Project **Insurance Contracts**

Topic **Risk adjustment techniques**

Introduction

1. In their May 18 joint meeting, the boards discussed margins. The boards decided tentatively that if the measurement model for insurance contracts were to include a separate risk adjustment, the range of available techniques for measuring that risk adjustment should be limited. This paper discusses which techniques should be available for measuring a risk adjustment.

2. Specifically, it discusses whether a Cost of Capital technique would meet the proposed objective for the risk adjustment.

Staff recommendation

3. In this paper the staff recommends that, if the measurement model for insurance contracts includes a separate risk adjustment, the range of permitted techniques should be limited by specifying the available techniques for estimating risk adjustments as described in the appendix to this paper.

Structure of the paper

4. This paper is divided into the following sections:

   (a) Background (paragraphs 5 –11).

   (b) How different are the techniques (paragraphs 12 –15)?

   (c) A Cost of Capital technique for liability measurement (paragraphs 16 – 22).

   (d) Staff analysis and recommendations (paragraphs 23 –25).

Background

5. In their May 18 joint meeting, the boards discussed the approach to margins for the proposed insurance model. The IASB tentatively selected an approach with a separate risk adjustment and a residual margin. The FASB decided tentatively to use a single composite margin.

6. However, both boards decided that if the measurement model for insurance contracts were to include a separate risk adjustment, the range of available techniques for measuring that risk adjustment should be limited. The boards noted that a wide range of risk adjustment techniques exist and concluded that to ensure a degree of comparability the number of available methods should be narrowed down. Furthermore, some techniques may not meet the proposed objective for the risk adjustment.

Objective of the risk adjustment

7. In their May meeting, the boards decided tentatively that the objective of the risk adjustment for insurance contracts is:

   The maximum amount an insurer would rationally pay to be relieved of the risk taking into consideration that the amount of benefits and claim costs actually paid may exceed the amount expected to be paid.

8. The accompanying guidance will emphasise that the purpose of the risk adjustment is to convey useful information in the measurement about the level of uncertainty inherent in the cash flows arising from the insurance liability, with that information being developed from the perspective of the insurer (rather than from the perspective of a market participant).

Which techniques were discussed in May?

9. In May, we proposed a list of three techniques that would be available for measuring the risk adjustment under the proposed objective, namely:

   (a) Confidence level (or Value at Risk)

   (b) Conditional Tail Expectation (or Tail Value at Risk)

(c) Cost of Capital

10. Staff suggested that in principle all of these techniques should not be available for use in all circumstances, but their application should depend on the circumstances. This approach used a confidence level technique as starting point and, in some circumstances, would require the insurer to use Conditional Tail Expectation technique (CTE) or a Cost of Capital (CoC) technique, supplemented with disclosure of the confidence level corresponding to the risk adjustment. The appendix to this paper includes a full description of this approach.

11. Generally, board members seemed to perceive both the confidence level technique and the CTE technique as meeting the objective of the risk adjustment (although some board members suggested limiting the range of available techniques to one). However, several board members questioned whether a CoC technique would meet the objective.

How different are the techniques?

12. Paragraph 11 raises an issue: how different are the techniques? We describe the basic mechanics of these methods below, at a very high level:

    (a) A confidence level technique starts by deriving the distribution for the expected claims. The insurer then determines a confidence level that, when applied to the distribution, results in a Value at Risk (VaR) for the risk adjustment, for example the VaR at 70%. The risk adjustment for the liability measurement is the difference between this VaR number and the best estimate of the claims.

    (b) The CoC approach conceptually also starts by deriving the distribution for the expected claims. But instead of determining a VaR for the risk adjustment, it determines a VaR for the (economic) capital used in the method, for example VaR at 99.5%. CoC uses this VaR for determining the risk adjustment by applying a factor, in the form of an appropriate annual capital rate, to the difference between this VaR and the best

estimate (expected value) of the liabilities (the economic capital) over the lifetime of the contract. Thus, VaR for this capital purpose minus the best estimate of liabilities, multiplied by the capital rate gives the risk adjustment. The difference between VaR and the best estimate of the liabilities itself does gives not give a number for the risk adjustment because it reflects risk assessment at **capital** level, it needs to be multiplied by a factor.

