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SOLVENCY II: WHERE WILL THE LONG ROAD TO THE STANDARD FORMULA LEAD US?

The insurance industry awaits the European Commission's implementing measures

Authors
Dr. Kathleen Ehrlich
Lars Moormann
Norman Ducoffre
Dr. Tian Zhou-Richter

Contact
solvency-solutions@munichre.com

January 2012

The European Parliament and the Council of the European Union are expected to decide on the Omnibus II Directive in the first half of 2012 and then to adopt the implementing measures at level 2 of the Lamfalussy process. The new supervisory rules will then be close to becoming reality for insurers. The implementing measures will basically serve to define the principles of the Directive in greater detail at company and group levels. Since most insurers will be using the standard formula to calculate their solvency capital requirement when Solvency II has been introduced, the way it is defined in the implementing measures is extremely important. Technical details will be prepared in parallel at level 3.

The Solvency II project, which has been running for over ten years, has included five quantitative impact studies, the first of which was conducted in October 2005 and the latest in 2010. Though there are expected to be no further studies at EU level, some countries have announced their intention to carry out another study at national level.

The aim of QIS1 was to test new valuation principles to be used to determine technical provisions at market value. The technical provisions according to national regulations were compared with those anticipated under Solvency II. Various methods were tested.[1] Whilst QIS1 addressed the calculation of provisions, since QIS2 the focus has been on testing the standard formula for calculating the solvency capital and minimum capital requirements. As the Solvency II project has progressed, the methodology and parameters used in the standard formula have been adapted, enhanced and then tested in subsequent studies. The fifth, and probably the last, study to be conducted on a Europe-wide basis, QIS5, demonstrated from the perspective of the insurance industry that further changes to the methodology are required and that the calibrations for certain parameters need to be revised.

[1] The tests also covered a method for estimating the expected values of future cash flows, their quantiles and, for property-casualty insurance companies, the standard deviation of future cash flows.

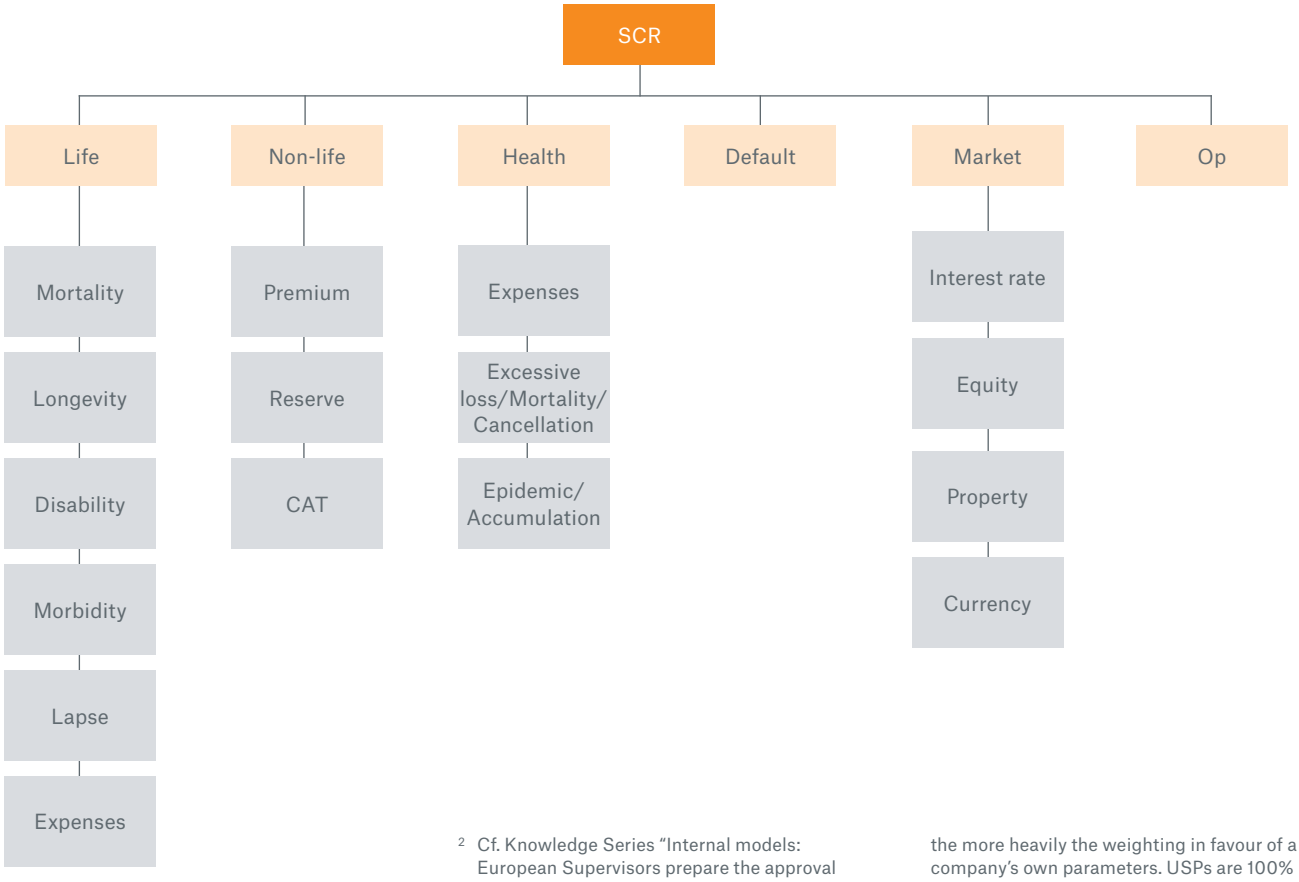
The data and feedback from the participants provided valuable input for this. Large quantities of data covering a sufficiently long period are necessary for the calibration of the individual risk factors, but yet another test would put at risk the planned start date for Solvency II. As with internal models, there will be a continuing need to adjust the standard formula in the future, for example to take account of changing market conditions and new products.

