Reinsurance as a capital management tool under Solvency II

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SOLVENCY II AT SWISS RE

While the full implementation of Solvency II is currently being delayed, there are still many parties pushing for a gradual implementation of some aspects of the framework. This should encourage insurance and reinsurance companies to continue with the work required to become compliant with the different aspects of Solvency II. This effort to implement and embed in the business the changes required by the framework should not be underestimated. At Swiss Re, we have had a program running for the past 3 years to ensure that our various legal entities based in the European Economic Area (EEA) operate in line with the new rules. It has been a significant effort even though we had significant advantages from the start:

- There is a strong culture of risk management within the company
- We have an existing framework for an Economic Value Management (EVM) and have been publishing our EVM results since 2008, we have been steering the business according to this economic basis
- We developed our Internal Model more than 15 years ago, constantly improving its level of sophistication and the governance around it since then
- We are operating under the Swiss Solvency Test (SST) framework, a regime that we expect will be considered equivalent to Solvency II

Despite this we needed to invest in the setting up of the production environment to produce the detailed reporting required under Solvency II as well as implement the specific governance required under the framework. Pillar I also required a significant effort to ensure that the Internal Model and related governance was well aligned with the requirements and properly embedded within the various legal entities in scope. The Internal Model Approval Process (IMAP) has also required significant resources.

We have made very good progress and are now in a position to be able to make Solvency II operational with limited additional efforts. The expertise built up in this process has also allowed us to contribute to the work done on assessing the continued appropriateness of our various reinsurance solutions in a Solvency II world.

REINSURANCE AS A CAPITAL MANAGEMENT TOOL

1. Consideration of reinsurance under Solvency II

One of the aims of Solvency II is that insurance companies manage their business on a risk basis. The use of risk-mitigating techniques, such as reinsurance, allows companies to reduce their risk exposure and therefore their Solvency Capital Requirement (SCR). Article 101.5 of the Solvency II directive deals with the recognition of risk-mitigating techniques:

"When calculating the Solvency Capital Requirement, insurance and reinsurance undertakings shall take account of the effect of risk-mitigation techniques, provided that credit risk and other risks arising from the use of such techniques are properly reflected in the Solvency Capital Requirement."

This means that an insurer whose portfolio is protected by reinsurance can take this protection into account when calculating its solvency position. On the other hand the insurer has to make sure that the risks arising from a reinsurance contract, e.g. default risk, are taken into account as well. It has to be noted here, that intra-group reinsurance solutions can lead to an SCR reduction at entity level. However, at group level, only external reinsurance can lead to an SCR reduction.

The impact of a reinsurance solution will mainly affect the underwriting modules (life, health, non-life). Without quantifying the impact of different solutions, Graph 1 gives an overview of available reinsurance solutions to reduce each of the underwriting risks. The life underwriting module serves as an example here.

2. Optimising the SCR and maximising diversification

When talking about optimising the SCR two different aspects have to be considered. An insurer can either reduce its SCR in an efficient way, or it can assume more risks while benefiting from diversification effects so that the additional SCR that has to be provided is less than the standalone requirement for the additional risks taken. When trying to minimise the SCR there are generally two different possibilities:

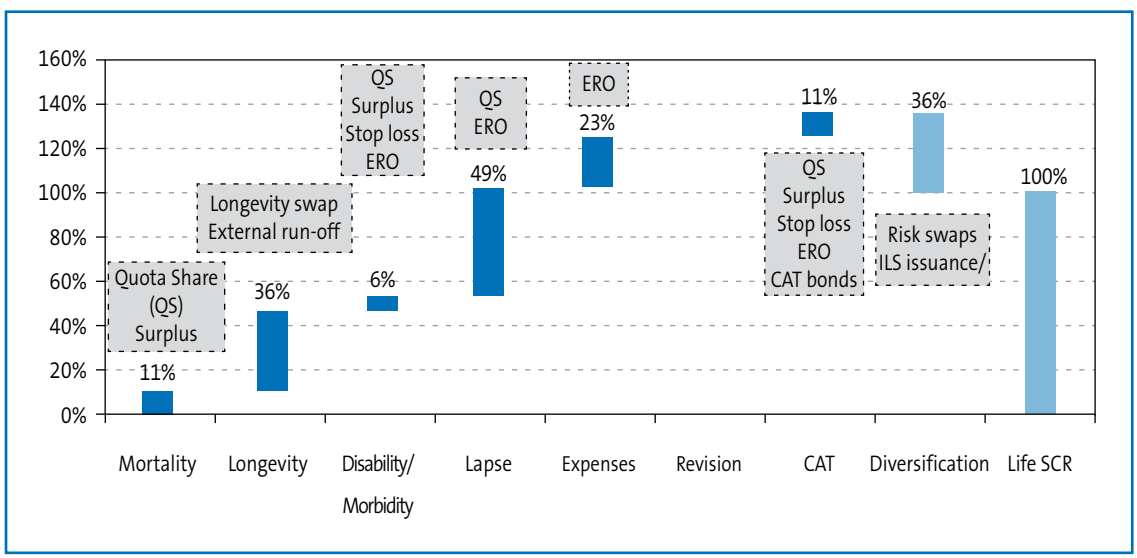
1) Reduction of market risks
2) Reduction of underwriting risks

