Solvency II Standard Formula: Consideration of non-life reinsurance

Under Solvency II, insurers have a choice of which methods they use to assess risk and capital. While some insurers will opt for the Standard Formula as the basis for an economic view of their business, they should be aware of its limitations. This report shows how the Standard Formula deals with non-proportional reinsurance and suggests how it might be improved.
Solvency II Standard Formula: Consideration of non-life reinsurance

The Solvency II framework is based on an economic assessment of insurers’ risk and capital. This will oblige insurers to apply economic principles when calculating their required and available regulatory capital. An economic principle-based approach means using market-consistent values for the assessment of the asset and liability side of an insurer’s balance sheet.

Based on their individual situation, each (re)insurance company must answer the question of whether to use the Solvency II Standard Formula or, alternatively, a partial internal model or a full internal model for this calculation. It is anticipated that some companies will rely on the Standard Formula once the Solvency II framework is implemented. While the Standard Formula has many strengths, there are also several issues that require improvement.

The so-called Quantitative Impact Studies (QIS), with which the industry is preparing for the new capital regime, show that proportional reinsurance contracts are fully reflected in the Standard Formula, thus leading to an appropriate reduction of the solvency capital requirements (SCR). However, non-proportional non-life reinsurance in the Standard Formula, such as excess of loss treaties and stop loss treaties, do not create the appropriate full risk mitigation effect for regulatory purposes, as the economic benefits for these solutions are not fully reflected in the Standard Formula. As a consequence, the underwriting SCR could be over- or understated.

Solvency II’s Standard Formula

With the Solvency II Directive the EU has created a modern, risk-sensitive insurance regulatory framework. It is widely believed that the framework will have far-reaching consequences and will transform the insurance landscape throughout Europe. The European insurance industry, in particular the CEA (Comité Européen des Assurances) and the CRO Forum, supports the new framework which will be implemented in late 2012.

The current Solvency I framework only considers insurance risks when determining an insurer’s required capital. Other risks, such as market or credit risks are not considered. Furthermore the Solvency I framework has limits on the consideration of reinsurance for capital relief.2

Whereas Solvency I does not explicitly consider company specific exposures like natural catastrophe risk and market risk, they are considered by Solvency II and as such may lead to a significant increase in the total solvency capital requirements (SCR). On the other hand, a well-diversified asset and liability portfolio can lead to diversification effects, which lower the total SCR.

The design of the Standard Formula is of relevance to all insurers, as supervisors may use the Standard Formula as a benchmark for internal models in the certification process. Additionally, supervisors may request that companies using an approved internal model still apply the Standard Formula (not necessarily just for an initial phase of two years after implementation of the Solvency II framework as proposed by the EU Commission in the draft Framework Directive).

Swiss Re welcomes the shift towards an economic risk-based supervisory system: not only does the project aim to improve insurers’ risk management techniques, it is also expected to create a framework that more accurately reflects the risks borne by insurers. Solvency II will have a significant impact on the industry’s key value drivers and particularly on capital requirements. However, the ultimate benefit for the industry and consumers will depend on the finalisation of the implementation measures which are currently being drafted by the EU Commission.

Structure of the report

This focus report shows how the Standard Formula deals with non-proportional reinsurance and how it might be improved. On the basis of illustrative calculations, the report shows that the Standard Formula only provides limited capital relief for non-proportional reinsurance when compared with the internal model. For the reader interested in the technical background, guidance on the examples is provided. Finally, the report suggests two possible ways of improving the Standard Formula in order to allow for a more adequate consideration of non-proportional reinsurance.

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1 Four Quantitative Impact Studies (QIS 1–4) have so far been conducted by the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS). CEIOPS was established in November 2003 and includes representatives from the insurance and occupational pensions supervisory authorities of the EU Member States. The QIS5 exercise – taking into account the proposed implementation measures and lessons learnt from QIS4 – is expected to be carried out between April and end of July 2010.

2 The utilisation of non-life reinsurance is limited to 50% of the retention ratio (defined as average net claims incurred as % of average gross claims incurred).
A closer look at non-life risks in the Standard Formula (QIS 4)

In the context of the QIS, the Standard Formula calculates the SCR as an aggregation of risk capital figures for underwriting, market, counterparty default and operational risk and their respective modular SCRs (see Figure 1).

