IFRS 17 SERIES

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Equivalent Confidence Level for the IFRS 17 Risk Adjustment

Executive Summary

International Financial Reporting Standard (IFRS) 17 introduces the concept of a risk adjustment for non-financial risk. The IFRS 17 risk adjustment is an influential factor in the pricing of insurance contracts and in how profit from insurance contracts is reported and emerges over time. While the risk adjustment must satisfy certain conditions, the method for its calculation is not prescribed and is the choice of the insurer. As such, there are many potential methods of calculation.

This paper is the third in a series designed to provide an introduction to different features of the risk adjustment that should be considered before implementation. This paper does not attempt to address all the challenges in choosing and implementing a calculation methodology, but focuses on the specific issues around calculating an equivalent confidence level for the IFRS 17 risk adjustment when a method other than Value-at-Risk (VaR) is used. The methodology is important, as in the extreme case, two identical insurers with the same policies and same risk adjustment methodology might disclose different equivalent confidence levels for the same IFRS 17 risk adjustment, solely because the translation methodology is different.

The paper opens with a simple case study to illustrate the methods described in the subsequent sections. The paper concludes with a summary including issues to consider.

CONTENTS

1. Introduction

Under IFRS 17 the risk adjustment for non-financial risk is "…*the compensation an entity requires for bearing the uncertainty about the amount and timing of the cash flows that arises from non-financial risks as the entity fulfils insurance contracts.*"[1] The calculation method is not prescribed and is the choice of the insurance company, subject to the principles detailed in paragraphs B91 and B92[2] of the standard. As the methodology for the risk adjustment for non-financial risk is regarded as a significant judgment, the approach used must be disclosed. In addition:

"…*An entity shall disclose the confidence level used to determine the risk adjustment for non-financial risk. If the entity uses a technique other than the confidence level technique for determining the risk adjustment for non-financial risk, it shall disclose the technique used and the confidence level corresponding to the results of that technique…*"[3]

We interpret the "confidence level" referred to here as the probability that the change in the Present Value of Future cash flows (PVCFs) over a one-year horizon will be lower than the risk adjustment (under changes to non-financial risks only). So the entity can either choose a confidence level and derive a risk adjustment (using the confidence level, or VaR, technique) or use another technique to calculate a risk adjustment and then translate this into an associated confidence level. Either way, the entity must take a view of the distribution of the change in PVCFs over a one-year horizon. In this paper, we consider two different methods for choosing such a distribution and calculate the equivalent confidence level under each method and under different assumptions. We will illustrate each method using a case study, which is introduced in the next section.

2. Case study

To demonstrate the impact different translation methods can have on the disclosed equivalent IFRS 17 risk adjustment confidence level, we consider an entity that calculates economic capital on a Solvency II standard formula basis and its own economic capital basis. The entity writes regular premium term assurances and has derived distributions for its lapse, mortality, and expense risk in its internal modeling. However, as it reports on a Solvency II Standard Formula basis, and already produces a risk margin, it has chosen the cost of capital approach[4] to determine its IFRS 17 risk adjustment.

Under the cost of capital approach, the capital requirement for non-financial risk at a specific percentile, is projected for the lifetime of the business. The present value of these capital requirements is then calculated using an appropriate discount rate and a cost of capital is applied. In our example, the percentile of the capital requirements was 99.5th and the cost of capital used was 6%. The resulting IFRS 17 risk adjustment is calculated as 29.7 million.

3. Method 1 – Assumed distribution for PVCFs

Perhaps the simplest approach is to assume a parametric distribution (for example, normal, lognormal, or Students' T) for the change in PVCFs and calibrate its parameters to other available value or risk metrics. In this example, we consider distributions that are described by two parameters, and choose these parameters so that:

» The median of the distribution is zero.

» The 99.5th percentile of the distribution is 47.9 million, the Solvency II standard formula SCR for non-financial risk, which in this case is readily available as part of the entity's regulatory reporting.

Figure 1 shows the projected capital requirements for non-financial risk, the resulting risk adjustments calculated under the cost of capital method, and their mapping to an equivalent confidence level.