This also means that each of the possibilities will first of all reduce the requirements in either market or underwriting risk modules on a standalone basis and that this standalone reduction will then be reduced by the diversification effect when calculating the SCR. The nature of the SCR formula has two effects:

1) The highest reduction of the SCR can be achieved by reducing the exposure to the most significant standalone risks (mortality, longevity, etc.) or risk module (i.e. market, life, health, non-life)
2) Increasing the exposure to the smallest requirement leads to the lowest additional SCR

The two points above show the aim of the Solvency II framework to encourage diversification. For instance an insurer mainly exposed to longevity can assume mortality risks with relatively little additional capital. The same effect applies at the level of market, life and health modules. Graph 2 shows a plain of different standalone module requirements that always add up to 100 (i.e. market =100 - life - health) but with different weights. The plain

GRAPH 1.



area is the resulting SCR (for this purpose, BSCR and SCR will be considered the same) based on those weights. The minimum SCR has to be provided, and as such the highest diversification is obtained, in the case where all three modules have the same weights (i.e. 1/3, 1/3, 1/3). In this case, the SCR amounts to roughly 70% of the undiversified risks.

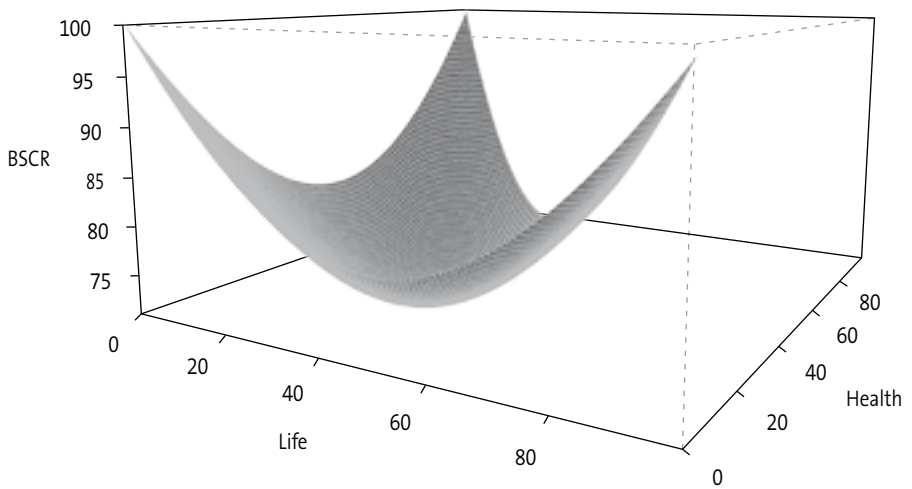
In a same way as above for each of the risk modules, there is a maximum diversified risk profile. Graph 3 shows how the optimal diversified life underwriting module looks like.

It is highly questionable if a risk profile like the one above can be obtained in practice. However, it gives an idea in what direction to go. It has to be noted that in this optimal profile, mortality and longevity risk requirements are of almost the same size.

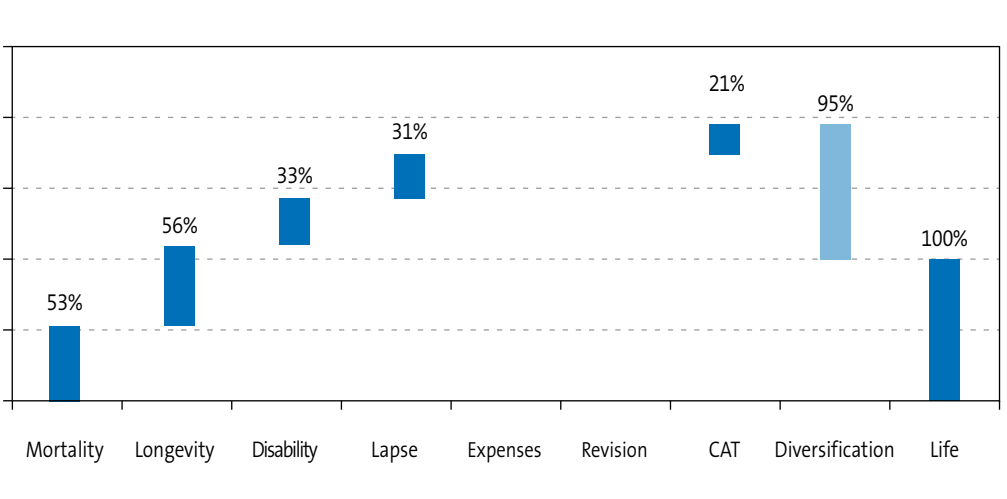
3. Cost of Reinsurance (CoR)

