

Insights

Solvency II

Getting to grips with QIS5

The final technical specification for the fifth Quantitative Impact Study (QIS5) exercise was published on 6 July 2010.

As this is likely to be the last comprehensive QIS exercise, the European Commission and supervisors have emphasised the importance of good quality submissions to enable all key stakeholders to understand the impact of the introduction of Solvency II. This paper analyses the QIS5 publication, the main areas of debate and some of the practical difficulties that may be faced in completing the exercise.

Process and timeline

The stated objectives of the QIS5 exercise include to enable a good understanding of the impact of Solvency II on companies' balance sheets and to test companies' state of readiness for Solvency II, thereby providing a starting point for discussions with the supervisors in preparation for the new regime. The target level of participation is therefore high – 60% of solo undertakings and 75% of insurance groups covered by the scope of Solvency II. The European Commission has also stated that it is important for small and medium-sized companies to participate in significant numbers.

To support the objectives, a number of supervisors have emphasised the need for “better than best endeavours” submissions and if possible, to a near-production level.

This is likely to be very challenging, particularly as most financial projection models will not be completed in time for the QIS5 exercise and extra work will be required by companies to provide appropriate estimates in advance of the completed models.

In some countries, the supervisors have stated explicitly that completion of QIS5 is a prerequisite for participation in the Internal Model approval process. Companies that intend to apply for Internal Model approval are therefore requested to submit two sets of results – on the Standard Formula and the Internal Model bases. Many companies are still developing their Internal Model and will not yet be in a position to deliver complete Internal Model results. Also, the format for reporting the Internal Model results is not yet clear and it is possible that further work will be required to re-present the Internal Model results in the QIS5 submission spreadsheets.

QIS5 includes a large number of qualitative questions covering the level of preparedness for companies as well as the methodology, practical difficulties and simplifications used. There is also a specific questionnaire focusing on Group issues. Completion of the questionnaires will require input from various parts of the organisation and should not be underestimated.

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Timelines

The QIS5 exercise is scheduled to run between August and November 2010, with calculations performed as at 31 December 2009. The key deadlines for the exercise are shown in **Figure 01**:

The publication of a draft specification in April was beneficial as this raised awareness of the exercise and helped companies to develop plans earlier in the process. Since QIS4, many companies have now developed formal Solvency II programmes and there is often a workstream and dedicated resources allocated for the QIS5 exercise.

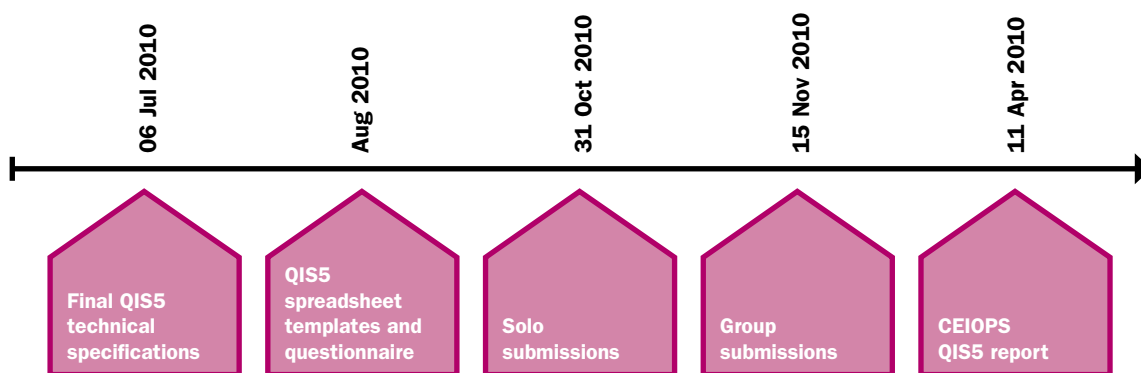
For QIS4, there was wide variation in the time spent by companies to complete the exercise but on average this was equal to approximately 90 man

days. Our discussions with companies to date and informal surveys indicate that they will be spending substantially more time on the current QIS5 exercise.

The emphasis on producing a “better than best endeavours” set of results will prove to be challenging for all but the simplest of companies. In particular, the Group submission is a non-trivial exercise particularly for those groups with operations outside the EEA.

Although QIS5 is currently expected to be the last comprehensive QIS exercise, there still remains a number of unresolved issues and the head of the Commission’s Internal Market and Services unit has implied that there may be a further QIS6 exercise before the final implementation of Solvency II.

Figure 01. Key deadlines for QIS5



Assets and other liabilities

Assets are to be valued as the amount for which they could be exchanged between knowledgeable willing parties in an arm’s length transaction. This has been interpreted as to conform with the International Accounting Standards (IAS) unless otherwise explicitly stated.

The default approach is to use mark to market values based on readily available market prices in orderly transactions that are sourced independently. If mark to market values are not directly available, mark to model techniques should be used. However in doing so, companies are expected to maximise the use of relevant observable inputs.

In a small number of areas, QIS5 sets out specific adjustments which should be made to asset values. In general, these are intended to bring the IFRS-reported value in line with the fair value principle underlying Solvency II.

Goodwill, in particular, carries a value of zero so that there is no differentiation between business grown organically and business grown through combinations. Other intangible assets are now recognised on the balance sheet provided they meet the criteria of separation, control and evidence of tradable value.

Reinsurance is shown as an asset on the balance sheet as opposed to a reduction in gross liabilities.

For post-employment benefits, IAS 19 is recommended, although with the elimination of the smoothing corridor. However, companies retain the option of applying their Internal Models to value the post, employment benefits, provided that it is based on Solvency II valuation principles.

The main point of interest relates to the treatment of post-employment benefits. In QIS4 there was an explicit reference which stated that post-employment benefits were not to be taken into account in the assessment of the SCR. There is no such explicit reference in QIS5 and it is not clear whether this means that risks to the post-employment benefits will form part of the SCR.

If this were the case, then companies would need to be able to revalue their pension obligations under the various stresses indicated in the SCR. This is likely to be an additional challenge for QIS5. For companies using an Internal Model, some assessment would be required as to the results under the Internal Model compared to IAS 19.

It should be noted however, that in certain areas such as valuation of post-employment benefits, the IASB standards are to be reviewed and are therefore expected to change.

Technical provisions

As in QIS4, the technical provisions typically consist of a best estimate liability and risk margin. The overall methodology for calculating the best estimate liability has largely remained unchanged from the QIS4 exercise. Essentially, this should be the present value of the probability-weighted average of future cashflows with no allowance for prudent margins or surrender value floors.

There are some circumstances where the technical provisions may be calculated as a whole, rather than as the sum of the best estimate liability and the risk margin. However, these circumstances are very limited and in practice, most contracts would not meet the requirements.

Best estimate liability

Segmentation

For life business, the segmentation follows the same basic structure as QIS4 with 16 segments derived from two segmentation levels. The first is by high-level product type and the second is by the main risk driver at the inception of the contracts. For QIS5, a new segment has been introduced for annuities derived from non-life contracts.

For non-life business, there are 12 lines of business with additional segmentation specified for non-proportional reinsurance accepted.

Health business is separated into life and non-life business depending on the techniques used to value the best estimate liability. These are then allocated into the relevant life and non-life segments.

The requirement to unbundle life and non-life business has been retained as has the requirement to unbundle non-life contracts across the 12 indicated segments. For life business, there is a requirement to segment by product type (with profit, unit linked and other life insurance) but it is no longer a requirement to unbundle by main risk driver. The requirement in earlier CEIOPS advice to segment by country for cross border activities has been removed.

The removal of the requirement to unbundle life contracts by risk driver is a welcome change in QIS5 as compliance would likely require significant resources and development work without any obvious advantage for risk management capabilities. The relaxation may have been in part a result of changes in the risk margin calculations which are now applied at the company (rather than segment) level.

Risk-free interest rate and illiquidity premium

The appropriate risk-free interest rate continues to be one of the main areas of debate. The European Commission requested that a task force be set up to consider the appropriate risk-free rate, whether there should be an illiquidity premium and the appropriate methodology for extrapolation of the risk-free curve. The task force concluded that an illiquidity premium may be appropriate during periods of stress and proposed a set of principles for its calculation.

For the purpose of QIS5, the Commission is testing a risk-free interest rate curve corresponding to the relevant swap curve for each currency, less a 10 bp adjustment for the swap credit risk. In addition, there should be various levels of illiquidity premium added to the risk-free discount rate, depending on the predictability of the liability cashflows.

The risk-free curves are pre-calculated and QIS5 proposes that, in principle, all insurance contracts can allow for some illiquidity premium. The illiquidity premium follows a 'bucket' approach where:

- Contracts which exhibit high levels of predictability with regard to future cashflows (that is, where the only underwriting risks are longevity and expense risk and where all premiums have already been paid can apply 100% of the illiquidity premium).
- Life insurance contracts with profit participation that do not meet the high predictability criteria can apply 75% of the illiquidity premium.
- All other business should apply an illiquidity premium of 50%.

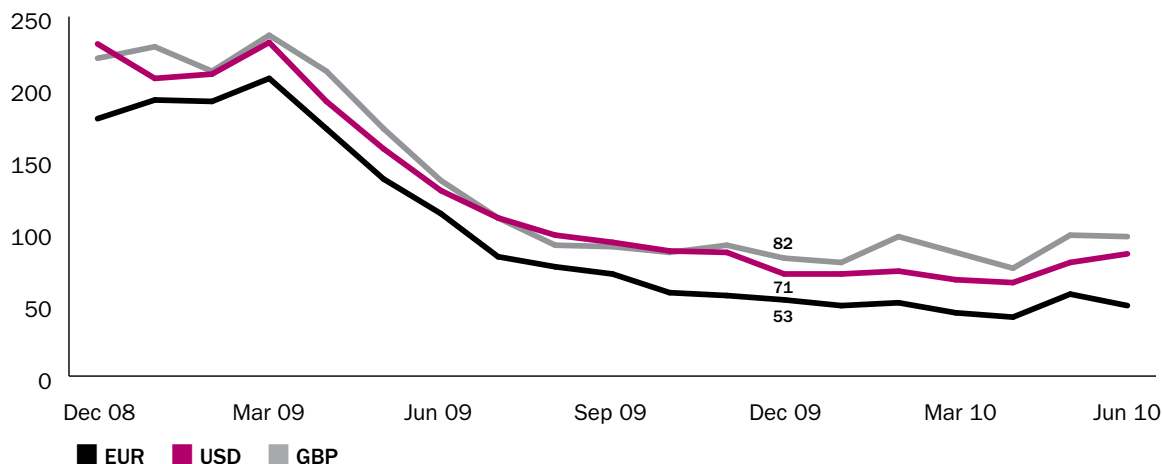
The issue is most material for life insurance business but will also be important to non-life business which will be valued using the 50% bucket. The assessment of the requirements should be carried out at the level of each contract, with all cashflows of a contract receiving the same treatment.