With regards to reinsurance, the Standard Formula has certain shortcomings that do not set the right incentives for proper risk management. Proportional reinsurance treaties can be fully considered under the Standard Formula, thus leading to a reduction of the SCR. In contrast to this, non-proportional reinsurance treaties are not adequately considered, and therefore insurance companies often do not receive adequate capital relief for a non-proportional solution. This is because the Standard Formula uses a lognormal distribution and does not allow for the adequate consideration of non-linear risks.

There are several ways of overcoming the inadequate consideration of non-proportional reinsurance:

- Instead of using the Standard Formula, insurers could use a full or partial internal model which would produce more realistic results. This would allow for a more appropriate consideration of non-proportional reinsurance in an entity-specific economic cost and benefit context.
- The EU Commission may come up with a revised approach with respect to non-proportional reinsurance, allowing for more flexibility regarding its risk mitigation effect.

The Standard Formula combines premium and reserve risk to one modular SCR of non-life underwriting risk while the other modular SCR is catastrophe risk. Because of the aggregation of the modular SCRs, the risk mitigation effects of reinsurance will lead to a lower underwriting SCR, base SCR, and total SCR.

The reinsurance effect on catastrophe risk can be considered without restriction, because it is possible to use results from an internal model as input for catastrophe risk. There is also an option to assess the catastrophe risk according to a standardized method described in the technical specification. Here the effect of reinsurance will be considered by deducting the entire cover (including reinstatements) of non-proportional reinsurance from the gross exposure, assuming that this will be used in the 200-year event.

The impact of non-proportional reinsurance in the Standard Formula

The Standard Formula uses the Value at Risk at the 99.5%-quantile (VaR99,5)\(^3\) to quantify the risk capital for the total and modular SCRs, ie a VaR99,5 is calculated for natural catastrophe risk and for premium & reserve risk. But the method for considering reinsurance is different for these risk categories.

For a description of how non-proportional reinsurance mitigates risks, see the box on next page.

In the non-life module of the Standard Formula, reinsurance has a risk mitigation effect on:

- premium risk per line of business
- reserve risk per line of business
- natural catastrophe risk.

\(^3\) The 99.5% VaR measures the loss likely to be exceeded in only 1 year out of 200.
For premium & reserve risk, with a standard deviation and a percentile function, a different approach is followed. Premiums and reserves net of reinsurance are regarded as an underlying exposure that follows a lognormal distribution. The best estimate is given by the sum of premium and reserves (volume measure).

A standard deviation (σ) is calculated as a weighted average of market based standard deviations for premium and reserve risk and different lines of business (model parameters given by CEIOPS).

The weights are defined as the premium, respectively reserves, for each line of business. A potential diversification effect due to geographical diversification, calculated based on a country breakdown of premiums and reserves, is considered as a discount on the volume measure.

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**Risk mitigation by non-proportional reinsurance**

Non-proportional reinsurance is a very flexible risk mitigation instrument that allows for the transfer of a specific portion of the risk from an insurer to a reinsurer, according to limits set by the insurer’s risk appetite. It is typically used to transfer peak exposures, e.g., protect against catastrophe risk by so-called Cat Excess of Loss (Cat XL). Also very common are Working XLs that can be adjusted to any exposure layer where the cedant requires protection. XL reinsurance programmes are frequently used for motor third party liability (MTPL). A typical XL can be defined by priority, a cover, and a number of optional reinstatements. It covers single losses, i.e., the excess loss to the priority. Another type of non-proportional reinsurance is the Stop Loss that defines a priority on the total year’s loss and covers excess losses.

Because of its flexibility, the modelling of non-proportional business is by its nature more complex than proportional business. Unlike proportional reinsurance, the price of non-proportional reinsurance is not linked to the premium income of the cedant but the expected exposure covered under the contract. Thus a thorough assessment of the risk mitigation effect of non-proportional reinsurance needs information on the single losses. However as this is not available in advance, assumptions need to be used on the distributions of loss severity and frequency. Under these assumptions the price will be calculated based on an average claims pattern (expected loss) and not on the total cover that might be used in the 200-year event. However the risk capital calculation looks at the 200-year event. This is neglected by the Standard Formula that takes the price as a measure for the risk mitigation effect of non-proportional reinsurance.

