The Solvency II Directive provides for two ways of measuring risk. Insurance companies can use either the standard formula or their own (partial) internal model, which must first be approved by the local supervisory authority. It appears likely that, when Solvency II is introduced, the majority of European insurance companies will initially apply the standard formula prescribed for Europe-wide use.

Implementation of Solvency II

As Solvency II approaches, insurers need to set priorities and decide whether they wish to invest in a (partial) internal model to calculate their capital requirement rather than using the prescribed standard approach. Developing and/or obtaining certification of their own internal model is, for example, attractive for well-diversified insurance companies and groups, specialist insurers and any other insurer with a risk situation that cannot be appropriately depicted by the standard formula. By using their own calculation methodology, insurers can represent their portfolio more accurately than with the Europe-wide standard formula and in most cases their risk capital requirement will prove to be lower than with the standard formula.¹

However, the hurdles to be cleared by an internal model to obtain approval are high. One of the key criteria is the evidence that a company is using the internal model for internal management purposes (the “use test”). It has to be demonstrated that the internal model is an integral part of the company’s key management processes and is taken into account in making decisions. In addition to the certification process, which ties up significant resources and hence generates costs – with an uncertain outcome – an internal model is very expensive to develop and operate, which is an obstacle especially for smaller companies. However, the decision to use or not to use an internal model is based not only on the saving in risk capital and the costs expected for its development, maintenance and certification, but also on the expected cost of implementing the Pillar 2 and Pillar 3 requirements.

Current surveys suggest that most European insurance companies will initially resort to the standard formula prescribed for Europe-wide use. The number of companies expected to introduce their own internal model as soon as the new supervisory rules enter into force is below the initial estimates. In particular British insurers, around a hundred of which a few years ago had planned to use an internal model for supervisory purposes, are opting to use the standard formula at first, and more and more German and French companies are joining them. But what alternatives are there to an internal model if a company wishes to depict its actual risk profile more accurately?

¹ According to the QIS5 results, capital requirements decrease by an average of around 20%, mainly due to the actual geographical diversification of property-casualty insurers being taken into account in the internal model. Cf. EIOPA QIS5 Report, p. 114. Online at www.eiopa.europa.eu.
Undertaking-specific parameters

The principles of Solvency II allow “undertaking-specific parameters” (USPs) to be used in addition to the prescribed market-wide standard risk factors if by doing so a company can depict its risk profile better than with the standard approach,\(^2\) given that the parameters are determined in accordance with certain standards.

Property-casualty insurers and health insurers (providing insurance conducted like non-life insurance) may replace the standard risk factors for the premium and reserve risk with their own parameters. Due to the structure of the premium risk, various types of USP can be applied:

The premium risk is calculated according to the current Level 2 text (\(\sigma\) is the factor used for the standard deviation).

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\sigma \text{ (Non-life premium risk)} = \sigma \text{ (Non-life gross premium risk)} \times \text{NP factor}\]

In order to calculate the premium risk for non-life using a USP, you can replace either

a) \(\sigma\) (Non-life premium risk) directly with a USP, or

b) \(\sigma\) (Non-life gross premium risk) with a USP, or

c) the NP factor used to recognise non-proportional reinsurance with a USP.

Only one of the options may be applied, and in particular b) and c) cannot be used at the same time. Only option a) is available for the reserve risk because of the calculation methodology used.

The standard NP factors prescribed are 80% for motor liability, fire and general third-party liability, and 100% for other classes. Hence, only by using USPs can the effect of non-proportional insurance for the premium risk for classes other than the three mentioned above be recognised in the standard formula.

For life insurance companies and health insurers (similar to life business), the choice is limited to the factor for the sustained rise in pension benefits in the revision risk.

USPs can be derived from both a company’s own data and relevant external data. There is, however, one hurdle to be cleared: like internal models, USPs can only be used for supervisory purposes if approved in advance by the local regulator. Data quality requirements must be met, and standard methods must be followed to calculate the USPs. If a company only uses USPs for selected fields of business, it has to explain why the standard parameters are appropriate for the areas in which it is not proposing to use USPs. The current draft of the implementing measures contains information on both the data and methodology requirements and the approval process (Table 1).

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\(^2\) Cf. Solvency II Directive, Article 104 (7).

\(^3\) The NP factor reflects the risk-reducing effect of non-proportional contracts.
Calculation methodology

In the current Level 2 and Level 3 drafts, the USPs for the premium risk must be calculated in accordance with options a) and b) on the basis of a credibility approach. The “provisional” USP and the prescribed market-wide risk factor are weighted depending on the length of the data series used.

The following methods of calculating the “provisional” USPs are currently proposed:

- Log-normal distribution for premium and reserve risk
- Run-off triangles for reserve risk

The input for the calculation under the first method is the earned premiums for each accident year and the ultimate loss estimates at the end of the first accident year. The basic principle is to use a log-normal distribution for the ultimate loss estimates. Certain assumptions can produce a negative log-likelihood function.