Figure 02 overleaf shows the derived illiquidity premium at various valuation dates for major currencies.

Risk-free curves

The risk-free curves are pre-calculated and QIS5 proposes that, in principle, all insurance contracts can allow for some illiquidity premium.

Figure 02. Illiquidity premium for major currencies



The analysis shows illiquidity premia of 53bp (EUR), 71bp (USD) and 82bp (GBP) at the December 2009 valuation date for QIS5. These will result in higher valuation rates compared to QIS4 where the valuation rate was previously based on swaps. The potential of the illiquidity premium to act as a counter to procyclical behaviour is apparent as the illiquidity premium increased significantly (resulting in a reduction in insurance liabilities) during the recent financial crisis.

The Illiquidity Premium Task Force report¹ recommended that the illiquidity premium should be independent of the investment strategy adopted by companies. The calculation is therefore based on predefined asset mixes deemed appropriate for each currency.

In order to assess the impact of potential transitional arrangements, the QIS5 specification requests that companies provide another set of results for technical provisions in respect of business which uses market-based Solvency I valuation rates.

For liabilities that have reasonably predictable cashflows, companies can and do implement investment strategies which assume some element of illiquidity premium can be earned in excess of the risk-free rate. This is because for these types of business, companies are able to match the predictable cashflows using illiquid assets with credit risk exposures such as corporate bonds. By managing the credit risk (through the use of hedging or other techniques), insurers can effectively realise the illiquidity premium. There is therefore a sound argument that some form of illiquidity premium should apply for these types of businesses.

However, it is not clear that the wide application indicated in QIS5 is appropriate, particularly in respect of unit-linked business.

QIS5 currently sets the illiquidity premium independently of the company's actual asset holdings. This approach is not without its issues, as companies investing in more liquid assets (for example, government bonds or swaps) may be capitalising future margins which they will not be able to earn in practice.

The application of the illiquidity premium also presents some practical issues for companies. Companies may need to use multiple valuation rates in their actuarial systems and those using market-consistent stochastic models would need to recalibrate the scenarios to take into account the effects of the illiquidity premium. In such cases, the asset models will no longer be able to reproduce market prices.

It is worth noting that the work to date on the illiquidity premium was time constrained and made a number of simplifying assumptions which will likely need to be considered further before full Solvency II implementation. Further work may include considering in more detail the "ability to capture illiquidity premia" criteria, the interaction with the valuation of illiquid assets, the term for which the illiquidity premium can be earned and testing of alternative extrapolation methods.

¹ CEIOPS-SEC-34/10 (March 2010)

Contract boundaries

Another area of controversy is around what constitutes the boundary of an insurance contract. Under QIS5, the boundary for existing insurance contracts is set at the point at which the company:

- Can unilaterally terminate the contract, refuse to accept a premium, or
- Amend the benefits or premiums without limit

This contract boundary sets the point at which premiums can be recognised on existing contracts. Within the boundary period, both contractual recurring premiums and premiums arising from policyholder options to renew or extend their policies should be taken into account on a best estimate basis.

There has been a great deal of concern expressed on possible unintended consequences from the above definition of contract boundaries. Some stakeholders have interpreted the requirements to mean that future premiums related to unit-linked and participating business should be excluded as management often has the ability to vary management charges on these types of business. However, we do not believe this is the intention of the proposals. It is more likely to impact term assurance with renewable premiums or variable premium adjustments regardless of whether there is an associated underwriting review of the underlying risks. It is not clear how this is consistent with the market-based concept underlying the liabilities which would normally take into account the premiums expected to be received.

Life: valuation of options and guarantees

QIS5 requires companies to identify and value all material options and financial guarantees. This would include guaranteed surrender options, annuity conversion options, minimum credited rates, guaranteed return of capital and profit sharing arrangements.

Valuation of financial guarantees could be based on deterministic, weighted deterministic or stochastic analysis. The stochastic analysis consists of a market-consistent asset model to produce scenarios of asset returns together with a model for the liabilities which can reflect liability cashflows under each scenario.

For profit sharing business, discretionary benefits need to be taken into account and explicitly identified. Such business should reflect realistic policyholder behaviour and management actions that are consistent with how the business is managed.

Material non-financial guarantees should be valued similarly to financial guarantees.

The valuation of options and guarantees is likely to be the greatest challenge for life companies that do not have a tradition of market-consistent reporting. Setting up systems to perform the stochastic calculations is a non-trivial exercise and would usually require enhancements to existing actuarial models. Companies who do not have these systems in place should be using QIS5 as an opportunity to pilot such calculations with a view to developing a production version in time for the implementation of Solvency II. Such calculations will be required for both the base balance sheet and for the stresses underlying the SCR calculation. The use of deterministic approaches may be more appropriate in cases where the time value of the option is not material.

QIS5 (and Solvency II in general) places greater emphasis on the justification of assumptions underlying policyholder behaviour and management actions. This will necessitate more formal analysis and supporting documentation from companies in the future.

Non-life: deterministic or stochastic?

Under Solvency II, the best estimate should correspond to the “probability-weighted average of future cashflows, taking account of the time value of money”. For non-life liabilities, this definition raised the possibility that commonly used deterministic methods such as chain-ladder methods might not be acceptable, as they do not explicitly consider “all possible future scenarios”, and might therefore need to be replaced by stochastic methods.

QIS5 provides useful clarification on this matter and specifies that “allowance for uncertainty refers to the consideration of the variability of the cashflows necessary to ensure that the best estimate represents the mean of the cashflows”. The QIS5 technical specification states that for non-life best estimate liabilities, deterministic reserving techniques “can be more appropriate” than stochastic techniques.

In our opinion, companies should focus on choosing the valuation methods that are most suited to the nature of the liabilities, bearing in mind the data and tools available and the inherent limitations of the estimates. For most classes of business, deterministic methods combined with expert judgment will produce the most suitable, reliable best estimates. However, stochastic methods are likely to increase in importance over the medium term as their use may become more widespread within the European non-life insurance market. Companies should therefore take steps to develop stochastic methods and keep up-to-date with developments in this area.

Best estimate liability

Under Solvency II, the best estimate should correspond to the “probability-weighted average of future cashflows, taking account of the time value of money”.

Whichever valuation method is chosen, it will be important to demonstrate its appropriateness to the nature, scale and complexity of the underlying risks by carrying out a proportionality assessment. The process to be followed is described in the QIS5 technical specification and involves assessing materiality and uncertainty (parameter risk and model risk) as well as the assessment of nature, scale and complexity.

Another new concept for Solvency II is that the technical provisions may need to include an allowance for the impact of so-called “binary events”. Binary events are defined as ‘losses with low probability but high cost’, such as a mega tsunami hitting Florida, widespread genetically-modified crop contamination, stepped retrospective changes in court rulings, or the emergence of a major source of latent claims. An allowance for binary events might be made in the technical provisions by potentially adopting a scenario-based approach to model a small number of representative events, applying a percentage load to the best estimate or adjusting the tail of the reserve distribution.

QIS5 does not refer to binary events explicitly. However, consideration of extreme low probability, high severity events may be necessary in order to demonstrate that the best estimate liability represents the “weighted average of the outcomes of all possible future scenarios”.

As binary events are rare and relevant data is sparse, the reserve-setting process will necessarily be substantially subjective, whichever method is chosen. Such events are likely to be particularly important for large risk carriers such as reinsurers and London Market companies.

Non-life: legal obligations basis for unaccepted contracts

Legally-obliged unaccepted contracts are those which have not yet accepted, but the corresponding liabilities cannot be waived or reduced by the company as of the valuation date. Under Solvency II (and for QIS5), such business must be included within the technical provision assessment. This is a relatively new concept that many companies have yet to consider in detail.

The legal obligations basis for recognising unaccepted business may lead to an increase in the future premiums included under the Solvency II premium provision compared to that currently included within the UPR. However, there is uncertainty over the interpretation of the Solvency II requirements and the extent of future premiums that would be captured by the legal obligations basis.

In our view, the ‘legal obligations’ basis is of most relevance where business is written via:

- Delegated underwriting authority (for example, binders)
- Brokers (where backlogs of aggregated ‘pipeline premiums’ are common)
- Year-end renewal (for example, reinsurers entering into 1 January renewals prior to a 31 December valuation date)
- Tacit renewal agreements

For business written via delegated underwriting authority, the most common interpretation is that such business might be taken into account to the extent that underwriting authority has been granted. For example, if three month notice is required to exit the contract, then three month binder business should be included within the technical provision assessment.

Another issue for companies to consider is what allowance to make for reinsurance contracts that would be purchased in future to protect the unaccepted legally binding contracts. The aim should be to achieve consistency between the technical provisions gross and net of reinsurance. The assumed future reinsurance purchases will need to be justified, which may be difficult in practice where the cost and availability of future reinsurance is uncertain.

It is worth noting that the inclusion of unaccepted contracts would reduce technical provisions, to the extent that such business is expected to be profitable. A more liberal interpretation would therefore generally act to improve the company’s declared solvency position. As there is currently ambiguity over the practical application of the legal obligations basis, this is an area where companies will need to monitor emerging market practice and guidance, as well as the expectations of regulators.

As part of the QIS5 exercise, insurers will need to assess the implications of these requirements for data collection systems and processes. For example, there may need to be additional recording of unaccepted contracts on underwriting systems as this information would need to be available in time for the year-end valuation.