RISK CAPITAL CALCULATION UNDER SOLVENCY II

The purpose of companies holding a certain level of capital is to limit the risk of insolvency. Under the new supervisory rules, insurers will have two alternative ways of determining their solvency capital requirement (SCR): they can use either the standard formula or their own internal model, which must be approved in advance by the supervisory authority in a time-consuming process.[2] Companies opting for the standard approach will save the costs of developing their own model and obtaining approval for it. Nevertheless, implementing it will still be very costly, as, for example, the data required will need to be prepared and processed.

The European standard approach, which is a "bottom-up" method, is intended to reflect an insurance company's full risk profile. Figures 1 and 2

Fig. 1: Structure of the standard approach according to QIS2



[2] Cf. Knowledge Series "Internal models: European Supervisors prepare the approval process", online at www.munichre.com.

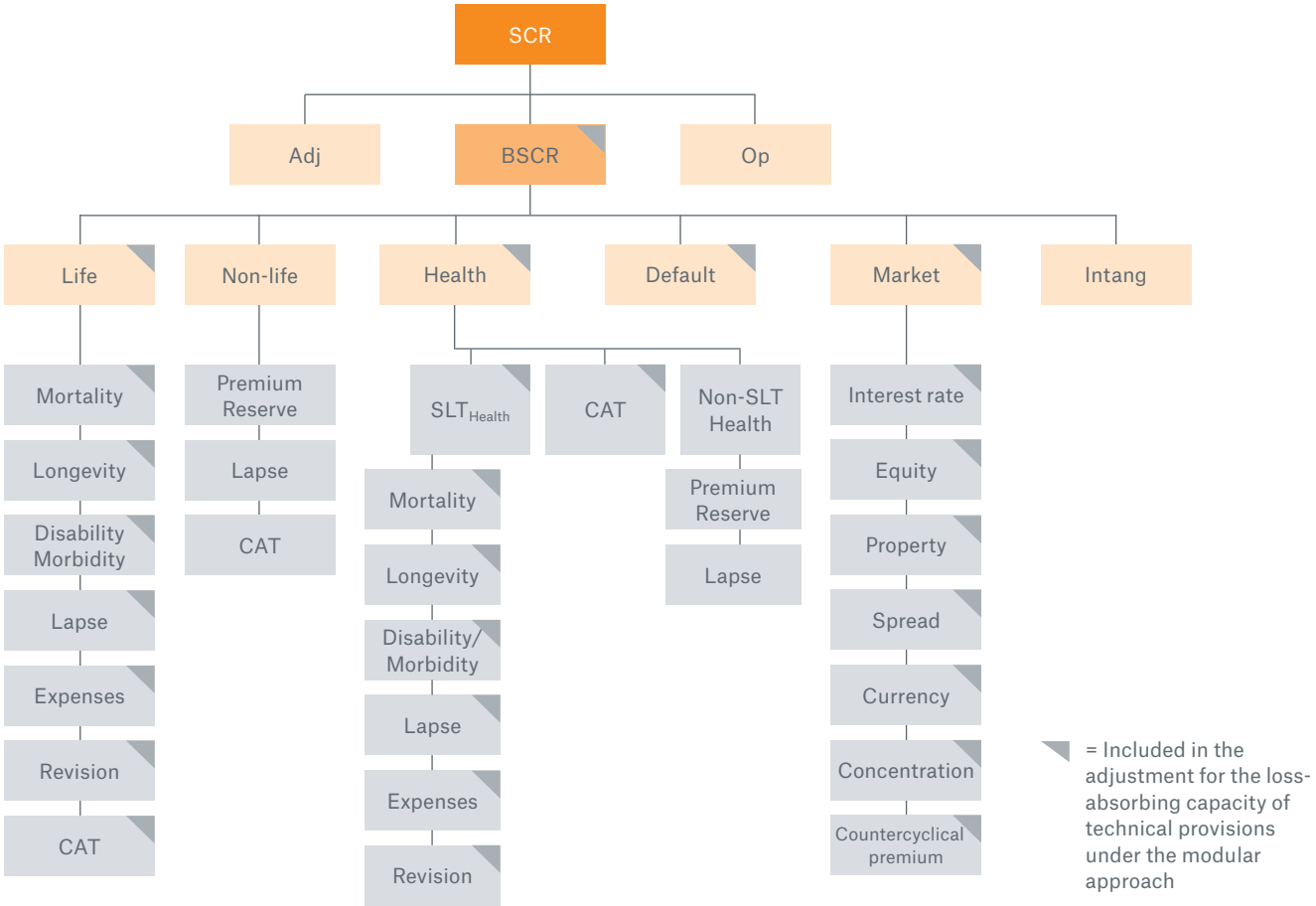
[3] Property-casualty insurers can use USPs to value their premium and reserve risk. Market-wide standard parameters are used to weight USPs. The more historical data are available, the more heavily the weighting in favour of a company's own parameters. USPs are 100% eligible only with a history of at least 15 years for the third-party liability, motor third-party liability insurance and credit and bond insurance lines of business, and ten years for all other classes of insurance.