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1   IFRS 17 Insurance Contracts – Appendix A Defined Terms
2   Potential calculation methodologies are discussed in more detail in the Moody's Analytics paper "Calculating the IFRS 17 risk adjustment" Hannibal, C. (2018)
3   IFRS 17 Insurance Contracts – Paragraph B119
4   The cost of capital approach and other potential calculation methodologies are discussed in more detail in the Moody's Analytics paper "Calculating the IFRS 17 risk adjustment" Hannibal, C. (2018)

Figure 1 – Mapping of risk adjustment to equivalent confidence level (normal distribution)
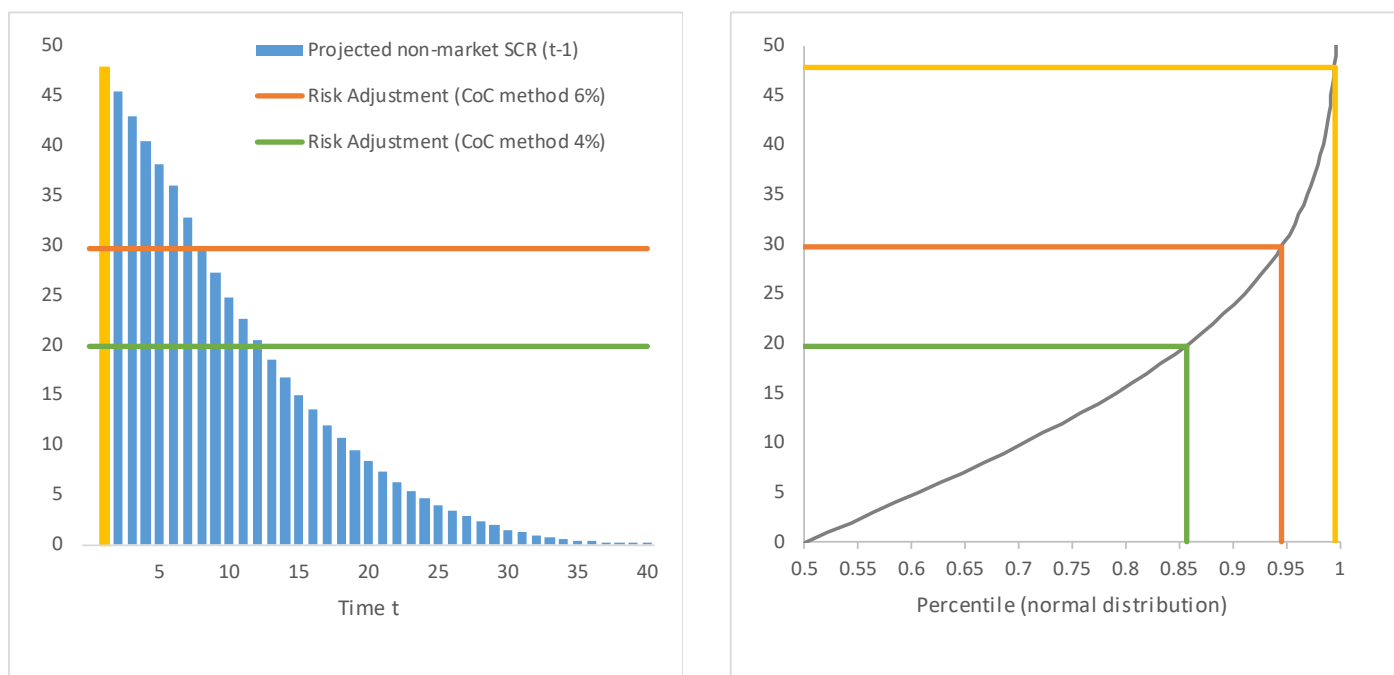
The bar chart on the left shows the projected non-market SCR, with the yellow bar highlighting the non-market SCR at t=0. The orange and green lines show the resultant risk adjustments, calculated by discounting these projected non-market SCRs and applying different costs of capital (6% in orange and 4% in green).

The chart on the right shows the percentiles of a normal distribution (gray line) calibrated so that it matches the assumed median (0) and 99.5th percentile (47.9 million).

Given this distribution, we can easily calculate the resulting equivalent confidence levels corresponding to risk adjustments calculated using different cost of capital assumptions. In this case, the equivalent confidence levels are calculated as 94.5% (assuming 6% cost of capital) and 85.7% (assuming 4% cost of capital).

Under the cost of capital technique, although the risk adjustment is calculated using projected capital requirements at a 99.5% confidence level, it does not mean that the equivalent confidence levels for the risk adjustment are equal to 99.5%. Under the cost of capital approach, the risk adjustment is calculated by projecting 99.5% capital requirements over the entire coverage period, discounting, summing, and multiplying by the chosen cost of capital. The resulting risk adjustments in this case are lower than the SCR for non-financial risk, and so the equivalent confidence levels are lower than 99.5%.