“Another issue for companies to consider is what allowance to make for reinsurance contracts that would be purchased in future to protect the unaccepted legally binding contracts.”

Risk margin

The risk margin represents the amount that theoretically would have to be paid to another insurer (in addition to the best estimate provisions) to compensate them for taking on the risky insurance liabilities. It is based on the cost of holding capital to support risks which cannot be readily hedged. These include underwriting risks, market risk which cannot be avoided, credit risk related to reinsurance and special purpose vehicles and operational risk.

For QIS5, the reference rate for the cost of capital (COC) calculation remains at the relatively high 6%, despite industry lobbying. The capital underlying the cost of capital approach assumes that the whole insurance business, including existing risk transfer arrangements, are transferred to a single start-up company which will raise its own capital to cover the SCR and will manage the insurance business in a manner similar to the current management. This is a major change from QIS4 where each line of business was assumed to be transferred separately and no credit was taken for diversification between lines of business.

Theoretically, the capital underlying the COC calculation should be derived by applying all the necessary stresses at each future time period. However, performing these calculations is complex and impractical for most financial projection models at the current time. Therefore, QIS5 proposes a hierarchy of simplifications which we expect many companies will use. These simplifications range from using designated factors to running off the time zero capital amounts in proportion to an underlying risk driver.

The risk margin then needs to be allocated between the lines of business. QIS5 specifies that this should be done according to the contribution of the line of business to the overall SCR during the lifetime of the business.

Unavoidable market risk

QIS5 also sees the introduction of an allowance for unavoidable market risk in the risk margin calculation. Unavoidable market risk arises where the duration of the undertaking's liability portfolio exceeds the duration of risk-free financial instruments available to match the underlying liabilities. In such a case, the undertaking cannot practically hedge the long-term exposures of its portfolio.

For non-life insurance obligations and short to mid-term life obligations, the value for unavoidable market risk can be considered to be nil.

For long-term life insurance business, there is likely to be exposure to unavoidable market risk. This is likely to be most material where the longest duration of risk-free financial instruments is low compared to the duration of the insurance liabilities.

Overall, we believe the calculation of the risk margin at the company level is a welcome change in the QIS5 specification. The previous calculation at segment level was in many cases impractical and would cause companies to undertake major development work without tangible risk management benefits.

The cost of capital rate is still relatively high at 6%, and we note the risk margin does not reflect the loss absorbency of any deferred tax liability.

We welcome the provision of simplifications within QIS5 as this would allow companies to apply some proxies as they develop their actuarial systems in order to more accurately reflect the projected risk margins in the future.

The unavoidable market risk is a new addition for QIS5. For interest rate risk, we expect this to apply to business where the liabilities exceeded the duration of observable risk-free rates (50 years in the UK and 30 years for the Eurozone and US) as after these points extrapolation techniques are required for deriving the curves.

“The cost of capital rate is still relatively high at 6% but does now allow for diversification between lines of business.”

Solvency Capital Requirement (SCR)

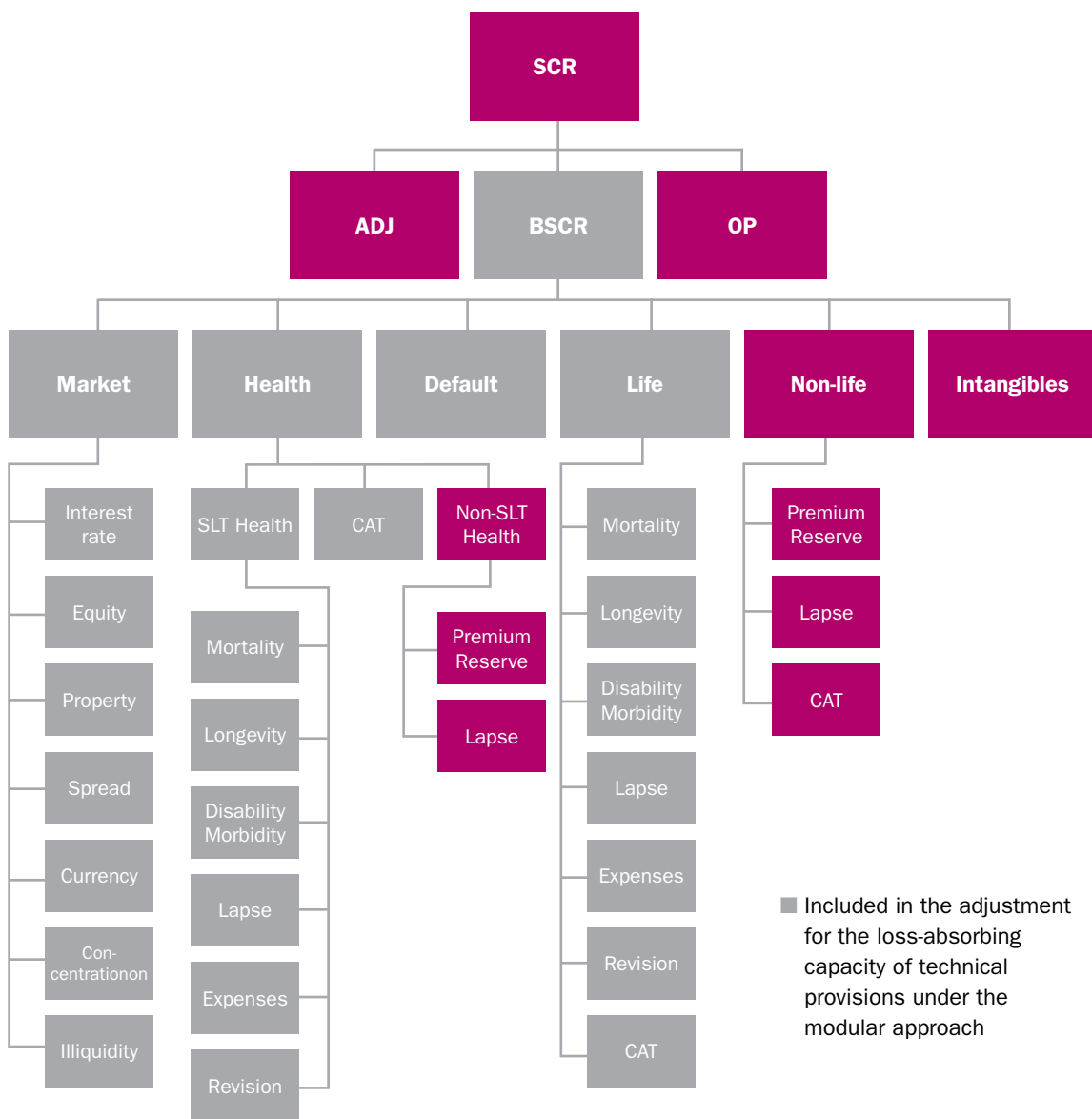
Figure 03 shows the structure of the SCR calculation under QIS5.

QIS5 maintains the same basic structure as QIS4, with a modular structure and separate back-end adjustments for operational risk and the loss absorbing capacity of technical provisions and deferred taxes. Compared to QIS4:

- An intangibles assets module was introduced to assess the risk of not being able to achieve an assumed value for any intangible assets that are recognised on the Solvency II balance sheet. The charge is simply 80% of the asset value and there is no diversification with the other risk modules.

- An illiquidity premium module has been introduced within market risk, in tandem with the allowance within the best estimate liabilities.
- A lapse risk stress has been introduced into the non-life underwriting risk module.
- The health risk module has been split into three sub-modules to cover business calculated on a similar basis to life, business calculated on a similar basis to non-life, and catastrophe risk.

Figure 03. Structure of the SCR calculation under QIS5



Allowance for future new business

There had been some confusion as to whether the SCR calculation should include an allowance for new business written over the following 12 months, as the Level 1² text implies.

For non-life and non-SLT health business, the risk associated with new business is already included within the premium risk calculation.

However for life business, the specification indicates that the life underwriting risk in the standard formula is based on instantaneous stresses at the valuation date, at which time there is no further new business. As the scenario does not take into account changes in assets and liabilities after the valuation date, the capital requirements should not allow for them.

This clarification will be welcomed by life companies, as the addition of new business adds complexity to the calculations. However, the intention of the Level 1 text was to ensure that companies would be able to meet their capital requirements over the following year, including for any new business that they intended to write. In practice, this now falls to companies to manage as part of their ORSA and risk management processes. For non-life business, the approach indicated does not capture all risks associated with the new business, for example market risk. In addition, the expected future profits associated with new business continue to be excluded from the standard formula.

Adjustment for loss absorbency of technical provisions and deferred taxes

Under the QIS5 structure, a BSCR is derived which is the capital requirement assuming no offset for reductions in discretionary benefits or deferred tax liabilities in stressed circumstances. These offsets are then considered separately.

Two approaches are prescribed to calculate the offset for discretionary benefits within the technical provisions – the ‘modular’ approach (where the net of discretionary benefits capital charges are correlated using the standard correlation matrices and compared to the BSCR) and the ‘equivalent scenario’ approach. The single equivalent scenario will be derived based on input from the individual stresses using a spreadsheet to be supplied as part of QIS5.

In order to calculate the loss absorbency of deferred taxes, the undertaking is required to recalculate the tax position assuming an instantaneous loss equivalent to the capital requirement before any tax adjustment. The resultant change in deferred taxes can then be considered as an offset to the overall capital requirement.

The ‘modular approach’ used within QIS4 attracted much criticism. The method required companies to produce two runs for each scenario – assuming the company has full ability to manage its future bonus rates (the ‘net of changes in discretionary benefits’ basis), and that bonus rates remain the same as in the best estimate scenario (the ‘gross of changes in discretionary benefits’ basis).

In QIS5, a modular approach has been retained but the methodology has been simplified and no longer requires two sets of model runs. In the new method, only the ‘net’ stressed scenario runs are carried out, but the guaranteed and discretionary benefits need to be separately identifiable within each run. To derive the value of the gross calculations, the discretionary benefits from the best estimate run are added to the guaranteed benefits from the net stressed scenario runs.

The underlying rationale for the complicated ‘gross’ and ‘net’ approach being applied under QIS5 is to ensure that companies do not double count the risk absorbing ability of discretionary benefits in the individual risk modules. However, the solution being put forward is somewhat artificial and does not reflect the reality of the management of participating business.