(c) Like the other two methods, CTE starts by deriving the distribution for the expected claims. The aim of CTE is to consider the range of outcomes in excess of a specified confidence level, in other words a 'tail' VaR. So the next step is to determine the confidence level that gives the 'tail'. For example, the CTE over the 70% confidence level considers all claims that fall into in the highest 30% of the claim distribution. The risk adjustment is the expected value of those highest 30% of the claim less the mean (i.e. best estimate) of claims.

13. This means that, although the three technique are based on somewhat different philosophies, they share significant similarities:

(a) all use the same estimated distribution for assessing the level of uncertainty.

(b) all use a Value at Risk in some way to quantify this uncertainty, though each method determines different 'types' of VaR and uses them in a different way.

14. We now demonstrate and compare the basic mechanics for a confidence level technique and a CoC technique through a highly-simplified example.

> We have a portfolio of non-life contracts with a life of two years. The expected (mean) claims payments are CU450 for each year.
> For convenience, we assume that the losses have a normal distribution and that the standard deviation for the claims in each year is CU50. This means that the expected value of total claims over the life of the contract is CU900 and we assume the standard deviation over the life of the contracts is CU100 (the sum of the standard deviations for each year).

[This is a simplifying assumption. In a more realistic example, the standard deviation would be somewhere between CU70 [if the losses in the second year are totally independent of the losses in the first year] and CU100 [if the losses in the first year always equal the losses in the second]]. Because the normal distribution is symmetrical, the expected value is at the 50th percentile.

We ignore time value of money.

We first consider the outcome under a confidence level technique and then discuss the outcome under a Cost of Capital technique.

Confidence level technique

We assume the insurer sets the confidence level at the 70th percentile. For a normal distribution, this results in the following estimates of the VaR and expected claims:

	Inception	Year1	Year2
Estimated claims @70% (VaR)	952	476	-
Expected value@50%	900	450	-
Risk adjustment	52	26	-

The risk adjustment is the difference between VaR and the expected value of the claims at each reporting date, so CU52 at inception and CU26 at the end of year 1,

The estimated claims at the 70th percentile are the product of applying a standard statistical formula available in excel spread sheets. Staff can provide these calculations, as well as other statistical calculations in this example, to Board members on request.

Cost of Capital technique

The fact pattern is the same as in the example for the confidence level technique.

A CoC technique determines the economic (risk) capital needed to provide a high degree of confidence that the insurer can fulfil its obligations arising from existing insurance contracts, as well as the run-off of that capital over the life of the contract. This is usually determined by selecting a specific confidence interval (VaR) for that capital. We assume for this example that the insurer sets the confidence level for the capital at the 99.5th percentile. For a normal distribution, this confidence level results in the following estimates of the economic capital over the life of the contract:

	Inception	Year 1	Year 2
Estimated claims@99.5%(VaR)	1,158	579	-
Expected value@50%	900	450	-
Economic capital	258	129	-

This means that, at inception, the total assets the insurer needs to hold are CU1,158, which is an additional amount of assets of CU258 over the expected claims. At the end of year 1, the insurer needs an additional CU129.

The risk adjustment is derived by applying a factor, a capital rate, to those additional assets (the economic capital) for each period. The **sum** of those capital charges is the risk adjustment. The amount we are describing here as the capital rate is the reward investors who provide the economic capital would require for exposure to the risk in the liability, but not including asset risk, mismatch risk or those risks that are already captured elsewhere in the measurement of the liability by using financial market inputs. We assume that the insurer determines a capital rate of 8% (see paragraph 21(b) for a further discussion of the capital rate). Applying this factor to the capital level results in the following risk adjustment:

	Capital	Capital@8%
Year 1	258	21
Year 2	129	10
Risk adjustment at inception		31

[The Cost of Capital technique would discount those amounts. But for simplicity we did not include this feature because our example ignores time value of money].

The above table shows that at inception the risk adjustment is CU31, being the sum of the individual outcomes of capital, times the rate over the total life of the contract (CU21 plus CU10). At the end of year 1, the remaining risk adjustment is CU10 and at the end of year 2 it has been fully released. [Strictly speaking, the economic capital should be slightly smaller than shown above, because of the margins included in the measurement. For simplicity, we have ignored this small correction].

