be double counting.
- Depending on the approach to which the correlation factor is applied, the result may not be representative of the true currency risk exposure of the undertaking.

- The approach introduces another factor in to the Standard Formula calibration which could be open to criticism.

5.2.3 Conclusion

The need for currency risk to consider both the risk of foreign exchange rate movements in either direction across different currencies (which it does now) and not penalise undertakings for holding surplus capital in foreign currencies (which it does not do now) points to option 4 as the most appropriate. However, this could be applied in conjunction with other options such as 5 if it is deemed appropriate.

Option 4 is the approach which was originally proposed by the CEA/Insurance Europe and has already been widely tested with the European Commission and gained the support of industry at the time. Insurance Europe demonstrates in their original paper on the topic that this meets the requirements and objectives of any new proposal as listed in the bullet points towards the top of this paper.

In conclusion, we propose to support the original Insurance Europe option for amending the currency risk calculation to better support good risk management practices, thereby increasing policyholder protection and further removing an element of reduced competiveness for EU undertakings.

5.3 Premiums as a risk measure in the Standard Formula

5.3.1 Background

The Standard Formula uses premiums as a key measure of exposure when calculating the capital required to cover non-life premium risks, certain non-life catastrophe risks and Not Similar to Life (NSLT) health premium risks. Whilst this is a relatively simple and accessible measure, when combined with the relevant factors and calculations, the resulting capital figures may not be an appropriate estimate of the 1-in-200 risk to the undertaking.

Typically, where premiums are used as a measure of exposure within the Standard Formula SCR, the resulting required capital calculation is of the (simplified) form:

Premiums x factor x sigma, where:

Premiums typically represent the premiums earned after the balance sheet date in respect of existing business and business being written over the next year; and

Factor and *sigma* are specific to the risk module and Solvency II line of business.

The resulting required capital is intended to represent the 1-in-200 risk to the Solvency II balance sheet over the next year.

We have identified 3 key potential weaknesses to the current approach, set out below.

1. **Multi-year policies:** The definition of the premium measure used to approximate exposure means that multi-year policies would include premiums earning over the lifetime of the policy (rather than just the next year). In simple terms, for example, the capital required to support a 10-year warranty policy would be ten times higher than the capital required for a 1-year policy underwriting exactly the same risks over the next year. The issues with this approach are twofold:

    - It assumes that the 1 in 200 shock will apply to each and every year of the policy (and so each future year's losses are 100% correlated with each other); and
    - SCR is intended to be a 1-year measure only.

    This could be a material weakness for undertakings writing a material amount of multi-year business.

2. **Catastrophe risk via loss ratio approach:** Several perils within the CAT risk module of the Standard Formula estimate the 1-in-200 loss via a loss ratio multiplied by premium approach. This has the benefit of being a simple approach but does not differentiate between contracts that have different policy limits.

    This means the resulting required capital is effectively "blind" to the differences in risk of loss from policies providing unlimited cover and those with a policy limits. This may be a material weakness for undertakings writing policies with limits in place that mean that the 1-in-200 losses calculated under the Standard Formula would not be payable in practice.

3. **Continuing soft market conditions:** The soft market conditions means that, year-on-year, as premium rates fall, so too does the capital required to protect against losses. In broad terms, at times when the industry is charging less for a given risk exposure year on year, it will make lower profits at

the same time as holding lower regulatory capital. So not only is the risk of making a loss higher (all else being equal) but the regulatory cushion in place to withstand material losses is also smaller.

For premium risk modules, the Standard Formula does have a provision to protect against short term drops in pricing (by subjecting the premium measure to be a minimum of the previous year's earned premiums), but this offers only limited protection when rates are dropping year-on-year, and does not apply to those catastrophe risk modules which use a loss ratio approach.

This may be a material weakness for all firms and may result in the calculated SCR being inappropriate.

5.3.2 Proposed solution/ suggested improvement:

1. **Multi-year policies:** For the weakness around multi-year policies, we propose two possible improvements.

   Option 1: Allow for some diversification between future years' losses by applying a reduction factor to premium volume measure, which can be mathematically derived assuming a specific level of correlation between years. The working group believes this approach would be relatively simple to implement, but appropriately calibrating the factors would be challenging.

   Option 2: Limit the premium volume measure to allow only for premiums expected to be earned over the next 12 months. The working group believes this would be a simple revision to the current approach and would be easy to implement.

2. **Catastrophe risk via loss ratio approach:** For the weakness around the loss ratio approach to calculating catastrophe risk, we propose two possible improvements.

   Option 1: Move to a scenario-based approach that focuses on actual loses linked to policy limits for the relevant contracts. The working group believes this approach would have the benefit of applying a consistent approach to calculating required capital across all catastrophe risk modules, however may make the calculation more difficult to apply in practice. This option would also address the weakness highlighted around soft market conditions, and have the benefit of applying a consistent approach to calculating required capital across all catastrophe risk modules. It would also have the benefit of removing the link to the prevailing pricing environment.

   Option 2: Enhance the current calculation to all firms to take into account policy limits that would reduce the 1-in-200 loss expected in practice. That is, the loss ratio to be applied is limited to the minimum of the sum of the limits across all corresponding policies as a proportion of the premium measure and the loss ratio assumed in the current version of the Standard Formula. The working group believes this would be a pragmatic way of addressing this weakness for those firms affected by the limitations in the current approach.

5.3.3 Conclusion

The working party believes that the weaknesses identified in the current approach require the approach to be reviewed. We have put forward some possible solutions to address the weaknesses identified and recommend these be considered at future Standard Formula reviews.

5.4 Calculation of CAT risk within the Standard Formula

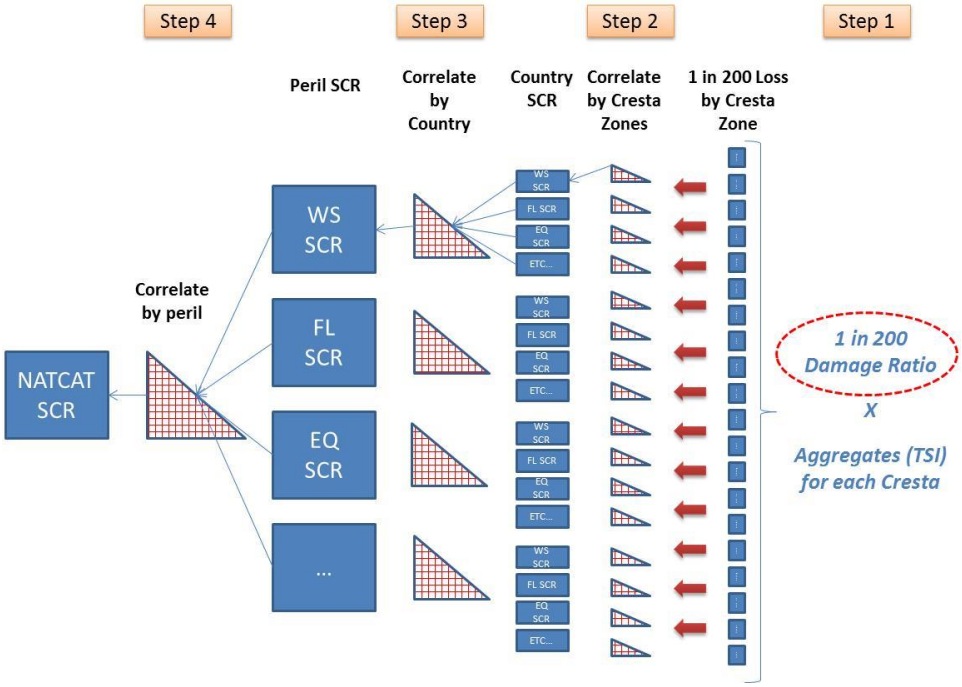
5.4.1 Issue Title 1:

