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# QIS5: A review of the results for EEA Member States, Austria and Germany

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**Björn Weindorfer**
University of Applied Sciences bfi Vienna

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**Abstract**

Solvency II represents a fundamental review of the supervisory regime for insurance and reinsurance undertakings in the European Economic Area. As part of this project, European insurers and reinsurers were invited to participate in five quantitative impact studies (QIS) in order to test the practicability of the new approach and to determine the financial impact of the planned changes in capital adequacy requirements. The results of the last of these studies, QIS5, were published in 2011.

This paper describes, for insurance and reinsurance undertakings in the European Economic Area and, more specifically, in Austria and Germany, the difficulties faced under the QIS5 approach, the financial impact of the new regulations on the solvency balance sheet and the most significant contributors in the calculation of the new capital requirements.

# 1 Background

## 1.1 Solvency II

In November 2009 the Council of the European Union and the European Parliament adopted the Solvency II Directive (see European Parliament and the Council of the EU 2009), which establishes a revised set of requirements with respect to capital adequacy and risk management for insurance and reinsurance undertakings in the European Economic Area (EEA[1]). The main aim of the new requirements is to improve protection for policyholders against failure of (re)insurance undertakings.

The risk-based capital adequacy rules under Solvency II are stronger and more comprehensive than the current factor-based solvency rules. Under Solvency II the capital requirements for an insurance undertaking[2] are determined on the basis of the undertaking's risk profile and the way in which its risks are managed. The aim of this approach is to incentivise the implementation and use of sound risk management practices (see EIOPA 2011: 4), thereby reducing the likelihood of undertaking failures and associated disruptions in the European insurance market.

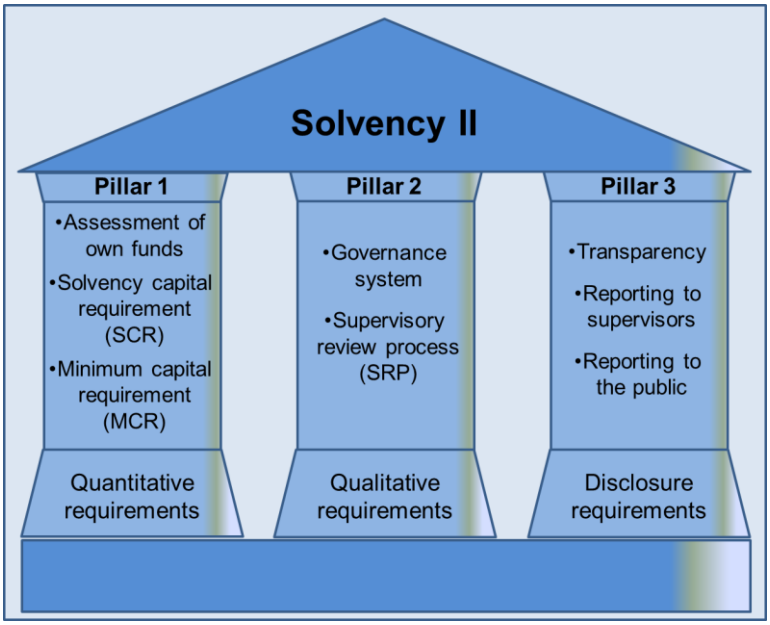
Solvency II will be adopted by all 30 countries in the EEA. The varying local standards currently supplementing Solvency I in the Member States will be replaced by the Solvency II requirements. The resulting supervisory consistency should make it easier for insurance undertakings to do business across the EEA (see FSA 2011).

The combined effects of reducing the likelihood of undertaking failures and improving the harmony in supervisory requirements should serve to strengthen the stability of the European insurance markets.

The elements of capital adequacy and risk management which are considered under Solvency II can be grouped under 3 pillars (as shown in Figure 1).

[1] The EEA consists of the 27 European Union Member States plus Iceland, Liechtenstein and Norway.
[2] In this paper, unless stated otherwise, the terms "insurance undertaking" and "insurer" are assumed to include both insurance and reinsurance undertakings.

**Figure 1:** The 3 Pillars of Solvency II




Pillar 1 addresses the quantitative requirements for insurance and reinsurance undertakings. Solvency II prescribes a risk-based approach for assessing an undertaking's own funds and the amount of capital that it must hold. The quantitative requirements are:

- An undertaking must hold sufficient eligible own funds to cover the solvency capital requirement (SCR) calculated for the undertaking.
- An undertaking must hold sufficient eligible basic own funds to cover the minimum capital requirement (MCR) calculated for the undertaking.

where

- basic own funds equal assets minus liabilities plus subordinated liabilities.
- own funds equal basic own funds plus ancillary own funds (see European Parliament and the Council of the EU 2009: 48).
- SCR and MCR are values derived using standard formulae, internal models or combinations of these.

The directive also describes the actions to be taken by undertakings and supervisors in the event that an undertaking is, or may in the near future be, unable to meet the capital requirements stated above.

Pillar 2 deals with the qualitative requirements for the effective risk-oriented management of an insurance undertaking. These requirements are covered under two main headings:

- Internal governance. The directive requires that insurers have in place an effective risk management system (including the own-risk-and-solvency-assessment or ORSA) and an effective internal control system. Undertakings must provide for the necessary functions to be performed (including at least risk management, compliance, internal audit and actuarial

functions). The directive also requires undertakings, for example, to define rules for outsourcing any functions and to ensure that their management is “fit and proper”.

- Supervisory review process (SRP). Supervisory authorities are required to review and evaluate undertakings’ compliance with the quantitative and qualitative requirements of Solvency II. The directive describes the powers and duties of the supervisors with regard to these functions.

Pillar 3 covers the requirements for supervisory reporting and public disclosure. Transparency with regard to solvency is achieved through regular submission of the following reports by insurance undertakings (see CEIOPS 2009: 17):

- Solvency and Financial Condition Report. The SFCR is disclosed to the public, including supervisory authorities.
- Report to Supervisors. The RTS is disclosed only to the supervisory authority. It aids supervisors in carrying out the SRP.

### 1.2 Quantitative impact studies

As part of the Solvency II Project, the Committee of European Insurers and Occupational Pensions Supervisors (CEIOPS)[3] launched five Quantitative Impact Studies (QIS) during the period 2005 to 2010.[4] These studies involved simulations carried out by insurers on a voluntary basis. The simulations were intended to test the practicability of the Solvency II approach and measure the impact of the proposed calculation methods on the undertakings’ solvency balance sheets. Results of the studies have contributed to the on-going task of assessing the suitability of the standardised formulae and the associated parameters proposed under Solvency II. A further benefit for supervisors and the undertakings that participated in the studies has been that they have had additional experience preparing for the introduction of Solvency II and identifying areas where further effort may be required (see EIOPA 2011: 20).

### 1.3 QIS5

The fifth Quantitative Impact Study (QIS5) was scheduled to be the last of the studies before the implementation of Solvency II. Its main goals were to test the following areas of the Solvency II system (see EIOPA 2011: 17-18):

- The design of the risk-based approach.
- The valuation rules for assets, technical provisions and other liabilities.
- The specified calibrations.

[3] CEIOPS was replaced on 1 January 2011 by the European Insurance and Occupational Pensions Authority (EIOPA).
[4] In 2009 the Austrian Financial Market Authority launched an additional study, QIS4.5, carried out in Austria only.

- The financial impact on reported capital surpluses and the sustainability of the insurance and reinsurance industry under the new regulations.
- The feasibility and practicability of performing the required calculations.
- The preparedness of insurance and reinsurance undertakings for performing the capital adequacy calculations.
- The appropriate transitional measures to be implemented.

The rules to be followed by the undertakings taking part in the study are set out in the QIS5 Technical Specifications, published in July 2010. This document describes, in much more detail than the Solvency II Directive, the approaches to be used for determining the values of all items required for assessing the solvency of an insurance undertaking, i.e. assets, technical provisions and other liabilities, eligible (basic) own funds, SCR and MCR. Besides the prescribed formulae and parameters, the document also specifies simplifications that may be used for certain items, e.g. in determining the risk margin for technical provisions. The technical specifications reflect the status of Solvency II Level 2 Implementing Measures as at mid-2010 and are, therefore, more up-to-date than the directive.

The data for QIS5 was submitted by participating undertakings in all 30 EEA countries to their national supervisors during the second half of 2010. The national supervisors reviewed the submissions and forwarded them to EIOPA which published its report on the aggregated QIS5 results for EEA participants on 14 March 2011 (see EIOPA 2011). The Austrian Financial Market Authority (FMA) and the German Federal Financial Supervisory Authority (BaFin) published their reports in May 2011 (see FMA 2011) and March 2011 (see BaFin 2011) respectively. The results shown and commented on in this paper are taken from these three reports. When making comparisons between the results of each report, between undertakings within each report or between regimes (QIS5 vs. the current supervisory regime) it must be borne in mind that there are likely to be distortions caused by different segmentations of business and different interpretations of the approaches laid down by the QIS5 Technical Specifications.[5]

[5] Numerical information is not always consistently presented in the three source reports. For example, technical provisions are alternately reported net and gross of reinsurance recoverables, sometimes within the same report. In the BaFin report, SCR structure is reported only before adjustment for the diversification effect while the other two reports include graphs representing SCR structure both before and after diversification is taken into account. The EIOPA report generally includes numbers quoted by undertaking type (groups and solos) while the FMA and BaFin reports tend to segment by business type (life, non-life and health). The BaFin report is very concise and, in general, includes much less detail than the EIOPA and FMA reports. The information reported in this paper is presented with the appropriate descriptions taken from the relevant source reports, and these descriptions must be considered when making comparisons. The above is also the reason why, in Section 4, some graphs compare slightly different information between regions.

## 2 Participation of insurance undertakings in QIS5

The European Commission's targeted participation rates for QIS5 were 60% for solo insurance undertakings and 75% for groups.

### 2.1 QIS5 participation for solos

The numbers of solo insurers affected by Solvency II, the numbers participating in QIS5 and the resulting coverage for each of the three regions are shown in Table 1. Germany represents about 10% of the solo insurers in the 30 EEA countries while Austria represents about 1.3%.