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Thus the SCR for premium & reserve risk (NLpr) is given as:

\[ NLpr = V \cdot p(\sigma) \]

where \( p(\sigma) \) assumes a lognormal distribution of the underlying risk, \( p(\sigma) \approx 3 \cdot \sigma \)

Proportional reinsurance can be considered appropriately by proportionally reducing the underlying exposure (V) and therefore also SCR for premium & reserve risk. If special conditions such as event limits, annual aggregate limits (AAL), loss and profit participations or commutation clauses are introduced, however, these features may not be adequately considered.

Individual risks are not sufficiently considered in the volume measure, e.g., for non-proportional reinsurance the difference between gross and net is the price of the reinsurance, which reflects the best estimate loss covered under this contract but does not reflect the 200-year event.

QIS 4 allows cedants to use individual standard deviations for the premium risks that are based on their historic net loss ratios. Unfortunately this approach is inflexible with regard to changes in the portfolio, such as a change in the reinsurance structure, and therefore in many cases it is not applicable.

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4 The premium & reserve risk capital charge (NLpr) is calculated based on (1) a volume measure (V) describing the exposure of the portfolio, (2) a standard deviation and (3) a percentile function that is used to calculate the VaR of the lognormal distribution that is assumed for the underlying exposure. NLpr is calculated as a product of volume measure and \( p(\sigma) \). The function \( p(\sigma) \) calculates the 99.5%-ile of the lognormal distribution:

\[ p(\sigma) = \frac{\exp(N_{99.5}) \cdot \ln(\sigma^2 + 1)}{\sigma^2 + 1} - 1 \approx 3 \cdot \sigma \]

5 The approach to geographic diversification is not appropriate in the industry’s view. The following analysis focuses on the impact of reinsurance without consideration of geographic diversification.
Table 1 summarises how the Standard Formula considers risk mitigation for the different risk types.

Three simple examples
In order to illustrate Swiss Re’s assessment, three examples with different types of reinsurance are applied on a sample portfolio. To show the differences in the valuation of the reinsurance effect, we will focus on the risk capital charge for insurance premium risk before and after reinsurance, which is used as a modular SCR in the Standard Formula. In our examples, we have used the simulation tool Ricasso as a proxy for the internal model calculation (for further information on the different types of models and Ricasso, see box on next page).

Summary of the examples
The results demonstrate that the individual risk situation is not appropriately considered, particularly with reference to non-proportional reinsurance. The main findings from the three examples are summarised in the table below. In the Stop Loss example (2) the capital relief via reinsurance is substantially higher in the internal model than in the Standard model. In the XL example (3) the internal model also results in substantially lower capital requirements.

The Standard Formula allows the use of undertaking-specific parameters for premium & reserve risk standard deviations, but with two major restrictions:
(a) It is inflexible because it is based on historic net results and thus is only sensible for stable portfolios covered by stable reinsurance programmes.
(b) The assumption of a lognormal distribution might be inappropriate for some underlying risks. For example, this is the case for the gross reserve risk of a portfolio with heavy casualty exposure or the net exposure of a portfolio that is protected by non-proportional reinsurance. This means the risk mitigation effect of some types of reinsurance is only partially considered.

<table>
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<th></th>
<th></th>
</tr>
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<td>Individual standard deviations are considered if the cedant provides at least seven years of historic loss ratios (credibility approach). This method is only appropriate if the reinsurance programme was stable in the last years.</td>
<td></td>
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<td>Reserve</td>
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<td>Entity specific standard deviations were not taken into account for the SCR calculation although they can be provided in the QIS Standard Formula.</td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td>Depending on the method chosen the risk mitigation effect of reinsurance can be fully considered in the Standard Formula, for example the use of internal models is permitted.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Risk | | |
|---|---|
| Premium | Reserve |
| Premium on exposure (volume measure) | Reserve on exposure (volume measure) |
| Premium on standard deviation | Reserve on standard deviation |

Table 1: Mitigation effects of reinsurance in the Standard Formula

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Table 2: Summary of the three examples