Catastrophe Risk Factors

5.4.2 Background:

The capital requirement for EEA natural peril catastrophe risk (NATCAT) is calculated using the "Hazard Map" approach[20]. Under this method, a probabilistic event set is used to calculate the 1 in 200 damage ratio for each individual cresta zone in each country and peril. The steps illustrated below are then carried out to calculate the NATCAT SCR:

1. Calculate the 1 in 200 year loss for each Cresta zone for each country: 1 in 200 Damage ratio X Total Sum Insured (TSI)
2. Apply the cresta-wide correlation matrix to obtain the SCR for each country
3. Correlate the SCR by each country to obtain the SCR for each peril
4. Use the peril-wide correlation matrix to obtain the overall NATCAT SCR



The key issue with this approach is that the 1 in 200 damage ratio (circled above) is calculated for an average firm that is diversified across the cresta zones in each country. Due to this, the factors will not be suitable for all companies, especially those that have a high concentration of risks located in post-code areas within a cresta that has high exposure to a certain peril. For example, when modelling flood as a peril, detailed post-code information should be used as flood is much localised and can vary quite significantly by post-code area. Cresta level factors, which are based on averages, will underestimate the risk. The difference between the capital calculated using the Standard Formula factors, vs. detailed level modelling can be very significant i.e., circa +/-400% leaving the firm highly over/ under- capitalised. Acknowledging that most elements of the underwriting risk module are based on industry average shocks, this would particularly be an issue for firms that are sufficiently divergent from the Standard Formula.

[20] *CAT Task force on Standardized Scenarios Report; June 2010; Section 164*

5.4.3 Proposed solution/ suggested improvement:

Replace 1 in 200 damage ratios with Undertaking-Specific Parameters (USPs). Companies with non-standard portfolios that are sufficiently divergent from the Standard Formula should be able **to replace the 1 in 200 zone damage ratios with those calculated using their portfolio of risks.** There is currently no flexibility around the CAT factors under the Standard Formula, unlike premium and reserve risk where USPs can replace the standard deviation factors where this is not deemed suitable.

Pros:

+ This will be more representative of the insurance companies' portfolio, therefore the Natural Catastrophe risk charge will not be under (or over) estimated.

+ No new information is needed to calibrate these, and provides firms with extra flexibility when calculating their NATCAT SCR (i.e., it is the firms that already use postcode data and detailed modelling who will know that the Standard Formula is not appropriate. Such firms will prefer the use of CAT USPs and will have the information available).

Cons:

- This may lead to further debate on which Catastrophe vendor models are suitable for calculating the CAT USPs, and a clear criteria on how these can be validated will be required. The USPs will need to be approved, therefore leading to additional regulatory burden.

- This may lead to additional questions around the appropriateness of the aggregation coefficients. USPs may determine appropriate stand-alone cresta zone or peril charges but if the aggregation is questionable then the final result could still be inappropriate.

Approved vendor models. Similar to the approach used by the Bermuda Monetary Authority (BMA), approved vendor Catastrophe model can be used to determine the NATCAT capital requirement i.e., 1 in 200 gross and net loss. However, this will require independent audit or validation e.g., by a reinsurance broker or a consultancy.

5.4.4 Issue Title 2:

NATCAT Calculation: Multiple Events

5.4.4.1 Background to issue:

For European Economic Area (EEA) Natural Catastrophe Windstorm, Flood and Hail losses, the Standard Formula assumes greater than one event for each peril. Therefore, a company that has exposure to e.g., Windstorm, Flood, and Earthquake will have to assume there are 5 events occurring per year (2 Windstorms, 2 Floods, 1 Earthquake)[21]. The probability of this happening is negligible i.e., much lower that a 1 in 200-year event. This has led to un-intended consequences, where companies that are exposure to an excess of 1 peril will need to purchase more than necessary horizontal cover to manage their NATCAT capital. This goes against the principles of a capital regime as such behavior does not add value to the industry.

5.4.4.2 Issue Type:

Unintended practical consequences, i.e., market behaviour changing unfavourably

[21] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0035&from=EN

5.4.4.3 Proposed solution/ suggested improvement:

Use top 2 events per year:
When exposed to multiple perils, firms should be required to use the top 2 events per year instead of multiple events from each peril occurring in one year. The return period of more than 2 major CAT events occurring across the EU regions in a single year significantly exceeds the 200 year return period for an average EEA firm[22].

Pros:

+ Ensures reinsurance programmes are not motivated by Standard Formula assumptions and by actual risk transfer instead.

+ It is easy to enforce and no new information is needed.

Cons:

- The top 2 events may be dominated by perils with the highest Standard Formula damage ratios for all companies irrespective of the number of perils they are exposed to.

5.4.5 Issue Title 3:

Reinsurance benefit for premium and reserve risk

5.4.5.1 Background to issue:

The reinsurance benefit (or credit) for non-proportional structures on premium risk is 20%, irrespective of the level of cover provided by the program[23]. I.e., the standard deviation factors are reduced by 20%. This can be highly understated if a company has purchased facultative cover on a single policy. Furthermore, this benefit is only applied to 3 lines of business (out of 12 lines of business specified in the guidance) which is Motor Vehicle liability, Fire and Third Party Liability. For reserve risk, there is no benefit for non-proportional structures as the factors are assumed to be net. USPs can be used to give credit for non-proportional reinsurance on the 3 lines of business listed above, however, this is only allowed for premium risk, and the process for obtaining USPs is very time consuming and lengthy, which has to be repeated every time the reinsurance programme is altered. There are two concerns due to this:

1. 20% may be too low (or high). It can hardly be representative of a firms reinsurance programme.
2. The other major lines of business do not benefit from having a reinsurance structure in place.

It leads to over (or under) capitalisation, and unintended consequences whereby a firm may move to a proportional structure, where non-proportional structures are more appropriate. Firms that use USPs to allow for non-proportional reinsurance are incentivised continue with the same programme for longer, irrespective of it's continued suitability in order to avoid the lengthy process of applying for a USP approval. Therefore, risk management decisions are affected due to the way that the Standard Formula is applied.

5.4.5.2 Issue Type:
Unintended practical consequences, i.e., market behaviour changing unfavourably

5.4.5.3 Proposed solution/ suggested improvement:

Calculate non-proportional reinsurance credit using risk profiles. The insurance companies risk profiles can be used to calculate the approximate level of losses ceded to the non-proportional programme

[22] Based on leading vendor catastrophe models on average EU exposure
[23] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0035&from=EN

by calculating the % of TSI above the retention and below the reinsurance limit. This can be carried out for all LOBs, after which the standard deviation for each LOB can be adjusted by the proportion ceded.

It is worth noting that the premium measure used in the calculation of Premium Risk is net of outwards non-proportional cover. It may be argued that there is an element of double-counting, however, the non-proportional premium may not represent actual risk transfer, especially in a soft market, or where the cover is purchased at very high attachment points that are priced at minimum rates. The impact of these structures is to significantly reduce the volatility and thus the 1 in 200 loss. This reduction in volatility and corresponding reduction in capital can be achieved by adjusting the standard deviation factors.

Pros:

+ Risk profiles or individual risk information is usually available, and therefore data requirements are not onerous. The calculation is simple and easy to explain.

Cons:

- The method does not allow for reinstatements however, the approach is a step up from having no allowance or simply 20%.