Operational risk

The operational risk module follows the same structure as QIS4 and is based on a percentage of earned premiums and technical provisions. However, compared to QIS4, the factors underlying the assessment have been increased by up to 50%. In addition, new factors have been introduced for situations where the coming year’s premiums are increasing by more than 10% compared to the previous year. As with QIS4, there is a cap for the operational risk component equal to 30% of the BSCR.

Operational risk relating to unit linked business is effectively carved out and based on the annual expenses incurred during the previous 12 months.

The structure of the operational risk module has been criticised in the past due to the lack of diversification with other risks modules and because the simple factor based calculation does not provide incentives for companies to improve their operational risk management. This remains the case in QIS5.

² Article 101 (3)

Market risk

The QIS4 exercise was conducted as at 31 December 2007, that is, before the full onset of the global financial crisis. The crisis focused attention on some risks, in particular spread risk, tail correlations and systemic risk. As a result, the overall calibration of the market risk module has increased compared to QIS4.

Table 01 shows the evolution of the market risk approach since QIS4.

Table 01. Evolution of the market risk calibration

Market risk sub-module	Methodology	QIS4 technical specification	CEIOPS final advice	QIS5 technical specification
Equity	Scenario-based change in NAV: worst of combination of stress scenarios	-32% for Global equities -45% for Other equities	-45% for Global equities -55% for Other equities Symmetric adjustment mechanism Additional two-way equity volatility stress of +50% or -15% change in implied volatilities	-39% for Global equities -49% for Other equities Symmetric adjustment mechanism No volatility stress 22% for strategic participations
Interest rate	Scenario-based change in NAV: worst of combination of stress scenarios	Up and down stresses as % change to yield curve varying by term to maturity	Some small changes to shocks Additional two-way additive interest rate volatility stress of +12% or -3% change in implied volatilities	Up and down stresses as % change to yield curve varying by term to maturity (calibration of stresses differ from QIS4) No volatility stress
Property	Scenario-based change in NAV	-20% stress to price	-25% stress to price for all properties	-25% stress to price for all properties
Spread	Formula-based calculation for QIS4 and CEIOPS final advice Scenario-based for QIS5	Corporate bonds: stress factor based on rating x duration Structured credit: as for bonds with higher factors Credit derivatives: most onerous of 300% widening or 75% reduction in spreads	Corporate bonds: % capital charge based on rating and maturity with strengthened factors Structured credit: as for bonds with strengthened factors Credit derivatives: most onerous of 600% widening or 75% reduction in spreads Real estate: charge based on secured and unsecured exposure	Corporate bonds: Change in NAV due to asset shock based on rating and maturity of bonds Structured credit: Greater of look-through basis to the underlying assets and a direct stress based on the rating of the instruments themselves Credit derivatives: most onerous impact on NAV of fixed (depending on rating) widening or 75% reduction in spreads
Currency	Scenario-based change in NAV: sum of worst result for each currency, where up/down shock is applied for each currency	Max of +/-20% change in exchange rate	Max of +/-25% change in exchange rate Lower stresses apply to currencies within European Exchange Rate Mechanism	Max of +/-25% change in exchange rate Lower stresses apply to currencies within European Exchange Rate Mechanism
Concentration	Formula-based calculation	Formula based on exposure, rating and total assets held	Approach similar to QIS4 but with a lowering of thresholds referring to total assets for AAA, AA, A rated exposures from 5% to 3% Lowering to 1.5% for all other rated and unrated exposures	Approach similar to QIS4 but with a lowering of thresholds referring to total assets for AAA, AA, A rated exposures from 5% to 3% Lowering to 1.5% for all other rated and unrated exposures
Illiquidity premium	Scenario-based calculation	Illiquidity premium not included	Illiquidity premium not included	Change in NAV due to a 65% fall in the value of the illiquidity premium

QIS5 applies a **look-through principle** for assessing market risk in assets such as collective investment schemes and structured credit. This requires identification of the assets underlying the investment scheme and application of the relevant stress. For collective investment schemes which invest in other schemes, the iterations of look-through should, if possible, be performed until all the material market risk is captured. Alternative approaches are possible where this is not an option such as assuming the worst case scenario allowed by the schemes' investment mandates.

For **equity risk**, a symmetric adjustment has been introduced to avoid pro-cyclical effects. For QIS5, the period over which this is calculated is three years. This results in an adjustment of -9%, reducing the Global and Other equity stresses from 39% and 49% to 30% and 40% respectively as at the end of December 2009.

QIS5 also allows companies to recognise hedging instruments such as derivatives. In cases where these are part of a rolling hedging strategy, the derivatives can be fully recognised, provided they are part of a documented strategy with no material risk to rollover and the costs and associated counterparty risk are adequately recognised.

There are no **volatility stresses** for equity and interest rate risk, although these were included within CEIOPS' final advice.

Spread risk is based on the sum of three sub-modules – corporate bonds, structured credit and credit derivatives. The spread risk requirement is now scenario based where the fall in asset value is determined through the use of a formula. For corporate bonds, the loss on the assets is given by a function of the duration of the assets and the credit rating of the underlying bonds, with lower requirements for public sector and mortgage-covered bonds. There is no credit risk associated with government bonds issued by EEA member states, but non-EEA government bonds rated A and below do attract a capital charge.

An extra dimension has been added to the structured credit sub-module, which takes the maximum of the stress applied on a look-through basis to the underlying assets and a direct stress based on the credit rating of the instruments themselves. This was to avoid the potential for regulatory arbitrage between direct holdings of the assets and holding the assets within the structured products.

For credit derivatives the capital requirement is based on the greater of a widening of credit spreads (from 130bp for AAA to 1620bp for B or lower) and a 75% relative decrease in current spreads.

QIS5 sees the introduction of an **illiquidity premium module**. This is a one-sided test which takes into account a 65% reduction in the illiquidity premium. CEIOPS indicate that the widening of the illiquidity premium has already been taken account of in the calibration of the spread risk module. There is a -50% correlation between the illiquidity premium module and the spread risk module and zero correlation with other market risk modules.

Following the recent financial crisis, it is not surprising to see some strengthening of the market risk calibration, particularly around the credit risk module as the financial crisis was particularly severe on corporate bonds and structured credit products.

The exclusion of the volatility stresses from the market risk module simplifies the calculations. However, for organisations with significant options and guarantees, there is a danger that this may lead to supervisors imposing capital add-ons or requiring development of an Internal Model in order to ensure that these risks are adequately captured. As a minimum, we would expect supervisors to focus on the ORSA for such companies. It is also unclear whether the symmetric adjustment for the standard formula will have any implications on the calibration of equity stresses within Internal Models.

It is disappointing to see the separation of the credit risk and illiquidity premium calculations. An alternative approach would have been to incorporate the illiquidity premium within the spread risk module by defining the offsetting impact in the liability valuation rate. In addition, it is not clear how the calibration of the spread risk implicitly takes into account an increase in the illiquidity premium as stated by CEIOPS.

In the final QIS5 technical specification, the exclusion of sovereign credit risk has been narrowed to be consistent with the Capital Requirement Directive. This means that OECD government debt from outside the EEA now attracts a capital charge. This will impact investors in such assets including multinational groups, offshore insurers and reinsurers.

Market Risk

QIS5 sees the introduction of an illiquidity premium module. This is a one-sided test which only takes into account a 65% reduction in the illiquidity premium. CEIOPS indicate that the widening of the illiquidity premium has already been taken account of in the calibration of the spread risk module.

Counterparty default

The counterparty default risk represents a departure from QIS4. QIS5 now follows CEIOPS' final advice and differentiates between two types of counterparty exposure. Type 1 exposures usually consist of a small number of counterparties which are usually rated (for example, reinsurers or derivative counterparties). Type 2 exposures are those where there is likely to be a diversified mix of counterparties who are not rated (for example, receivables from intermediaries).

Type 1 exposures are based on a loss distribution derived from loss given defaults and default probabilities. The default probabilities are based on the rating of the counterparty or solvency ratio cover if ratings are not directly available. The loss given default depends on the direct exposure to the counterparty, collateral arrangements in place and indirect exposures (in other words, potential loss if the counterparty were to fail and not provide any compensation for losses in stressed scenarios).

Type 2 exposures are based on an immediate shock, assuming losses of 90% on receivables which have been due for more than three months and 15% on other receivables.

The counterparty risk module in QIS4 attracted much criticism for the overall complexity of the approach. This has been replaced in QIS5, but the calculations for Type 1 exposures are still involved and not necessarily intuitive, making it difficult for management to engage with the risk assessment.

For complex groups, managing the exposure and rating information on all counterparties is likely to be a challenge. Overall, the module will steer companies to diversify their counterparty exposure, work with highly rated counterparties and encourage additional protection in the form of collateral and segregation of assets. It will also lead to a reassessment of intra-group arrangements such as internal reinsurance.

“The counterparty risk module in QIS4 attracted much criticism for the overall complexity of the approach. This has been replaced in QIS5, but the calculations for Type 1 exposures are still involved and not necessarily intuitive, making it difficult for management to engage with the risk assessment.”

Life underwriting risk

Table 02 summarises the evolution of the life underwriting risk calibration.