**Table 1:** Participation of solo insurers in QIS5 for the EEA, Austria and Germany

| | EEA | Austria | Germany |
|---|---|---|---|
| **Number of solos affected by Solvency II** | 3 680 | 49 | 375 |
| **Number of solos participating in QIS5** | 2 520 | 47 | 251 |
| **% of solos participating in QIS5** | 68% | 96% | 67% |

Austria, Germany and the EEA overall each achieved participation rates above the QIS5 target. For Austria, the FMA decided, after reviewing the submitted data for consistency, to include in its analysis only 33 of the 47 participating undertakings. These 33 undertakings represent about 67% of the Austrian solo undertakings affected by Solvency II.

### 2.2 QIS5 participation for groups

The EIOPA results for QIS5 cover 167 participating groups[6]. Austria has five groups affected by Solvency II and Germany has 50. The numbers of participants for these two countries were four[7] and 26 respectively. Thus, the participation rate in Germany (52%) was below the target for QIS5. The EIOPA report does not state the group participation rate but it is likely that supervisors and groups in the EEA Member States generally faced issues similar to those mentioned in the BaFin report. These issues were that there was not enough time allowed for undertakings to aggregate solo insurers' results to the group level, or for adequate supervisory review of the group submissions.

[6] A 'group' generally includes a participating undertaking (i.e. owning 20% or more of the voting rights or capital of another undertaking), its subsidiaries and the entities in which the participating undertaking or its subsidiaries hold a participation. Under Solvency II the definition of a 'group' requires that one of the undertakings effectively exercises, through centralised coordination, a dominant influence over the decisions of the other undertakings that are part of the group. The supervisor with authority over the group is generally either the supervisor that has authority over the undertaking heading the group or the supervisor that has authority over the undertaking in the group with the largest balance sheet total (see European Parliament and the Council of the EU 2009: 81, 95-96).

[7] The FMA report indicates that ultimately the data for 33 undertakings was included in the analysis (see FMA 2011: 7). It is assumed in this paper that the FMA data reflects the 33 solo undertakings mentioned in Section 2.1.

## 3 The balance sheet and solvency coverage

### 3.1 Technical provisions

The principle behind the Solvency II approach to valuing technical provisions is that the value should reflect market consistency, i.e. it should correspond to the amount that the undertaking would have to pay if its insurance obligations were to be transferred immediately to another insurer. As there is no active market for buying and selling portfolios of insurance obligations, it is difficult to verify that a calculated amount is market-consistent.

Under Solvency II, technical provisions are calculated as the sum of a best estimate (BE) and a risk margin (RM).[8] The BE represents the level of technical provisions calculated on the basis of realistic expectations. The RM represents the amount to be added to the BE to ensure that the technical provisions reflect the amount that would need to be paid for another insurer to take over the insurance obligations (see European Parliament and the Council of the EU 2009: 46).

For EEA solo insurers in aggregate, the technical provisions constitute about 80% of the QIS5 balance sheet (see EIOPA 2011: 37-39). Because of their relative size, a change in the calculation methodology which leads to even a small percentage change in the technical provisions has a significant impact on the level of own funds and the solvency ratio of an undertaking. It is, therefore, important that the required approach for calculating technical provisions is clear and practicable to allow insurance undertakings to perform their calculations in a consistent manner. However, it is difficult to define a one-size-fits-all approach for valuing technical provisions. The QIS5 approach includes elements that are open to interpretation and, in some cases, explicitly allow for alternate methods to be used. This flexibility allowed under QIS5 is a potential challenge for supervisors who have to ensure that a level of consistency is maintained between the approaches taken by different insurers and across the Member States.

#### 3.1.1 Best estimate

The BE is determined by valuing projected future cash flows, including future discretionary benefits, using discount rates which reflect an appropriate risk-free interest rate term structure. The QIS5 Technical Specifications specified the risk-free yield curves to be used for different currencies. These curves also allowed for the addition of illiquidity premiums which vary depending on the liability type (see European Commission 2010: 50-51). Unlike the Solvency I approach, the BE does not allow for an implicit prudence margin.

[8] Separate calculations of the BE and the RM are not necessary for those future obligations which can be replicated using financial instruments which have an observable reliable market value. The technical provisions for these hedgeable obligations are determined on the basis of the market value of the relevant financial instruments.

### 3.1.2 Risk margin

The RM represents the present value of the future cost of holding adequate own funds to cover the future projected SCRs over the lifetime of the insurance undertaking. It is calculated as:

$$RM = CoC \cdot [\sum_{t=1}^{\infty} SCR_t \cdot (1+r_t)^{-t}]$$

where

CoC = the Cost-of-Capital rate (set at 6% for QIS5)

$t$ = year $t$

$SCR_t$ = the SCR projected for the end of year $t$

$r_t$ = the risk-free rate for maturity $t$ (without any illiquidity premium)

(see European Commission 2010: 56 and FMA 2011: 12)

Under QIS5 the SCR projections are determined using the SCR standard formula. However, the formula need consider, with regard to market risk, only the unavoidable market risk and, with regard to counterparty default risk, only the risk for ceded reinsurance. The Technical Specifications also allowed a number of simplifying approaches, which may be applied subject to the proportionality principle (see European Commission 2010: 59-67).

### 3.1.3 Approaches for determining technical provisions under QIS5 and the current regime

The important differences between QIS5 and the current Solvency I regime in determining the technical provisions include:

- Under QIS5 the BE calculation is based on realistic assumptions and does not allow for an implicit prudence margin (although this is partly offset by the requirement for a RM to be added to the BE).
- The discount rates to be used under QIS5 are prescribed (no longer selected by the undertaking) and, for the BE calculation, include an illiquidity premium.
- Under QIS5 the projected future cash flows must reflect potential future management actions with regard to, for example, asset allocation, bonus rates and expense charges.
- Under QIS5 potential future policyholders' behaviour with regard to lapses, renewals and surrenders is to be considered relative to the undertaking's financial position, management actions and financial markets in general.

### 3.1.4 Difficulties faced by undertakings in determining technical provisions under QIS5

Inconsistencies between the results of different insurance undertakings could result from differing decisions and interpretations regarding elements of the QIS5 Technical Specifications. Some of these elements are:

- The assumptions to be made regarding policyholders' behaviour (these "should be realistic and based on current and credible information") and management actions (these "should be determined in an objective manner" and "should be consistent with the insurance or reinsurance undertaking's current business practice and business strategy") when projecting and valuing future discretionary benefits (see European Commission 2010: 41-42).
- The assignment of liabilities to illiquidity premium buckets to determine the discount rate to be used when calculating the BE.
- The contract boundaries. Where the insurer has the right, at some point in the future, to terminate a contract or to change the premiums or benefits under a contract, any insurance obligations after that date are not considered to belong to the existing contract (see European Commission 2010: 27).
- The definition and identification of avoidable market risk that is to be excluded from the SCR projections when calculating the RM.
- The various simplifying approaches allowed in the calculation of the RM.

In addition to the above interpretation problems, Austrian insurers commented that, although data availability was not an issue, the calculation of the BE represented a considerable challenge. This was especially the case for the many small and medium undertakings which have not yet implemented the necessary standardisation and automation (see FMA 2011: 8). BaFin mentions a related issue for German life insurers who had technical difficulties performing stochastic projections. Some small and medium undertakings used a deterministic approach with the result that they were limited in explicitly considering future management rules in the projections (see BaFin 2011: 5).

Furthermore, BaFin has pointed out that the technical provisions of German life insurers are very sensitive to changes in the discount rate structure due to the long-term liabilities which are typical of life insurance contracts and the interest rate guarantees offered in Germany. Accordingly, BaFin recommends that the approach to setting the discount rate structure include stability criteria in order to avoid unnecessary fluctuations in the calculated technical provisions and own funds for life insurers.

The FMA report highlights that life insurers may be negatively affected when the illiquidity premium is added to the discount rates for a limited term. For example, the illiquidity premium prescribed for Euro cash flows ceases after nineteen years. This has an impact for insurance policies where premiums are expected to outweigh outflows in the next nineteen years. These policies will require higher technical provisions than if the illiquidity premium was not applied.

An Austrian insurer also pointed out an interesting consequence of the rules related to contract boundaries. A contract is considered to be terminated at the first point in time for which the insurer has the unilateral right to terminate the contract or change the premiums or benefits payable under the contract. If the insurer has an expectation of profit after that date, the result of this rule is to require a higher level of technical provisions. This could lead to the paradoxical result that insurers might limit

their own rights in order to reduce their technical provisions, thereby increasing their level of own funds (see FMA 2011: 11).

### 3.1.5 QIS5 results for technical provisions

For all EEA insurance and reinsurance undertakings the aggregate gross technical provisions across all lines of business were 1.4% lower under QIS5 than under Solvency I. For life insurance business, the reduction in gross provisions was 1% but due to a reduction in the reinsurance recoverables[9] under QIS5 the net technical provisions were actually higher under QIS5 (by about 3% and 6% for solos and groups respectively). For non-life business the gross technical provisions were 25% lower under QIS5. The main reasons for this large reduction are the discounting of future cash flows and the exclusion of implicit prudence margins under QIS5. (Different segmentations of business under the two regimes may also have caused some differences in the results.)

The BaFin report reveals that in Germany the technical provisions (presumably net of reinsurance recoveries) for life business are 7% higher under QIS5 than under Solvency I[10], while for non-life insurance they are 30% lower under QIS5.

Austrian insurers showed similar patterns to their EEA counterparts for the impact of QIS5 on technical provisions[11]. For life insurers the reduction is relatively slight. For these undertakings (if we exclude unit-linked obligations) the ratio of gross technical provisions under QIS5 to those under Solvency I range between 80% and 117%, their average being about 96%. So, a move to QIS5 results in a reduction of about 4% in gross technical provisions. The wide range of results observed may be the result of different interpretations and applications of the rules prescribed in the technical specifications.

For Austrian non-life and health insurance business the technical provisions under QIS5 were significantly lower than under the Solvency I approach. For non-life the reported reduction in technical provisions (net of reinsurance recoverables) was about 41%. For health insurance the reductions in the gross technical provisions were approximately 25% and 49% for SLT and NSLT respectively.[12]

The RM generally contributed only slightly to the technical provisions. For EEA life insurance business, it made up approximately 2% of the net technical provisions, while for EEA non-life business this figure was about 8% for solos and 7% for groups. For Austrian solo insurers, the observed ratio of RM to technical provisions was similarly smaller for life business than for non-life business – for life insurance business (excluding unit-linked business) the RM constituted less than 2% of the technical provisions (the largest value for a single insurer was about 4%), while for non-life business it made up about 11% of the technical provisions. The relatively low significance of the RM for life insurance

[9] 'Reinsurance recoverables' are the amount of an insurer's incurred losses that will be paid by reinsurers.
[10] In Germany the current accounting regulations under Solvency I are specified by the Handelsgesetzbuch (HGB).
[11] In Austria the current accounting regulations under Solvency I are specified by the Unternehmensgesetzbuch (UGB) and the Versicherungsaufsichtsgesetz (VAG).
[12] Under Solvency II the treatment of Health business depends on whether the insurance obligations are pursued on a similar technical basis to life insurance (SLT) or not (NSLT).

business suggests that undertakings should give careful consideration to using a simplified approach for its calculation for this class of business (see FMA 2011: 20).