- This will require regulatory approval and therefore can be time-consuming.

5.4.6 Issue Title 4:

Non-EEA NATCAT factors

5.4.6.1 Background to issue:

The EEA NATCAT damage ratios do not cover non-EEA regions. Whilst the Standard Formula is intended for an average company based in the EEA, certain firms may have large catastrophe exposures in non-EEA regions. The capital requirement corresponding to these is calculated using an alternative approach which involves applying a loss ratio to gross premium figures corresponding the these non-EEA regions, allowing for geographical diversification. The issue with using premium as a risk measure has been discussed in section 5.3. Therefore using the Sum Insured figure is a more representative exposure measure for Catastrophe risk. Finally using the same loss ratio for all non-EEA regions by peril does not allow for the difference in vulnerability between the different non-EEA regions. An approach consistent to that for EEA regions would be better at representing the difference in potential losses in the various non-EEA regions.

5.4.6.2 Issue Type:

The consequence here is that inappropriate levels of NATCAR SCR will be calculated

5.4.6.3 Proposed solution/ suggested improvement:

Factors for non-EEA regions. Damage ratios for non-EEA regions can be provided under the Standard Formula so firms can use these to make an allowance for NATCAT exposures in these regions. The factors can be calculated using the same method as that for EEA regions e.g., using output from Vendor models, and incorporated in the Standard Formula.

Pros:

+ The method is easy to understand and apply is it will be consistent to the current calculation of NATCAT SCR.

Cons:

- Obtaining factors may be difficult due to limited data in certain non-EEA regions, however, they can be provided at Cresta or country level depending on the data available. The method can further be simplified by only focusing on EEA regions with high Catastrophe exposure, and using a "Capital Add-on" which can be expressed as a % of sum insured figures, where there is no or limited data.

5.4.7 Issue Title 5:

Outwards Reinsurance Allowance Method 1

5.4.7.1 Background to issue:

When calculating reinsurance recoveries, diversification benefit on Catastrophe risk can be calculated using "Method 0" or "Method 1"[24].

Method 0 assumes that reinsurance is applied to peril losses, after which the net losses are combined using the inter-peril correlation matrix.

Method 1, on the other hand, assumes that the peril losses are first combined using the inter-peril correlation matrix. The resulting diversified gross NATCAT SCR charge is allocated back to the perils, after which reinsurance is applied to each peril loss. The net peril losses are then combined by straight addition, without applying further diversification benefit.

Method 1 has the un-intended consequence of firms possibly buying less cover vertically, and buying more horizontally (where the risk is negligible). Despite this consequence, Method 1 appears to be market practice for all types of Catastrophe reinsurance covers, since the guidance on outwards reinsurance application requires the use of Method 1 when aggregate covers across perils are bought. This is however now applied as the default option for all types of cover.

5.4.7.2 Issue Type:

The consequence here is that inappropriate levels of vertical reinsurance cover may be purchased if firms are relying on the Standard Formula SCR to determine their reinsurance programme. Additionally, the implied diversified gross charges will be deemed inappropriate for this purpose.

5.4.7.3 Proposed solution/ suggested improvement:

Recommend Method 0 and provide additional guidance: As with the requirement to use Method 1 where aggregate covers across perils are bought, the guidance also recommends using Method 0 where the reinsurance covers only one peril/ scenario. However, additional guidance should be included for firms to be aware of the above issue when using Method 1 and incorporate this when setting their reinsurance programme.

Pros: The additional guidance is simple to incorporate.

Cons: Difficult for the regulator to enforce or determine whether firms have determined their reinsurance programme to allow for the potential weakness in Method 1.

[24] https://eiopa.europa.eu/Publications/Consultations/EIOPA_EIOPA-BoS-14-173_Final_Report_Application_Outwards_Reins.pdf; Technical Annex I

5.5 Allowance for PPOs within the Standard Formula

5.5.1 Background and Issue

The Periodic Payment Orders (PPOs) are largely a UK market feature within the European Union. The Standard Formula currently allows for longevity risk (Life Underwriting sub-module), along with the interest rate stress (Market module) associated with all future cash flows.

Bias and Calibration

The Standard Formula does not particularly allow for material risks associated with PPOs, resulting in an underestimation of the required capital.

> *The PRA noted that PPOs were an important feature of the general insurance industry and confirmed its concern that the Standard Formula will not adequately capture the risk for firms with material PPO exposures. The PRA highlighted the need for firms to make appropriate allowance within the risk margin for these exposures and to be able to demonstrate how they have approached this.*
>
> *PRA Solvency II Directors' Update (14 July 2015)*

This is a key weakness for undertakings with material PPO exposures. Whilst capital add-ons may serve as a bridge solution, such undertakings using the Standard Formula are likely to have to apply for a partial or full internal model. For firms that currently have minor PPO exposures, they are likely to find PPOs growing in materiality as the liabilities can sometimes take decades to runoff, while their exposure accumulates over time. There were about 500 settled PPOs by the end of 2014[25]. On a conservative estimate of an average of £1m per claim, this would be a £0.5bn issue for the industry. As such, the fact that the Standard Formula does not adequately capture risks from a prominent source that impacts a large part of the General Insurance market leaves much room for improvement.

PPOs are modelled under the Life underwriting sub-module, whereby the longevity risk is stressed[26]. However, a major component of the PPO risk stems from volatility in the assumed inflation against the ultimate. The Life underwriting module assumes the volatility in the future inflation of indemnity not to be material. Whilst it may be appropriate for conventional fixed annuities, the periodic payment is typically indexed to the Retail Price Index (RPI) or Annual Survey of Hours and Earnings (ASHE) to provide sufficient indemnity to cover the care cost element of the claimant. This can be fairly volatile and difficult to predict over the life of a PPO.

On the longevity risk shock, even though the risk charge underlying it *is intended to reflect the uncertainty in mortality parameters as a result of mis-estimation and/or changes in the level, trend and volatility of mortality rates and to capture the risk of policyholders living longer than anticipated*[27], its calibration is based on the mortality of the general population, rather than impaired lives.

For a PPO claim, the remaining life expectancy is estimated by medical professionals, whose expert judgments can vary significantly. A claimant's true remaining life is also heavily dependent on their quality of life and medical advancements, which can be substantially influenced by any breakthrough in medicine

[25] Figure 2.2 from IFoA PPO Working Party, GIRO 2015 Report
[26] Standard Formula Appropriateness for Life and General Insurers (www.bankofengland.co.uk/pra/Documents/solvency2/session2standardformula.pptx)
[27] The underlying assumptions in the Standard Formula for the Solvency Capital Requirement calculation (eiopa.europa.eu/Publications/Standards/EIOPA-14-322_Underlying_Assumptions.pdf)

and technology. It is deemed that the longevity risk associated with PPO claimants in a 1-in-200 scenario is considerably more volatile than those from the general population.

Risk Management
The lack of inflation risk stress, or specifically the associated risk-mitigation requirements, on Standard Formula also results in undesired incentives in the form of lower required capital for undertakings, and to ignore the inflation risk in their asset-liability management. Under the current regime, undertakings have little incentives to hold matching assets which are long term in nature with a hedge against inflation. The undertakings that do attempt to mitigate the inflation risk by investing into long-dated index-linked bonds, equities, infrastructure funds and properties are penalised with the associated market stresses compared to those holding cash and short-dated bonds.