Table 02. Evolution of the life underwriting risk calibration

Life risk sub-module	Methodology	QIS4 technical specification	CEIOPS advice	QIS5 technical specification
Mortality risk	Scenario-based change in NAV	Permanent 10% increase in Mortality Rates	Permanent 15% increase in Mortality Rates	Permanent 15% increase in Mortality Rates
Longevity risk	Scenario-based change in NAV	Permanent 25% decrease in Mortality Rates	Permanent 25% decrease in Mortality Rates	Permanent 20% decrease in Mortality Rates
Disability/morbidity risk	Scenario-based change in NAV	35% increase to 'disability rates' in first year + 25% increase to 'disability rates' in subsequent years	50% increase to 'disability rates' in first year + 25% increase to 'disability rates' in subsequent years + (where applicable) a permanent 20% decrease in disability /morbidity recovery rates	35% increase to 'disability rates' in first year + 25% increase to 'disability rates' in subsequent years + (where applicable) a permanent 20% decrease in disability /morbidity recovery rates
Life expense risk	Scenario-based change in NAV	Increase of 10% in future expenses + increase of 1% pa in expense inflation (+ for policies with adjustable loadings 75% of these additional expenses can be recovered from year 2 onwards)	Increase of 10% in future expenses + increase of 1% pa in expense inflation (no recovery for policies with adjustable loadings – any ability to change loadings should be allowed for in management actions)	Increase of 10% in future expenses + increase of 1% pa in expense inflation (no recovery for policies with adjustable loadings)
Revision risk	Scenario-based change in NAV	3% increase in the annual amount payable for annuities exposed to revision risk	3% increase in the annual amount payable for annuities exposed to revision risk	3% increase in the annual amount payable for annuities exposed to revision risk
Lapse risk	Scenario-based change in NAV: maximum of three scenarios, up, down and mass lapse	Permanent increase /decrease of lapse rates of 50% (depending on which is onerous for a policy) + mass lapse event where 30% of policies are surrendered	Maximum of up, down and mass lapse stresses. Up and down based on a permanent increase/decrease of lapse rates of 50% (depending on which is onerous for a policy with limits applied to change in absolute rate). Mass lapse event where 30% of policies are immediately surrendered (70% for non retail policies) In scenario calculations of SCR, revaluation of technical provisions should allow for adverse changes in option take-up behaviour of policyholders	Maximum of up, down and mass lapse stresses. Up and down based on a permanent increase/decrease of lapse rates of 50% (depending on which is onerous for a policy with limits applied to change in absolute rate). Mass lapse event where 30% of policies are immediately surrendered (70% for non retail policies) In scenario calculations of SCR, revaluation of technical provisions should allow for adverse changes in option take-up behaviour of policyholders
Life catastrophe risk	Scenario-based change in NAV	Absolute increase of 1.5 per mille of policyholders dying next year	Absolute increase of 1.5 per mille of policyholders dying next year	Absolute increase of 1.5 per mille of policyholders dying next year

The structure of the life underwriting risk module is largely unchanged from QIS4. There is an increase in the size of the mortality stress, a reduction for the longevity stress and some adjustments in the lapse and expense risk modules.

The definition of lapses has been widened to include partial terminations, decreases, restrictions and suspension of insurance cover and reinstatement thereof. The lapse test is also meant to apply at the individual policy level, but there is a simplification which allows the calculation to be applied at the level of homogenous risk groups provided that this distinguishes between policies of different lapse rates and the result is not materially different from a policy-by-policy calculation.

In practice, the lapse risk simplification indicated will be welcome as most companies apply lapse shocks at the level of homogenous risk groups. We expect most companies to make use of the simplification indicated, although it is not clear how to determine whether the result is not materially different from a policy-by-policy calculation without performing the underlying calculation. For many companies, developing systems to perform a policy-by-policy calculation would be costly and time consuming and does not produce any tangible risk management benefit. A compromise between cost and benefit should be maintained.

Even at a homogenous risk group level, lapse stresses on a selective basis assume that policyholders have full knowledge of the current position of their policies. This does not recognise any natural diversification among policies. Widening the definition of lapse will also have system implications for companies as many projection models are not currently set up to do this calculation.

Although the industry may be pleased with the reduction of the longevity stress, the fundamental structure of the longevity stress still remains an issue for many companies.

“The lapse test is also meant to apply at the individual policy level. For many companies, developing systems to perform a policy-by-policy calculation would be costly and time consuming and does not produce any tangible risk management benefit. A compromise between cost and benefit should be maintained.”

Non-life: Premium and reserve risk factors

At the time QIS4 was carried out, CEIOPS had not yet performed a detailed analysis of premium and reserve risk. The QIS4 calibration for this area was therefore set ‘tentatively’ pending this analysis. During the period between QIS4 and QIS5, there have been a number of revisions to the calibration of premium and reserve risk factors.

In Consultation Paper 71 (on the non-life underwriting risk SCR), CEIOPS presented factors substantially higher than QIS4. This paper was, however, widely criticised by the non-life insurance industry as the analysis was based on an inadequate data set (provided by only six Member States), did not allow for company-specific reinsurance programmes, and the calibration methods had considerable limitations (for example, not adjusting for the underwriting cycle, which is an explainable source of variability in results from year to year).

CEIOPS then sought to address some of these concerns for the final advice by obtaining and analysing data from 15 Member States and developing methods to allow for each company’s reinsurance programme. This resulted in the factors reducing, although they were still much higher than QIS4.

The non-life insurance industry continued to lobby for a lower calibration on the basis that QIS4 resulted in higher capital requirements than indicated by Internal Models. This may have influenced the Commission’s decision to specify a QIS5 calibration which is lower than that proposed by CEIOPS (but still somewhat higher than QIS4) and to reintroduce an allowance for geographical diversification.

In order to measure the impact of the variation in the calibration, we have developed a 'Towers Watson Factor Index' (essentially a weighted average of the factors for each line of business). The premium and reserve risk factors and the associated TW index are summarised in **Tables 03** and **04** below. The premium risk factors are before any net to gross adjustment factor (see below).

Table 03. Evolution of the premium risk factors

Line of business	QIS4	CP71	Final CEIOPS advice	QIS5
Motor vehicle liability	9.0%	10.0%	11.5%	10.0%
Motor Other	9.0%	10.0%	8.5%	7.0%
Marine Aviation and Transport	12.5%	20.0%	23.0%	17.0%
Fire and other damage	10.0%	12.5%	15.0%	10.0%
TPL	12.5%	17.5%	17.0%	15.0%
Credit & suretyship	15.0%	20.0%	28.0%	21.5%
Legal expenses	5.0%	7.5%	8.0%	6.5%
Assistance	7.5%	10.0%	5.0%	5.0%
Miscellaneous	11.0%	20.0%	15.5%	13.0%
NPL Property	15.0%	30.0%	20.0%	17.5%
NPL Casualty	15.0%	30.0%	16.5%	16.0%
NPL MAT	15.0%	30.0%	18.5%	17.0%
TW Index	100	159	137	114

Table 04. Evolution of the reserve risk factors

Line of business	QIS4	CP71	Final CEIOPS advice	QIS5
Motor vehicle liability	12.0%	12.5%	9.5%	9.5%
Motor Other	12.0%	12.5%	12.5%	10.0%
Marine Aviation and Transport	10.0%	17.5%	17.5%	14.0%
Fire and other damage	10.0%	15.0%	12.0%	11.0%
TPL	15.0%	20.0%	16.0%	11.0%
Credit & suretyship	15.0%	20.0%	25.0%	19.0%
Legal expenses	10.0%	12.5%	9.0%	9.0%
Assistance	10.0%	12.5%	12.5%	11.0%
Miscellaneous	10.0%	20.0%	20.0%	15.0%
NPL Property	15.0%	30.0%	25.0%	20.0%
NPL Casualty	15.0%	30.0%	25.0%	20.0%
NPL MAT	15.0%	30.0%	25.0%	20.0%
TW Index	100	156	141	114

Our TW index indicates that although the calibration under QIS5 is higher than QIS4, it is significantly lower than calibrations which have been discussed within CEIOPS over the last 12 months. Companies currently intending to use the standard formula to calculate the non-life underwriting risk SCR will need to re-evaluate this decision in the light of the increased capital requirements for QIS5 relative to QIS4, and the possibility of even higher factors for Solvency II eventually.

In addition, companies should note that even if they do use an internal model the standard formula result may well be used by supervisors as a benchmark against which their internal model result is compared. An overstated standard formula result could therefore place upwards pressure on the internal model calibration. There may also be knock-on effects to rating agency models and capital standards.

Companies developing an internal model should start comparing the QIS5 calibration with that implied by their own analysis and capital modelling. This will help to assess the reasonableness of the QIS5 factors for each line of business and, should the factors be felt to be too high, add weight to future industry lobbying. The final calibration will be influenced by the political process and future changes remain a possibility.

One of the criticisms of CEIOPS' draft advice on non-life underwriting risk was that the premium and reserve risk factors did not allow for company-specific reinsurance programmes. As an attempt to remedy this, CEIOPS proposed a company-specific **net-to-gross adjustment** factor for premium risk in its final advice on non-life underwriting risk. This was to be calculated as a moving average of the ratio of the gross and net combined ratios over the last three years. However, this approach was criticised by the industry for being too simplistic and not capturing one of the key purposes of reinsurance cover – the dampening impact in extreme scenarios. It was more a measure of the relative profitability of the gross and net business over recent years.

For reserve risk, CEIOPS proposed that company-specific adjustment should not be permitted on the basis that a company's own data would generally not be sufficient to estimate the benefit of reinsurance in a 1 in 200 reserve runoff scenario. This has been maintained for QIS5.

For direct and proportional reinsurance lines, the Commission has adopted the following approach in QIS5 to determine the net-to-gross adjustment factor for premium risk:

- For each line of business, a distribution (assumed to be lognormal) must be parameterised for the gross cost-per-claim based on an analysis of historical data.

- The retention and limit of the coming year's excess of loss reinsurance programme are then specified.
- This information is then used to estimate the theoretical impact of the actual reinsurance programme on the premium risk factor. Companies may however choose to set the adjustment factors to one.

Although the Commission's proposal represents an improvement over CEIOPS' method, in terms of capturing the impact of reinsurance on capital requirements, it still leads to a number of practical challenges. The method is non-trivial but will not be appropriate for all companies. In particular, it can only be used for direct or proportional reinsurance business protected by simple per-risk excess of loss reinsurance. Companies may need to apply for a partial internal model to reflect more complicated reinsurance programmes or if they write non-proportional reinsurance.

It is not yet clear what data quality standards will apply to these calculations. Although a lower standard than that required for internal models would be expected, this may still prevent some companies from applying net-to-gross adjustment factors. A mechanical analysis of historical data is unlikely to produce a reliable parameterisation of the gross cost-per-claim distribution. However, it is not clear whether data adjustments could be made where necessary to improve the relevance of historical data, or if expert judgment could be applied in cases where there is insufficient data.

For those companies not intending to use an internal model, **underwriting specific parameters** (USPs) within the standard formula remains an option. The methods proposed by CEIOPS in Former CP75 have been included within the QIS5 technical specification.