The advantage of this method is its simplicity. It is simpler to explain than some other methods so it is pertinent for disclosures. The method does not require any stochastic models or complex calculations. It is quick and simple to calculate so it is unlikely to delay a reporting process as long as the corresponding Solvency II (or other economic capital basis) inputs are available.

Conversely, this method makes some broad assumptions. In particular, it assumes the distribution of the best estimate liabilities (BEL) is an appropriate proxy for the distribution of the IFRS 17 PVCFs. Whether this assumption is appropriate depends largely on the consistency between the IFRS 17 cash flows and those assumed for Solvency II (or the economic capital basis used for the calibration). Elements to consider include contract boundaries, application of stresses, and the exclusion of financial risks.

This method is sensitive to the shape of the chosen distribution, as shown by the difference in result when alternative distributions are used in place of the normal distribution. To illustrate, Figure 2 shows the translation of the risk adjustment (assuming 6% cost of capital) to equivalent confidence levels using the Students' T distribution (with different degrees of freedom) in addition to a normal distribution. In all cases, the distributions are calibrated to match the same median and 99.5th percentile. Figure 3 shows the resulting equivalent confidence levels.

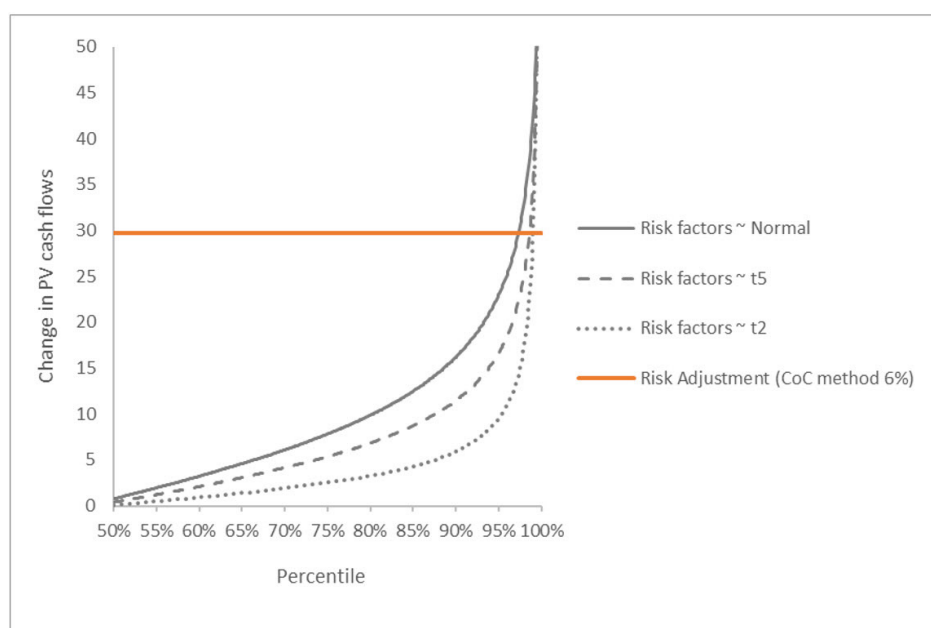Figure 2 – Mapping of risk adjustment to equivalent confidence level (normal, t5, and t2 distributions for PVCFs)
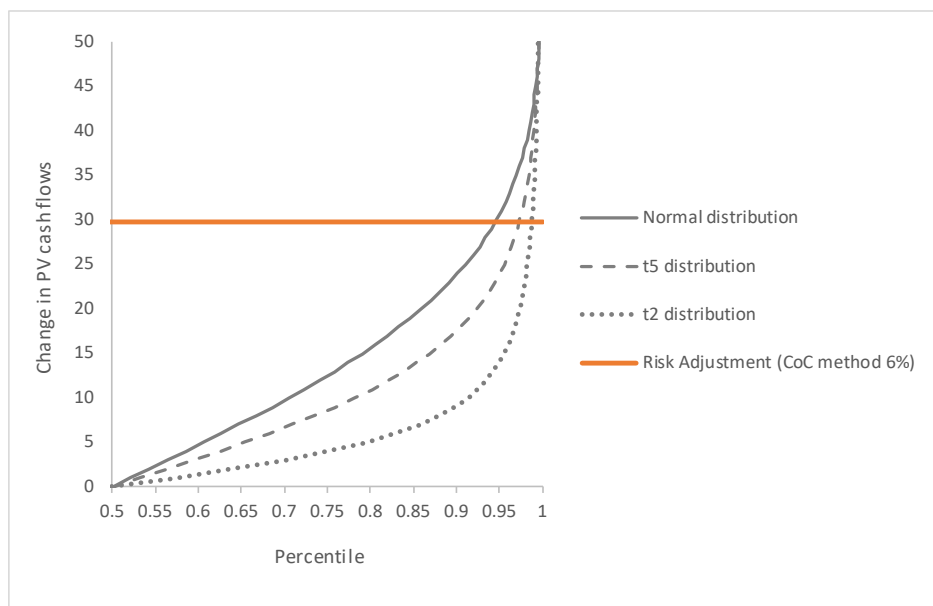
Figure 3 – Equivalent confidence level assuming different parametric distributions for change in PVCFs