5.5.2 Proposed Improvements

Impaired Life
A potential solution to the longevity issue is to a separate the Impaired Life module with calibration specific to undertakings with impaired life exposures (for both Life & Health and General Insurers alike). The longevity assumptions associated with the impaired life are likely to be materially different from the general population, as specific medical and technological breakthroughs (eg. stem cells, bionic) can substantially improve the quality of life and lengthen longevity of the claimants, beyond those of the general population.

The longevity stress factors can be calibrated based on collation of market wide data of claimant life expectancy versus actual. Calibration and benchmark against the impaired lives mortality tables developed by the Continuous Mortality Investigation (CMI) bureau should also be considered.

These will help reflect the longevity risk more accurately and therefore the associated required capital.

Inflation Risk
The exposure of PPOs to inflation risk is considerable. Realised inflation in the year can deviate from the expected. There is also the risk of a change in the assumed future healthcare wage inflation, which would potentially impact cash flows multi-decades in the future (albeit heavily discounted) on some PPOs.

By introducing inflation risk stress to the adverse impact from a 1-in-200 shock, it would arguably capture the most material risk stemming from PPOs. The inflation shock can be parameterised by examining any sustained peaks and the volatility of healthcare cost inflation, wage inflation or other proxies over a multi-decade time horizon. This should be done in absolute and relative terms to ensure relevance to future expected inflation. The stress would then be applied to derive the impact on basic own funds through the difference in technical provisions between the stressed and the assumed inflation underlying the best estimate.

Risk Management
The Standard Formula should not penalise undertakings for managing long term inflation risk by investing in appropriate financial instruments, such as inflation-linked bonds, infrastructure funds, properties and equities, which possess degrees of inflation risk mitigation in the long run. Although they carry basis risk (as few asset classes are directly linked to the wage of healthcare staffs) and the volatility in their values can adversely impact the basic own fund in any given year, their longer term benefit in enabling some inflation risk hedging should be valued. It is recommended that some credit should be considered for

undertakings that utilise such inflation-sensitive assets to manage their long term inflation risk exposure, much like collaterals are considered as risk mitigation in calculating the required capital for credit risk.

5.5.3 Conclusion

It is believed that the weaknesses identified in the current approach can be addressed and improved. The proposed improvements would address some of the weaknesses identified. We therefore recommend PPOs to be considered at future Standard Formula reviews.

5.6 Operational risk

5.6.1 Issue

Operational risk is defined as the risk of loss arising from failure of people, processes and systems or from external events, and includes legal risk.

The general market view is that the operational risk charge in the Standard Formula is not sensitive to a firms risk environment and does not incentivise wise operational practices.

Under the Standard Formula approach, the capital charge for operational risk is calculated as a sum of 25% of unit-linked expenses over the prior year and the greater of the operational risk charge in respect of premium earned and technical provisions held, subject to a minimum of 30% of the basic solvency capital requirement (BSCR) (Solvency II Delegated Regulation, Article 204).

As the operational risk charge is a function of earned premium and technical provisions, the larger the insurer the greater the operational risk charge. In reality, however, the relationship is not linear. Larger firms often have the resources to permit a more sophisticated handling of operational risk, but as it stands, the Standard Formula cannot reward this.

5.6.2 Background to the Issue

Both academic literature (e.g. Slawski & van den Heever, unpublished) and industry opinion (section 3 survey results) highlight the weaknesses of the Standard Formula in key areas already covered. This is also true for the operational risk charge calculation in the Standard Formula. In a 2015 survey conducted by Milliman[28], it appeared that insurers were calculating true operational risk numbers that were both lower and higher than the Standard Formula requirement, with 30% of respondents expecting that operational risk is significantly understated by the Standard Formula. This finding illustrates that the Standard Formula operational risk charge is failing to capture the relative operational risk between companies, let alone the absolute risk.

From as far back as Quantitative Impact Study 3 ("QIS3")[29], the general market view is that the operational risk module is too simplistic and unsophisticated. Issues cited (both there and in other industry consultations) include the inappropriate calibration of the calculation factors, the lack of an allowance for diversification between operational risk and any of the other risk factors, as well as the lack of benefits for companies who have developed a strong operational risk control framework. The operational risk calculation has not been revised since then.

It could be argued that the latter point is addressed in Pillar II. Currently, firms are required to justify the appropriateness of the Standard Formula operational risk calculation, and assess their own operational risk exposures and management practices as part of the ORSA, under Pillar II. Article 37 of the Solvency II Directive discusses the application of a capital add-on to firms in circumstances where the Standard Formula is found to be an inappropriate representation of the firm's risk profile, however there appears to be a lack of guidance on how the PRA will enforce this. In the banking sector, more detailed guidance has been issued by the PRA on Pillar 2A add-ons, which may be an indicator of how this will be handled in the future[30]. Given the uncertainty, it is reasonable to say that the Pillar I requirements have the greatest

[28] http://uk.milliman.com/uploadedFiles/insight/2015/flaor-survey-2015.pdf
[29] https://eiopa.europa.eu/Publications/QIS/CEIOPS-DOC-19-07%20QIS3%20Report.pdf
[30] http://www.bankofengland.co.uk/pra/Documents/publications/ps/2016/ps2016app6.pdf

influence on where insurers focus their efforts with regard to Solvency II, and therefore should be addressed.

In rebuttal to this, a Critical Analysis of the Solvency II Proposals in the Geneva Papers, feels that, although the Standard Formula approach for operational risk is relatively simple, and is merely an indicator of company-size rather than operational risk profile, a more complex calculation would not be a better predictor of operational losses. This is due to the fact that the internal control environment is hard to express in a quantitative capital requirement.

5.6.3 Proposal Solutions and Suggested Improvements

Official proposals to address the short-comings of the operational risk Standard Formula calculation do not appear to have been made, although a number of improvements or alternative calculations have been suggested.

Suggestions in the QIS4 performed by CEIOPS (operational risk formula unchanged from the current Standard Formula approach), included:

- the operational-risk charge should be more sensitive to operational risk management
- the operational-risk change should be based on entity-specific sources of operational-risk, the quality of the operational risk management process and the internal control framework
- diversification benefits and risk-mitigation techniques should be considered
- the formula should be more sensitive to operational risk events that have occurred in the past and technical provisions should be replaced by the frequency of occurrence of operational-risk events or the cost of those events

These suggestions, however, do not provide a defined change to the calculation, but do serve to suggest the theme of changes that could be incorporated into the calculation.

A number of research papers have suggested an investigation into ways in which the Standard Formula for operational risk could be improved, however, few have actually proposed an alternative.

Below we have summarised a few potentially viable improvements and alternative to the current approach providing examples of cases where these approaches have been adopted, where possible.

Quantification of Scenarios

Much like the man-made catastrophe risk calculation in the Standard Formula, a scenario approach could be used to quantify the operational risk within a company. Under this approach, firms would be presented with a number of operational risk scenarios for consideration and would be asked to quantify the impact of each of these scenarios on their business. Firms could also be asked to consider 'firm specific' scenarios, which they will be required to define themselves.

The quantification of scenarios could be done either on a prescriptive basis – i.e. for the internal fraud scenario, consider set criteria such as the number of employees in the business, the average transaction size, legal costs associated with disciplinary action etc, or on a more conceptual approach, i.e. quantify the impact of an internal fraud scenario whereby critical business information is shared by an employee, who is not caught for a period of 3 months.

All scenarios should be considered pre and post the implementation of controls, so as to reflect the effectiveness of the controls that have been put in place, and also to incentivise the implementation of further controls in the future. Methods on regulating and auditing these will need to be devised.