show the modular approach adopted for QIS2 and the probable final structure when Solvency II is introduced. The structure has been revised a number of times since QIS2. Experience with the impact studies has demonstrated that addressing problems at an early stage is crucial to successful and efficient implementation. The main feature is that economic principles are to be applied in evaluating an insurer's financial situation.

We have been aware since QIS2 that insurers will in future have to quantify their capital requirements for various risk modules. These include underwriting risks, the current state of the debate on which is the subject of this paper, broken down into three segments – property-casualty, life and health. Companies will also have to meet capital requirements not only for market and credit risks, but also for risks arising out of intangible assets. Correlation and diversification effects are taken into account both within individual risk modules and across the various modules.

Subject to certain conditions being met, insurers can use their own "undertaking-specific parameters" (USPs) based on historical loss ratios to determine their capital requirements.[3] Overall risk capital equates to the sum of the basic solvency capital requirement (BSCR), the capital requirement for operational risk and further adjustments, for example due to tax effects or future profit sharing.

Fig. 2: Expected structure of the Solvency II standard approach



UNDERWRITING RISK FOR PROPERTY-CASUALTY INSURERS

Underwriting risk is immensely important for property-casualty insurers – according to QIS5, it accounts for more than 50% of their capital requirements. It is the risk of an insurer's premiums and provisions being insufficient to cover its contractual liabilities for a given period. The expectation is that the solvency capital requirement for this module will have to be calculated from the capital requirements for the three risk sub-modules premium and reserve risk, catastrophe risk and lapse risk. For the first field test, in QIS2, the premium and reserve risk was calculated in two separate risk sub-modules, but technical and methodological problems ultimately resulted in the decision to combine the two sub-modules. Since QIS5, it has also been necessary to cover the lapse risk with risk capital. Table 1 shows the evolution of the structure over last few years.

It is to be assumed that there is no correlation between lapse risk, and premium and reserve risk or catastrophe risk. A dependency factor of 25% between the premium and reserve risk and the catastrophe risk is used. The capital requirement for this module may therefore rise substantially.

Table 1: Development of the underwriting risk module for property-casualty insurers

	QIS2	QIS3	QIS4	QIS5/Expected implementing measure
Risk sub-module	Premium risk	Premium/ reserve risk	Premium/ reserve risk	Premium/reserve risk
	Reserve risk			
	Catastrophe risk	Catastrophe risk	Catastrophe risk	Catastrophe risk
				Lapse risk

PREMIUM AND RESERVE RISK

The term "premium risk" refers to the risk of the insurance premium for the following year being insufficient to cover future claims and other costs relating to the business in question (excluding catastrophes). It thus relates to the future, whereas the "reserve risk" is the risk of existing technical provisions being insufficient to cover claims from the past. As with the premium risk, a period of one year is used as a basis for the valuation. Both the premium risk and the reserve risk are calculated in accordance with an allocation by class of insurance prescribed for all companies in Europe and then combined taking account of dependencies and diversification effects.

In recent years, work has been done not only on methodology, but also on the calibration of individual parameters (Figures 3 and 4). However, if the standard approach is adopted, the calibration used to depict a company's situation will be the European average, as it is, after all, a tool designed to be used by any company in the EU to calculate its risk capital requirement.

