Life (re)insurance under Solvency II

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Introduction

The introduction of the new European supervisory System, Solvency II, is around the corner, even though now with a modified timetable compared to the initial planning. Insurers and reinsurers will face important and far-reaching changes in all areas of corporate management. The current process of solvency capital calculation, which is in the area of responsibility of only a few people within the company, will be expanded – not least due to the new "Own Risk and Solvency Assessment" process (ORSA) – to the entire company.

Obviously the risk exposure of the insurance company will not change due to Solvency II. But the introduction of Solvency II with the new rules on how to calculate company's solvency capital requirements (SCR) will provide a comprehensive insight into the company's own risk situation and enable the management to align the company's strategy.

Based on SCOR's Group Internal Model (GIM) and its long-term experience with the Swiss Solvency Test (SST), SCOR has put in place a high diversification strategy which is a competitive advantage in the Solvency II framework. With a more than 50% share of life reinsurance business within SCOR's total portfolio, SCOR Global Life leverages a well-balanced diversification benefit that it can share with its clients.

After a short introduction and a summary on the latest quantitative experiences **this publication focuses on** the additional capital requirements European life insurers will be facing and **how life reinsurance can be used to efficiently optimise company's solvency capital requirements under Solvency II.**

The changing environment: From Solvency I to Solvency II

The 3 pillar approach of Solvency II on its own, with the clear separation between quantitative and qualitative requirements as well as the public disclosure obligations, makes a comparison with its predecessor system, Solvency I, almost impossible.

Table 1: Main characteristics of Solvency I and Solvency II

	Solvency I	Solvency II
Basic idea	Rule based	Principle based
Calculation methodology	Simple formula	Complex standard formula resp. internal models
SCR-Basis of calculation	Premiums, reserves and insurance benefits (claims payments)	Best Estimate assumptions of all cash flows
Risks taken into account	Underwriting risk	Underwriting risk Market risk Counterparty risk Operational risk
Reinsurance	Limited recognition of reinsurance	Comprehensive recognition of reinsurance
Approach	Simple quantitative approach	Quantitative and qualitative approach
Addressee / Receiver	Supervisory authorities	Supervisory authorities and public

A brief comparison of both systems should identify how the capital requirements of insurers and the impact of reinsurance will change with the transition from Solvency I to Solvency II. While the capital requirements under Solvency I are only based on biometric risks and the corresponding reserves [1], only related to insurer's liabilities, Solvency II takes all balance sheet positions as well as all significant risks, the undertaking is exposed to, into account. Thus, Solvency II is far more than only a required evidence of holding sufficient capital, as is the case for Solvency I.

Recognition of the entire risk situation of the undertaking

While the rule based supervisory system, Solvency I, focuses on the fulfilment of all quantitative capital requirements, the new principle based supervisory system, with its 3 pillar approach, refers not only to the quantitative requirements but also to qualitative ones under pillar 2 and the public disclosure obligations under pillar 3. The transition from Solvency I to Solvency II is consequently more than just the change from a simple formula to a more complex calculation of the SCR. It is also the introduction of a comprehensive risk management system, that will enable the general management of the company, to detect the entire risk position of the undertaking and to derive appropriate actions and management rules. Furthermore, Solvency II will put the supervisory authorities in the position to identify and to verify the actions taken by the management at a very early stage.

1 • Under Solvency I the Life Solvency Capital Requirement is expressed as a per mille factor of the sum at risk (1 - 3‰) plus a percentage of the corresponding mathematical provisions (4%). Reinsurance covers are only recognized up to a limit of 50% of the sum insured and 15% of the reserves. (Directive 2002/83/EC of the European Parliament and of the Council of 5 November 2002 concerning life assurance)

Graph 1: Components of SCR calculation under Solvency I and Solvency II

The risk exposure of an insurance company will not change following the transition from Solvency I to Solvency II. The capital requirement will change due to the fact that for the first time almost all measurable risks will be taken into account while calculating company's solvency capital requirements.