As scenarios will be categorised and quantified individually, it would be possible to include correlation and diversification with some of the scenarios and other risk types in the business, e.g. catastrophe risk could be correlated with the operational risk scenario around 'inaccurate data provided to reinsurers'. The calibration of these dependencies will, however, be difficult.

The aggregation of operational risk scenarios into a final capital charge would need to be rationalised in order to ensure that operational risk does not become inappropriately significant in a firm's capital. It may be appropriate to retain the limit of 30% of Basic Solvency Capital Requirement (BSCR) for a firm's operational risk capital charge.

This approach will serve to align the key risk register with the Standard Formula operational risk charge within the business. This will facilitate in the communication of the operational risk capital charge with senior management and the board, and will provide a more reasonable link between the Pillar I capital charge and the Pillar II risk assessment.

The pre-specified scenarios will ensure that all firms give consideration to the most common and critical operational risk categories. If a firm believes that a certain scenario is inappropriate to their business, a full justification as to why this will be the case should be required. The firm-specific scenarios will allow insurers to more fully consider their own exposures, particularly when the standard scenarios are not deemed appropriate.

A number of challenges could arise with this approach, particularly if the guidance provided by the regulator on its implementation is too vague. If firms are left to specify and quantify their scenarios under each of the categories, there is a danger that significant variation in the sophistication of the approach used to quantify scenarios may lead to variation in capital charges. Additionally, it is a possibility that those firms that do not quantify their scenarios properly may end up with a lower capital charge, thereby disincentivising proper consideration of losses.

Much like the catastrophe risk calculations, an alternative, more severe, operational risk calculation could be included in the Standard Formula for firms who are not able to quantify their scenarios.

Scorecard Capital Calculation

A scorecard approach used a set of pre-specified criteria, or questions, for which insurers assign a score, based on their level of compliance with the criteria. These criteria are broken down into a number of different functions, such as the board of directors, the risk management function and the risk management process (identification, measurement, management, response and reporting).

The scoring is either done on an open-ended basis, i.e. score the setting of risk policies, practices and tolerance for all material foreseeable operational risks from 0 to 200, or using a 'bucket' scoring approach, i.e. select the most suitable response to the question 'Has the insurer taken steps to identify all material risks arising from the Operational Risk Areas identified below?'. The suggested answers being 'ad hoc' – 50 points, 'implemented but not standardised' – 100 points, 'implemented and well documented in a stardardised manner across the organisation' – 150 points, 'implemented, documented, standardised and reviewed at least annually' – 200 points.

The final operational risk score is then used to calculate an appropriate capital charge, usually through an adjustment of the BSCR capital.

An example of a regime where this approach has been implemented is the Bermudan Solvency II equivalent regime. Under this regime, operational risk is modelled as a percentage uplift to the Solvency II BSCR (post-diversification) dependent on the operational risk score. This score ranges from 1 % to 10 %. The

score is determined using a scorecard approach that takes into account operational risks and their associated risk management and control framework. This approach aims to capture an insurer's developmental stage within eight pre-specified operational risk areas (see Appendix), rewarding those insurers for achieving progress in each area. The final score is to be signed off by two Directors of the insurer.

This approach emphasises the interrelationships between the Risk Management and Corporate Governance functions, and the operational risk level with in an organisation. It is responsive to changes in a firm's operational risk management framework and rewards firms for improving their risk management practices, thereby incentivising good operational risk behavior.

This approach is easy for insurer's to use, and can be understood and completed by the risk management function, who do not necessarily have specific capital modelling experience. The simplicity also results in an operational risk capital charge that is easily understood by management and the board.

A challenge with this approach is the calibration of the capital charge based on the operational risk score. This is due to the lack of information available to use to benchmark the capital charge with the actual operational risk of the insurance entity. Although industry-wide operational risk databases do exist, such as the Operational Risk Consortium (ORIC), it has proven difficult to standardise this data for use in a broad operational risk calculation.

This approach will also not necessarily allow for diversification of operational risk with the other risks, unless a specific adjustment is made.

A scorecard approach does run the risk of becoming too much like a 'check-box' exercise, wherein insurer's may meet all the criteria for a good operational risk score, but will not fully take into account the changing nature of its operational risk. An emphasis on this will need to be included under the Pillar II guidance.

5.6.4 Conclusion

In conclusion, it is believed that there are viable alternatives to the current Standard Formula operational risk calculation that exist and could be implemented. The two alternatives mentioned in this paper, the scenario approach and the scorecard approach, both serve to address a number of concerns highlighted by the industry around the operational risk capital change.

It is acknowledged that calibration work will be required for either approach to be implemented, but this should prove no more difficult than the calibration of the existing operational risk charge.

Although the scenario approach is likely to be more representative of a firm's true operational risk exposure, it does provide additional challenges when compared to the scorecard approach. It is therefore more likely that the scorecard approach will provide a more universally acceptable calculation that could be easily adopted by the majority of firms. It is not advised to simply copy the approach from the Bermudan regulators, but rather to use the concept to determine a calculation that is appropriate to the UK insurance industry.

6 Other Issues

The following additional issues were identified, in addition to the top issues covered in sections 4 & 5.

6.1 Capital Add-Ons

6.1.1 Issue

It is widely believed that, although Solvency II is broadly fit for purpose, the overall regime is too complex which is introducing unnecessary risks and costs. Improvements could be changes in the PRA's interpretation of the Solvency II rules, not changes to the underlying regulations.

In particular, a key issue raised in the market survey (section 3) was the complexity and expense of the onerous internal model approval process. A number of respondents called for the amendment / simplification of the internal model approval process and model validation requirements, and a reinstatement of discretionary loadings by the PRA. The IFoA has previously proposed to allow capital add-ons.

This has lead the working party to consider whether it should be easier for firms to adopt a capital loading, instead of a change in modelling methodology where required and practical.

6.1.2 Background to Issue

Overview of Supervisory Capital Add-Ons

To explore capital add-ons, this paper will briefly discuss the existing use of capital add-ons as a regulatory supervisory tool.

Although it is the aim of Pillar 1 and Pillar 2 of Solvency II to ensure that all risks are adequately captured in the initial capital calculation, it is acknowledged that this is not always the case. Provision for cases where it is believed that the calculated capital does not fully capture the risk profile of the business was made through the introduction of the concept of capital add-ons in the EIOPA directives. These add-ons are, however, primarily considered to be a tool of the supervisory authorities to 'penalise' firms for inadequacies in their capital calculations or governance frameworks. The capital add-on is therefore seen only as a regulatory tool, and a punishment to firms regulated under the Solvency II regime.

The extract below, taken from sections 26 – 28 of the Solvency II Level 1[31] text, highlights the adverse sentiment towards using capital add-ons as a tool.

"The imposition of a capital add-on is exceptional in the sense that it should be used only as a measure of last resort, when other supervisory measures are ineffective or inappropriate. Furthermore, the term exceptional should be understood in the context of the specific situation of each undertaking rather than in relation to the number of capital add-ons imposed in a specific market."

The level 1[31] text discusses the two broad cases where a capital add-ons may be imposed;

1. in cases where the risk profile of the entity differs significantly from the assumptions underlying the SCR, as calculated by the Standard Formula, internal model, or partial internal model, or
2. in cases where the governance of the entity deviates significantly from the standards laid out in the Solvency II directives, preventing the entity from being able to properly identify, measure, monitor, manage and report the risks to which it may be exposed.

[31] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0138

The magnitude of the add-on should be proportionate to the material risks arising from the inadequacy of the capital requirement.