Even though the capital requirements for individual segments rise in comparison with QIS5, the average capital requirements for Europe as a whole are somewhat lower with the current implementing measures than in QIS5. This is mainly due to a fall in the risk factors for the high-volume segments, e.g. third-party liability, motor third-party liability and property risks. Insurance companies with a broad spread of risks in particular benefit from the recognition of diversification effects. By contrast, capital requirements for companies offering legal expenses or assistance insurance will rise. A significant change from the QIS5 proposal is the methodology for taking account of non-proportional reinsurance. Whilst under QIS5 insurers could apply an individual adjustment factor to the capital requirement for the premium risk to reflect the effect of non-proportional reinsurance, according to the current state of debate on the implementing measures there will be a standard deduction of 20% for non-proportional reinsurance in the

motor third-party liability, fire and general third-party liability classes of insurance. Though it will still be possible to use risk-based, company-specific adjustment factors, they will require regulator approval in advance as they fall under the heading "USP recognition". The additional approval process will involve considerable time and effort.

CATASTROPHE RISK

Risks arising out of the high degree of uncertainty surrounding pricing and the assumptions applied to determine reserves for extreme and extraordinary events are to be taken into account separately in the catastrophe risk module. The QIS5 results showed that there are still many weaknesses in methodology and calibration. At the request of the European Commission, the industry had put forward numerous proposals, including a valuation method that distinguishes not only between risks, but also between classes of insurance, and the industry also believes that insurers should be permitted to apply company-specific parameters and scenarios. However, the current debate on the implementing measures is taking little account of the industry's proposals for adjustment of the catastrophe risk module on the table since the end of the last impact study (QIS5). Nor is there any provision for using company-specific parameters. The Commission has justified its negative attitude to the proposals by its concern that they are too complex and would be a problem for small and medium-sized insurers, pointing out that companies have the option of developing their own (partial) internal model.