When comparing reinsurance as a capital management solution to other financing tools such as equity or subdebt, a benchmark is needed to compare the benefits and costs of all of those instruments. The costs of equity and subdebt are well known as the cost of equity (CoE) and the cost of debt (CoD), respectively. From a financing side, the benefit of those two forms of capital is also known: One unit of equity or debt increases the own funds by one unit. So in order to make reinsurance comparable to CoE and CoD, costs and capital benefits of the solution have to be compared

GRAPH 2.



GRAPH 3.



over the total contract period, and as such on a present value (PV) basis:

$$\text{Cost of Reinsurance} = \frac{\text{PV (total costs)}}{\text{PV (total capital benefit)}}$$

The total costs of the reinsurance solution consist of the reinsurer's margin and the profits that are ceded to the reinsurer. Under Solvency II, a reinsurance solution will have two effects:

1) reduce the SCR
2) reduce the Risk Margin (as this is a PV of the reduced SCR)

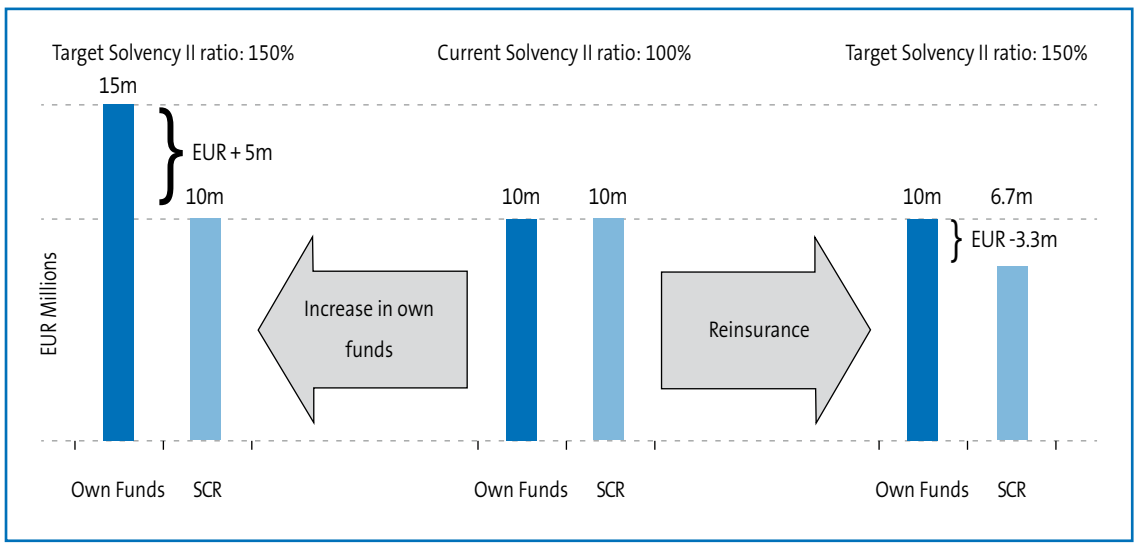
So that the CoR under Solvency II will be equivalent to:

$$\text{Cost of Reinsurance} = \frac{\text{PV (reinsurer´s margin + ceded profits)}}{\text{PV (SRC relief)} * \text{TSR} + \text{PV (Risk Margin relief)}}$$