Capital add-ons are not considered to be a long-term solution, but rather a temporary measure until the identified inadequacy has been remedied. The intention of the loading is to encourage entities to remedy the situation timeously. It is only where the Standard Formula approach does not adequately reflect the risk profile of an undertaking that a capital add-on may be imposed for a long period of time.

6.1.3 PRA Supervisory Capital Add-Ons

The PRA has a remit to apply capital add-ons to firms following either the Standard Formula approach, or an internal, or partial internal, model approach. In a collaborative study of the CEA and PWC[32], it was, however, felt that capital add-ons are most appropriate for entities following the Standard Formula.

In its advisory document on the calculation of Pillar 2 capital calculations[33], the PRA has summarised a number of cases where an entity following the Standard Formula may be assessed to require a capital add-on. These primarily relate to cases where it is felt that the risk profile of the entity in question differs significantly from the Standard Formula, such that the capital requirement calculated would be materially unrepresentative and inadequate. This not only highlights inadequacies in the Standard Formula, but also that a number of firms should be using an internal model, that are not currently doing so.

6.1.4 Lloyd's Supervisory Capital Add-Ons

Although the Society of Lloyd's is not, in itself, a regulator, it is responsible for the regulation of the internal models of its member syndicates. Lloyd's therefore has the power to impose model recommendations and capital add-ons on these syndicates.

Lloyd's has a common practice of applying capital add-ons to the internal model SCR calculations submitted by its syndicates. These loadings are used for a number of different reasons, and are often regarded as being penal for syndicates with excessive losses, or poor forecasting.

In a Capital Briefing to Syndicates[34], the most common reason cited for loadings applied by Lloyd's were:

- Ultimate Loss Ratio (ULR) differences with the business plan or ULR too low
- Differences with the Quarterly Monitoring Return part C (QMC) Q2 risk margin
- Other – operational risk, expense treatment, operational failures (i.e. unrelated to the capital model)

Loadings are applied to new syndicates, for which no adequate historical data exists.

It is clear that the objective of using capital add-ons to encourage model improvements has been achieved. This is shown by the decrease in the number and average size of loadings applied to their syndicates since 2010 (source – Capital Briefing 2016)[35]

[32] https://www.pwc.com/gx/en/financial-services/pdf/cea_capital.pdf
[33] http://www.bankofengland.co.uk/pra/Documents/publications/sop/2017/p2methodologiesupdate.pdf
[34] http://www.lloyds.com/~/media/files/the%20market/operating%20at%20lloyds/solvency%20ii/2016%20workshops/scr%20market%20briefing%20january%202017.pdf
[35] http://www.lloyds.com/~/media/files/the%20market/operating%20at%20lloyds/solvency%20ii/2016%20workshops/scr%20market%20briefing%20january%202017.pdf

Year	GBPm Loading	Number of Loadings	Average Loading
2010	281	23	2.22
2011	218	12	18.17
2012	255	17	15.00
2013	282	33	8.55
2014	219	26	8.42
2015	119	19	6.26
2016	71	18	3.94

6.1.5 How this fits into the Internal Model Approval Process (IMAP)

As highlighted above, there are sufficient cases whereby the Standard Formula calculation of the SCR is not appropriate for the risk profile of an entity. For these the PRA has produced detailed guidelines on how add-ons will be calculated. This indicates that firms could benefit from choosing to adopt an internal model approach, rather than continuing with the standard approach, but receiving a loading each year.

A number of firms have cited the complexity and cost of the internal model approval process as their primary reason for adopting the standardised approach, over an internal model approach, despite believing that the Standard Formula does not appropriately represent the risk profile of their business.

This leaves (often smaller) entities for which the standardised approach is inappropriate but are unable to meet the stringent and costly requirements of the internal model approval process in a difficult situation. Not only could they face perpetual capital add-ons, but they are left with a model that does not necessarily enlighten them on the risks facing their business. This is a key problem.

The need for a more practical approach to internal model approval is evident, however, any changes to these requirements would need to be carefully considered so as to not diminish the rigor of the regulatory regime, and place the equivalence of UK legislation with EU regulations at risk.

6.1.6 Proposed Solutions and Suggested Improvements

Although the internal model approval process could be adjusted in a number of different ways, the working party proposes the consideration of management capital add-ons, much like the supervisory capital add-ons discussed in previous sections. These add-ons could be used in instances where it is felt that an applicant entity is not able to meet all the IMAP requirements just yet, but does have a materially representative internal model in place that would provide for a SCR that is more representative of an entities risk profile.

Like supervisory add-ons, managerial capital add-ons would have to be required to be set at a sufficiently onerous level so as to encourage firms to address the shortcomings of their models. Managerial add-ons should also, like supervisory loadings, also be allowed for a limited period of time, allowing for the issues to be addressed, but not providing firms with a ‘way out’ of proper model implementation and validation.

The more ‘acceptable’ use of management loadings does appear to be one way of allowing firms more freedom with their models, whilst still acknowledging the potential shortcomings and limitations of their models.

All loadings would need to be appropriately justified, and in themselves, would need to be approved by the PRA.

The reluctance of the PRA to accept management loadings is, however, noted. This is particularly evident in their 2016 directive SS17/16[36]: *Internal models – assessment, model change and role of non-executive directors*:

"The PRA can approve an internal model application only where it is satisfied that the model has met all the Directive tests and standards (T&S). Approval must be based on this requirement and not an 'on-balance' judgement. **Some firms have proposed applying internal management loadings to models to help deal with known areas of weakness which cannot be fully fixed ahead of the formal application.** In some cases, such adjustments might help firms to demonstrate that specific areas of the model meet the relevant T&S (for example, the Directive calibration standard of 99.5% over one year). However, all areas of the model must meet the Directive requirements and the use of more generic management loadings cannot be used by firms as a mitigant where the model does not meet the required T&S."

6.1.7 Conclusion

It is evident that capital add-ons are an effective capital tool and could potentially be used to make having an internal model attainable to more firms. It is, however, unclear whether the PRA could be persuaded to consider the more routine use of management capital add-ons to compensate for inadequacies identified by the firm for its internal model at the application stage, and throughout the use of the model. The working party believes that this should be more thoroughly considered by the regulator, but acknowledges that strict requirements would need to be put in place to ensure that these capital add-ons do not have a detrimental impact on the effectiveness of the Solvency II regulations on firms.

[36] https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2016/ss1716

6.2 Non-compliant Asset Backed Securities (ABS)

6.2.1 Issue

Solvency II imposes onerous monitoring (Article 256 of the Delegated Regulations) and capital (Article 178 of the Delegated Regulations) requirements on firms holding investments in securitisation positions.

Further, where the investments are assessed as not meeting stringent rules (Article 135(2) of the Directive and Article 254 of the Delegated Regulations), in particular that the issuer of the security must retain at least 5% of the exposure ('net economic interest') to the security or the underlying assets, additional burdens are placed upon the (re)insurance entity (Article 257 of the Delegated Regulations). These burdens include:

- Immediate notification to the supervisory authority;
- An increase to the capital requirements of these securities by no less than 250% (in spread risk when using the Standard Formula) as determined by the supervisory authority; and
- Potential assessment by the supervisory authority of a breach in the firms system of governance.

Generally, EU securitisations issued after 1 January 2011 are required to comply with the risk retention requirements. However, the application of the above rules to non-EU, notably US, issued securitisations are not always clear and, while they may have a retention requirement or an underlying guarantee, may not meet the Solvency II requirements.

The above puts EU regulated entities at a disadvantage compared to non-EU regulated peers who have less regulatory restrictions on their investment decisions.