Fig. 3: Development of the premium risk factors in the Solvency II process

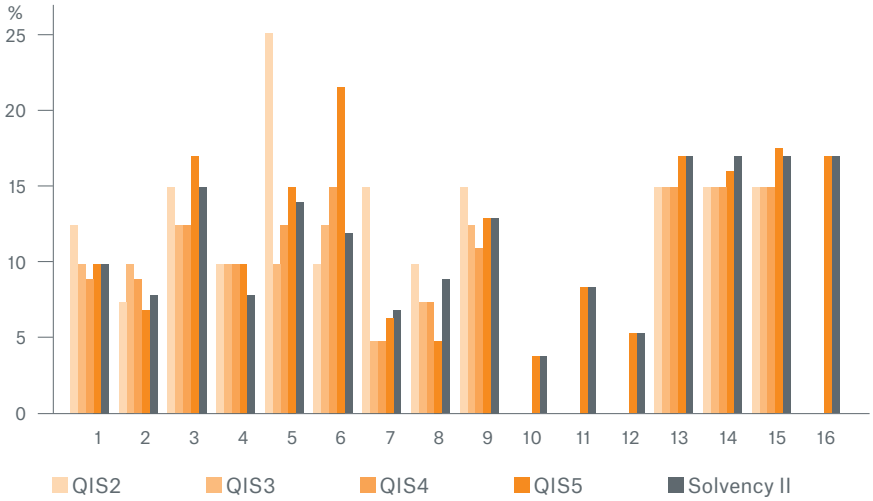
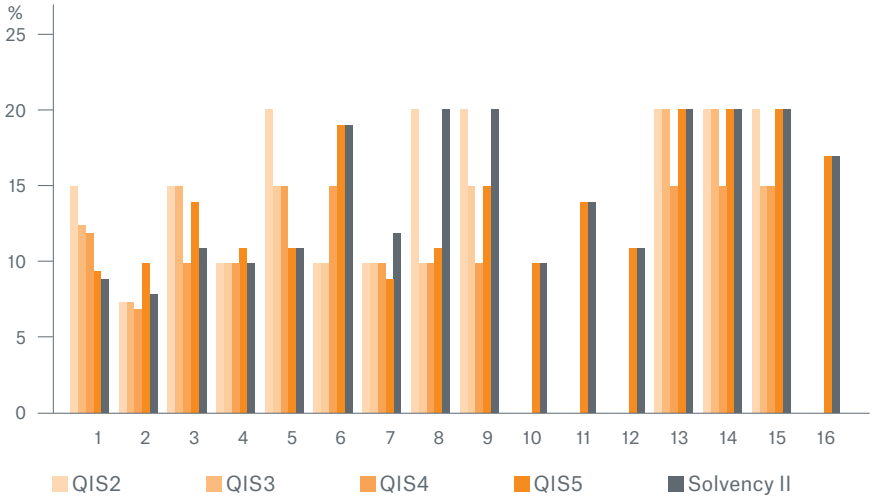
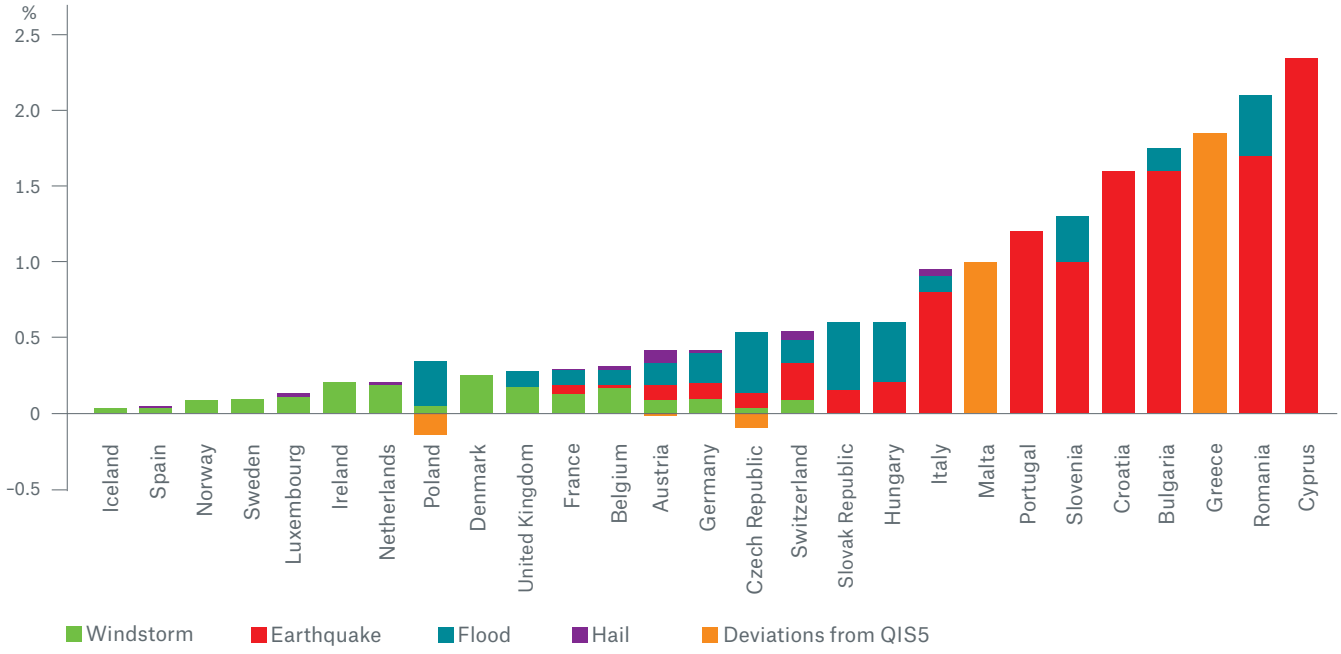


Fig. 4: Development of the reserve risk factors in the Solvency II process



1 MTPL
2 Other motor
3 MAT
4 Fire
5 GTPL
6 Credit
7 Legal exp.
8 Assistance
9 Miscellaneous
10 Medical expense
11 Income protection
12 Workers' compensation
13 NP casualty RI
14 NP MAT RI
15 NP property RI
16 NP health RI

Fig. 5: Development of the premium risk factors in the Solvency II process



Even though the implementing measures do not take full account of the proposals from the industry, the provisions currently under discussion differ considerably from the QIS5 requirements.

– Methodology: The risk module will consist of four sub-modules: natural catastrophes (windstorm, earthquake, flooding, hail and subsidence), man-made catastrophes (motor third-party liability, general third-party liability, fire, marine, credit and bonds), catastrophe risks arising out of non-proportional non-life insurance, and other catastrophe risks. These risk sub-modules are based on individual scenarios. According to the current discussions, the risk capital is derived from the decrease in basic capital[4] after occurrence of the scenarios, taking risk-mitigating instruments into account. The heavily principle-based method enables a wide range of reinsurance/retrocession covers to be depicted. Further technical details are currently being prepared at level 3.

Calibration: Unlike in QIS5, where dependencies between windstorm, flooding and hail had to be taken into account, in the current version of the implementing measures it is assumed that there is no correlation between any of the natural catastrophe risks. There are only a few changes in the risk factors. For example, the factors for flooding risks are lower for Poland, Austria and the Czech Republic, and there is now a capital requirement for earthquake hazard for Malta and Greece. Figure 5 shows the likely risk factors for windstorm and hail by country and the deviations from QIS5.[5]

[4] This method corresponds to the delta net asset value approach, on which the measurement of market and life insurance risks is also based. The basic capital equates to the difference between the market values of the assets and liabilities. To determine the capital requirement, the market value balance is subjected to a defined shock scenario. The capital requirement is the difference in basic capital before and after the shock scenario.