<table>
<thead>
<tr>
<th>EURm</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Gross Net Capital relief via reinsurance</td>
<td>Internal Gross Net Capital relief via reinsurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) QS</td>
<td>25.6</td>
<td>12.8</td>
<td>12.8</td>
</tr>
<tr>
<td>(2) SL</td>
<td>25.6</td>
<td>25.1</td>
<td>0.5</td>
</tr>
<tr>
<td>(3) XL</td>
<td>25.6</td>
<td>23.5</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Gross and net refer to capital requirements
Description of the examples
The sample portfolio consists of Motor Third Party Liability (MTPL) policies. The expected premium is EUR 100m. We expect a high frequency of small losses and some large losses, e.g., bodily injuries. The cumulated yearly losses can be modelled as a statistical loss frequency curve. To be consistent with QIS and to facilitate the comparison of the results of the internal calculations with the Standard Formula, we assume that a lognormal distribution can be used to describe the total losses before reinsurance (the underlying risk).

Our assumed lognormal distribution uses the expected premium (EUR 100m) as best estimate and the standard deviation given for MTPL in the QIS specification (9%). Thus $\rho(\sigma)$ is approximately 0.256. Based on these assumptions on the underlying losses we evaluate the impact on the following different reinsurance covers:

1. a 50% Quota Share. Reinsurance commission is at original cost.
2. a Stop Loss treaty with a priority of 120% loss ratio and EUR 100m cover. The reinsurance price is EUR 2m.
3. a XL per risk cover with the following layers:
   - 2 x EUR 3m, unlimited reinstatements (Working XL per risk)
   - 25 x EUR 5m, no reinstatements
   The reinsurance price is EUR 8m.

Standard Formula, partial internal model and internal model
For calculating the required solvency capital position in a Solvency II framework, companies will be able to use either a Standard Formula, a partial model or an internal model.

Standard Formula
In a Standard Formula (e.g., as developed under QIS 4), the company’s risks are measured on the basis of certain pre-determined market parameters (such as standard deviations and correlations). These parameters are provided by the supervisory authority (in case of QIS 4 by CEIOPS). The advantage of a Standard Formula is that the capital requirements are relatively easy to calculate. The drawback obviously is that the risk landscape assumed to derive the parameters is only an approximation of the entity-specific risk landscape. The required capital can be over- or underestimated. The use of the Standard Formula needs no sign-off from the national regulator as it has been defined by CEIOPS.

Partial internal model
A partial internal model includes characteristics of the Standard Formula and of the internal model. In a partial model, some risk modules are calculated on the basis of an internal model (e.g., the non-life insurance risk module), while the other risk modules are measured on the basis of the Standard Formula. The outcomes of both internal model components and the Standard Formula components are then integrated into one approach. The use of the partial internal model needs approval from the national regulator.

Full internal model
An internal model encompasses a quantitative measurement of all risks which are relevant to an individual (re)insurance company. Input parameters for the calculation (such as distribution functions including their relevant parameters, e.g., standard deviations or correlations) are derived from the company’s portfolio. An internal model gives the insurer the ability to steer capital requirements in a most effective way. An internal model does not have to follow the risk category structure of the standard approach. The use of the full internal model needs approval from the national regulator.

Ricasso: A tool which allows for the simulation of the non-life risk landscape.
Ricasso is an example of a tool which can describe the non-life insurance risk landscape. Developed by Swiss Re, the Ricasso software tool supports the modeling of a company’s specific risk landscape. Using Monte Carlo simulations, Ricasso determines how much economic capital a (re)insurance company needs to manage a specific line or a total book of business. It also analyses the effect of different risk mitigation strategies on the economic capital requirement. The tool takes into account both the non-life insurance (underwriting) side and the investment side. In this report, we have used Ricasso for the calculation of the insurance risks. If you are interested in knowing more about Ricasso, please contact your Swiss Re client manager.

To demonstrate the economic impact of reinsurance, we show for each example the net loss probability distribution (after reinsurance) simulated by Ricasso compared to the gross probability distribution (before reinsurance). This is compared with the result from the Standard Formula. While the Standard Formula assumes that also the net losses follow a lognormal distribution, just as with the gross losses, we demonstrate that the net loss distribution and the resulting capital requirements might be indeed considerably different. This is the main reason why the Standard Formula fails with non-proportional reinsurance.