Solvency I
Capital Requirements

Underwriting Risk

Reinsurance

Market Risk

Credit Risk

Operational risks

+ new Solvency II
Capital Requirements

Graph 2: Components of the Solvency II standard formula (according to QIS 5 technical specifications, July 5th, 2010)

SCR

Adj   BSCR   Op

Market   Health   Default   Life   Non-life   Intang

Market	Health		Default	Life	Non-life
Interest rate	SLT Health	CAT	Non-SLT Health	Mortality	Premium Reserve
Equity	Mortality		Premium Reserve	Longevity	Lapse
Property	Longevity		Lapse	Disability Morbidity	CAT
Spread	Disability Morbidity			Lapse	
Currency	Lapse			Expenses	
Concentration	Expenses			Revision	
Illiquidity	Revision			CAT	

= included in the adjustment for the loss-absorbing capacity of technical provisions under the modular approach

In conformity with the technical specification of the Solvency II standard formula (according to QIS5) the Basic Solvency Capital Requirement (BSCR) is composed of the following components (risk modules):

- Market risk
- Health insurance risk
- Counterparty default risk
- Life insurance risk
- Non-life insurance risk
- Intangible asset risk

Each of these components are composed of sub modules which reflect the main sub-risks that can be summarized under the respective main risks, e.g. the mortality and longevity as part of the life underwriting risk. For all these sub-modules a separate SCR is required. Each SCR can be expressed as the change in net asset values caused by certain deviations from the best estimate assumptions, e.g. the change in future cash flows caused by an increase of incidence rates, while Solvency I only focussed on the ability of the company to pay a predefined number of claims (e.g. 3‰ of

sum at risk) plus the increase of reserves by a fixed interest rate (e.g. 4%) in the following year.

First experiences from quantitative impact studies

Due to the economic approach and the fixed date evaluation of all assets and liabilities, the capital requirements for insurance companies will be more volatile in the future, especially for life insurance companies. The current rules of thumb for measuring the solvency ratio will be outdated and replaced by extensive calculations following the Solvency II standard formula or a potentially approved internal model. The main driver within the different risk components will be the market risk from which the highest fluctuation can be expected. On a European level it turned out that the market risk represents the main risk driver for life insurance undertakings under Solvency II. It represents more than ⅔ of life insurer's BSCR, followed by the Life underwriting risk with almost ¼ of the BSCR.

Graph 3: Diversified BSCR – Life undertakings (solo) [2]

Diversified Risk Charge
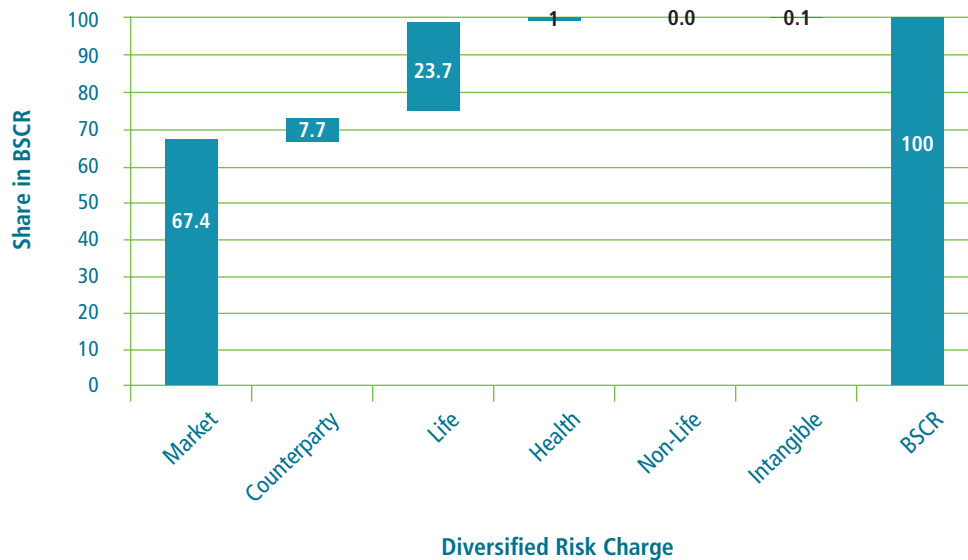
2 • Source: EIOPA Report on QIS5 results.