### 3.2 Assets

Under Solvency II, assets and liabilities are generally to be valued using a market-consistent approach (see European Commission 2010: 6). In many of the Member States local accounting principles do not follow this principle, so insurers had a significant task in determining the QIS5 balance sheet. Where insurers were unable to apply a mark-to-market approach (for example, due to illiquid or non-existent markets) they used a mark-to-model approach, reverted to local accounting figures or performed valuations on a cost basis (see EIOPA 2011: 39).

Goodwill is to be valued at zero in the QIS5 balance sheet and insurers generally used this approach for most intangible assets.

EIOPA, the FMA and BaFin all reported that insurers used varying approaches for the valuation of deferred taxes. QIS5 requires that deferred tax assets be recognised only when future taxable profits, against which the tax assets may be realised, be probable within a reasonable timeframe. No specific definitions of “probable” or “reasonable timeframe” were provided in the technical specifications.

For EEA insurers the level of assets has reduced slightly under QIS5 compared to Solvency I. However this reduction has been more than offset by reductions in the technical provisions (described in section 3.1.5) resulting in a significant increase in the level of own funds under QIS5. The differences between the levels of assets, liabilities and own funds under the two regimes are shown in Table 2. The table demonstrates that the change in methodology causes small percentage changes in assets and liabilities, but has a large relative impact on own funds.

**Table 2:** Balance sheet items under the current regime and QIS5 for EEA insurers

| Balance sheet item (EUR billions) | Solos | | | Groups | | |
|---|---|---|---|---|---|---|
| | Current regime | QIS5 | % change | Current regime | QIS5 | % change |
| **Assets** | 7 457 | 7 432 | -0.3% | 6 543 | 6 455 | -1.3% |
| **Liabilities (excl. subordinated liabilities)** | 6 714 | 6 491 | -3.3% | 6 166 | 5 936 | -3.7% |
| **Basic own funds** | 743 | 941 | 26.7% | 377 | 519 | 37.8% |
| **Ancillary own funds** | | 12 | | | 3 | |

The reduction in the level of assets for EEA insurers is largely a result of the differing treatments of goodwill and other intangible assets, reinsurance recoveries and mortgages. However, the impact on reported asset values varies considerably between EEA states. In Austria, for example, the accounting rules require that assets are valued on a cost basis rather than using a market-consistent approach. As a result, the Solvency I balance sheets of Austrian insurers do not benefit from unrealised gains on

stocks, bonds, investment funds, property, etc. A change to the QIS5 valuation approach, therefore, has a significant positive impact on their reported asset values[13].

The technical provisions (see section 3.1.5) are the main driver behind the reduction in liabilities under QIS5.

## 3.3 Own funds

The basic own funds and own funds of an insurer can be determined directly from the Solvency II balance sheet[14]. As can be seen in Table 2, for the EEA a shift from the current solvency regime to QIS5 resulted in increases in basic own funds of 27% and 38% for solos and groups respectively. Insurers, both in Austria and in the EEA overall, reported negligible levels of ancillary own funds, i.e. own funds consisted almost solely of basic own funds.

### 3.3.1 Available own funds

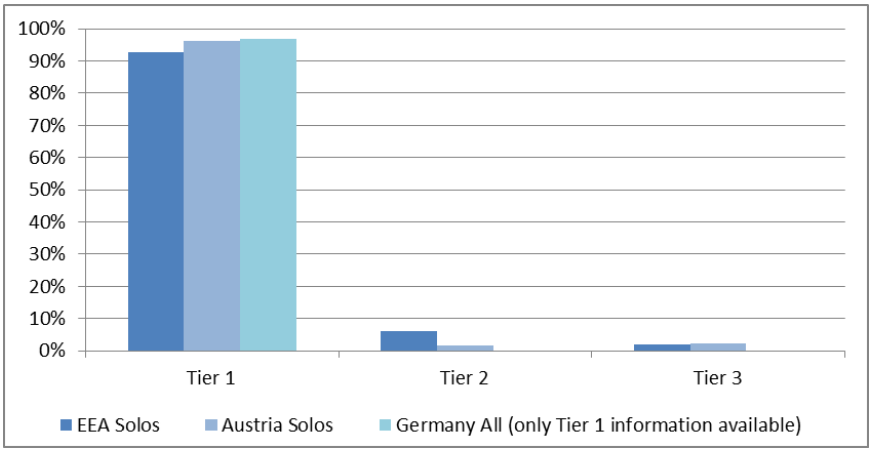
Under QIS5 it is recognised that certain balance sheet items are not always immediately available to absorb losses that may occur. In order to derive the basic own funds which are available to meet the capital adequacy requirements, adjustments are made in respect of ring-fenced funds, restricted reserves and participations in financial and credit institutions. The overall impact for EEA insurers of these adjustments was a reduction of 3%.

### 3.3.2 Eligible own funds

The amount of the available own funds that is eligible for demonstrating solvency depends on the quality of the own funds elements. The QIS5 Technical Specifications provide rules for categorising available (basic) own funds items into three tiers according to their loss-absorbing characteristics. Insurers in Austria, Germany and in the EEA overall categorised the vast majority of their own funds as Tier 1, i.e. own funds of the highest quality.

[13] The value of the increase in the assets under QIS5 is quantified on page 34 of the FMA report as 11% of own funds.
[14] Basic own funds = assets - liabilities + subordinated liabilities. Own funds = basic own funds + ancillary own funds.

**Figure 2:** The composition of own funds for insurers in the EEA, Austria and Germany




The categorisation of own funds items was not straightforward for all items. In Austria, in previous quantitative impact studies, insurers allocated all own funds to Tier 1. Under QIS5, however, 30% of insurers reported some own funds in either Tier 2 or Tier 3. In spite of this apparent improvement in the categorisation of own funds, there are still difficulties in this area which are not adequately dealt with in the technical specifications or by the recommendations in the Level 2 Implementing Measures (see FMA 2011: 41).

The eligible own funds are limited by applying tier rules to the available own funds. These rules are:

- Eligible basic own funds
  1. Only Tier 1 and Tier 2 basic own funds items are eligible.
  2. Tier 1 basic own funds items must be at least 80% of the MCR.
- Eligible own funds
  1. Tier 1 own funds items must be at least 50% of the SCR.
  2. Tier 3 own funds items must be less than 15% of the SCR.

An additional rule requires that “other paid-in capital instruments” (preference shares, subordinated mutual members’ accounts and subordinated liabilities) constitute a maximum of 20% of Tier 1.

The effect of these rules was difficult to assess for EEA insurers, but EIOPA reports that the level of eligible own funds appears to have been impacted by the 20% limit on other paid-in capital instruments in Tier 1, and the 15% limit on Tier 3 items. For Austrian solo insurers the impact of the limits was negligible; own funds of €13.313 billion were reduced by 1‰. The German report states that the limits had an effect for only twelve of the participating undertakings, but BaFin expresses its doubt about the validity of this result (see BaFin 2011: 14).

Table 3 demonstrates the impact on eligible own funds of a change to QIS5 for insurers in the EEA overall and in Austria. Based on the QIS5 reported figures EEA insurers in aggregate will have 28% more own funds eligible to meet the capital requirement under Solvency II than under the current regime. Austrian insurers observed a much greater relative impact on the level of own funds than EEA insurers overall. The main drivers behind the 111% increase in eligible own funds for Austrian insurers were the reduction in technical provisions and, to a lesser extent, the increase in the level of assets resulting from the shift from a cost basis to a market-consistent valuation approach.

**Table 3:** Eligible own funds under the current regime and under QIS5 for solo insurers in the EEA and Austria

| Eligible own funds (EUR billions) | EEA | Austria |
|---|---|---|
| **Current regime** | 703 | 6.3 |
| **QIS5** | 902 | 13.3 |
| **Increase under QIS5** | 199 | 7.0 |
| **% increase under QIS5** | 28% | 111% |

For German insurers the changes in the level of own funds under QIS5 varied significantly by class of insurance business. The median observations for changes in eligible own funds were -16% for life insurance, 27% for health insurance and 131% for non-life insurance. The large relative increase in the eligible own funds for non-life insurance is due to a 7% increase in the value of assets and, in particular, a 30% reduction in the level of technical provisions under QIS5.

### 3.4 Solvency coverage

Solvency II specifies two target levels of capital which allow for an escalating ladder of supervisory intervention (see European Parliament and the Council of the EU 2009: 7). The first trigger for supervisory intervention is the SCR. When an insurance undertaking fails to demonstrate that its eligible own funds cover the SCR, the supervisory authority will require the undertaking to take the steps necessary to comply with the SCR within six months (see European Parliament and the Council of the EU 2009: 62). The SCR represents the amount of capital which is sufficient to cover losses in the next twelve months with a probability of 99.5%.

The second capital requirement is that an insurance undertaking holds enough eligible basic own funds to cover its MCR. Failure to comply with the MCR will result in more serious intervention by supervisory authorities, including possible withdrawal of the license (see European Parliament and the Council of the EU 2009: 64).

We have seen above that the eligible own funds increase under QIS5 for EEA insurers. However, as can be seen in Table 4, the SCR under QIS5 is larger than the capital requirement under the current regime[15]. The combined effect of these movements on the solvency surplus and the solvency coverage ratio[16] is shown in the table. When assessed against the SCR the solvency surplus reduced by about €120 billion and the solvency ratio fell from 310% to 165%. However, insurers still demonstrated a strong financial position in that the eligible own funds exceeded the SCR by 65%. Measured against the MCR, the point of mandatory supervisory intervention, the solvency surplus, increased by €200 billion under QIS5.

[15] The capital requirement under Solvency I is called the Required Solvency Margin (RSM).
[16] Solvency coverage ratio = eligible (basic) own funds/solvency requirement. Also called 'solvency ratio'.