6.2.2 Proposal to Carry Forward as a Working Party

The compliance requirements are generally fine for UK firms investing in UK or wider EU securitisations. However, globally exposed non-life firms will generally invest significant proportions of their assets in US securitisations such as student loan, mortgage or credit card backed securities. Where these are deemed non-compliant, the firm, as set out above, will be subject to additional monitoring and capital requirements.

This leads to anti-competitive outcomes and is unintuitive given most of these securities are highly rated and some even supported by government guarantees.

We believe this is a significant issue for the UK non-life industry and it should be carried forward by the working party.

6.2.3 Proposal to fix/amend the issue

The working party currently does not have the expertise or time to investigate and recommend detail solutions or alternatives to these requirements. However, the solution could be relatively pragmatic, such as:

- Scrap these requirements all together. They are EU specific rules which discourage non-EU asset backed security investment. The credit rating and duration, as applied through the spread risk calculation should be the sole determinant of the capital requirement.
- PRA clarifying the application of the rules with a view to giving firms confidence to process with investment decisions.
- Applying equivalence rules for US originated bonds already complying with US regulation similar to Solvency II.
- Permit exemptions of ABSs which have underlying guarantees.

6.3 Tail Dependencies

6.3.1 Issue

The Standard Formula is a relatively simplistic, deterministic model for assessing (re)insurance firms' capital requirements. The formula is primarily based on factors of exposure measures for each risk category and sub-category. The methods and assumptions to aggregate risk components are also relatively simplistic. In all cases, linear correlation matrices are used to derive diversification benefits. These apply fixed factors to the results of two independently derived risk components to aggregate these amounts in to a single capital charge.

The potential issue here is that the factors do not adequately represent the level of dependency which exists at the percentile and over the time horizon which the Standard Formula targets – 99.5th VaR over one-year. As the Standard Formula does not provide the full distribution of outcomes for the (re)insurance company's balance sheet – it targets the 99.5th percentile only, there is no need for a complex copula structure which varies the level of correlation depending on point of the distribution. As such, a linear dependency structure may be appropriate provided the correlation parameters are adequately parameterised to capture the inter-dependency of risks at that point of the distribution. This is largely dependent on how these parameters were derived in the first instance. For example, deriving correlation parameters through an assessment of historical movements is (depending on the amount of historical data used) unlikely to capture the different nature and relationship between these risks in extreme circumstances.

A common example often cited is the response of the investment markets following the World Trade Centre attacks in 2001. Typically, insurance events and investment market performance is relatively unrelated, however following the extreme events of 9/11, the investment market response was severe, indicating a degree of dependency in the extremes.

6.3.2 Proposal to carry forward

We propose not to carry this subject forward.

Short of a benchmark survey of internal models on their tail dependency (which even then could be wrong) or a very in depth analysis of historic events to analyse the level of dependency at the 99.5th percentile, there is little which could be done as a working party to investigate whether the level of correlation is appropriate. Further, the reason assumptions need to be made is the lack of historical data to perform these types of analyses.

EIOPA's document "The underlying assumptions in the Standard Formula for the Solvency Capital Requirement calculation"[37] notes on page 8 that coefficients have been "*chosen in such a way as to achieve the best approximation of the 99.5 % VaR for the overall (aggregated) capital requirement*". We believe it would be difficult to validate this conclusion.

[37] https://eiopa.europa.eu/Publications/Standards/EIOPA-14-322_Underlying_Assumptions.pdf

6.4 Sovereign risk within the Standard Formula

6.4.1 Background to Issue:

There is currently no allowance for market risk on sovereign bonds issued by the European Economic Area (EEA) countries within the Solvency II Standard Formula SCR (Solvency II SF SCR). In light of the increased uncertainty surrounding sovereign bonds issued by certain EU states, this potentially understates the SF SCR, particularly because a sizeable proportion of non-life insurers' assets are invested in sovereign bonds to match their liabilities.

Additionally, this approach is inconsistent with the approach required of internal model firms, where the PRA has specified[38] that sovereign risk should be included in the internal model, unless it can be demonstrated that it is not material. This is because EIOPA recommended that national regulators ensure that internal model firms' risk-weight their holdings of sovereign bonds[39].

This issue is particularly important in light of the potential Greek default and the uncertainty surrounding Italian sovereign bonds. Although, it is worth noting that this issue has previously been brought to light by the European Systemic Risk Board (ESRB)[40] including valid arguments against changing the current approach.

We have identified the following three key potential weaknesses to the current approach, set out below:

1. Drives the asset allocation of insurance companies towards sovereign bonds even when it doesn't necessarily provide the best match for their liabilities;
2. Disincentivises holding a diversified portfolio where sovereign debt is concerned. For instance by geography, state (concentration risk);
3. Incentivises holding low-rated sovereign bonds (spread risk);

These weaknesses are set out in more detail below.

Concentration Risk

Concentration risk measures the risk arising from large investments in individual counterparties and single name exposures. The Standard Formula treatment of concentration risk is as follows.

The capital charge for each single name exposure applies once accumulated single name exposures are above the specified concentration thresholds. The capital charge is calculated as the product of the excess exposure and specified risk factors which are based on the credit quality step of the counterparty.

Article 187(3)(b) of the Delegated Act states that sovereign bonds issued by EU Member states should be assigned a risk factor of 0% and hence a concentration risk charge of zero, while article 187(4) specifies stress factors for non-EU Member states.

The issue with this approach is that sovereign debt is likely to feature in a typical insurance company's top five counterparties, therefore the Standard Formula concentration risk charge is likely to be understated for most insurers. This is a material weakness as it does not provide an incentive for undertakings to hold a diversified portfolio.

[38] http://www.bankofengland.co.uk/pra/Documents/publications/ss/2015/ss3015.pdf
[39] http://www.bankofengland.co.uk/pra/Documents/publications/ss/2015/ss3015.pdf
[40] http://www.esrb.europa.eu/pub/pdf/other/esrbreportregulatorytreatmentsovereignexposures032015.en.pdf?c0cad80cf39a74e20d9d5947c7390df1

Spread Risk

Spread risk measures the risk of a fall in the market value of bonds due to an increase in spreads. Under the Standard Formula, spread risk is segregated into the following asset categories

1. Bonds and loans;
2. Securitisations;
3. Credit derivatives.

Sovereign bonds fall into the first category in accordance with Article 180 of the Delegated Act. The spread risk on bonds and loans is assessed by taking the market value of the instrument and multiplying it by a stress factor. The stress factor is equal to the bond duration and a specified credit quality step that varies by credit rating.

Article 180(2)(b) of the Delegated Act states that sovereign bonds issued by EU Member states should be assigned a stress factor of 0% and hence a spread risk charge of zero, while article 180(3) specifies stress factors for non-EU Member states.

These weaknesses are a potential issue for many firms across the market given that the majority of general insurance firms hold a considerable proportion of sovereign bonds. The working party therefore suggests that a review of the current approach is appropriate and challenges the assumption that sovereign debt is risk-free.

6.4.2 Proposed solution/ suggested improvement:

For the weakness around **concentration risk**, we propose two possible improvements.

Option 1: Allow for concentration risk on sovereign bonds within the SF SCR in line with the requirements for non-EU sovereign bonds.

Option 2: Determine a separate set of risk factors to apply to EU sovereign bonds

For the weakness around **spread risk**, we propose two possible improvements.

Option 1: Allow for spread risk on sovereign bonds within the SF SCR in line with the requirements for non-EU sovereign bonds.

Option 2: Determine a separate set of stresses to apply to EU sovereign bonds

6.4.3 Conclusion

The working party believes that the weaknesses identified in the current approach require the approach to be reviewed. We have put forward some possible solutions to address the weaknesses identified and recommend these be considered at future Standard Formula reviews.

