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IFRS 17 Series

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Aggregation and diversification of the IFRS 17 Risk Adjustment

Executive Summary

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. Whilst the risk adjustment must satisfy certain conditions, the method for its calculation is not prescribed and is the choice of the insurance company. As such, there are many potential methods of calculation.

This paper forms part of series of high-level papers designed to provide an introduction to different features of the risk adjustment that should be considered in advance of implementation. This paper does not attempt to address all of the challenges in choosing and implementing a calculation methodology, but focuses on the specific issues around calculating the IFRS 17 risk adjustment at contract group level, as required by the standard. Broadly, there are two approaches:

» Calculate the IFRS 17 risk adjustment at contract group level directly, or

» Calculate the IFRS 17 risk adjustment at some higher aggregate level and allocate this amount to specific contract groups.

Each approach generates different types of issues; around the appropriate allowance for diversification across groups and the choice of allocation method.

The paper opens with a short discussion around the types of diversification that exist and what IFRS 17 requires. In the next section, our focus is on materiality. The following two sections discuss bottom-up approaches with aggregation considerations and top-down approaches with allocation of diversification. The final section summarises the conclusions.

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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.

Disclosure of the methodology is also required including the equivalent confidence level [3] of the calculated IFRS 17 risk adjustment.

As the present value of future cash flows is required at contract group level under IFRS 17, so too is the risk adjustment along with the contractual service margin. The criteria used to set the minimum aggregation level for contract groups are[4]:

- Portfolio level – contact groups should contain contracts within a product line with similar risks that are managed together.
- Cohort – contract groups should contain contracts that are issued no more than one year apart.
- Profitability level – contract groups should distinguish between contracts that are:
  - Onerous at initial recognition, or
  - At initial recognition have no significant possibility of becoming onerous, or
  - Remaining contracts (i.e. neither of the above).

Most insurers have a substantial number of contract groups so will need a clearly defined approach. The risk adjustment will impact the pricing of a contract so will need to be able to be calculated, or at least approximated, to help pricing decisions. In addition it will need to be calculated early in the reporting process, alongside the present value of future cash flows. Calculating the IFRS 17 risk adjustment at this level of granularity may be broadly split into two approaches:

- Calculate the IFRS 17 risk adjustment at contract group level directly, referred to as 'bottom-up' in this paper, or
- Calculate the IFRS 17 risk adjustment at some higher aggregate level and allocate this amount to specific contract groups, referred to as 'top-down' in this paper.

These methods both pose some challenges to the insurance company that are described and discussed further in subsequent sections of this paper. One of these challenges is diversification.

2. Diversification

With either the top-down or bottom-up approach, a key issue is that of diversification. It is likely that the appropriate risk adjustment for a collection of contract groups is smaller than the sum of the risk adjustments for each contract group, reflecting diversification of risk between different contract groups (for example longevity and mortality risks for annuities and term assurance contracts respectively). The insurance company will need to decide how to account for this diversification when considering the risk adjustment. Specifically can the IFRS 17 risk adjustment allow for diversification between contract groups? And if it does so allow, at what level of aggregation should the diversification be included?

2.1. Diversification in the IFRS 17 risk adjustment

IFRS 17 permits diversification in the risk adjustment; paragraph B88 of IFRS 17 says:

"*Because the risk adjustment for non-financial risk reflects the compensation the entity would require for bearing the non-financial risk arising from the uncertain amount and timing of cash flows, the risk adjustment for non-financial risk also reflects:*

a. *The degree of diversification benefit the entity includes when determining the compensation it requires for bearing the risk*
b. *Both favourable and unfavourable outcomes, in a way that reflects the entity's degree of risk aversion.*"

Therefore, in addition to determining the appropriate confidence level for the risk adjustment, another key task for the insurance company is to identify the type of diversification that is reflected in the insurance company's risk appetite.

2.2. Types of diversification

Diversification can occur because of the interaction:

- Between risks, and
- Between collections of contracts, for example between contracts, contract groups, portfolios, entities and so on

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 Paragraph 119 requires that an entity that uses a technique other than VaR discloses the technique used and the confidence level corresponding to the results of that technique.
4 Contract groups are discussed in more detail in the Moody's Analytics paper "IFRS 17 and the level of aggregation" Neri, M. (2018)

The IFRS 17 contract grouping requirements (outlined in the introduction) mandate that contracts within a contract group have similar risks and are managed together. Therefore it may be reasonable that both the diversification between risks and diversification between contracts in a contract group is included. This diversification is likely to be small as the contracts are exposed to similar risks.