**Table 4:** Surpluses and solvency ratios under QIS5 and the current regime for EEA insurers

| (EUR billions) | Current regime | QIS5 | |
|---|---|---|---|
| | | SCR | MCR |
| Solvency requirement | 227 | 547 | 185 |
| Eligible (basic) own funds | 703 | 902 | 861 |
| Solvency surplus | 476 | 355 | 676 |
| Solvency ratio % | 310% | 165% | 466% |

Table 5 shows that for Austrian solo insurers, the aggregate solvency ratio reduced only slightly from 262% to 246% under QIS5 (based on SCR). Although Austrian insurers appear, under the current rules, to be less well capitalised on average than EEA insurers, they expect, under Solvency II, to report a higher SCR coverage than the EEA overall. German insurers similarly reported smaller reductions in solvency coverage ratios than their EEA counterparts.

**Table 5:** Solvency ratios under QIS5 (assessed against SCR) and the current regime for EEA insurers, Austrian solo insurers and German insurers

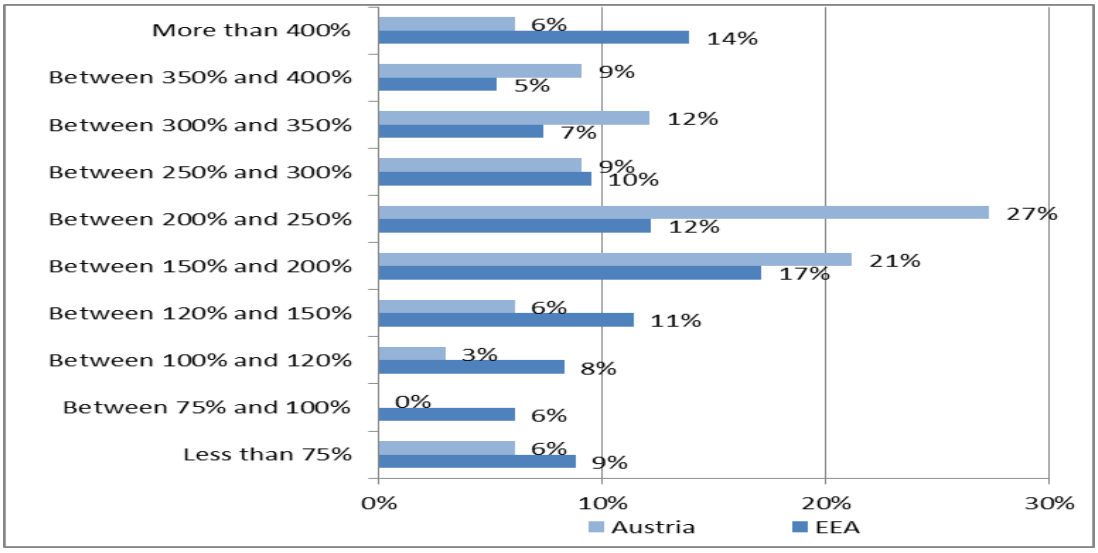
| | EEA All | Austria Solos | Germany All | | |
|---|---|---|---|---|---|
| | | | Life | Health | Non-Life |
| Current regime | 310% | 262% | 174% | 217% | 233% |
| QIS5 | 165% | 246% | 158% | 176% | 225% |

It is important to note that the €120 billion reduction in the solvency surplus (based on SCR) for the EEA overall was driven by a handful of countries such as the UK, Sweden and France which demonstrated large negative impacts on the solvency surplus under QIS5. For thirteen EEA countries the QIS5 approach resulted in increased solvency surpluses. For Austria and Germany, for example, EIOPA reports that the surpluses (based on SCR) increased by €2.9 billion and €13 billion respectively (see EIOPA 2011: 28). Although the overall solvency ratios for insurers in these two countries reduced, they had more free capital available under QIS5 than under the current capital adequacy rules.

Figure 3 shows how the SCR coverage ratios of individual solo insurers in the EEA and in Austria were distributed. In the EEA, 15% of insurers held insufficient eligible own funds to cover their SCR. In Austria only 6% of insurers failed to meet the SCR requirement. These insurers, however, had SCR coverage ratios which were significantly below the 100% threshold (less than 75%). In Germany 17% of life insurers and 5% of non-life insurers failed to meet the SCR based on the QIS5 data.

For the EEA, 23% of insurers reported SCR coverage ratios lower than 120%. For Austrian solos this number was only 9%. Just less than half of EEA undertakings reported that they held at least double their SCR in eligible own funds. In Austria this was true of nearly two thirds of the undertakings.

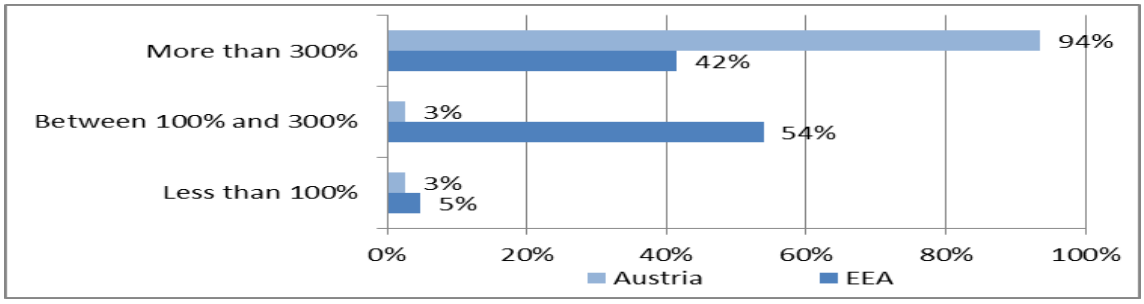
**Figure 3:** The distribution of SCR coverage ratios for solo insurers in the EEA and Austria




In Figure 4 we see that 3% of insurers (one undertaking) in Austria failed to cover their MCR. For EEA insurers this figure was 5%. Under the Solvency II regime such insurance undertakings would face strong supervisory action, including the possible withdrawal of licenses.

The vast majority of Austrian insurers held eligible basic own funds of at least three times the MCR, while in the EEA this was the case for less than half of the insurers.

**Figure 4:** The distribution of MCR coverage ratios for solo insurers in the EEA and Austria

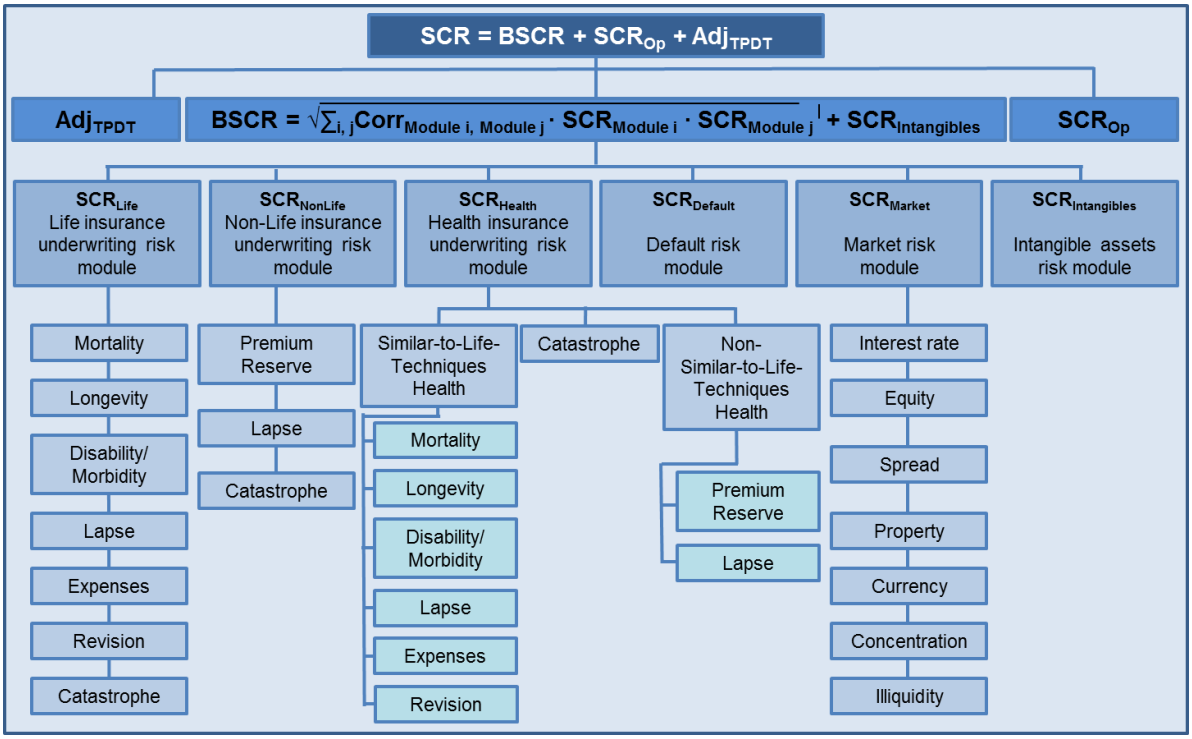


# 4 SCR

## 4.1 Modular approach

The calculation of the SCR using the standard approach is performed on a modular basis as shown in Figure 5 (see European Commission 2010: 90).

**Figure 5:** The modular approach to determining the SCR according to the standard formula




At the highest level the SCR is the sum of the basic solvency capital requirement (BSCR), the SCR for operational risk and the AdjTPDT. The last of these is an adjustment for the loss-absorbing capacity of technical provisions and deferred taxes. It is always less than or equal to zero.

The BSCR is the aggregated value of the SCRs calculated for each of six risk modules. Three of these cover underwriting risks (life, non-life and health risks) and the remaining three cover counterparty default risk, market risk and intangible assets risk[17]. The BSCR is not calculated by summing the undertaking's module SCRs (see Figure 5). The aggregation formula and the correlation coefficients ($Corr_{Module\ i,\ Module\ j}$) prescribed under the standard approach allow for a reduction in the BSCR to reflect the effect of risk diversification for an undertaking.

The QIS5 Technical specifications describe all methods, formulae, parameters and correlation coefficients to be used under the standard approach for determining the SCR. Where the standard approach does not reflect the risk profile of a specific insurer the undertaking may calculate the SCR using partial or full internal models. Insurers may also use undertaking-specific parameters if those

[17] The requirement to calculate SCR Intangibles is a new development of QIS5. The intangible assets risk module was not mentioned in the Solvency II Directive.

defined for the standard approach are not appropriate. Any deviations from the standard approach will, however, require supervisory approval in order to be used under Solvency II.