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6 The standard deviation is 9%.
7 Typically further restrictions might apply for Stop Loss treaties, e.g., certain exclusions that we do not consider here.
8 We chose this example for illustrative purposes even though it is an unusual cover.
9 It should be mentioned that internal models commonly show the VaR based on the distribution of the result including premium, claims, and cost. This means that a projected profit may reduce the risk capital requirement. However, QIS does not consider any projected profit.
(1) A 50% Quota Share.
For a 50%-Quota Share the internal model calculation and the Standard Formula show the same required risk capital of EUR 12.8m.

The Standard Formula uses the net premium (50% of EUR 100m = EUR 50m) as best estimate and calculates the premium risk capital charge as EUR 25.6m which is obviously 50% of the gross VaR. Our internal calculation (see Figure 2) shows that each simulated loss is reduced by 50% which applies for best estimate and the VaR, too. Also the standard deviation of 9% is the same for gross and net (before and after reinsurance).

(2) A Stop Loss treaty with a priority of 120% loss ratio and EUR 100m cover.
For a Stop Loss the Standard Formula shows a higher risk capital than the internal model calculation. The Standard Formula shows a premium risk capital charge of EUR 25.1m while according to the internal calculations the VaR$_{99.5}$ is only EUR 20m.

In the Standard Formula the reinsurance price is deducted from gross premium to get the net best estimate premium (EUR 100m – EUR 2m = EUR 98m). The risk capital charge of EUR 25.1m means the risk capital relief effect of the Stop Loss would only be EUR 0.5 m. Indeed the real risk mitigation effect is EUR 5.6m (EUR 25.6m – EUR 20m) because the Stop Loss truncates all losses above EUR 120m which is exactly the VaR$_{99.5}$ of net losses as shown in Figure 3.

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1 $\rho(\sigma) \cdot$ EUR 100m = EUR 25.6m
2 $\rho(\sigma) \cdot$ EUR 98m = EUR 25.1m
The Standard Formula also underestimates the risk mitigation effect of the XL-programme. The risk capital charge for premium risk is EUR 23.5m while we internally calculated a VaR99.5 of EUR 17.8m.

The net premium in the Standard Formula is calculated as the gross premium less reinsurance price (EUR 100m – EUR 8m = EUR 92m). Thus the risk capital charge NLp is EUR 23.5m corresponding to a risk mitigation effect of EUR 2.3m. But our internal calculations show a risk capital relief of EUR 7.8m (EUR 25.6m – EUR 17.8m). The XL cover cuts large losses in excess of the deductible and thus reduces the tail and standard deviation of the loss distribution as shown in Figure 4. It should be mentioned that the actual impact of the XL depends on severity and frequency of losses that contribute to the aggregated annual loss. For our simulation we assumed a varying number of large losses contributing to the total loss that still follows the lognormal distribution.

![Figure 4: Example 3 – XL Programme](image)

<table>
<thead>
<tr>
<th>EURm</th>
<th>Gross</th>
<th>Net</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>100.0</td>
<td>92.0</td>
<td>–8.0</td>
</tr>
<tr>
<td>Required capital, Standard Formula, (NLp)</td>
<td>25.6</td>
<td>23.5</td>
<td>–2.1</td>
</tr>
<tr>
<td>Required capital, Internal model, VaR99.5</td>
<td>25.6</td>
<td>17.8</td>
<td>–7.8</td>
</tr>
</tbody>
</table>

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12 $p(\sigma) \times EUR 92m = EUR 23.5m$
13 Without differentiation between severity and frequency the impact of XL could only be captured approximately.
Two possible improvements in the Standard Formula

The Standard Formula should also allow insurers who do not have an internal model to show their VaR_{99.5} per line of business in an appropriate way, both best effort-based and well documented. We suggest two approaches as to how this could be achieved within the Standard Formula:

A) Specific adjustment factors could be used to adjust the result from the Standard Formula to the VaR_{99.5}. The individual adjustment factor would be dependent on the structure of the reinsurance cover, such as structure of layers, number of reinstatements, etc.¹⁴

This would allow for the adjustment of the Value-at-risk that is calculated based on the 99.5%-quantile of a lognormal distribution with market average standard deviation to any other assumed distribution or standard deviation (see Figure 5).