For companies intending to use the option of USPs in the future, it is important to use QIS5 to assess:

- Are the methods appropriate? The specified methods contain a number of known limitations (for example, they do not allow for the underwriting cycle). If they do not produce reasonable results, a partial internal model may be required.
- Which method is preferred and why? There are a range of methods available, each of which is based on different underlying assumptions and will produce different results. Companies will need to test all the methods, select a preferred method, and justify this choice to supervisors (in particular, being careful to avoid being accused of 'cherry-picking' the most favourable method).

Premium and reserve risk

Companies currently intending to use the standard formula to calculate the non-life underwriting risk SCR will need to re-evaluate this decision in the light of the increased capital requirements for QIS5 relative to QIS4, and the possibility of even higher factors for Solvency II eventually.

- Are the methods practical? Even if the methods are appropriate, some companies may find the calculations too complex and burdensome. This should be identified now, not after the methods have been finalised.
- Can the required data standards be achieved? For some companies, the data standards which must be met in order to use USPs may prove to be too stringent. As part of QIS5, companies should discuss data quality standards with their supervisors to see whether USPs are likely to be a realistic option.

Companies will then be able to provide feedback on USPs as part of the QIS5 exercise.

A **lapse risk** component has been added to the non-life underwriting risk SCR. This is a new concept for QIS5, and is designed to capture the impact of lapse assumptions (for example, rates of policyholder mid-term cancellations) that turn out to be incorrect. It is assumed to be independent of other sources of non-life underwriting risk.

Lapse risk applies to future premiums and only needs to be included in cases where lapse assumptions have a material impact on premium provisions. Therefore, lapse risk is likely to be zero for many non-life insurers. The calculation involves stresses of a 50% increase or decrease in lapse rates or a mass lapse risk stress (assumes 30% lapse for policies contributing a negative premium provision), with the capital equal to whichever stress has the most adverse impact.

Non-life catastrophe risk

On 15 June 2010, CEIOPS released the Catastrophe Task Force’s (CTF) final report on standardised scenarios for the catastrophe risk module in the standard formula. The CTF is a joint industry and CEIOPS working group set up in 2009 to provide input and guidance on the calibration and application of standardised scenarios, in line with CEIOPS’ Level 2 guidance.

The report covers extreme events arising from a range of natural catastrophes (for example, windstorm, flood and earthquake) as well as man-made catastrophes (for example, fire, marine, terrorism, aviation and liability). The CTF’s advice has been adopted for the QIS5 technical specification for non-life catastrophe risk.

QIS5 identifies a hierarchy of methods to be considered in the following order:

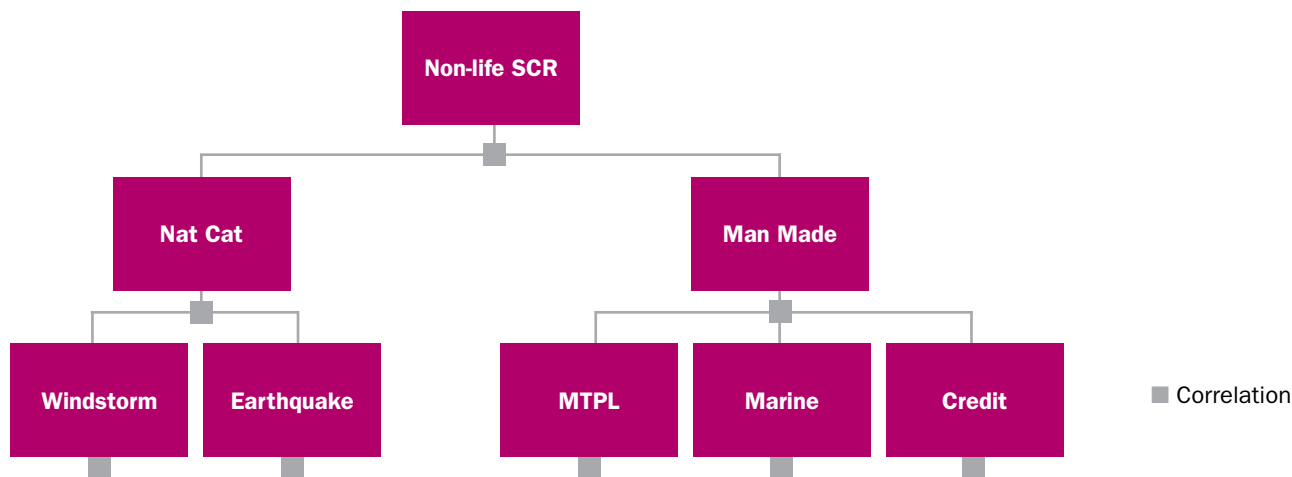
- Standardised scenarios, for use only when they provide an adequate representation of the company’s actual catastrophe exposures. In particular, they must not be used for exposures outside the European Economic Area (EEA) or for non-proportional inwards reinsurance business.
- The factor method, which appears to be conservatively calibrated and is to be used where the standardised scenarios are not appropriate.

In practice, insurers with large catastrophe risk exposures are expected to apply for a (partial) internal model to assess their catastrophe risk SCR. However, the partial internal model option is outside of the scope of QIS5 and all companies will therefore need to use a combination of standardised scenarios and the factor method to assess their standard formula SCR for QIS5 purposes.

The **standardised scenarios** are specified on a gross of reinsurance basis, with companies able to apply their actual reinsurance programme (and other risk-mitigation arrangements) to calculate the net of reinsurance positions. The framework is flexible enough to allow for regional, national and transnational reinsurance programmes at the appropriate geographical and peril levels.

Net of reinsurance catastrophe risk charges should be aggregated across countries first and then across perils or classes (for natural catastrophe and man-made events respectively) for a selection of catastrophe events, as illustrated by **Figure 04** below.

Figure 04. Proposed non-life catastrophe risk hierarchy



The aggregations are to be carried out using specified correlation matrices which aim to reflect geographical diversification. The final aggregation between natural catastrophes and man-made events assumes that these are independent.

The **factor method** is also specified on a gross of reinsurance basis, with net of reinsurance figures obtained in a similar way as for the standardised scenarios. Factors are specified for a representative set of catastrophe events (storm, flood, major fire and so on). The capital charge is calculated by applying each factor to an estimate of the following year's gross written premium which is affected by the event, and then aggregating in accordance with a prescribed formula (which assumes events are independent, except for corresponding direct and non-proportional classes which are assumed to be 100% correlated).

It will be important for companies to understand the capital charge arising from the QIS5 standardised scenarios in order to assess whether a partial model might be required, or if the factor method might be more appropriate.

In addition, carrying out the QIS5 calculations will help companies to assess whether they have the required exposure data to apply the standardised scenarios. This will include Total Insured Values split by CRESTA zones for the natural catastrophe scenarios, and peak exposures for the man-made catastrophe scenarios (for example, largest Fire exposure within a 150m radius). If the required data is not currently available, it will be necessary to develop plans to ensure this information will be available in time for Solvency II.

The factor method requires companies to split premiums between events (for example, between storm and flood) and to estimate the amount of premium 'affected by the event'. In our view, this definition is ambiguous. In the absence of clearer guidance, the premium estimates and splits could be subject to widely differing interpretations. This is a difference in treatment to QIS4, for which the factors were simply applied to the entire premium.

For QIS4, companies were permitted to use their own models to calculate catastrophe risk. This is not permitted for QIS5 and companies must use a combination of standardised scenarios and the factor method. The implication is that insurers with material exposures to non-EEA catastrophe events (for example, US Windstorm) or writing inwards reinsurance business will have to use the factor method for these exposures.

This may lead to a capital charge which is significantly higher than that implied by Internal Models, given that for QIS4, companies' Internal Models gave capital charges that were an average of 60% of the factor method, and the factors have

since increased substantially for QIS5. The increase in factors could be offset by reductions in premium to which the factors are applied, depending on the extent to which companies consider premium to be 'affected by the event'.

Another issue to consider is the computational complexity of the standardised scenarios. It is becoming apparent that the required calculations will involve significant work, mainly because the capital charges must be calculated by CRESTA zone and then aggregated, rather than calculating at a less granular level and making an implicit allowance for geographical diversification. Further, for some scenarios it is necessary to carry out calculations for alternative sub-scenarios (for example, a major flood and a small flood, or two medium-sized floods) with the overall capital charge taken as the higher of the two. Insurers will need to assess the practicality of these calculations and, should they prove to be overly onerous, feed this view back to supervisors and suggest possible simplifications.

Health

The health risk sub-module has been redesigned to be consistent with the segregation of health business into business conducted on a life (SLT) or non-life (non-SLT) technical basis. The techniques used for the two types of business are mostly similar to their equivalent risk modules within the life and non-life modules.

For non-SLT business, there is a specific calibration for premium and reserve risk factors for medical expense, income protection, workers compensation and non-proportional health insurance.

For SLT business, there is a higher calibration for revision risk (stress of 4% as opposed to 3%) and a lower calibration for lapse risk (stress of 20% instead of 50%). There is also greater differentiation between medical expense and income protection insurance.

QIS5 includes a separate health catastrophe risk sub-module based on the work of the Catastrophe Task Force. This consists of three standardised scenarios:

- Arena disaster which captures the risk that catastrophe impacts lots of people at a particular location
- Concentration scenario which captures the risk that an area of concentrated exposure is impacted by a disaster
- Pandemic scenario which gives rise to many non-lethal claims

The scenarios apply to worldwide health exposures. As such, the scenarios do not segment between SLT, non-SLT or underlying lines of business.

Non-life catastrophe risk

It will be important for companies to understand the capital charge arising from the QIS5 standardised scenarios in order to assess whether a partial model might be required, or if the factor method might be more appropriate.

Ring fenced funds

Ring fenced funds are defined to include profit participation business where assets can only be used to cover losses for particular policyholders. There are restrictions on the use of assets to meet losses outside the fund and any excess assets are usually maintained within the fund. Certain types of occupational pensions business and the separation of life and non-life business within composites may also be subject to requirements of ring fenced funds.