[5] Ranging from 2.5% to 5%, the risk factors for windstorm and earthquake for Guadeloupe, Réunion, Martinique and Saint Martin are considerably higher than for other areas, but for the sake of clarity are not shown in the chart.

LAPSE RISK

Property-casualty insurance contracts may contain policy options that can have a substantial effect on the amount of the underwriting liabilities, such as the option to terminate the policy before the end of the agreed term or to renew it. Non-life insurers must hold risk capital to cover these risks. Notwithstanding the fact that the QIS5 results showed that lapse risks are far less significant for non-life insurers than for life insurance companies, the European Commission would like to retain this risk module in the standard formula. Nevertheless, according to the current debate, there will be a change in the valuation method from QIS5. In future, non-life insurers will have to take two shock scenarios into account: on the one hand, the termination of 40% of insurance policies, leading to an increase in the best-estimate reserve, and on the other hand, if the insurance policies are covered by reinsurance treaties, a 40% decrease in future insurance contracts flowing into the valuation of the reserves. The more capital-intensive of the two is to be used to determine the reduction in basic capital. The current version of the implementing measures also stipulates calculation at individual-contract level, which will increase complexity and calculation work substantially.

UNDERWRITING RISK FOR LIFE INSURERS

This risk module quantifies underwriting risks associated with the writing and managing of life business.

It focuses on the uncertainty surrounding biometric expectations, expense ratios, assumptions relating to policyholders' exercise of options and lapse expectations:

- The mortality risk is the risk of technical provisions rising as a result of higher mortality rates.
- The longevity risk is the risk of technical provisions rising as a result of falling mortality rates.
- The disability (morbidity) risk[6] is the risk of the technical provisions rising if disability rates rise or recovery rates fall.
- The lapse risk is the risk of the technical provisions rising as a result of changes in termination, renewal or surrender rates.
- The expense risk is the risk of the technical provisions rising as a result of changes in administration expenses.
- The revision risk[7] is the risk of the technical provisions rising as a result of changes in the revision rates, which in turn arise out of changes in the legal environment or in the insured's state of health.
- The catastrophe risk is the risk of the technical provisions rising as a result of significant uncertainty in the pricing and provisioning assumptions relating to extreme or exceptional events. Solvency II is focusing here on changes in the mortality rates of policyholders that could be caused, for example, by pandemics or nuclear catastrophes.

[6] Disability risk includes the biometric risks in occupational disability insurance and life covers for morbidity or sickness.
[7] The revision risk relates principally to annuities in non-life business.

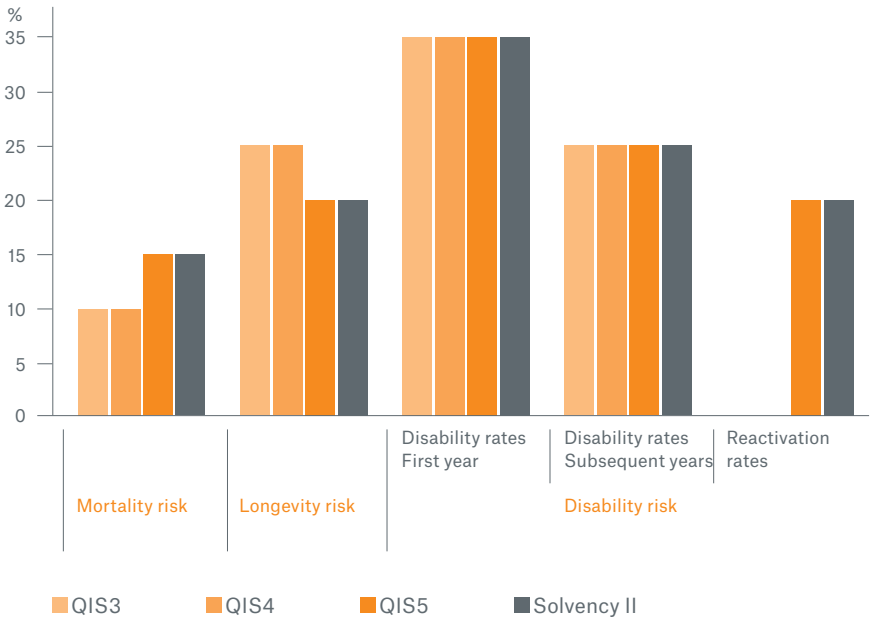
The individual risk modules take account of level, trend and volatility risks arising in respect of the relevant actuarial assumptions.[8] The modelling of the risks is based on scenarios, with the changes only to be assumed in respect of the contracts subject to each risk. There have been no further changes in the risk factors since QIS5. The delta net asset value method is used to calculate risk capital.