At higher levels of aggregation the treatment is not obvious, as reasoned arguments could be made either way. For example, due to the other IFRS 17 contract grouping requirements of profitability and cohort year, a portfolio (in this case, a group of contract groups) may have similar risks and be managed together. Therefore diversification between risks and contracts is again reasonable. Similarly, non-financial risks may be managed across several portfolios and so it may be judged reasonable to take credit for the diversification between the portfolios in the entity. Alternatively, as it is possible to sell or reinsure a portfolio of contracts, it may be judged unreasonable to take credit for diversification between portfolios in the entity because in the event of a sale, the diversification allocated to the portfolio would be not be part of the sale, that is, the diversification benefits would not be realized by the purchaser. This exit value principle is used in some regulatory regimes, such as Solvency II, but is not a requirement under IFRS 17. At even higher levels of aggregation such as entities within a group structure, there has been discussion on whether the compensation required for bearing the non-financial risk, is that required by the entity or that required by the group as a whole[5]. In this case diversification is one factor that could contribute to differences.

The Transition Resource Group ('TRG') proposed that the risk adjustment for a group be the sum of the risk adjustment of the subsidiary entities as noted in their May 2018[6] meeting "… *risk diversification that occurs at a level higher than the issuing entity level must not be considered when determining the risk adjustment for non-financial risk if it is not considered when determining the compensation the issuing entity would require for bearing non-financial risk related to insurance contracts it issues …" and "…This means that for a group of insurance contracts the risk adjustment for non-financial risk at the consolidated group level is the same as the risk adjustment for non-financial risk at the individual issuing entity level.*

15. The analysis in paragraph 14 of this paper precludes different measurement of the risk adjustment for non-financial risk for a group of insurance contracts at different reporting levels…"

The International Accounting Standards Board ('IASB') discussed the proposal in their December 2018[7] meeting, and agreed to leave the wording in IFRS 17 unchanged.

Whatever approach is taken for the other levels of aggregation, these decisions should be made in advance and must be consistent with the relevant risk management policies, risk appetite and risk metrics utilized by the insurance company, in order to "*reflect the entity's degree of risk aversion*".

2.3. Materiality of diversification

Before any significant time and resource is dedicated to diversification methodologies, the insurer should consider whether the diversification is material. If it is not then the insurer could decide to use a very approximate method or simply exclude it altogether. In determining whether the diversification is material, the following items should be considered:

- Magnitude – if the diversification between contract groups is material in size, then its treatment should be considered. Materiality should be considered in the context of profit emergence and to the risk adjustment in isolation.
- Sensitivity – the risk adjustment will be recalculated at future time periods where there are changes to both actual experience and future assumptions. Therefore a risk adjustment that may be insignificant in one time period may become significant in the future.
- Uses – if the risk adjustment will be used for other purposes then the diversification may be significant. For example, if the aggregated risk adjustment is used as a key metric to manage risk, it is important that the impact of diversification is appropriately considered in the decision making process to avoid unexpected impacts when actions are taken.

3. Bottom-up contract group approaches

In this paper, we define a bottom-up approach as an approach where the risk adjustment calculations are carried out at IFRS 17 contract group level directly. This approach is likely to arise when the calculations for the risk adjustment are already executed, or

5 IASB meeting October 2018, paragraphs 68 to 78

6 TRG for IFRS 17 Insurance Contracts https://www.ifrs.org/-/media/feature/meetings/2018/may/trg-for-ifrs-17/trg-for-ifrs17-meeting-summary.pdf?la=en

7 IASB December 2018 https://www.ifrs.org/-/media/feature/meetings/2018/december/iasb/iasb-meeting-agenda-december-2018.pdf

can be readily executed, as part of another IFRS 17 process, for example the present value of future cash flows. This approach has the advantage of outputting the risk adjustment at contract group level. However there are some additional considerations when aggregating the risk adjustment across contract groups. In particular, the diversification between contract groups may not be included.

