ARE THE DIFFERENCES IN RISK MARGINS MEANINGFUL?

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The risk margins included in technical provisions for solvency reporting are not the same across different regulatory regimes.

This is true even where the underlying principles guiding the regulatory approach seems quite similar. Some of these differences are subtle, but others reflect a fundamentally different view on the purpose of the risk margin.

The time is also appropriate to dig into these differences. IFRS17 has forced insurers to reconsider their risk margin and risk adjustment methodologies. European insurers operating in emerging or non-EEA markets or looking to enter emerging markets, may have opportunities to influence regulations, including those on risk margins.

This article compares the non-life risk margin under three solvency regimes, namely:

- Solvency II.
- Solvency Assessment and Management (SAM), the Solvency II derived regulations applicable in South Africa.
- Swiss Solvency Test (SST).

One item all three have in common is the 6% cost of capital rate. Despite this agreement, the rate continues to be a source of intense debate.

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Considering all views, it is too high and possibly too low, too interest rate sensitive and difficult to hedge, theoretically flawed and, according to some, entirely the wrong approach altogether.

We don't delve into these issues in this article, but it is clear that South Africa followed Solvency II's approach with little interrogation, and Solvency II was heavily influenced by early papers developing ideas for SST a decade and a half ago.

ITEMS CONSIDERED IN THIS ARTICLE

This article is only limited to the scope of the calculation of the non-life risk margin under the three regulatory regimes.

The items covered for each of the three regimes includes:

- Calculation methodology of the risk margin.
- Projection frequency of the regulatory capital requirement.
- Capital projection starting from t = 0 or 1?

We use the term risk margin to refer to the risk margin analogue Market Value Margin (MVM) under the SST for simplicity. This article will also refer to Solvency II terminology for Solvency II to allow for easier reading and understanding.

CALCULATION METHODOLOGY OF THE RISK MARGIN

This section discusses some key differences in methodology applied in calculating the non-life risk margin under each of the three regulatory regimes considered.

General Methodology

Under all three regimes, the non-life risk margin calculation is performed using a cost of capital approach. That is, calculating the risk margin as the discounted present value of the cost of projected regulatory capital requirement over a future time period.

Definition of the capital requirement

The risk margin calculation under the three regimes is based on the regulatory capital requirements calculated over a future period.
However, there are some differences in definition of the regulatory capital requirement under the three regimes. The table in *Figure 1* shows a summary of these differences.

The capital requirement principle is the same for Solvency II and SAM. However, the SST uses a tail value at risk compared to the value at risk used under both SAM and Solvency II.

The value at risk measure represents the loss that will be incurred for a certain confidence level. The tail value at risk represents the expected loss given that the loss exceeds a loss at a specified confidence level.

While the tail value at risk measure will always be greater or equal to the value at risk for a given confidence level, SST and Solvency II are calibrated with different confidence levels (99% vs 99.5% respectively).

The standard formulae for deriving capital requirements are quite different between SST and Solvency II. While SAM inherited much of its structure and calibration from Solvency II, there are key differences in health underwriting risk, default risk, treatment of sovereign default risk, matching and volatility adjustments and other allowances

FIGURE 1: CAPITAL REQUIREMENTS

REGULATORY REGIME	DESCRIPTION
Solvency II SCR	99.5% value at risk over one year time horizon
SAM SCR	99.5% value at risk over one year time horizon
SST ZK (target capital)	99% tail value at risk over one year time horizon, excluding operational risk

for illiquidity premia, and more subtle differences in treatment of contract boundaries and volume measures for non-life underwriting risk.

Given these differences, the capital required for an identical portfolio of risks can vary dramatically. These differences in results will change non-life risk margin calculated under the different regimes.

Transfer scenario assumed

The risk margin calculation under all three regimes is based on a regulatory capital requirement under a prescribed transfer scenario.

The transfer scenario considers existing obligations and therefore excludes allowance for future new and renewal business for all three regimes.