### 4.2 Difficulties faced by undertakings in determining the SCR

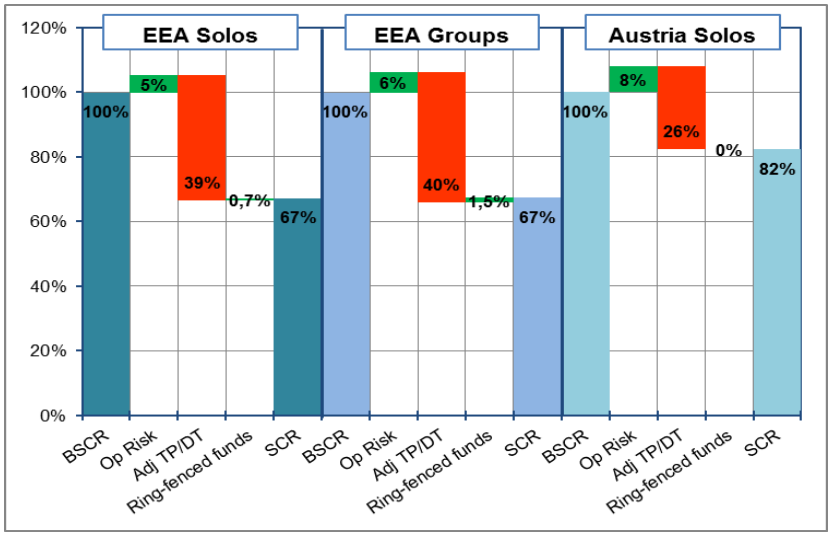
Figure 5 demonstrates that the modular approach for determining the SCR involves calculations for many modules and sub-modules. Given the level of detail and the number of calculations required, it is not surprising that there are elements of the calculations that are open to interpretation or difficult to implement. Areas of the SCR calculation for which insurers provided critical feedback include (see EIOPA 2011: 68):

- Catastrophe risk for the non-life risk module: calibration and methods used; applicability for respective lines of business or regional markets; data availability; effort required.
- Default risk module: difficulty of calculations and effort required to measure a relatively small impact.
- Calculating the loss absorbency of deferred taxes.
- Lapse risk for life and non-life risk modules: the requirement to model this risk at a policy level; lack of adequate systems and processes to model risks as required.
- Market risk module: the required look-through approach for unit-linked funds and structured products is difficult and time-consuming to implement.

### 4.3 SCR structure

Figure 6 shows, for EEA and Austrian insurers, how the BSCR, operational risk and the AdjTPDT contribute to the SCR. The AdjTPDT significantly reduces the SCR while operational risk causes a slight increase. The combined impact of these two effects was to reduce BSCR to SCR by about 33% in the EEA overall and by only 18% for Austrian solo insurers.

**Figure 6:** The composition of the SCR for EEA insurers and Austrian solo insurers




In the EEA, solos and groups reported similar compositions of SCR. The adjustment for technical provisions and deferred taxes had a large effect (reduced the SCR by about 40% of the BSCR) while the effect of operational risk was relatively small (increased the SCR by about 6% of the BSCR). EIOPA reported that only 60% of participating undertakings calculated the AdjTPDT so the SCRs may have been overstated for these insurers.

For Austrian solo insurers the reported impacts of operational risk (8% of the BSCR) and the AdjTPDT (26% of the BSCR) were more conservative than those for the EEA overall. It must be pointed out, however, that the reported impacts of these SCR elements were very heterogeneous for Austrian insurers.

In the FMA report the reported reduction for the AdjTPDT was due more to deferred taxes (16.4% of the BSCR) than to technical provisions (9.2% of the BSCR). The relatively slight impact of the AdjTPDT for Austrian insurers (compared to EEA undertakings) may be partly explained by the fact that almost all Austrian insurers used simplified, often conservative approaches, in determining the adjustment for deferred taxes. For example, some Austrian insurers placed an upper limit on this adjustment to ensure that it cannot exceed their reported net deferred tax liabilities (see FMA 2011: 57).

### 4.4 BSCR structure and the diversification effect

Figure 7 demonstrates, for EEA solo undertakings, how the impact of the risk modules on the BSCR (after taking into account the diversification effect) varied by type of insurance. For life insurers the largest contributor to BSCR was market risk while the life underwriting risk had a much smaller impact. For non-life insurers, although market risk was still a significant contributor to the BSCR, the non-life underwriting risk module had by far the greatest impact. In Figure 8 we see that solo insurers in Austria reported similar patterns with respect to market risk and the underwriting risks for life and non-

life business, but the differences in the contribution of market risk were more pronounced than for the EEA overall.

**Figure 7:** The composition of the diversified BSCR for EEA life insurers and non-life insurers (solos only)

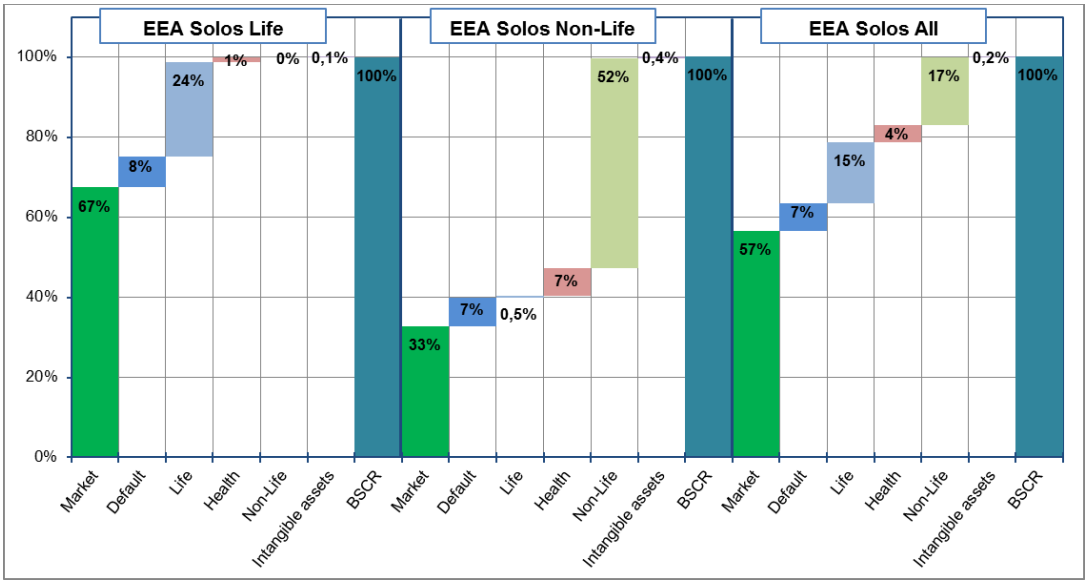



**Figure 8:** The composition of the diversified BSCR for Austrian life insurers and non-life insurers (solos only)

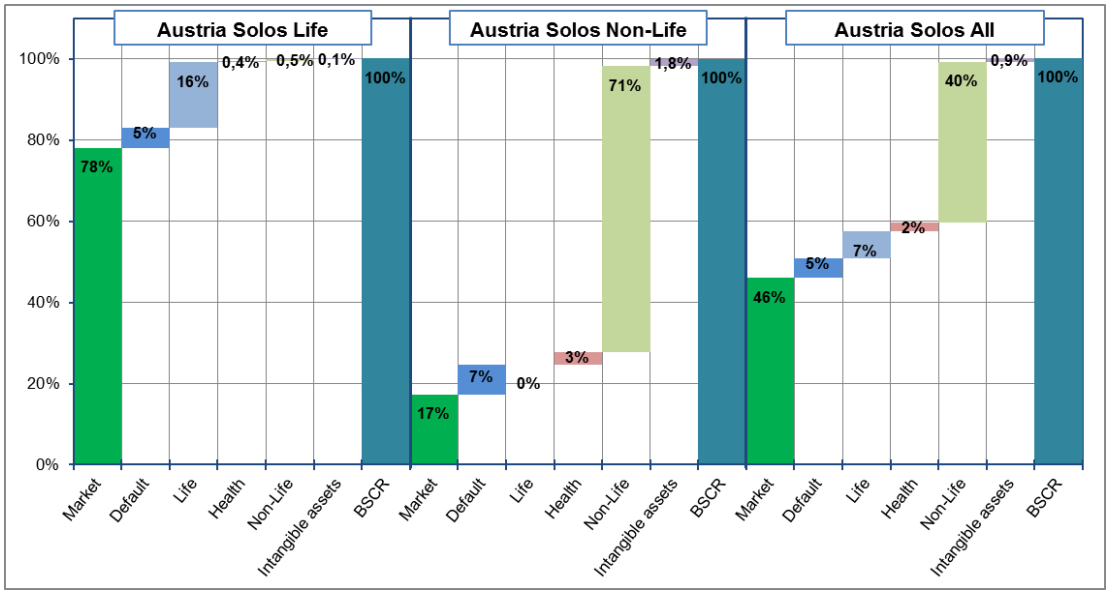
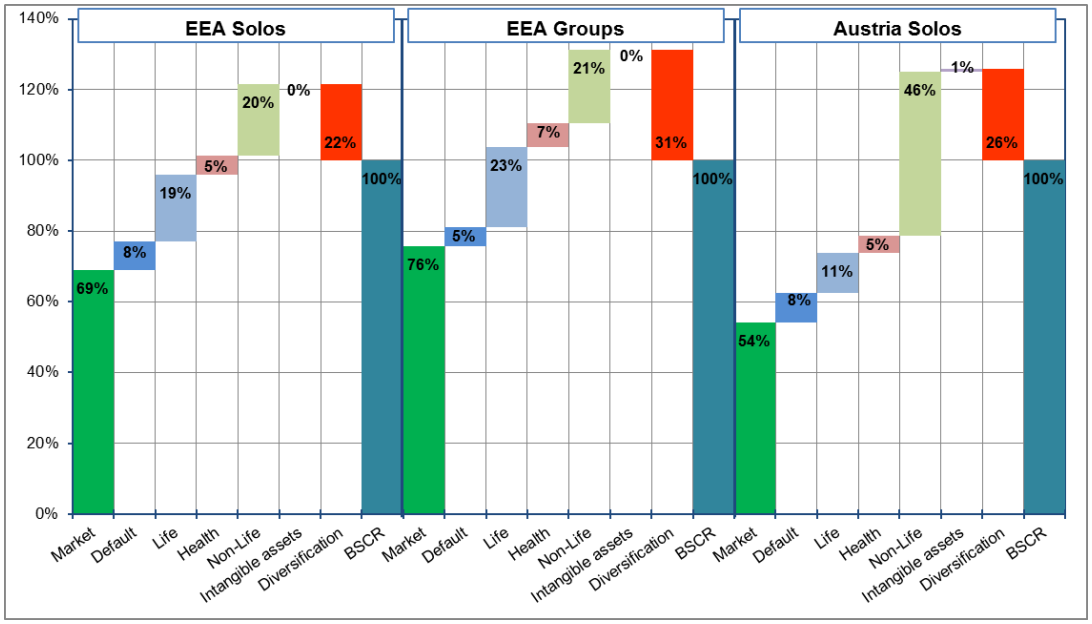



Figure 9 shows how the individual risk modules contributed to the aggregate BSCR (before the diversification effect is considered) for EEA insurers and Austrian solos. The graphs also highlight the

effect of risk diversification that resulted from the aggregation formula for BSCR using the correlation matrix specified by the technical specifications.[18]

**Figure 9:** The composition of the BSCR for EEA insurers and Austrian solo insurers




Although the relative impacts were different for the EEA and Austria, the market risk module was the biggest contributor to BSCR for both regions. For the underwriting risk modules Austrian solos reported a relatively high contribution for non-life risk and a relatively low impact for the life risk module when compared to the EEA overall.