Main reasons for signing a life reinsurance treaty

Currently, strong drivers for singing life reinsurance treaties are financial as well as risk related, e.g. the reduction of insurance liabilities per risk or the reduction of solvency capital requirements. The homogenisation of life insurance portfolios, the financing of acquisition costs and getting access to services, provided by the reinsurer, like underwriting manual or product development support, are also important arguments for signing life reinsurance treaties.

All of these reasons will still be valid under Solvency II. In addition to that and due to the new requirement for setting up a risk management system, the implementation of an appropriate reinsurance strategy will also be an integral part of the risk management of each company (Solvency II directive, article 44).

Table 2: Main reasons for signing life reinsurance treaties under Solvency I and Solvency II

Solvency I	Solvency II	Pillar	
Limitation of risk and homogenisation of portfolio		1	Biometric risks
(Facultative) cover for higher risks (providing capacity)		1	
Financing support for new business		1	Financial aspects
Arbitrage opportunities (reinsurance less costly than direct business)		1	
Reduced volatility of annual results		1	
Reduction of required capital		1	
	Risk management	2	Risk Management and governance
Access to reinsurance expertise and services including product development		2	
	Optimising required capital	2	
	Positive public recognition of reinsurance cover	3	

The reinsurance of biometric risks

Since the current formula of Solvency I capital requirements is only based on sums assured and reserves, the longevity risk, which is embedded in annuity products, is not recognized suf-ficiently. This will change under Solvency II where a separate capital for the longevity risk will be required. The latest quantitative impact studies (QIS4 and QIS5) identified the longevity risk as the most important biometric risk of European insurance companies, even more important than death risk.

Graph 4: Life Underwriting Risk Composition – (All undertakings solo) [3]
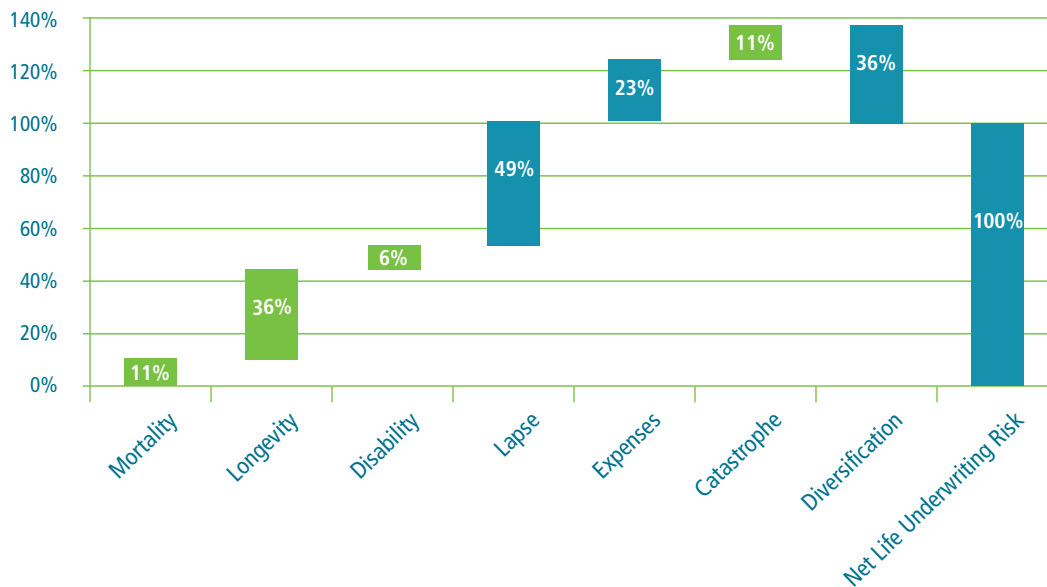
Focusing on longevity risks, the life insurer can reduce their solvency capital requirements by signing an appropriate reinsurance contract, e.g. a longevity swap.