7 Conclusion

Through working on this Working Party it is clear to us that there is ambivalence in the market about Solvency II. While there is a strong belief that it is effective, there remain practical issues to be resolved; some solutions were suggested in our paper. There was a desire to use Brexit as an opportunity to streamline parts of the regulation that are perceived to add little value, such as Pillar III reporting. There was also concern about the lack of flexibility and the increased cost of compliance with Solvency II which has negative impacts on competition.

The single issue that brings together all of the elements above is the risk margin, which is perceived to be impractical, inflexible, have little benefit relative to the cost, and have the effect of creating a competitive disadvantage. Reforming the risk margin would therefore seem to be a priority for the post-Brexit regulatory regime.

8 Next Steps

This paper has provides the PRA with the industry's view on the key practical issues around Solvency II, summarised in a single document. Any modifications to the Directive post-Brexit will be driven by industry views, and this paper, which acts as an informal consultation, is therefore important and will be taken into consideration when new regulations or modifications to existing standards are being defined.

The current paper has focused on the issues related to Technical Provisions and Capital. Reporting was identified as a key issue under the market survey carried out in section 3. Therefore, the next stage is for the working party to focus on the reporting issues and clearly understand the key concerns in this area.

9 Appendix

9.1 Appendix – Bermuda Operational Risk Calculation

Bermuda CIRA (Commercial Insurers Risk Assessment) framework operational risk areas:

a. Business Process Risk – risk of errors arising from data entry, data processing or application design
b. Business Continuity Risk – risk of an event that threatens or disrupts an insurer's continuous operational
c. Compliance Risk – risk of legal or regulator breaches or both
d. Information System Risk – risk of unauthorised access to systems and data, data loss, utility disruptions, software and hardware failures, and inability to access information systems
e. Distributions Channels risk – risk of disruption to an insurer's distribution channel arising from employment of inexperienced or incapable brokers or agents
f. Fraud Risk – risk of misappropriation of assets, information theft, forgery, or fraudulent claims
g. Human Resources Risk – risk of employment of unethical staff, inexperienced or incapable staff, failure to train or retain experienced staff, and failure to adequately communicate with staff
h. Outsourcing Risk – includes a risk of miscommunication of responsibilities in relation to outsourcing, breach of outsource service agreements or entering into inappropriate service agreements

http://www.bma.bm/document-centre/reporting-forms-and-guidelines/INSURANCE%20II/2016%20General%20Business%20Capital%20and%20Solvency%20Return%20Instructions%20Handbook.pdf

9.2 Appendix – List of Acronyms

ABI	Association of British Insurers
ALAE	Allocated Loss Adjustment Expenses
ALM	Asset-Liability Management
ASHE	Annual Survey of Hours and Earnings
BMA	Bermuda Monetary Authority
BSCR	Basic Solvency Capital Requirement
CAT	Catastrophe
CEA	European Insurance and Reinsurance Federation
CMI	Continuous Mortality Investigation
CoC	Cost of Capital
EEA	European Economic Area
EIOPA	European Insurance and Occupational Pensions Authority
ENID	Events Not In Data
EPIFP	Expected Profit In Future Premiums
ESRB	European Systemic Risk Board
EU	European Union
GI	General Insurance
IAIS	International Association of Insurance Supervisors
ICS	Insurance Capital Standards
IFoA	Institute and Faculty of Actuaries
IMAP	Internal Model Approval Process
MCEV	Market Consistent Embedded Value
NATCAT	Natural Catastrophe
NSLT	Not Similar to Life
PRA	Prudential Regulatory Authority
QMC	Quarterly Monitoring Return part C
RPI	Retail Price Index
SCR	Solvency Capital Requirement
TP	Technical Provisions
TSC	Treasury Select Committee
TSI	Total Sum Insured
ULAE	Unallocated Loss Adjustment Expenses
ULR	Ultimate Loss Ratio
USP	Undertaking-Specific Parameters
WACC	Weighted Average Cost of Capital

10 References

- **EIOPA consultation paper and comments**

  https://eiopa.europa.eu/Pages/Consultations/EIOPA-CP-16-008-Discussion-Paper-on-the-Review-of-Specific-Items-in-the-Solvency-II-Delegated-Regulation.aspx

- **CRO Forum Market Value of Liabilities for Insurance Firms – Implementing Elements for Solvency II (2008)**

  http://www.thecroforum.org/wp-content/uploads/2012/10/croforummvlpaperjuly2008.pdf

- **Comments Template on Discussion Paper on the review of specific items in the Solvency II Delegated Regulation**

  https://eiopa.europa.eu/Publications/Comments/Comments%20received%20by%20Association%20of%20British%20Insurers_02-05-2017.pdf

- **Solvency II: Changes to internal models used by UK insurance firms**

  http://www.bankofengland.co.uk/pra/Documents/publications/ss/2016/ss1216.pdf

- **Solvency II: internal models – assessment, model change and the role of non-executive directors**

  http://www.bankofengland.co.uk/pra/Documents/publications/ss/2016/ss1716.pdf

- **EIOPA Report on the fifth Quantitative Impact Study (QIS5) for Solvency II**

  https://eiopa.europa.eu/Publications/Reports/QIS5_Report_Final.pdf

- **Solvency II: resolving the currency risk problem**

  https://www.insuranceeurope.eu/sites/default/files/attachments/Solvency_II-proposal_for_resolving_the_currency_risk_problem.pdf

- **CAT Task force on Standardized Scenarios Report; June 2010; Section 164**

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

  http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0035&from=EN

- **Guidelines on application of outwards reinsurance arrangements to the non-life underwriting risk sub-module**

  https://eiopa.europa.eu/Publications/Consultations/EIOPA_EIOPA-BoS-14-173_Final_Report_Application_Outwards_Reins.pdf ; Technical Annex I

- **Figure 2.2 from IFoA PPO Working Party, GIRO 2015 Report**
- **Standard Formula Appropriateness for Life and General Insurers**
  www.bankofengland.co.uk/pra/Documents/solvency2/session2standardformula.pptx
- **The underlying assumptions in the Standard Formula for the Solvency Capital Requirement calculation**
  https://eiopa.europa.eu/Publications/Standards/EIOPA-14-322_Underlying_Assumptions.pdf
- **CEIOPS' Report on its third Quantitative Impact Study (QIS3) for Solvency II**
  https://eiopa.europa.eu/Publications/QIS/CEIOPS-DOC-19-07%20QIS3%20Report.pdf
- **The PRA's methodologies for setting Pillar 2 capital: 2016**
  http://www.bankofengland.co.uk/pra/Documents/publications/ps/2016/ps2016app6.pdf
- **The PRA's methodologies for setting Pillar 2 capital: 2017**
  http://www.bankofengland.co.uk/pra/Documents/publications/sop/2017/p2methodologiesupdate.pdf
- **The underlying assumptions in the Standard Formula for the Solvency Capital Requirement calculation**
  https://eiopa.europa.eu/Publications/Standards/EIOPA-14-322_Underlying_Assumptions.pdf
- **Solvency II: treatment of sovereign debt in internal models**
  http://www.bankofengland.co.uk/pra/Documents/publications/ss/2015/ss3015.pdf
- **ESRB report on the regulatory treatment of sovereign exposures**
  http://www.esrb.europa.eu/pub/pdf/other/esrbreportregulatorytreatmentsovereignexposures032015.en.pdf?c0cad80cf39a74e20d9d5947c7390df1