The reductions in SCR resulting from the diversification effect were significant in all three graphs. In the EEA, groups benefited more from this effect than solos. This is due to groups generally conducting a wider range of activities (see EIOPA 2011: 64).

### 4.5 SCR Market

Figures 7, 8 and 9 demonstrate that the market risk module had a significant impact on the BSCR for all types of insurance undertakings. Within this risk module, the sub-modules having the greatest SCR contributions were those for spread risk, interest rate risk and equity risk. The relative rankings of these risks varied by type of insurance undertaking.

For Austrian life insurers the risk with the greatest impact on diversified SCR Market was spread risk (Figure 10). This class of business has relatively long-term obligations so the technical provisions are sensitive to interest rate changes; accordingly, interest rate risk also had a significant impact. For non-

[18] Comparisons between graphs showing compositions of undiversified and diversified SCR (or BSCR) must be treated with caution. Not only do the absolute values of the individual constituents differ but the relative rankings may also change after taking into account the diversification effect.

life insurers equity risk was the largest contributor although the impact of spread risk was almost as high. Due to heavier weightings of real estate investments for non-life insurers and composite insurers, property risk had a large impact on SCR Market for these business lines (14% and 26%, respectively, of diversified SCR Market). However, the prescribed approach of setting SCR Property at 25% of the property value in the Solvency II balance sheet is considered to be too conservative for Austrian real estate by local insurers (see FMA 2011: 83).

**Figure 10:** The composition of the diversified SCR Market for Austrian life insurers, non-life insurers and composite insurers (solos only)

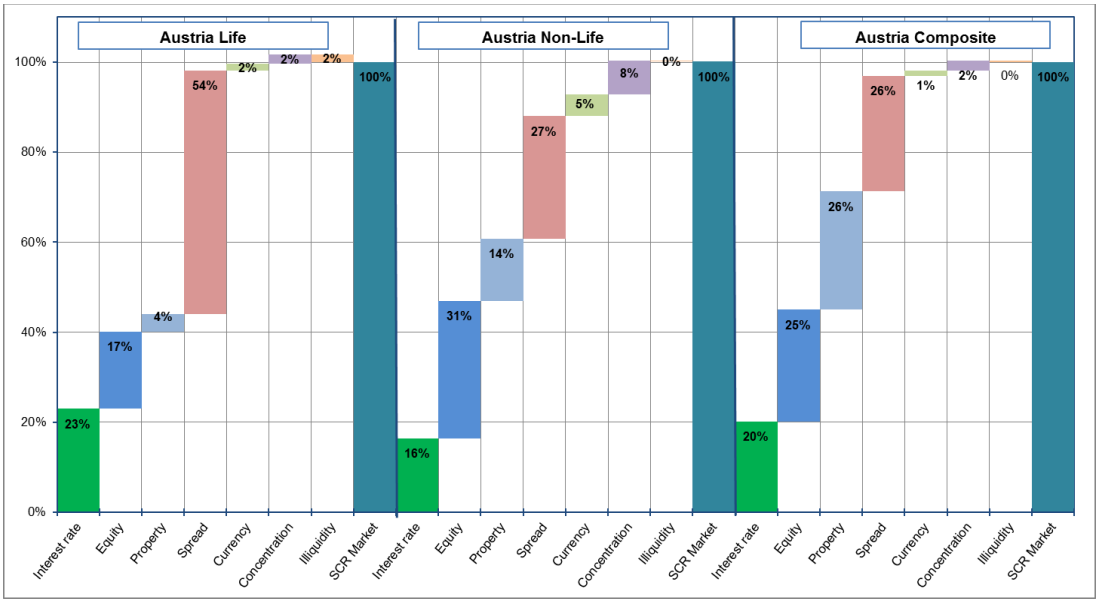
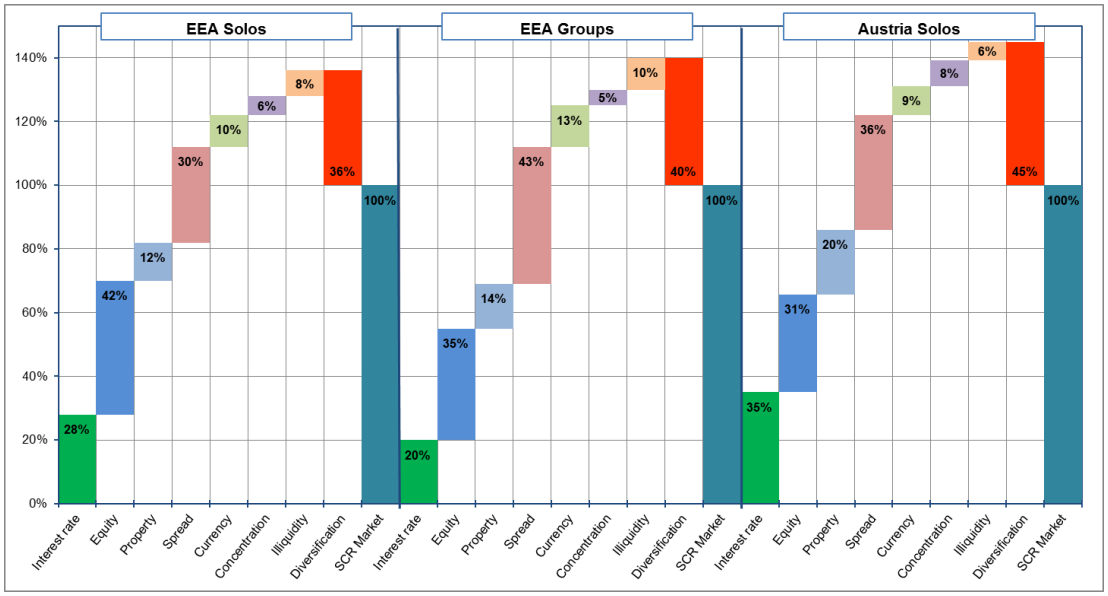



Figure 11 allows a comparison of the compositions of (undiversified) SCR Market for EEA solos and groups. For groups, equity risk had a smaller impact than for solos. This is possibly due to groups identifying a larger proportion of their equity holdings as strategic participations – these holdings attract a lower SCR charge than equities under Solvency II. Austrian solo insurers overall reported a more significant impact of property risk than their EEA counterparts.

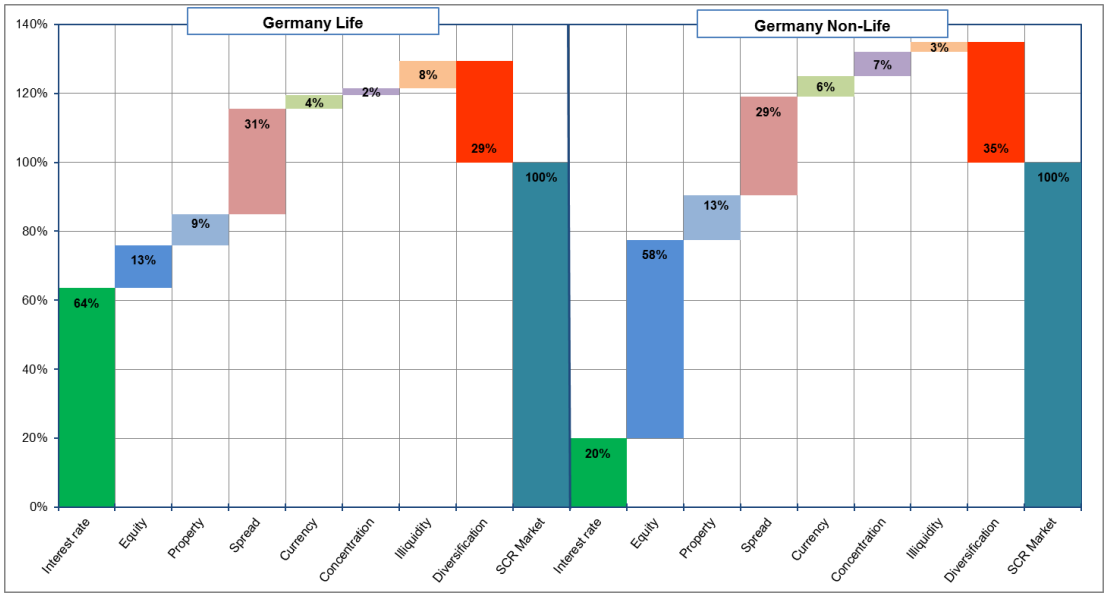
**Figure 11:** The composition of SCR Market for EEA insurers and Austrian solo insurers




The FMA report is critical of the correlation coefficients prescribed for aggregating the sub-risks to the SCR Market level (see FMA 2011: 84-85). The low assumed correlations do not reflect the experience of the recent financial crises where the markets for different financial asset categories were generally observed moving in similar directions, i.e. the correlation coefficients have tended toward 1. It is, therefore, likely that the reported diversification effects are higher than we would expect in practice.

Figure 12 shows how the composition of SCR Market varied for German insurance undertakings by type of business. The most striking feature is the large impact reported by life insurers for interest rate risk. BaFin reports that this effect, a result of the interest rate sensitivity of the technical provisions, confirms the findings of earlier impact studies (see BaFin 2011: 15).