For ring fenced business, companies need to calculate a notional SCR for each ring fenced fund separately. In the case of bidirectional scenarios (for example, interest rates), the scenario to be used is the one which is more onerous for the company as a whole. This avoids the inconsistency of assuming that for some funds interest rates go up and for others interest rates go down at the same time. The capital requirement for the overall entity is the sum of the requirement across the various ring fenced funds.

At the level of the legal entity, the own funds within the ring fenced structure are limited to the amounts covering the notional SCR within the fund with the exception of any shareholder transfers which are assumed to be available to cover losses in other parts of the business.

The approach to ring fenced funds has been simplified since the QIS5 draft although further work is expected as part of the Level 3 guidance. In general, QIS5 recognises the issues specific to ring fenced funds such as fungibility constraints and the treatment of shareholder transfers but this has led to increasingly complex calculations.

“The requirements to assess basis risk means that companies will be looking more closely at the effectiveness of their risk mitigation programmes.”

Risk mitigation

QIS5 sets out a number of qualitative requirements in order to recognise financial and insurance risk mitigation. This includes a requirement that basis risk inherent in the risk mitigation used is either not material or can appropriately be reflected in the SCR. This might arise where, for example, CDS protection may be on a different basket of assets compared to what is actually held by the insurance entity.

Risk mitigation should be based on techniques which are in place at the valuation date, with the possible exception of well-documented rolling hedge programmes with no material liquidity risk. Dynamic hedging is not allowed as a risk mitigation technique.

Companies are expected to recognise all material risk (for example, counterparty default risk that may arise from the entry into risk mitigation contracts).

The requirements to assess basis risk means that companies will be looking more closely at the effectiveness of their risk mitigation programmes. The failure to recognise dynamic hedging as a valid risk mitigation technique will impact many of the variable annuity writers who use such techniques to manage exposures. Consequently, such companies may be forced down the route of Internal Models.

Aggregation

QIS5, as in previous exercises, applies a multi-level correlation approach to aggregation with a number of different correlation matrices. The main changes in matrix assumptions compared to QIS4 include:

- A reduction in the correlation between the Non-life and Health risk-modules from 0.25 to 0.
- Correlations between the interest rate stress and other market risks now vary depending on whether the interest rate up or down shock bites.
- The new illiquidity premium module assumes a -0.5 correlation with spread risk, and zero correlation with other risks.
- The new intangible assets module is an add-on to other capital, and therefore assumes full correlation with other risks.
- The correlation between spread and equity risks has been increased, largely in response to the financial crisis.
- The life underwriting risk correlation matrix has introduced a correlation of 0.25 for catastrophe risk with mortality, disability, lapse and expense risk.
- The correlation between mortality and disability risk has been decreased from 0.5 in QIS4 to 0.25 in QIS5.

Minimum Capital Requirement (MCR)

The calculation of the MCR is based on a linear formula with a 'corridor' based on the SCR.

For non-life business, the MCR for individual lines of business consists of the maximum of a premium and reserve related factor. The factors are shown in **Table 05**.

For life insurance, the MCR consists of a combination of factors based on reserves and capital at risk on death or disability. The factors are shown in **Table 06**.

The methodology for the MCR is essentially the same, but there has been some increase in the factors compared to QIS4. The corridor for the MCR is between 25% and 45% of the SCR, which is narrower than that used for QIS4. Companies that intend to use an Internal Model (including a partial Internal Model) will need to calculate the MCR using both the Standard Formula and the Internal Model SCR.

Special rules apply to composites which need to calculate a notional MCR for the life and non-life businesses separately.

In QIS4, the corridor impacted over 40% of undertakings and there were many industry comments on the MCR linear formula not being sufficiently risk sensitive. Given the narrowing of the corridor in QIS5 and the strengthening of the MCR factors, we would expect that the cap and floor will continue to bite for a significant number of companies.

Table 06. Life MCR Factors

Life MCR factors	Factor
Contracts with profit participation	
Technical provisions – guaranteed benefits	5%
Technical provisions – discretionary benefits	(8.8)%
Unit linked contracts	
Technical provisions – without guarantees	0.5%
Technical provisions – with guarantees	1.8%
Contracts without profit participation	
Technical provisions	2.9%
Capital at risk on death and disability	
All contracts	0.1%

Table 05. Non-life MCR Factors

Line of business	Reserve factor	Premium factor
Motor vehicle liability	12%	13%
Motor Other	13%	9%
Marine Aviation and Transport	18%	22%
Fire and other damage	14%	13%
General Liability	14%	20%
Credit & suretyship	25%	28%
Legal expenses	12%	9%
Assistance	14%	7%
Miscellaneous financial loss	20%	17%
NPL Property	26%	23%
NPL Casualty	26%	22%
NPL MAT	26%	21%
Medical expense	13%	5%
Income protection	18%	11%
Workers compensation	14%	7%
NPL Health	26%	22%

Own Funds

Own funds refer to assets in excess of liabilities and subordinated liabilities. As with previous QIS exercises, the own funds consist of basic and ancillary own funds which are tiered based on specific criteria. **Table 07** shows the criteria to be used in the tiering of the basic own funds.

Table 07. Advice on tiering of capital instruments – Basic own funds

Criteria	Tier 1	Tier 2	Tier 3
Subordination	Deeply subordinated	Must rank after the claims of all policyholders, beneficiaries and non-subordinated creditors	Must rank after the claims of all policyholders, beneficiaries and non-subordinated creditors
Loss absorbency	Immediately available to absorb losses Absorbs losses at least on SCR breaches Should not cause or accelerate insolvency	Not necessarily immediately available to absorb losses Should not cause or accelerate insolvency	Should not cause or accelerate insolvency
Sufficient duration	Undated or minimum 10 years maturity at issue. Contractually locked in or replaced at least equivalently on breach of SCR	Undated or minimum five years maturity at issue. Contractually locked in or replaced at least equivalently on breach of SCR	Undated or minimum three years maturity at issue. Contractually locked in or replaced at least equivalently on breach of SCR
Free from incentives to redeem	Only redeemable at the option of the insurer or reinsurance undertaking; no step-ups	Only redeemable at the option of the insurer or reinsurance undertaking; moderate incentives to redeem permissible	Incentives to redeem are permissible
No mandatory fixed charges	Suspension of redemption provided and coupons/dividends can be cancelled in case of breach of SCR	Suspension of redemption provided and coupons/dividends can be deferred in case of breach of SCR	Suspension of redemption provided in case of breach of SCR. Deferral of coupons/dividends on breach of MCR
No encumbrances	Unconnected with other transactions and no restrictions, charges or guarantees	Unconnected with other transactions and no restrictions, charges or guarantees	Unconnected with other transactions and no restrictions, charges or guarantees

Deferred tax assets are specifically referenced as Tier 3 capital. Any surplus in a ring-fenced fund is only available to cover liabilities within the ring-fenced fund and cannot be used to cover the overall solvency requirement of the undertaking.

One of the areas of intense debate has been the exclusion from Tier 1 of some elements of the assets over liabilities, such as the so-called ‘winding up gap’ and the value of future profits. These have now been merged into a single concept called the expected profits included in future premiums (EPIFP). CEIOPS has argued in the past that this should be designated as Tier 3 capital.

QIS5 allows for the EPIFP to be treated as Tier 1 capital, but requires that companies perform a calculation to determine what this amount would be, so that the impact on companies can be assessed. The method prescribed to determine the EPIFP is artificial and assumes that all policies are made paid-up with immediate effect, regardless of whether they are legally able to or not.

Ancillary own funds consist of instruments other than basic own funds which can be called up to absorb losses. They are classified as Tier 2 and Tier 3 only, and consist of items such as unpaid share capital, supplementary credit and letters of credit or guarantees.

The financial crisis has stimulated much debate on the criteria around capital instruments and the ability to absorb losses in extreme events. It is sensible to put forward a framework in order to categorise capital instruments. However, care is required to ensure that the criteria are not set so strictly, particularly around the redemption incentives and payment of coupons, that it is commercially impossible for companies to issue such instruments. This would deprive the industry of what is currently a valuable source of financing and put it at a disadvantage compared to other financial institutions.

“It is sensible to put forward a framework in order to categorise capital instruments. However, care is required to ensure that the criteria are not set so strictly, particularly around the redemption incentives and payment of coupons, that it is commercially impossible for companies to issue such instruments.”

Fundamentally, we believe that carving out the EPIFP is inconsistent with the economic framework underlying Solvency II. It is a significant source of value for companies, and if it were to be assigned as Tier 3 capital, then this potentially double counts the impact of the risk exposures for the company. There are also significant difficulties with the calculation of the EPIFP amount as currently defined. The most obvious is that not all policies are legally able to reduce premiums to zero or have penal terms to discourage the policy becoming paid-up. It also raises inconsistencies with other assumptions such as expenses used in the valuation giving rise to artificial values. Finally, most systems are not set up to do such calculations so at best the answers will be approximate.

Limits on the eligibility of own funds

QIS5 specifies that capital of a minimum quality must be used to meet the regulatory requirements.

- To back the SCR, the proportion of Tier 1 items must be at least 50% of the SCR and the amount of Tier 3 items must be less than 15% of the SCR.
- To back the MCR, only Tier 1 and Tier 2 basic own funds are eligible with at least 80% of the MCR being met by Tier 1 items.
- Tier 3 basic own funds and ancillary own funds cannot be used to meet the MCR.

In addition, within these limits, other paid in capital instruments such as preference shares, subordinated liabilities and subordinated mutual member accounts may only make up 20% of the total value of Tier 1 own funds.

These limits remain more onerous than the limits specified in the Level 1 Directive, where it states that to back the SCR, Tier 1 items must be at least a third of the SCR, and Tier 3 may be no more than a third of the SCR. In addition, the limit on the recognition of hybrid debt instruments as Tier 1 may mean that some companies find some of their existing capital instruments do not count under Solvency II.

Grandfathering

QIS5 also requests that information on own funds is provided on two bases – the QIS5 basis as summarised previously, as well as a grandfathering basis applied to existing capital instruments. The Commission is asking all companies to classify their own funds on both bases and this will be used to assess the need for grandfathering and the criteria that could be used.