3.1. Stress test and correlation – Value at Risk ('VaR')

Under IFRS 17, the present value of future cash flows is calculated for each contract group. This would be the best estimate part of a VaR calculation. Using a stress test and correlation approach, the calculation would be repeated with different assumptions, the stress tests. Then the difference between these runs is aggregated using a correlation matrix. Considerations for this approach include:

- Appropriateness – Stress tests and correlations should be consistent with the chosen confidence interval. Using existing stress tests and correlations could minimize the additional calibration work but only if the confidence level is suitable for the risk adjustment and the stress tests are suitable for the IFRS 17 cash flows.
- Scalability and timing – Systems are required to perform the additional valuations for each contract group. These calculations are not fundamentally different to the present value of future cash flows calculation. However efficient use of resource and capacity is essential to carry these calculations out within the required timescales for the reporting process.
- Diversification – This method allows for the diversification between risks but not for the diversification between contract groups. This topic is discussed further in the following section.

An example of this approach may be for an insurance company that already uses the Standard Formula for Solvency II Reporting. An initial proposal for the IFRS 17 risk adjustment may be to assume a 99.5th percentile confidence level and use the Standard Formula stress tests for each of the non-financial risks that directly impact cash flows, (i.e. excluding general operational risk) and aggregate them using the relevant subset of the Standard Formula correlation matrix. This approach assumes that the confidence level, stress tests, and correlations are available in advance and are appropriate for this company and this purpose. However, that is unlikely to be the case for a 99.5th percentile capital measure[8]. Justification of the appropriateness of any approach is required in the disclosures.

3.2. Aggregation

As discussed in the previous section, the first thing to assess is whether this diversification is material. With a stress test and correlation approach as in our example, the diversification between contract groups may be small for contract groups of the same product type, but larger when aggregating across different product types.

In the bottom-up approach, there is no allowance for diversification between the contract groups. This means that the risk adjustment for any collection of contract groups (such as a portfolio, an entity, or an insurance group) is the sum of the risk adjustment for each contract group. In this case reconciliations across contract groups at different levels of aggregation are simple. However as there is no allowance for diversification, the risk adjustment at (a specific) aggregate level is potentially overestimated.

An alternative approach may be to apply the bottom-up calculation at each level of aggregation (that is for each collection of contract groups) to identify the diversification benefit at that level, and then either:

- Note this diversification benefit at each level of aggregation for internal reconciliation purposes, or
- Allocate it down to each contract group using a top-down approach (discussed in the following section).

While this approach has the advantage of including the diversification benefit, it involves many more calculations and is much harder to reconcile. This approach may also require additional disclosures, depending on the level of aggregation used in the published report and accounts.

4. Top-down aggregate approaches

A top-down approach is used when the risk adjustment calculation is performed in aggregate across different IFRS 17 contract groups. This methodology is likely to be the result of an insurance company using an existing metric in order to derive the IFRS 17 risk adjustment. The use of existing systems and processes could substantially reduce the additional resource required to derive the IFRS 17 risk adjustment from heavy model

8 Appropriateness of the Solvency II measures for the IFRS 17 risk adjustment is discussed further in the Moody's Analytics paper "Calculating the IFRS 17 risk adjustment" Hannibal, C. (2018)

runs through to analysis and review. It also forces consistency with the existing metric.

This approach assumes that the existing metric is well documented, widely understood and suitably governed. It also assumes the metric either is appropriate for the IFRS 17 risk adjustment or can be modified to be appropriate for the IFRS 17 risk adjustment. Any modifications will need to be sufficiently accurate, thoroughly explained and able to be efficiently produced in each reporting period. These are significant assumptions. For many insurers, IFRS reporting is first in the reporting cycle, with other bases reported later, so these other metrics may not be available in the necessary timeframe.

Where existing metrics are available, it is likely that the metric covers a collection of IFRS 17 contract groups. For example all business in a particular entity or fund, or business of the same product type. It will implicitly include an allowance for the diversification between the contracts. So to identify the IFRS 17 risk adjustment for each contract group an allocation method is required.