In QIS2, an approach was tested that takes into account a trend risk and a volatility risk for the biometric risks in the life underwriting module. To reduce complexity and to favour a scenario-based approach, the method defined in the current version of the implementing measures was tested for the first time in QIS3. The risk factors currently under discussion are hardly changed from QIS5 (Figure 6).

Whilst the risk factor for the mortality risk was increased from 10% to 15% in QIS5, the risk factor for the longevity risk in QIS5 was reduced from 25% to 20%.

EIOPA gives the reasons for the increase in the risk factors for the mortality risk in its Consultation Paper No. 49,[9] comparing the risk factor in the standard formula with the factors used by companies in their internal models.

Fig. 6: Risk factors for the biometric risk module



A total of 21 internal models were analysed, with an average factor of 22%. Since this figure was significantly higher than the 10% applied originally in QIS4, CEIOPS' proposal to increase it to 15% was also incorporated in the technical specification for QIS5.

The risk factor for the longevity risk was reduced to 20% in QIS5, despite the fact that CEIOPS had recommended retention of the QIS4 factor of 25% on the basis of a study by the Polish supervisory authority.

A significant change in QIS5 from QIS4 was the introduction of a shock in the recovery rates for the disability risk module. In both QIS5 and the current implementing measures, the recovery rates for all ages have been reduced by 20%, which could lead to substantial additional capital requirements for certain products.

The justification for introducing this shock was that, apart from the amount of benefits paid, there is a risk of benefits having to be paid for a substantially longer period than expected.

The solvency capital requirement for the life underwriting risk is obtained by aggregating the risk capital figures for the biometric, lapse, expense and catastrophic risks using dependency factors defined in the current implementing measures that are unchanged from QIS5.

[8] Cf. Directive 2009/138/EC of the European Parliament and of the Council, Article 105, online at: http://register.consilium.europa.eu/pdf/en/09/st03/st03643-re06.en09.pdf.

[9] Cf. "Draft Level 2 Advice on SCR Standard Formula – Life Underwriting Risk", online at: https://eiopa.europa.eu/consultations/consultation-papers/2010-2009-closed-consultations/index.html.

Existing proportional reinsurance covers are to be taken into account in the evaluation of each scenario. The risk-mitigating effect of reinsurance reduces the capital requirements in respect of the underwriting risk.

UNDERWRITING RISK FOR HEALTH INSURERS

The risk module for a health insurer's underwriting risk quantifies the risk of insurance liabilities arising out of

- medical treatment, preventive or curative care, and care due to illness, accident, disability or infirmity;
- financial compensation for illness, accident, disability or infirmity.

This risk module has been modified considerably in the course of the Solvency II project (Table 2). For the second quantitative impact study (QIS2), a risk module was developed to determine the risk in health business conducted similarly to life insurance. The risk module consisted of three sub-modules: the expense risk, the excessive-loss, mortality and lapse risks, and the epidemic and accumulation risks. Factor approaches were used to determine the risk capital for each sub-module. The methodology was retained for QIS3, complemented by special treatment for small and newly established insurance companies.

Table 2: Development of the underwriting risk module for health insurers

	QIS2	QIS3	QIS4			QIS5 / expected implementing measure		
Risk modules	Similar to life	Similar to life	Long-term health	Accident and short-term health	Workers' compensation	Similar to life techniques	Non-similar to life techniques	Catastrophe
Sub-modules	Expense	Expense	Expense			Expenses		
	Excessive loss/ mortality/ cancellation	Claim/ mortality/ cancellation	Claim/ mortality/ cancellation	Premium and reserve	General	Disability/ morbidity	Premium and reserve	
						Longevity		
						Mortality		
						Lapse	Lapse	
	Epidemic / accumulation	Epidemic / accumulation	Epidemic / accumulation	Catastrophe	Catastrophe			Arena (>mass)
								Pandemic
								Concentration
					Annuities			
						Revision		

The scope of this risk module was extended for QIS4 to comprise three risk scenarios: to health insurance conducted similarly to life insurance (long-term) were added sub-modules for accident and health insurance conducted similarly to non-life insurance (short-term), and workers' compensation, both of which had still been included in the risk module for non-life insurers in QIS3. The procedure for calculating the capital requirements for the two new risk sub-modules is thus the same as that for determining the underwriting risk for non-life insurers.