Longevity swap reinsurance arrangement

As a consequence of increasing life expectancy the uncertainty about future annuity payment durations is also increasing. The longevity swap is an appropriate reinsurance solution for closed blocks of annuities in payment in order to reduce this longevity risk in annuity portfolios.

The basic idea of this reinsurance solution is to swap uncertain future annuity payments against determined future payments. This swap is based on a mutual agreed mortality table, which should reflect the expected mortality development of the underlying annuity portfolio plus a margin. Based on this guaranteed mortality table all future annuity payments can be determined at the inception of the reinsurance contract. This future cash flow (expected annuities) represents the reinsurance premiums the cedant is going to pay to the reinsurer, while the reinsurer agrees on paying the actual annuities to the cedant. Obviously the cedant maintains the financial risk while the reinsurer participates in the longevity risk. **The longevity risk is ceded to SGL, as shown on the following graph.**
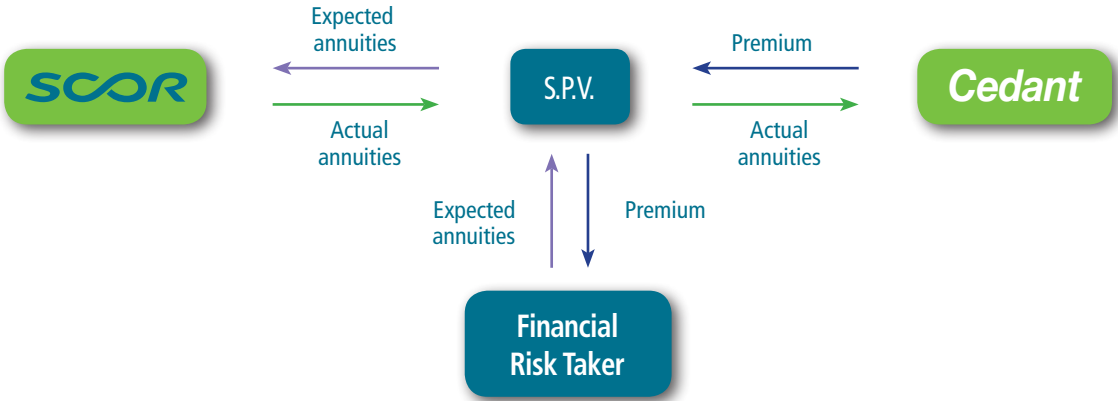
In case the insurer is also interested in ceding the market risk, a third party (e.g. a bank) who reinsures exclusively the financial risk, could be integrated in a more complex reinsurance structure.

Graph 5: Cash flow structure of a longevity swap
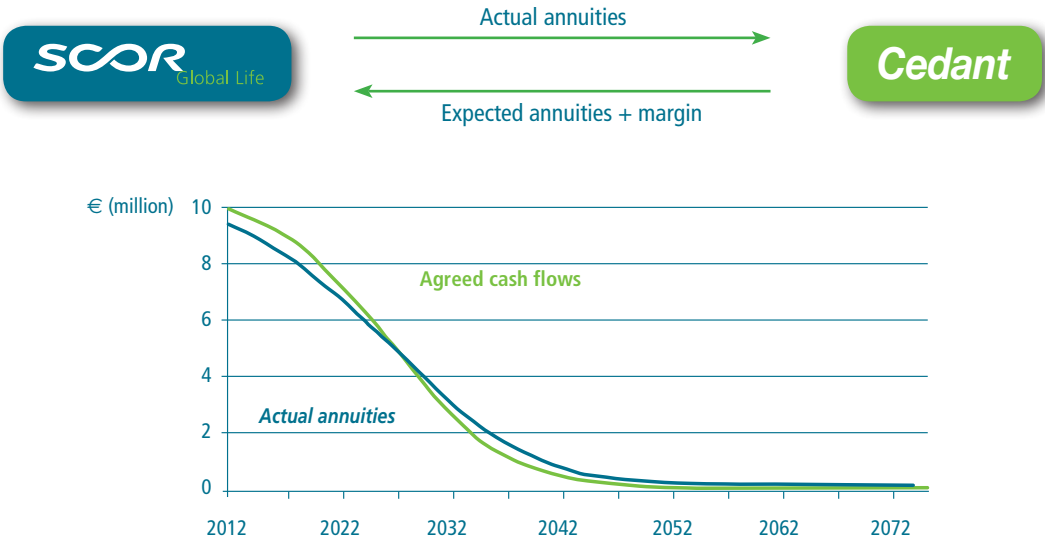
Graph 6: Swap structure incl. Special Purpose Vehicle (S.P.V.)