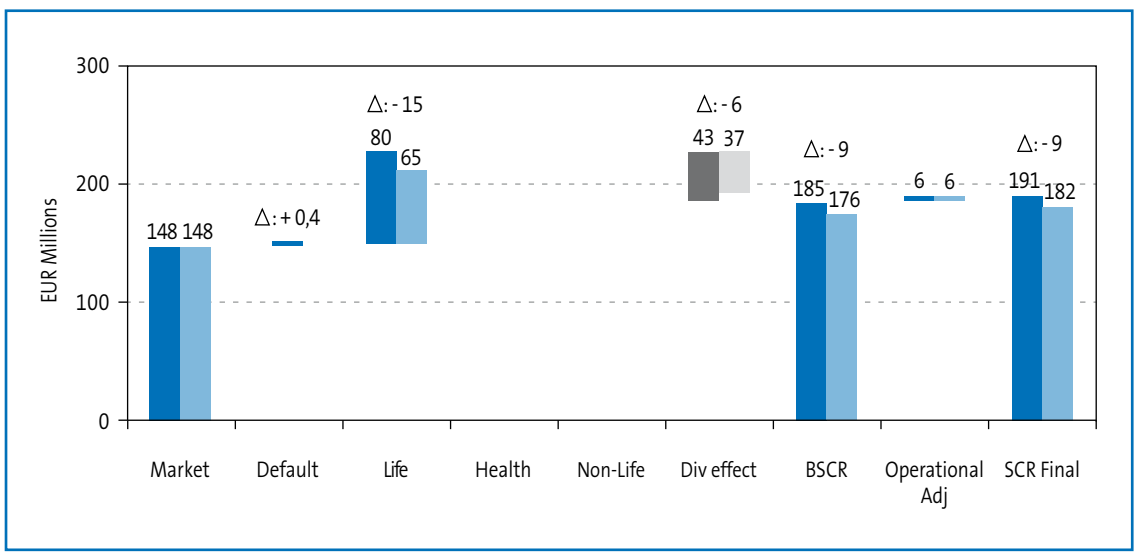
Since the Risk Margin is not part of the Own Funds but of the Technical Provisions (TP), a relief of Risk Margin leads to an increase of the Own Funds, while not further affecting the SCR. The SCR relief has to be leveraged by the Target Solvency Ratio (TSR). The reason for this becomes clear in the following example (Graph 4):

- A company has a Solvency II Ratio of 100% and own funds and SCR of 10m EUR each

GRAPH 4.



GRAPH 5.



- In order to increase the Solvency II Ratio to 150%, the company can increase the own funds by 5m EUR
- Alternatively, the company can buy reinsurance to reduce the SCR by 3.33m EUR

The CoR in life reinsurance is highly dependent on the underlying risk, reinsurance margin and profit commission. The CoR for mortality reinsurance is usually between 3% and 7% and for longevity solutions between1% and 3%. Considering that the current CoE for insurance companies is currently around 10%-15% and the CoD around 5%-8% above the risk-free rate, reinsurance is a much more effective and cheaper capital management tool under Solvency II than equity and debt are.

1. Case study: Mortality Quota Share under Solvency II

The following case study will give an idea of how reinsurance under Solvency II will work for an average Spanish life insurance portofolio (Graph 5 and Graph 6). The model company has an annual premium income of 150m EUR, with 40% of it from risk insurance, 17% deferred annuities, 19% (traditional) savings business and 24% unit linked products. The total assets under management of 1.1bn EUR are invested to 80% in bonds of different investment grades (AAA-B). 16% of the assets are invested in equity and the remaining assets are property investments and some cash.

The insurance company above agrees to a 50% quota share on all risk insurance products. This reinsurance agreement grants a 95% profit commission after a 5% reinsurance margin.

With the reinsurance contract, the insurer could reduce its SCR from 191m EUR to 182m EUR (-5%) in year 1. In addition, the Risk Margin is being reduced by 10m EUR in that year. Until run-off of the portfolio, the SCR relief amounts to 100m EUR and the Risk Margin relief to 49m EUR. All in all, the Solvency II ratio of that company rises from 105% to 113% by performing this transaction.

The price of this reinsurance arrangement is 5.5m EUR (until run-off). With the available numbers above, the CoR, according to the formula in this article, is given as:

$$\text{Cost of Reinsurance} = 5.\frac{5\text{m}}{100\text{m} * 113\% + 49\text{m}} = 3.4\ \%$$

CONCLUSION

The reasons to buy reinsurance will not change under Solvency II, but the way that reinsurance is looked at when talking about solvency capital management. Reinsurance as a flexible and cheap capital management tool will have an increasing influence under Solvency II, also because of the more limited effect of intra-group reinsurance on capital requirements. This article introduced the concept of the Cost of Reinsurance, which is not only a concept to benchmark reinsurance versus other forms of capital, but also to measure in general the effectiveness of reinsurance under Solvency II and to support buying decisions. Furthermore, the case study has shown that mortality quota shares can be a cheap capital management tool, while at the same time not ceding a majority of the profits.

Swiss Re has developed a tool with which the influences of reinsurance solutions on capital requirements under Solvency II can be calculated for specific client portfolios. We are happy to provide such customised case studies upon request.

GRAPH 6.