B) An additional module for large losses could be introduced into the Standard Formula or be incorporated into the Scenario section. Based on assumptions on the expected severity and frequency of large losses per line of business, defined shocks could be applied to these estimates. The exact effect of any reinsurance on the shock scenarios can then easily be calculated.

This requires some effort from the insurance company to calculate the 99.5%-VaR adjustment factor. An assessment of the economic effect of the reinsurance programme is done regularly, with the support of actuarial consulting firms or the reinsurer which has its own interest in properly assessing the risk transfer. However, it can be expected that this would require that the insurance company using individual parameters provides sound reasoning to the supervisor. The determination of f_{adj} is subject to actuarial judgement. It could also incorporate more realistic assumptions for the gross exposure like frequency and severity of claims, as used for the second approach.

¹⁴ For example, a single individual adjustment factor (f_{adj}) for premium and reserve risk could be used per line of business to adjust the VaR_{99.5} to a value that takes the reinsurance into account in a more appropriate way:

\[
\text{VaR}_{99.5 \text{ [lob, prem, res]}} = \text{VaR}_{99.5 \text{ [lob, prem, res]}} \cdot f_{adj \text{ [lob, prem, res]}}
\]
Conclusions
This report has demonstrated with the aid of examples that the Standard Formula, as developed for QIS4, is not capable of considering the full risk mitigation effect of non-proportional reinsurance. This contradicts the fundamental objective of the Solvency II framework which is to provide a meaningful picture of the true economic risk landscape, including all relevant risk mitigation instruments. In general, the effect of non-proportional reinsurance is more difficult to assess because of its diverse nature and the unpredictable development of reinsurance programs over time. As a consequence the underwriting SCR could be over- or understated by the Standard Formula, as has been demonstrated in the examples.

The recognition of reinsurance is different for premium & reserve risk:
- For premium risk it is possible to map some risk mitigation effect but some effort is required for the calculation of the individual standard deviations. It requires that the reinsurance programme is stable over time. Historic loss ratios are not a good estimate for the future, even for the gross portfolio. In many situations the real risk mitigation effect is not considered as our examples show for the Stop Loss and the XL programme. There is a clear case for change in further Quantitive Impact Studies.
- The reserve risk also depends on the reserving policy which allows for a reasonable risk mitigation effect for different reinsurance programmes. But reinsurance can provide additional protection in the case of adverse developments, e.g. late claims, or emerging risks. Thus the modelling of reserve risk should be improved in a way that is consistent with premium risk.

As a consequence of the problems described above, any potential solution must balance on the one hand the increased complexity of a model with individual standard deviations, whose implementation requires almost as much effort as a partial internal model, and on the other hand, an easy-to-use Standard Formula with shortcomings.

The Standard Formula is already very complex and we consider that it might best be seen as a preparatory step for partial or full internal models. This step makes sense because the parameters that are used in the Standard Formula are based on the “average European insurer” and are not necessarily appropriate for every insurance company. Partial or full internal models that are based on different principles, including stochastic risk factors and individual correlations, would produce a more accurate estimate of the required solvency capital. Internal models assess the entity specific risk profile, because they can reflect the real standard deviations and correlations and allow for individual threat scenarios.

While it might be acceptable for some insurance companies to use the Standard Formula to calculate the regulatory capital, it is suggested that insurers refrain from using it to steer the business.
Recommendations

Based on their individual situation, each insurance company must answer the question of whether to use the Standard Formula, a partial internal model or a full internal model. The larger the company and the more complex the business it generates, the more appropriate a partial internal or a full internal model might be. Users of the Standard Formula should be aware of its shortcomings.

Some improvements are expected for the Standard Formula in QIS 5 which is due to be conducted in 2010, e.g., the use of entity specific parameters or adjustment factors. This might improve the effectiveness of the Standard Formula. Insurers and reinsurers will continue to monitor these developments and compare the results from the Standard Formula with internal assessments to decide whether a potential deviation is acceptable. Reinsurers can support this assessment.

Companies wary of the effort needed for a full internal model might consider partial internal models which may be only a small step away from the Standard Formula. While the development of an internal model requires major effort, a partial internal model can be implemented with fewer resources. Today there are actuarial tools available on the market with standardised modules that can be customised for calculating the appropriate VaR with the same or less effort than with the Standard Formula. This allows the company to benefit from a more appropriate calculation of its capital requirements.