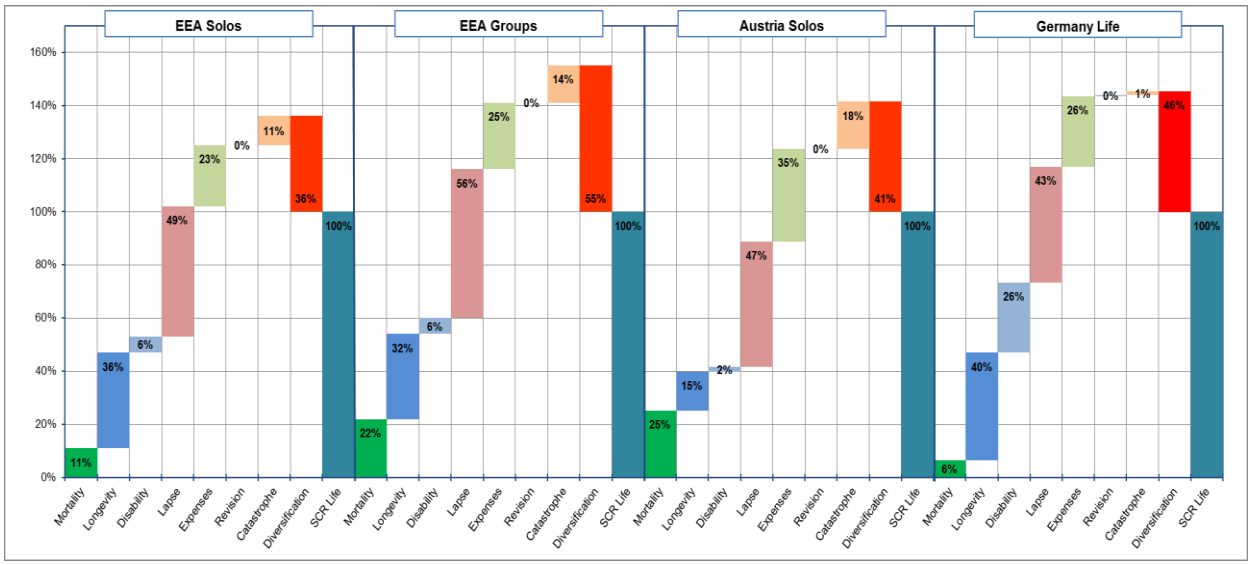
**Figure 12:** The composition of SCR Market for German life insurers and non-life insurers



### 4.6 SCR Life

The sub-risks contributing to SCR Life are mortality risk, longevity risk, disability risk, lapse risk and revision risk. For EEA insurers overall the biggest contributors were lapse and longevity risks (Figure 13). In Austria the largest sub-risk was lapse risk but expenses risk was reported as being more significant than longevity and mortality risks. The FMA does, however, point out that Austrian insurers were inconsistent in their approaches used for assessing the mortality and longevity risks. The prescribed shocks for these risks should each have been applied at a policy level with the risk being summed over only those policies for which there was a negative impact on the net asset value (NAV). Instead, Austrian insurers often applied the shocks to the aggregate portfolio, resulting in a netting-off effect for those policies where the shock scenario has a positive NAV impact. This treatment has resulted in Austrian insurers underreporting the levels of these two risks (see FMA 2011: 62).

**Figure 13:** The composition of SCR Life for EEA insurers, Austrian solo insurers and German life insurers




For German life insurers, the disability and longevity risks showed larger impacts than for EEA insurers, while the risks for mortality and catastrophe were less significant.

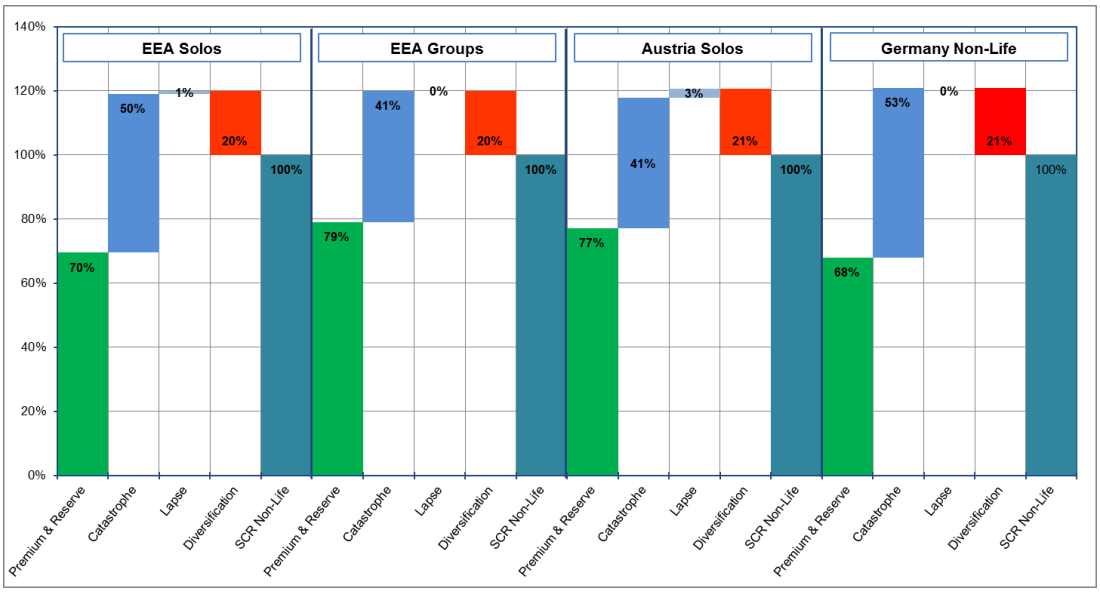
The impact of revision risk appears to have been negligible for the EEA. The BaFin report states that none of the German insurers considered themselves to be affected by revision risk for the life risk module and the FMA reported a 0% impact.

### 4.7 SCR Non-Life

Figures 7 and 8 demonstrate that for non-life insurers in the EEA and Austria the non-life underwriting risk module was by far the largest contributor to BSCR.

The requirement to calculate a lapse risk SCR for the non-life risk module is a new development of QIS5[19]. However, the reported level of required capital calculated for this risk was negligible for most Member States. Premium and reserve risk was the largest contributor to SCR Non-Life for insurers in Austria, Germany and the EEA overall (see Figure 14).

**Figure 14:** The composition of SCR Non-Life for EEA insurers, Austrian solo insurers and German non-life insurers




## 4.8 SCR Health

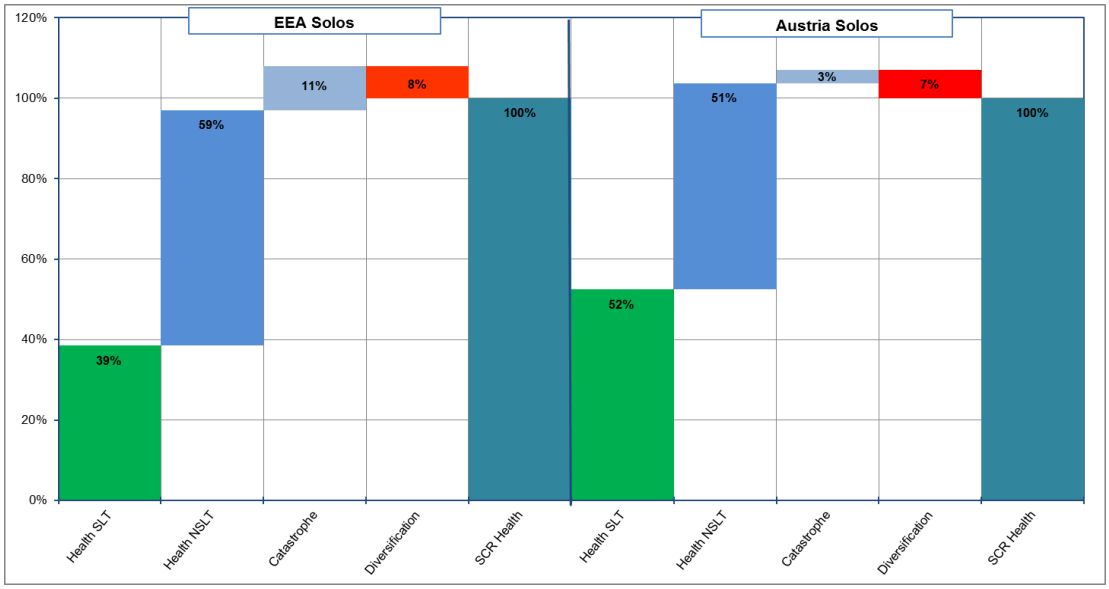
In order to calculate the capital requirement for the health risk module, insurance undertakings had to segment their health business into SLT (similar to life techniques) and NSLT (not similar to life techniques) lines. Many countries reported that their industries had difficulties with this segmentation. The SCRs for the Health SLT, Health NSLT and Health Catastrophe sub-modules are aggregated to determine the SCR for the health risk module.

Although this risk module had a relatively small impact for the insurance industry overall (see Figures 7 and 9) it was significant when we consider undertakings which write primarily health business. For the 382 EEA health undertakings which participated in QIS5 the Health risk module constituted about 63% of the BSCR (see EIOPA 2011: 80).

For EEA undertakings NSLT was the greatest contributor to SCR Health while for Austrian insurers SLT and NSLT contributed roughly equally (Figure 15). This difference may be due to inconsistencies in segmentation of health insurance business as well as genuine differences in the natures of the underlying business.

[19]The non-life lapse sub-module was not mentioned in the Solvency II Directive (see European Commission 2010: 124).