Projection period under the risk margin calculation

The Solvency II and SAM risk margin calculation is intended to support the insurance liabilities up to their contract boundary.

The SST does not specify a concept such as a contract boundary. However, cashflows for contractually binding insurance obligations should be recognised under the SST.

Determining the contract boundary is simpler for non-life insurance than life insurance. Non-life insurance contract boundaries are typically shorter with regular re-pricing expected, compared to longer term or whole of life contracts with specific premium guarantee periods and/or limitations on re-underwriting or changing premiums within the contractual policy term. As such, the differences in projection periods between Solvency II, SAM, and the SST for non-life are not usually a primary driver of differences.

PROJECTION INTERVAL OF THE REGULATORY CAPITAL REQUIREMENT

Impact of projection interval used in estimating the risk margin

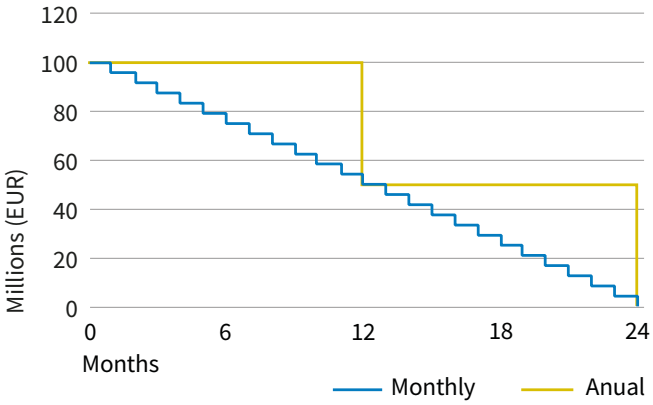
The calculation of the risk margin is based on the discounting of future cost of capital on required capital under the respective regulatory regime.

However, there are some differences in the prescribed projection interval for the regulatory capital requirements i.e., whether it's projected monthly, quarterly, or annual.

To illustrate this difference, let's consider an example where an insurer has a regulatory capital requirement of EUR 100 million. For the purposes of this calculation, we made a simplifying assumption that when calculating the full projected regulatory capital, it will run off linearly over a two-year period. The impact of discounting is also ignored for this example.

The area below the graphs in *Figure 2* demonstrates the impact on the calculated risk margin.

FIGURE 2: CAPITAL REQUIREMENT RUNOFF BY PROJECTION FREQUENCY



The table in *Figure 3* illustrates the calculated risk margin using different projection intervals. This table assumes that the risk margin calculations include the projected regulatory capital from time 0 onwards in the calculation.

The cost of capital rate for each of the scenarios above was calculated converting the cost of capital rate to an effective rate for the relevant period. That is, the quarterly cost of capital rate was calculated as $(1+CoC)^{\frac{1}{4}}$-1 and the monthly cost of capital rate was calculated as $(1+CoC)^{\frac{1}{12}}$-1. (The results are not materially different if other approaches are used to convert the annual cost to monthly and quarterly.)

FIGURE 3: RISK MARGIN BY PROJECTION FREQUENCY (EUR MILLIONS)

SCR PROJECTION INTERVAL	RESULT
Annual	9.0
Quarterly	6.6
Monthly	6.1

The table in *Figure 3* illustrates that the calculated risk margin differs based on the choice of regulatory capital projection interval. The differences will increase under shorter capital runoff patterns. The impact is significant for non-life insurers writing mostly business with short contract boundaries where much of the SCR runs off after the first few months.

SAM prescribed Projection frequency

The SAM regime does not unambiguously specify the SCR projection frequency to use in calculating the risk margin.