For QIS5, the grandfathering criteria generally differ from the Solvency II criteria as:

- Any reference to the SCR and MCR are excluded as they are not reflected in current capital instrument criteria.
- Some of the criteria have been modified in order to include current instruments which are widely used and satisfy most, but not all, the Solvency II criteria.

Overall, the grandfathering rules are less onerous than the QIS5 criteria, with one notable exception. QIS5 prescribes a minimum duration of 10 years in order to qualify as Tier 1, while the grandfathering criteria specifies that dated instruments should be classified as Tier 2, with only perpetual instruments qualifying as Tier 1.

It is important that companies carry out the assessment of own funds based on the criteria for grandfathering. This would help understand the extent to which any restructuring of capital instruments is necessary and the extent to which further industry lobbying may be required.

Groups

Groups are asked to produce results under a number of different bases with the focus on the default accounting consolidation method and the deduction and aggregation (D&A) approach described in the Directive. **Table 08** summarises the calculation methods to be performed.

The SCR under the consolidation method is based on applying the QIS5 requirements to the overall group consolidated assets and liabilities and therefore the method implicitly recognises group diversification effects. However, under the D&A method, the SCR is determined by summing the results of individual legal entities and therefore does not recognise group diversification effects. In both cases, intra-group transactions should be eliminated.

It is worth noting that the default for the D&A approach assumes that Solvency II would be applied to insurance entities outside the EEA. This is likely to be challenging for most multinational insurance groups. For Groups with headquarters outside the EEA, the expectation is that the results will be produced at the level of the EEA subgroup.

Where relevant, the Internal Model aggregation is also requested. In addition, companies may also wish to test combination methods and subgroup calculations, in consultation with the appropriate group supervisor.

Table 08. Group calculation methods

Method	EEA Groups without non-EEA entities	EEA Groups with non-EEA entities	EEA Subgroup(s) of non-EEA Groups
Solvency I – current calculations	Already available	Already available	Already available
Solvency II – consolidation method (default)	Required	Required	Required
Solvency II – deduction & aggregation (SII applied to non-EEA entities)	Required	Required	Required
Solvency II – deduction & aggregation (local rules applied to non-EEA entities)	N/A	Required, if relevant	N/A
Solvency II – combination of methods	Optional	Optional	Optional
Solvency II – Internal Model	Required, if relevant	Required, if relevant	Required, if relevant
Solvency II – default and deduction & aggregation – subgroup calculation	Optional	Optional	N/A

Treatment of participations

Calculations only need to be carried out at the level of the ultimate EEA insurance holding company and encompass the 'group' as defined within the Solvency II Directive. The treatment of each legal entity within the group calculations depends on a number of factors including:

- Level of control: This could be classified as dominant, significant or other depending mainly on ownership percentage. Dominant control requires full integration (or proportional if there is jointly shared control). Significant influence will be based on the group's proportionate share of the participation and participations classed as other (where the ownership is less than 20%) are treated as an investment of the group.
- Type of entity: Participations in other financial sectors requires that both the own funds and capital requirements be included in the group calculations using the D&A method according to the relevant sectoral rules (for example, Basel II for banks).

Fundamentally, it is important that there is consistency in the treatment of own funds and SCR for the individual entities at the group level. Under the default method, the SCR for the group is defined as the sum of the:

- Consolidated SCR for controlled entities (dominant influence)
- Capital requirement for financial non-insurance entities (for example, banks and unit trusts)
- Group's share of the solo SCR for non-controlled entities with significant influence (effectively between 20% and 50% ownership)

There are no diversification effects recognised among the above grouping of companies.

The Group results requested in QIS5 will be challenging for companies. The information is however necessary for the Commission to assess the impact of Solvency II on non-EEA business in order to understand the need for any transitional arrangements.

There is an additional two weeks allowed for the production of the group results during QIS5, but many companies outside the EEA will still find it a challenge to produce the QIS5 results due to resource and system constraints.

Although not directly tested in QIS5, equivalence will have a material impact for a number of groups, both in terms of the impact on group solvency, as well as possibly allowing companies to use local regulatory results for countries deemed to be equivalent.

Fungibility and transferability constraints

One of the most important aspects of the group assessment is the allowance for fungibility and transferability constraints. Such constraints arise because some own funds at the solo level may be available to absorb only certain losses or the transfer of the assets to another entity is not allowed or cannot be completed within a nine-month period. QIS5 requests that companies pay particular attention to fungibility and transferability constraints inherent in:

- Ring-fenced funds: Some companies have capital buffers which are only available to policyholders within the fund.
- Minority interests: Minority interests and other shareholders of subsidiaries may affect the ability to transfer own funds out of a subsidiary.
- Hybrid capital and subordinated liabilities which are not issued or guaranteed by the parent undertaking.
- Local regulatory requirements in other jurisdictions which represent a restriction on the ability to transfer capital across the group.

The Group available own funds needs to be haircut to reflect these constraints. In principle, non-fungible own funds at the Group level can only be counted to the extent that they cover the contribution of the corresponding solo SCR to the Group SCR. This represents one of the most complex parts of the QIS5 specification and undoubtedly further clarification will be required as companies complete the underlying spreadsheets.

Where next for companies?

QIS5 as an input for industry lobbying

QIS5 represents a key milestone in the Solvency II process. It is a comprehensive test of the new framework and provides the quantitative data with regard to the impact of the current proposals that will feed the debate on the Level 2 measures.

Much has been achieved via industry lobbying, particularly in areas such as the illiquidity premium, calibration of certain risk modules and better recognition of Tier 1 own funds. However, issues such as the form of any transitional arrangements and contract boundaries (treatment of future premiums) remain.

It is important to recognise that Solvency II is a continuing negotiation, and the industry should be looking to use QIS5 to reinforce the arguments on areas where progress has been made and highlight areas where there remain fundamental inconsistencies with how insurance companies view the business. It is therefore important to have coordinated industry input via bodies such as local insurance associations, CEA, CRO Forum, CFO Forum and AMICE when providing feedback to the Commission.

It is worth noting that many of the issues being discussed relate to the base technical provisions. It is important that the industry is comfortable that the basis underlying the technical provisions is consistent with economic reality. If this is not the case, then some of the more innovative proposals within Solvency II (such as the Use Test within Internal Models) would be compromised.

QIS5 is the first exercise following the financial crisis, and for this reason alone we would expect the results to attract attention from beyond the usual stakeholders. For companies that share their results with analysts, care should be taken to point out that QIS5 is still a test and there are a number of areas where the stakeholders believe further work is still required. It may therefore be sensible for companies to share a range of QIS5 results in such cases.

Finally, we note that QIS5 will collect qualitative information around data validation, assumption setting, use of management actions, expert judgement and validation processes. It is important that the industry sets out its views in these areas to ensure that the standards that will be expected in the future are achievable in practice. If the final standards are prescriptive and substantially beyond the current industry position, then under Solvency II, resources will be diverted to complete a compliance exercise rather than to improve the underlying risk management.

QIS5 as a gap analysis for processes and systems

All companies including those intending to apply for Internal Model approval should be planning to produce the results of the SCR on a Standard Formula basis.

QIS5 acts as a test (effectively a gap analysis) of the processes underlying the ability to produce such numbers. This ranges from the ability to source the underlying data for the calculations, support for the underlying assumptions used, testing the capability of the actuarial systems to produce the numbers in the prescribed format on a timely basis, and the availability of skilled resources to perform and review the calculations.

We expect that most companies would need to do some form of approximation within QIS5, given the complexity of the prescribed requirements and methodology changes to areas such as the risk margin. It is however less than 30 months before Solvency II will come into force and it is therefore important to identify any shortcomings in processes, systems and available resources. An internal deliverable from the QIS exercise should be a management report describing the approximations made and a plan to address the shortcomings. The objective should be to move to a controlled production environment for the Standard Formula calculations in time for the start of Solvency II. This would apply to both EEA and non-EEA entities.

“It is important that the industry is comfortable that the basis underlying the technical provisions is consistent with economic reality. If this is not the case, then some of the more innovative proposals within Solvency II (such as the Use Test within Internal Models) would be compromised.”

QIS5 as an input for industry lobbying

QIS5 represents a key milestone in the Solvency II process. It is a comprehensive test of the new framework and provides the quantitative data of the impact of the current proposals that will feed into the debate on and finalisation of the Level 2 measures.

A CEO perspective

Solvency II has wider implications for insurance companies and some companies have now begun to engage on the strategic opportunities that may result from the new framework.

For example, a number of groups have cited Solvency II and more specifically the desire to maximise diversification effects as one of the reasons they are intent on simplifying their corporate structure and reorganising certain divisions as branches. For these and other strategic decisions, QIS5 provides a useful reference point. It provides a quantitative framework to assess different strategic options and a basis for an objective cost-benefit evaluation.

QIS5 also has implications for investment and reinsurance strategies. Capital requirements will be driven by the two or three major risks to which a company is exposed. QIS5 enables companies to identify such risks and management needs to then decide whether they need to act. If they are uncomfortable with their risk exposures then a hedging, reinsurance or other risk reduction strategy will be necessary. It is important to table such issues now in order for management to have sufficient time to pursue any risk reduction strategy in advance of Solvency II implementation.

QIS5 can also be used to highlight issues to management on the profitability of products under a Solvency II basis and, particularly, the impact of the new illiquidity premium. Decisions will be required on whether to adjust pricing, product design or to even exit certain products or markets if these were no longer considered commercially viable.

Companies completing QIS5 need to assess whether the Standard Formula adequately captures their risk profile. If not, then those responsible for the organisation need to decide whether they wish to pursue the Internal Model option. This should not be considered lightly given the additional requirements and standards expected for Internal Model approval.

Ultimately, Solvency II will define how companies organise themselves and how risk is measured, managed and perceived both within organisations and externally. Solvency II comes into force at the beginning of 2013 and QIS5 is an important step in the development of the framework. It is therefore important that QIS5 is not perceived as an exercise limited to actuarial or risk management departments but encompasses the wider organisation which will be impacted by Solvency II.

Towers Watson is currently engaged with clients in all aspects of Solvency II and have assisted in excess of 80 QIS exercises across Europe. For further information on QIS5 calculation and how to get the most out of it or on Solvency II in general, please contact one of our experts listed opposite.

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