4.1. Scalar allocation

A scalar or pro-rata allocation is one of the simplest methods of allocation to carry out and to explain. It uses a reference measure, which acts as a proxy for the relative size of the non-financial risks at the contract group level. Under the scalar allocation, the aggregate risk adjustment is allocated to the contract groups in proportion to the reference measure. Therefore the key decision is an appropriate reference measure for the allocation. As a starting point, the reference measure could be anything that is available at the contract group level. For example guaranteed benefits or present value of future cash flows. However there are other important considerations:

- Availability – a reference measure that is already output will avoid the need for further data and/or calculations.
- Relevance – the reference measure should in some way reflect cash flow uncertainty so that more of the risk adjustment is allocated to the contract groups with the greater cash flow uncertainty.
- Appropriateness – cash flow uncertainty changes over time so the reference measure should be relevant at inception and both relevant and accessible at future time periods. It should allow the risk adjustment to unwind in relation to the remaining uncertainty around the remaining cash flows associated with the insurance contract. This point might tend toward a measure that is related to or is the same as the coverage unit.
- Comparability – the reference measure should be meaningful for all the contract groups. This is relevant when allocating the risk adjustment across contract groups of different product types, where a reference measure may be pertinent for one product but spurious for a different product.
- Communication – a reference measure that is simple to explain and justify will ease the additional communication burden internally and externally via the disclosures.

Let us consider this approach with an example.

4.2. Allocating the risk adjustment to contract groups

Consider a company with a portfolio of regular premium term assurance policies. The policies are split into three contract groups as they have different levels of profitability due to their different levels of risk and different best estimate assumptions:

- CG1 – Profitable i.e. at initial recognition has no significant possibility of becoming onerous
- CG2 – Onerous
- CG3 – Remaining contracts

Assume that the risk adjustment for the portfolio (all three contract groups) has been calculated so the insurer now has to assign this to the different contract groups.

For each contract group, the present value of future cash flows is required for IFRS 17. It is therefore likely that components of this calculation are readily available and could be used as reference measures. In addition, as the policies are term assurances the likely key risks driving the IFRS 17 risk adjustment are lapses, mortality and expenses. Therefore reference measures could include:

- Present value premiums – reflecting the in-force business so representing lapses and mortality
- Present value claims – reflecting death claims (which can only occur if the policy is in force)
- Present value cash flows – reflecting death claims, premiums (which can only occur if the policy is in force), and expenses
- Present value cash flows absolute – as preceding but using the absolute values for each contract group

Figure 1 – Scalar Allocation

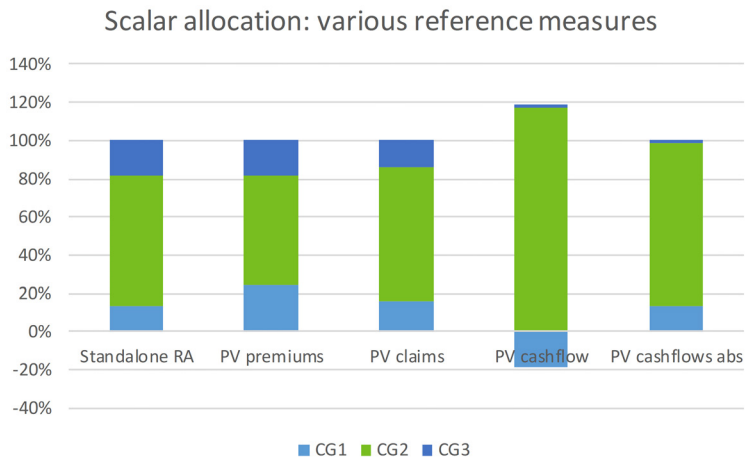

Figure 1 – Scalar Allocation shows how the allocation would look using different reference measures and a scalar allocation. As this is a case study we have calculated the standalone risk adjustment using a cost of capital approach and have shown this for each contract group but in practice this may not be known.