Considering this structure, the cedant primarily pays a determined single premium to the taker of the financial risk, who pays itself thereafter the expected annuities to SGL, while SGL pays the actual annuities to the cedant. In order to secure the contract against the default of one party, a special purpose vehicle (SPV) can be created. Obviously expenses within this scheme increase with the complexity of the structure.

Therefore, the more complex structures are only recommended for larger blocks of business.

Of course, under Solvency II, appropriate reinsurance solutions help to reduce capital requirements related to other biometric risks (e.g. death and disability). In addition to that, catastrophe covers help to reduce capital requirements under the Life cat sub-module.

Diversification

As a consequence of the modular structure of the Solvency II standard formula, insurers are requested to calculate, as a first step, all the SCR components separately and to compose them by means of pre-defined correlation matrices. Following this approach potential correlations between different risks can be taken into account. In this case, the total SCR of correlated risks is lower than the sum of single SCRs.

This so-called diversification effect is also a risk mitigating effect like reinsurance. Nonetheless, due to the predefined correlation factors of the standard formula and the standard formula itself this diversification is limited, but can be expanded by additional reinsurance covers.

In particular, this is the case for companies that have specialized in the cover of certain risks, which do not have sufficient potential for diversification (e.g. the diversification of death risks by longevity risks and vice-versa).

The life reinsurance under Solvency II

The unlimited recognition of reinsurance covers under Solvency II is an important effect compared to Solvency I, as the current limitation of reinsurance recognition will be withdrawn entirely. Under Solvency II it is less the share of ceded portfolios than the concrete impact of reinsurance covers on the future cash flows that counts. Since the capital requirements are based on the so-called Δ-Net-Asset-Value-Approach, i.e. the deviation of net assets from best estimate assumptions under certain scenarios, Solvency II helps to identify the advantages of reinsurance for the life insurer.

An important fact in the valuation of reinsurance in this context is the matching of insurance periods on the primary and the reinsurance side. In case of reinsuring long-term life insurance liabilities (e.g. death benefit or disability covers) with short-term reinsurance covers, the primary insurer is entirely in charge of the risk of change and the risk of error, while the reinsurer only participates in the volatility, meaning the risk of random fluctuations. This is due to the fact that in case of increasing mortality or disability rates for short-term reinsurance covers the rates will increase with the claims experience and therefore the effect of reinsurance gets less. In contrary, for long-term reinsurance guarantees, even in case of a negative deviation, the guaranteed rates remain unchanged. Bearing this in mind it is obvious that in case of a duration mismatch in reinsurance the risk mitigating effect of reinsurance reduces. This is true for all sub-modules of the

Life SCR except the catastrophe scenario, which is focussed on a single shock instead of a long-term deviation from the best estimate.

Table 3: Definition of risks

The 3 main kinds of risks in life insurance:
- Risk of change
  - the incidence rates, e.g. mortality rates, show a constant and long-term deviation from the basis of calculation due to a negative trend or development
- Risk of error
  - the insurer made an error while choosing the basis of calculation for the underlying business
- Risk of random fluctuations
  - the experienced incidence rates deviate from the underlying basis of calculation due to random fluctuations, e.g. shocks or certain events

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Generally, it is expected that Solvency II will result in a more capital driven perception of reinsurance covers. The complexity of the SCR calculation and the holistic risk assessment will lead to a more individual conception of reinsurance programmes. General reinsurance solutions will be replaced step-by-step by case specific reinsurance covers under Solvency II.