The feedback from the industry on QIS4 resulted in the risk sub-modules for QIS5 being adjusted again (Table 2, Figures 7 and 8). QIS5 focused on the differentiation between health business conducted like life insurance and like non-life insurance, with the calculations closely aligned with the methods used by life or non-life insurers respectively. The catastrophe risk module comprised three risk scenarios: arena disaster, the concentration scenario and the pandemic scenario.

The current state of the debate has changed only slightly since QIS5, with the most significant modifications being expected for catastrophe risk. Not only will the mass accident risk replace the arena scenario, but also the scope of application of individual scenarios will be redefined and the calculation formula for risk capital adjusted.

Fig. 7: Development of the premium risk factors in the Solvency II process

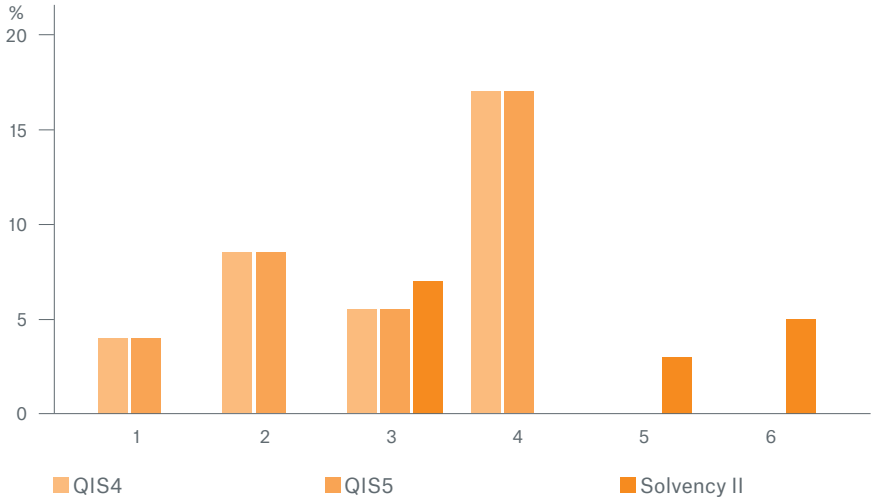
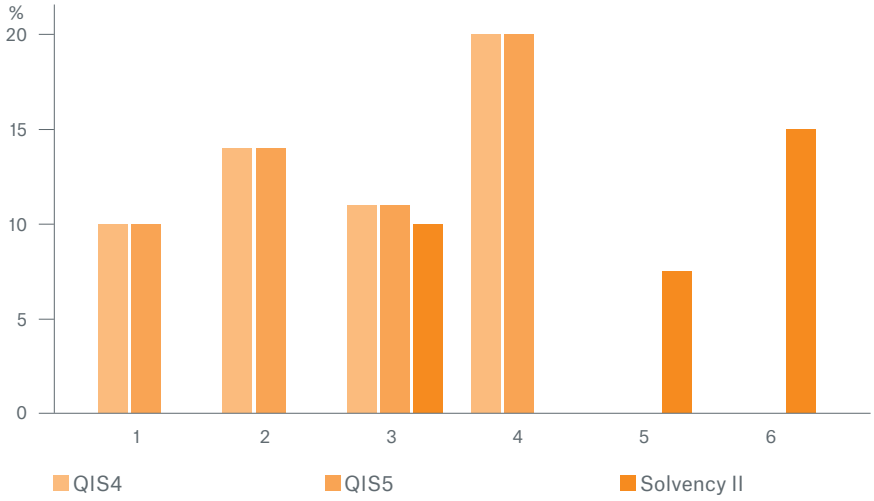


Fig. 8: Development of the reserve risk factors in the Solvency II process



1 Medical expense
2 Income protection
3 Workers' compensation
4 Non-prop. health reinsurance
5 Short-term health
6 Accident and others

CONCLUSION

Solvency II poses new challenges for the whole insurance industry. The standard formula, which companies can use to calculate their risk capital requirement, has changed considerably since 2006. It reflects the risk more closely, but has become more complex. To be prepared for the introduction of Solvency II, it is important for users of the standard formula to be aware of the implementing measures in good time. The current discussion relates mainly to technical details, which may well be adjusted again after the implementing measures have been approved. The standard formula, like internal models, will have to be adjusted again in the future to take account not only of developments in the capital markets, changes in the product landscape and the evolution of mathematical methods, but also of changes in the market environment and the experience gained in risk modelling.

Solvency II risk capital will in future play a crucial role in product design, with risk transfer gaining an additional dimension. In the past, reinsurance was considered to be an instrument to be used primarily for reducing underwriting risk and increasing underwriting capacity, whereas now it will play a major role in terms of risk capital. 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.

Münchener Rückversicherungs-Gesellschaft
Königinstrasse 107, 80802 München, Germany

Order number 302-07304