This example highlights some important points:

- Where the portfolio includes contract groups with different levels of profitability, reference measures using cash flows can lead to spurious results. In our example, there is a negative risk adjustment which is not permitted. This occurred because the present value of future cash flows for the profitable contract group has the opposite sign than for the onerous contract group. An alternative in this case could be to use absolute values as shown in the figure.
- The reference measure does not always maintain the relative sizes of the standalone risk adjustment. This is due to the allocation of the diversification benefit which is a significant process benefit, however the relative sizes may, or may not be appropriate.
- The allocation differs depending on the selected reference measure. These differences could be significant, so any choice of reference measure should be maintained in future periods to prevent spurious movements. In addition, any assumption changes in the reference measure will also impact the allocation so should also be considered.
- These measures incorporate the discount rate. It is important that this is consistent with the discount rate used in the top-down calculation of the IFRS 17 risk adjustment for the portfolio. This may be difficult, for example where different discount rates are used for different contract groups.

4.3. Marginal

Under the marginal approach, the risk adjustment is allocated to each contract group in the same ratio as the contract group's marginal impact. The marginal impact is the difference between the reference measure for the total portfolio and the reference measure for the total portfolio without each contract group, for any given reference measure. A marginal approach to allocation may be cumbersome for the entire business for each reporting period. Nevertheless it may be useful for interim calculations, for example after new business has been added.

Assume the risk adjustment is known at contract group level at a prior period, which could have been derived from a top-down or bottom-up approach. A reference measure is still required under this method but as it is not required for every contract group, it widens the available options. In this case measures that are more explicitly risk-focused, for example the Solvency II risk margin, may be available for the portfolio and the new business as it was required for the analysis of movement in the risk margin to highlight the contribution due to new business. This marginal impact could be used as the reference measure to allocate the new business risk adjustment. This would only be appropriate in a few cases, for example intermediate and approximate reporting of new business. Otherwise there would be inconsistency with the reference measure used for the other reporting.

As an example, consider the portfolio of term assurances shown in Figure 2 marginal allocation, where the risk adjustment has already been calculated at contract group level. Assume any new business during the period of analysis is written into a new contract group, contract group p. An analysis of change is carried out on the Solvency II risk margin. The Solvency II risk margin is calculated at the end of the interim period (using closing assumptions) on both the total opening business and the total closing business. Assuming any other changes are separately identified, then the marginal impact of the new business has also been identified. This can then be used as the reference measure for the risk adjustment.

Figure 2 – Marginal Allocation

Measure	All existing term assurance contracts in force at time T	New business Contract group p
Solvency II Risk Margin	165	9
IFRS 17 Risk Adjustment	145	

For the example above the risk adjustment for contract group p would be 145*9/165 = 7.9

As a reference measure is still required, similar items should be considered as under the proportional approach in the preceding section. More points to note are:

- The approach lends itself to a few additional or expanding contract groups. It requires a significant amount of calculation to identify the marginal impact for every contract group.
- Depending on the reference measure and the approach used for the rest of the contract groups, a full allocation is unlikely so consideration must be given to the allocation of the remaining surplus/deficit.
- The marginal approach may already be used elsewhere within the company, so explaining the methodology may not be difficult and existing tools could be utilised.

There are several approaches that can be used for a top-down risk adjustment allocation; only two have been described here. Many approaches are parallel to the methodology allowed for capital attribution[9]. However it should be noted that for capital attribution the stand alone capital is available at the aggregate level and the granular level, and the challenge is to attribute the aggregate diversified capital to the granular level. For the risk adjustment as described above, the standalone risk adjustment may not be known at contract group level.

5. Conclusions

The choice of methodology for the IFRS 17 risk adjustment is a key decision for insurers to take in the coming months. Different methods, assumptions, and confidence levels should be considered under different future scenarios to fully investigate the implications of this decision.

Alongside the methodology choice are some of the practical issues of implementing any methodology. One such issue, highlighted in this paper, is how to implement this methodology at the level of granularity required for the reporting standard. Both top-down and bottom-up approaches have their own merits and issues. Some have been highlighted in this paper including aggregation, diversification, allocation, and choice of reference measure.

The final decisions should not be restricted to purely theoretical considerations. Whether an insurer uses an entirely new process or uses its existing methodology and systems as far as possible, the practical considerations including more inputs or data requirements, links with existing processes such as pricing, risk management and other reporting bases, interfaces with existing reporting systems, the impact on existing reporting timelines and communication of results should not be underestimated.

9 Capital attribution methods are discussed more in the Moody's Analytics paper "Capital Attribution Methods" Morrison, S. Tadrowski, L. (2014)

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