To permit comparisons with the results of other approaches, the risk adjustments can be re-expressed as the confidence level they correspond to. At inception, the risk adjustment of CU31 corresponds to the 62nd percentile. The risk adjustment at the end of year 1 of CU10 corresponds to the 58th percentile.

15. We comment as follows on differences in outcome between the two models for the example:

    (a) The outcome for the amount of the risk adjustment is lower for the CoC technique than under confidence interval. This may be the result of the fact pattern. For example, the type of distribution is an important factor. The example applies a normal distribution. For other types of distribution, for example highly skewed (or heavy-tailed) distributions,

the CoC technique may result in the higher outcome, which is a result of the fact that confidence level techniques do not reflect the shape of the distribution (and insurance liabilities often have uneven distributions). For example, if the distribution is highly skewed, the mean (expected value) may be higher than the 75% confidence level. In that case, a risk adjustment set at the 75% confidence level would be negative (or perhaps zero), whereas a cost of capital approach would generate a positive risk adjustment.

(b) Under the confidence level technique, the risk adjustment is in this simplified example released evenly as the amount of risk declines over the life of the contract, which in this example gives a roughly straight-line pattern. But for the cost of capital approach the release in year 1 (CU21 of the CU31 calculated at inception) is higher than in year 2 (CU10). This is because the CoC method considers both the shape of the risk distribution (through the determination of the economic capital) and the pattern of its decline over time (by applying the annual capital rate).

A Cost of Capital technique for liability measurement

16. The proposed insurance contracts model reflects the fulfilment of the insurance contracts by the insurer over time. As a consequence, the risk adjustment should consider the effects of uncertainty about the amount and timing of future cash flows that will arise as the insurer fulfils the contract (ie the fact that benefits and claim costs actually paid may exceed the expected payments).

17. Why do some struggle to see CoC fitting into that objective?

    (a) Some have concerns that the capital used in this model would be influenced by circumstances that are not directly relevant for general purpose financial reporting, such as regulatory solvency requirements, which may not be directly related to the risk and uncertainties of the contract.

(b) Some have concerns that the cost of capital rate could include factors that are not relevant to translating uncertainty in the insurance liability into a number for financial reporting. If for example a weighted average cost of capital is used as the capital rate, that rate might include elements that are irrelevant to the liability measurement (such as market risks or future business).

(c) Some argue that the 'cost of capital' does not actually represent cost in the sense of the IASB *Framework* or FASB *Concepts* and it would include in the measurement of assets and liabilities the cost of holding equity; we do not do this for other types of business that deploy capital.

18. The staff believe some of these concerns arise because the label CoC technique is confusing for our purpose. The way it would be applied as a risk adjustment technique for the insurance contracts model is not intended to bring in solvency aspects or any capital elements that go beyond the liability. Its purpose is simply to assess effects of uncertainty about the amount and timing of future cash flows from insurance contracts and to translate that into a number for financial reporting, in a way that has similarities with confidence level and CTE methods (see paragraph 13).

19. A way to think of the application of CoC under a fulfilment notion is to consider the role of economic capital in fulfilling the contracts. In order to fulfil the contracts, the insurer needs to hold and maintain capital; without (sufficient) capital, the insurer is unlikely to be able to work out its contracts. This is true not only from a regulatory perspective, but also from a policyholder perspective. If the insurer did not have sufficient capital, policyholders would walk away from the insurer. A CoC method uses the capital (determined using an approach similar to value at risk) and then applies a capital rate that reflects the risks and uncertainties in the liability to determine the risk adjustment.

20. At their May meeting, the boards discussed the characteristics that a risk adjustment needs, namely:

(a) The less that is known about the current estimate and its trend, the higher the risk adjustment should be.

(b) Risks with low frequency and high severity will have higher risk adjustments than risks with high frequency and low severity.

(c) For similar risks, long duration contracts will have higher risk adjustments than those of shorter duration.

(d) Risks with a wide probability distribution will have higher risk adjustments than those risks with a narrower distribution.

21. In the staff's view, the CoC technique conceptually meets all these characteristics at least well as the confidence level and CTE approaches. But in order to actually meet the characteristics, as well as the overall objective for the risk adjustment, the CoC technique needs to be applied in an appropriate way:

(a) the capital should be an economic capital supporting the risks in the liability determined by the distribution at a portfolio level, set at a level high enough to, for example, identify how much uncertainty exists in the tail of the distribution.