Deeper inspection suggests that the SAM technical specifications are most consistent with an annual projection of regulatory capital in calculating the risk margin. Evidence to support the argument for an annual SCR projection frequency includes:

- The technical specifications state that the regulatory capital for the reference insurer is calculated every year under the proportional approach (level 2 of the simplification hierarchy).
- The technical specification refers to '*the years*' where the assumptions of the duration approach are outlined (level 3 of the hierarchy).
- The annual Quantitative Regulatory Return explicitly refers to the annual runoff in regulatory capital on the '*TP2.4S*' tab.
- The cost of capital rate, stated as 6%, is defined as an annual rate and therefore the risk margin formula as specified can only directly be interpreted as requiring an annual frequency.
- Annual intervals are prescribed under Solvency II in calculating the risk margin. The risk margin calculation and parameterisation were taken directly from Solvency II.

On the other hand, recent guidance issued by the South Africa Prudential Authority on the Iterative Approach for determining risk margin states '*The projection period can use monthly, annual or as a simplification, greater than annual intervals.*' The iterative risk margin has been adopted in South Africa exclusively by life insurers, where the impact of the choice between an annual or monthly projection interval is far smaller given the much slower runoff of the SCR.

Solvency II and SST prescribed Projection interval

The Solvency II and SST technical specification explicitly states that the risk margin should be calculated using annual projection intervals of the regulatory capital. Our understanding is that non-life insurers reporting under Solvency II almost universally use annual projection intervals in calculating their risk margins.

Capital projection starting from t = 0 or 1?

Under SAM and Solvency II, the risk margin calculation applies a cost of capital rate to the

FIGURE 4: RISK MARGIN BY PROJECTION FREQUENCY AND T = 0 OR 1 (EUR MILLIONS)

SCR PROJECTION INTERVAL	RESULT: PROJECTION FROM START OF FIRST YEAR	RESULT: PROJECTION FROM END OF FIRST YEAR
Annual	9.0	3.0
Quarterly	6.6	1.8
Monthly	6.1	1.6

projection of future regulatory capital starting at time 0.

In the authors' experience, this practice is universal in South Africa. It is also consistent with Solvency II. However, some otherwise excellent papers on the Solvency II risk margin have specified calculations from t = 1, possibly not appreciating the practical implications of this difference.

This rationale under SAM and Solvency II, however, stands in contrast to the calculation of the market value margin under the Swiss Solvency Test.

SST assumes that the regulatory capital requirement at time 0 absorbs losses up to a 1-in-200 loss over a one-year time horizon. After suffering the losses, the insurer will have no risk-bearing capital at the end of the first year. The transfer of the portfolio of assets and liabilities is assumed to take place, under which the reference insurer requires compensation for raising additional capital during runoff of the insurance portfolio.

As such, the MVM under SST only considers the cost of capital of the regulatory capital requirement from time 1 onwards. The impact of this difference will be significant in a non-life context where the regulatory capital has a short runoff period, due to short contract boundaries and due to the capital requirement at time 0 typically driving the size of the risk margin held.

The table in *Figure 4* shows the risk margin calculation assuming a capital projection starting at the end of the first year, contrasted to *Figure 3*.

Starting the projection from the end of the first year resulted in a reduction of 67% and 74% in the risk margin calculation using annual and monthly projection frequencies respectively compared to that starting at the valuation date.

CONCLUSION

In theory, the risk margin is a well understood component of the balance sheet. In practice, different interpretations and imprecision can easily result in a sixfold difference between results for similar insurers—even before allowing for a range of simplifications and their potential misuse.

In South Africa, there is not yet industry consensus on which of these combinations of practices is required or permitted.

As other countries adopt Solvency II style risk-based capital regimes, regulators will hopefully understand these differences and define the intended calculation precisely.

For European insurers operating in other markets, it would be worth confirming the local practice and treatment rather than assuming it is identical to home territory treatment. Unintentional compliance breaches or inefficient deployment of unnecessary capital are both possible.

Finally, given the differences already highlighted and separate ongoing and complex debates, the dream of consistent risk margins across territories, and across regulatory and IFRS17 reporting, are likely to be permanently several projection periods in the future.

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