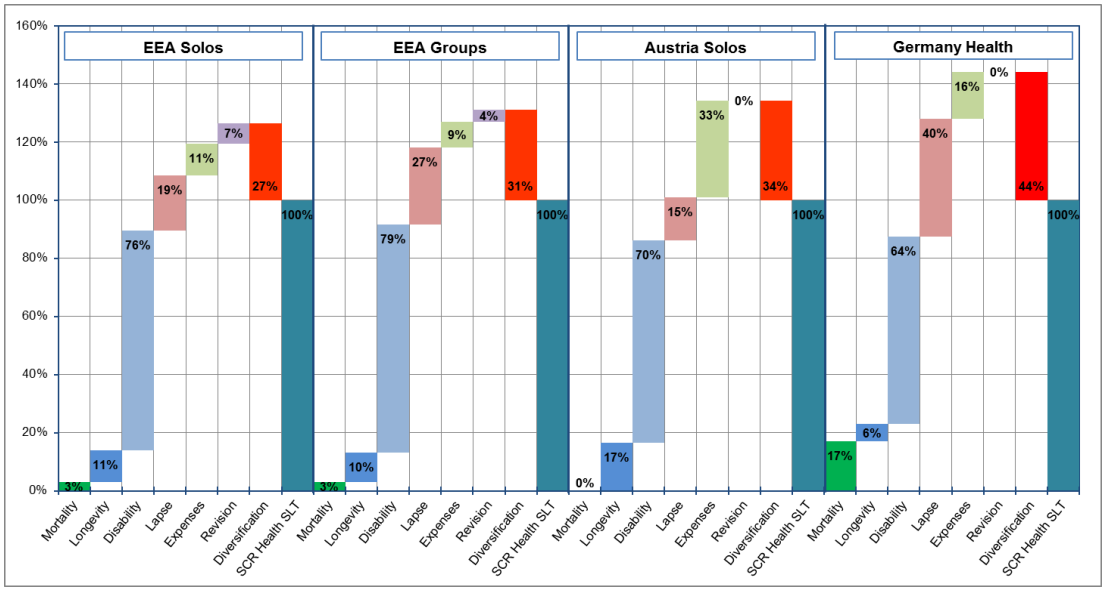
**Figure 15:** The composition of SCR Health for solo insurers in the EEA and Austria




### 4.8.1 Health SLT

SCR Health SLT has similar sub-modules to those for the life risk module. Generally, disability risk was the biggest contributor to SCR for this risk sub-module (Figure 16). Austrian solos reported disability and lapse impacts that were lower than the EEA averages and reported a relatively high contribution for expense risk. They also reported a relatively high impact for longevity risk while German health insurers reported a lower impact for this risk. The view of German insurers is that this risk can largely be offset by the ability to amend future premiums. Neither Austria nor Germany reported any impact for revision risk.

**Figure 16:** The composition of SCR Health SLT for EEA insurers, Austrian solo insurers and German health insurers



### 4.8.2 Health NSLT

The calculation of SCR Health NSLT is determined using an approach similar to that for the non-life risk module (see section4.7).

The calculation of the SCR for the premium and reserve risk uses a factor-based approach which did not yield any major technical problems. A number of Austrian insurers, however, made use of undertaking-specific parameters which would have to be approved by the FMA for use in Solvency II calculations. The values used were in some cases less than half of the market-wide estimates, which resulted in a significant reduction in the reported capital requirements for this risk sub-module (see FMA 2011: 70).

Many insurance undertakings in the EEA disregarded the lapse risk because of the time and effort required to perform the analysis at a policy level. The FMA points out that, given the significant impact reported for this risk by those insurers which performed the required calculations, it is clear that lapse risk for the health NSLT sub-module should not be neglected.

### 4.8.3 Health CAT

Figure 15 shows that catastrophe risk had a relatively small impact on SCR Health. There were a number of comments from EEA insurers regarding the complexity of this risk sub-module and the difficulty of meeting the data requirements. There were also comments that the prescribed catastrophe scenarios were inappropriate for the local markets and for some individual insurers.

The average contribution of catastrophe risk to SCR Health NSLT for Austrian insurers was 3%, well below the EEA average of 11%. The FMA notes in their report that the results in Austria varied strongly between insurers. The discrepancies were attributed partly to technical difficulties with the helper tab for this sub-module (a tool provided by CEIOPS) and partly to different interpretations of the insurance contracts to be included in the various prescribed catastrophe scenarios.

## 4.9 SCR Default

The default risk module considers the possible losses arising from unexpected defaults (or loss in credit standing) by counterparties or debtors in the next twelve months. The types of contracts or instruments covered by this risk module include reinsurance arrangements, securitisations, derivatives and receivables from intermediaries. Credit exposures which are covered in the spread risk sub-module, e.g. bonds, are not considered for SCR Default (see European Commission 2010: 134).

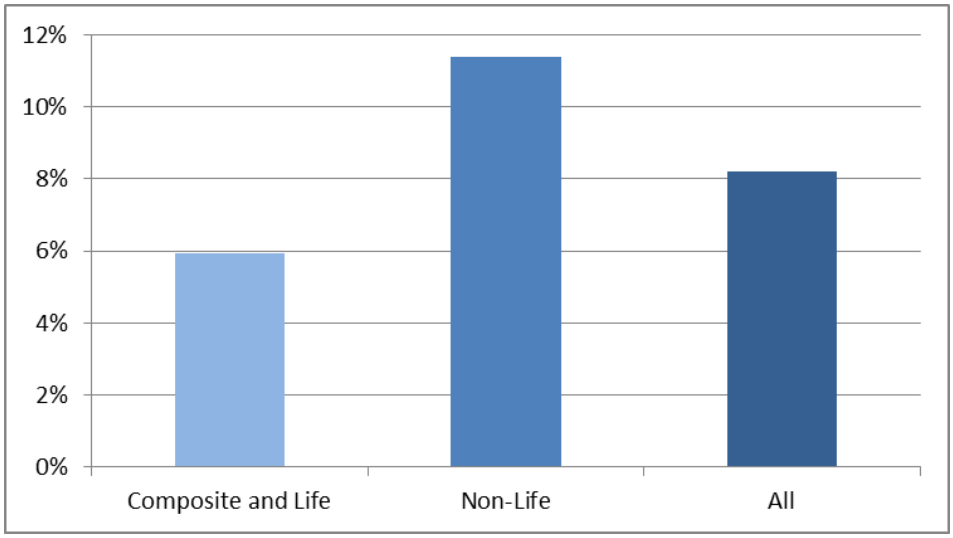
All three reports considered in this paper cited comments from insurers regarding the disproportionate complexity and effort required for a risk module with a relatively slight impact. The major issues were the requirement to measure the risk mitigating effect for individual counterparties, and the dependence of the calculations on other risk modules (underwriting risk and market risk modules).

An interesting inconsistency in the treatment of cash-at-bank was highlighted in the EIOPA report. The calculated risk charge under the default risk module for cash deposited at a bank is significantly higher

than the charge under the spread risk sub-module (under market risk) for a bond issued by the same bank (see EIOPA 2011: 77).

In Figure 9 we saw that for Austrian solos the default risk module contributes about 8% to the BSCR. Figure 17 demonstrates that this risk module has a larger impact for Austrian non-life insurers than for their local composite insurer and life insurer counterparts. This is because non-life insurers traditionally make greater use of reinsurance (see FMA 2011: 86-87).

**Figure 17:** SCR Default/BSCR for Austrian solo insurers



## 5 Conclusion

Based on the results reported for QIS5, Solvency II will have a negative impact on the reported solvency of EEA insurers. For EEA insurers in aggregate, a change from the current regime to QIS5 caused the capital requirements to increase by €320 billion (140%), the solvency surplus to reduce by €120 billion (25%) and the solvency ratio to reduce from 310% to 165%. These reported impacts of the QIS5 rules can be seen as the result of stricter regulations intended to increase policyholder protection. Based on the QIS5 results, the increased capital requirements under Solvency II will be of significant concern for the 15% of insurers that failed to cover their SCR and the further 8% that had a buffer of less than 20% of the SCR.

For Austrian and German insurers the reported impact of the Solvency II rules was less severe than for EEA insurers overall. In both these countries the surpluses increased significantly under QIS5. Austrian solo insurers generally reported reductions in technical provisions and increased assets, the latter being due to a move to market values in the Solvency II balance sheet. The effect of these changes was to increase eligible own funds by €7 billion or 111%. This increase in own funds was counteracted by an increase in the required solvency capital (SCR vs. RSM), resulting in an increase of the solvency surplus from €3.5 billion (against RSM under the current regime) to €6.4 billion (against SRC under QIS5) for the Austrian insurance industry. Although the aggregate SCR coverage ratio fell slightly from 262% to 246%, Austrian insurers had more free capital available under QIS5 than under Solvency I. Three insurance undertakings had coverage below 120%. More than two thirds of Austrian insurers demonstrated SCR coverage in excess of 200%.

Generally technical provisions for EEA life insurers were only slightly impacted by the change in valuation rules while non-life insurers saw large reductions under QIS5. The risk margin, which required significant effort in its calculations, constituted only about 2% of technical provisions for life insurance business. For non-life business this figure was 8% for the EEA and 11% for Austria.

The adjustment for the loss-absorbing capacity of technical provisions and deferred taxes had a significant impact on the aggregate SCR for EEA insurers. In Austria the reduction due to this adjustment was relatively low, partly due to Austrian insurers using conservative approaches for assessing the adjustment for deferred taxes.

In terms of the composition of the BSCR, market risk was the most significant element for life insurance business while non-life risk was the dominant element for non-life insurance business.

For the market risk SCR, the risks with the largest contributions were spread risk, equity risk and interest rate risk. For non-life insurers and composite insurers in Austria, the property risk sub-module also contributed significantly to SCR Market.

For SCR Life, lapse risk was the largest contributor for the EEA overall as well as for Austria and Germany. In Austria, the expense risk module was a more significant contributor to SCR Life than in Germany and the EEA overall. The contributions for longevity risk and mortality risk are, however, likely to have been understated for Austrian insurers as they often applied the prescribed shocks at an aggregate level rather than at a policy level as required.

In general, the FMA report on the QIS5 results for Austrian insurers is characterised by varying results among insurers, suggesting that there are inconsistencies in the interpretations and the implementations of the calculation rules specified in the technical specifications. At the EEA level, the inconsistencies in treatment may be compounded by varying local interpretations of the rules. Although the final wording of the Solvency II regulation will probably seek to reduce the uncertainties in the rules, it is important to provide a mechanism whereby local supervisors can confer with one another, directly or indirectly, to ensure that they enforce similar approaches. Without such an effort the stated aim of achieving greater harmony in supervisory requirements may be compromised.

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Fachhochschule des bfi Wien Gesellschaft m.b.H.
A-1020 Wien, Wohlmutstraße 22
Tel.: +43/1/720 12 86
Fax.: +43/1/720 12 86-19
E-Mail: info@fh-vie.ac.at
www.fh-vie.ac.at

FACHHOCHSCHULE DES BFI WIEN

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Alle: A-1020 Wien, Wohlmutstraße 22, Tel.: +43/1/720 12 86