Assumed distribution for PVCFs	Risk adjustment equivalent confidence level
Normal	94.5%
Students' T (5 degrees of freedom)	97.3%
Students' T (2 degrees of freedom)	98.7%

In this example, the equivalent confidence level varies between 94.5% and 98.7% depending on the assumed distribution, even though these have been calibrated to the same reference percentiles (median and 99.5th percentile). Furthermore, other choices are available, in particular:

» A different assumed distribution. Our example shows the normal and Students' T distributions but other distributions might be deemed more appropriate.

» A different reference percentile. This might naturally be the case where an internal economic capital basis is used instead of Solvency II that has been calibrated to a different percentile.

4. Method 2 – Assumed distribution for non-financial risk

Under this method, the distribution of the change in PVCFs is not assumed but generated using a model for the underlying non-financial risk factors. This method requires generating several thousand scenarios and recalculating the PVCFs under each one and so is better suited to companies that have scenario-based internal models and/or highly efficient cash flow models. Models that use techniques such as proxy modeling might also be a suitable alternative. However, even in these cases, the resource required might not be available within the required timelines.

For our case study, we have generated 100,000 scenarios assuming the different marginal distributions for each of the underlying non-financial risk factors (in this case mortality, lapse, and expense shocks). In all cases, 99.5th percentiles of the distributions are chosen to equal the corresponding Solvency II standard formula assumptions and a Gaussian copula dependency is assumed.

Figure 4 shows the resulting distributions for the PVCFs and translation of the risk adjustment (assuming 6% cost of capital), while Figure 5 shows the resulting equivalent confidence levels.

Figure 4 – Mapping of risk adjustment to equivalent confidence level (normal, t5, and t2 distributions for risk factors)

Figure 5 – Equivalent confidence level assuming different distributions for underlying risk factors

Assumed risk factor distribution	Risk adjustment equivalent confidence level
Normal	97.3%
Students' T (5 degrees of freedom)	98.6%
Students' T (2 degrees of freedom)	99.0%

This method gives a range of equivalent confidence levels depending on the assumed distribution of the underlying risk factors. Other choices are available; in this case, for the assumed copula and the marginal distributions for the risk factors.

5. Conclusions

One factor to consider when choosing a risk adjustment methodology is the requirement to disclose the equivalent confidence level. Entities without existing capital-based reporting regimes might prefer to use the VaR method directly to avoid subsequent calculations to translate the result. Entities wishing to use elements of their existing capital reporting process can use a VaR method or some other method. Where they use a method other than VaR, a translation methodology is also required.

The decision for the translation methodology depends on many factors, including:

» Accuracy, complexity, and ease of communication. Some of the methodologies described in this paper are challenging to implement and difficult to explain. The complexity and accuracy of the IFRS 17 risk adjustment calculation must be considered as it would be inappropriate for the translation methodology to be more complex than the underlying IFRS 17 risk adjustment calculation methodology.

» Availability of data, models, and modeling resources. The methodologies described in this paper rely on outputs from and/or models used for other reporting processes. These might or might not be available within the IFRS 17 reporting timeline.

» Stability of results. The purpose of equivalent confidence level is to facilitate comparisons, both over time and between different entities, so the translation methodology itself should not be volatile and should not change frequently. For example, a methodology that relies on output or models that are not available at every reporting cycle would not be appropriate.

This paper shows that after calculating a single value for the IFRS 17 risk adjustment, several different equivalent percentiles can be derived depending on the translation methodology used. In our examples alone, the equivalent percentile could be anything between 94.5% and 99.0%. Choosing an appropriate methodology for the translation can have as much of an impact as choosing the methodology for the IFRS 17 risk adjustment calculation itself.

6. References

IASB, May 2017, IFRS 17 Insurance contracts
https://www.ifrs.org/issued-standards/list-of-standards/ifrs-17-insurance-contracts/

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