If the run-off triangle method is used, the loss triangles for the claims payments serve as input parameters and the Merz/Wüthrich formula can then be used to estimate the prognosis error in the economic run-off result. The prognosis error as a percentage of the best estimate is the new risk factor required for the standard deviation of the reserve risk.

Since it is assumed that a longer time series will produce a higher degree of accuracy, the more data available to the company for the USP calculation, the higher the weighting of the USP calculated will be. The weightings also depend on the class of insurance (see Figure 2).

The overview shows that the bar is set high for USPs – similarly to certification of an internal model.

In view of the strict requirements for data quality and analysis, and the approval process, companies intending to use USPs in the standard approach should start working on them well in advance (Figure 1).

Insurance companies should note that, once an application has been approved, permission for a return to the standard parameters will be given only in exceptional and justified cases. This is intended to prevent companies regularly redefining their risk factors in their favour depending on external conditions. Approved USPs will also be subject to continuous examination by the supervisory authority.
For classes of insurance with long run-off periods (which include third-party liability, credit and suretyship insurance), at least 15 years' claims experience is required for a company's own data to be eligible for full recognition. Ten years' claims experience is sufficient for short-tail business.

The calculation under option c) is based on the principle of a correction factor for the disproportionate risk reduction arising out of non-proportional reinsurance treaties. As already mentioned, the calculation of the premium risk in the non-life module of the standard formula is a pure factor model based on predefined standard deviations for each class of insurance and the premium volume. The correction factor is needed to reduce the standard deviation to a level commensurate with the risk.

The methodology for the calculation of the correction factor makes sense if:

- the reinsurance meets the requirements for recognition as a method of reducing risk in the standard formula;
- the underlying per-risk excess of loss treaty substantially covers all loss events in the course of the following year and provides for sufficient reinstatements to cover all losses arising throughout the entire year.

The following input is needed to calculate the correction factor for a particular class of insurance:

- First-loss retention and limit of liability under the underlying non-proportional reinsurance treaty
- Average cost per claim (gross) and its standard deviation
Assuming a log-normal distribution, which would be erring on the conservative side for modelling a single loss amount, and the input parameters mentioned, it would be relatively easy to estimate the average cost per claim after deduction of reinsurance and the associated decrease in volatility.

Thus, the non-proportional correction factor under option c) is based on the comparison between the volatility before and after deduction of reinsurance, making it possible to recognise per-risk excess of loss cover within the standard formula in a way that more accurately reflects the risk.

Current state of the debate

The use of USPs is firmly anchored in the Solvency II Directive. The last quantitative impact study (QIS5) demonstrated that in most cases the use of company-specific risk factors can reduce the solvency capital requirement, but in some cases may increase it (Figures 4 to 64).

On the basis of the results of QIS5, there were a number of areas that, from the perspective of the insurance industry, should have more precise instructions or need to be amended. They include the methodology to be used to derive USPs, and the strict data requirements were also criticised, for example the large number of years of loss data required for a company’s own data to be eligible for full recognition. In QIS5, some 100 companies made use of USPs, split approximately equally between option a) and option c), providing an adequate basis for testing data for both options.

Work on the final definition of the methods for USP calculation is still in progress. The implementing measures are expected to have been finalised by the end of 2012 and the Level 3 technical details in the course of 2013.

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Conclusion

Undertaking-specific parameters enable companies to depict their risk profile better than with prescribed universal standard risk factors. According to the current state of the debate on the implementing measures, for many classes of insurance it will only be possible to take account of non-proportional reinsurance treaties by using correction factors in the calculation of USPs. Companies should therefore consider the use of USPs in good time, as they will not only allow them to depict their risk profile better, but also substantially affect the capital requirements for individual risk modules.

The cost of introducing USPs is lower than for (partial) internal models, but they are still subject to a certification process involving submission of a formal application justifying the methodology and the supervisory authority will then have six months to examine it and come to a decision. Furthermore, there are high data quality requirements and companies will not be able to return to using the standard parameters. However, the current position is that the methods to be used for calculating USPs will be prescribed, so that there will be no development costs and the integration of the USPs into the standard formula will not involve any additional costs either. The decision to use or not to use USPs should therefore be based on a careful cost-benefit analysis.

Munich Re supports its clients and enhances the efficiency and effectiveness of their risk management with broad portfolio diversification and attractive reinsurance solutions. Solvency Consulting has amassed a wealth of experience in dealing with the standard formula, the development and use of (partial) internal risk models and their linkage to value-based portfolio management. Munich Re also plays an active role in industry committees looking at regulation and specialist issues and ensures that knowledge and expertise are transferred and translated into practical recommendations for action on the ground. We are thus able to offer our clients real and ongoing help in preparing for Solvency II.