The recognition of non-proportional reinsurance under Solvency II

For non-proportional or short-term reinsurance covers, e.g. a one-year excess of loss cover, the recent claims experience will be taken into account while quoting the new rates. In case of an error in the primary insurer's premium calculation or a negative trend on these basis of calculation, the reinsurance premiums will be affected immediately. On the contrary, if the reinsurance premiums are guaranteed throughout the whole insurance period, as it is the case for most of the long-term reinsurance treaties, both insurer and reinsurer are affected by the deviation from the expected incidence rates in the same way.

In consequence a duration mismatch in reinsurance (short-term reinsurance to cover long-term guarantees) is also reflected in the SCR, since the reinsurance premiums are likely

to increase under the predefined scenarios, and the SCR reduction of short-term reinsurance is less that for long-term reinsurance covers.

Taken as a whole and despite the very complex assessment of the risk exposure of an insurance company, the Solvency II standard formula doesn't recognize non-proportional reinsurance (e.g. excess of loss) in a fully appropriate manner, as while the risk cession is taken into account, the reduction in the volatility of the total claims distribution is not. The only situation within the standard formula where non-proportional covers are correctly recognized is in the case of life catastrophe module, since they can help to reduce the impact of the pre-defined shock scenarios.

Reinsurance and credit risk under Solvency II

The Solvency II standard formula recognizes the risk mitigating effect of proportional reinsurance covers for 100%. In itself, the receivables a life insurer shows on the reinsurance balance sheet is subject to a certain credit risk, and it is appropriate that this counterparty risk is also reflected in the Solvency II standard formula. Experience has shown, that especially reinsurance companies with a rating of at least an A level show a quite low counterparty risk and the positive impact of reinsurance cover on the solvency capital requirements far exceeds the SCR of the credit risk arising from reinsurance.

Internal reinsurance

While under Solvency I internal reinsurance was recognized to be an instrument that could help insurance companies to improve their solvency situation while keeping the ceded business within the group, this construction may turn out to be a disadvantage under the new regime. In case the internal reinsurer is a non-rated or even only a BB-rated company, the counterparty risk, which arises from this reinsurance relation, strongly reduces the positive impact of reinsurance arrangements. According to QIS5 technical specifications replacing an A-rated reinsurer by a BBB-rated internal reinsurer leads to an increase of probability of default by 380%. For a BB-rated company the probability of default would be 23 times higher compared to an A-rated reinsurer.

Potential weaknesses of internal reinsurance will definitely be identified within the Solvency II framework and a complete review of internal reinsurance arrangements, which were a useful vehicle of risk management until now, will be unpreventable.

Recognition of reinsurance covers under pillar II

An innovation which will be introduced to the insurance industry by Solvency II is the obligation to implement an appropriate risk management within the company. The Solvency II directive lists some minimum requirements that the risk management has to meet. An important part of these minimum requirements is the implementation of a reinsurance strategy.

Supervisory authorities are entitled to require additional capital charges, i.e. to increase the SCR accordingly, in the case, where the risk management is considered to be not sufficient. In this context appropriate reinsurance solutions may support especially small and medium sized companies, since reinsurance on the one hand reduces the risk exposure of the company and on the other hand the insurer has access to reinsurer's support and expertise, e.g. with respect to risk assessment, claims handling and review of basis of calculation, which can be integrated in insurer's own risk management.

Services provided by the reinsurer

The relations between SGL and life insurers is traditionally more tied compared to the non-life insurance since the life reinsurer is involved in many of the primary insurer's internal processes.

SGL provides its clients a variety of services which includes all product development related services as well as risk assessment and claims management support. Apart from the risk mitigating effect of life reinsurance and the reduction of SCR under Solvency II, the reinsurance services are also of value as an integral part of cedant's risk management system.

In addition to traditional life reinsurance services, SGL also offers Solvency II related services. In cooperation with its clients, SGL is developing reinsurance solutions that help to reduce the Solvency II capital charges as far as required, but which also take into account potential risks that are not treated appropriately by the standard formula.

The above mentioned longevity swap is only one example of reinsurance solutions that might become more important under Solvency II, demonstrating the changing perception of risks and risk mitigation under Solvency II.