(b) the capital rate should reflect only those elements that are relevant to the liability by reflecting the reward its investors would require for exposure to the risk in the liability, but not including asset risk, mismatch risk or those risks that are already captured elsewhere in the model by using financial market inputs. For example, suppose investors require a return of 18% for investing in an insurer, but 2% of that relates to asset risks born by the insurer, 1% relates to avoidable asset/liability mismatch risk taken by the insurer and 3% relates to uncertainty about future business (including operational risk related to future business). Assuming a risk free rate of 4%, the capital rate used in the cost of capital approach would be 8%. The risk free rate is also excluded because that return is not related to the insurance liability; it is a return that someone would generate anyway.

22. Some may argue that the 'additional step' under the CoC approach of applying a capital rate to a capital level results in subjectivity and complexity. But in fact there are several factors that may result in complexities, eg the derivation of the risks and uncertainties; all risk adjustment techniques are subject to

complexities. And in terms of the ultimate outcome, a technique that applies a factor to a confidence level may not necessarily be more subjective than a method that determines the risk adjustment from a confidence level directly.

Staff analysis and recommendations

23. Staff concludes that, if applied appropriately (but this is true for all techniques), a CoC technique would meet the characteristics included in the draft application guidance for risk adjustments. And if the boards permit a confidence level approach for estimating a risk adjustment, it seems difficult to find a reason to dismiss a technique that estimates a risk adjustment by applying a relevant factor to a confidence level result.

24. But do we actually need it? Some may argue that for cases where confidence level would not be good enough, the insurer would already have a CTE approach available. However, CoC may be able to deal better with some types of liabilities, for example long-duration liabilities because it combines time and shape of the distribution. And permitting its use it would in our view not significantly undermine comparability because the outcome can be expressed and disclosed at a corresponding confidence level. Further, it is one of the methods actually used in pricing and valuation by insurers in some parts of the world, as well for other internal management purposes and supplementary external reporting.

25. Staff therefore recommend that, if the measurement were to include a separate risk adjustment, the application of the techniques should be limited as proposed in the appendix to this paper. This approach under certain circumstances also involves the application of a CoC technique.

Question for the boards
Do the board agree with recommendation in paragraph 25 to adopt the approach described in the appendix to this paper? If not, which methods would you exclude from the list of applicable techniques? And are there any methods not proposed by staff that you would to like to include?

APPENDIX- PROPOSED APPROACH TO RISK ADJUSTMENTS

A1. This appendix gives the approach recommended by staff during the May joint meeting, see paragraph 17 of agenda paper 2A/FASB Memorandum 45A.

A2. This approach would specify the available risk adjustment techniques as follows:

(a) For some types of contracts, a confidence level technique (or Value at Risk) will be sufficient to meet the characteristics of the risk adjustment; for example, if the distribution is not significantly skewed or if time is not a significant factor for the risk. The advantages of the confidence level technique are its simplicity and understandability.

(b) In other cases, for example if the distribution is more skewed or if time is a significant factor for the risk, other techniques may better reflect the characteristics of a risk adjustment to such an extent that their application outweighs the simplicity of a confidence level technique. In that case, the insurer should apply either a Conditional Tail Expectation technique (or Tail Value at Risk) or a Cost of Capital technique. The insurer should use judgment in determining whether it uses the confidence level technique or one of those other two techniques to meet the characteristics of the risk adjustment. The insurer should be able to justify why the Conditional Tail Expectation or the Cost of Capital techniques is more relevant than a confidence level technique.

(c) The insurer shall disclose the confidence level at which it determined its risk adjustment. If the insurer uses a Conditional Tail Expectation approach or a Cost of Capital approach, it shall disclose the confidence level to which the risk adjustment determined under those methods corresponds (for example, that the risk adjustment of CUX determined at Conditional Tail Expectation (Y) corresponds to a confidence level of Z%). The insurer shall disclose this information in addition to specific disclosures about the Conditional Tail Expectation technique or a Cost of Capital technique. This information gives a common benchmark for disclosure that is also easy to communicate to users.

(d) For any technique, an insurer shall disclose its characteristics (eg actuarial and statistical) and management's rationale for the specific technique selected.