



Institute of Actuaries of Australia

The Cost of Capital Approach to Risk Margins

Prepared by Felix Tang

Presented to the Institute of Actuaries of Australia
16th General Insurance Seminar 9-12 November 2008
Colum, Australia

This paper has been prepared for the Institute of Actuaries of Australia's (Institute) 16th General Insurance Seminar 2008.

The Institute Council wishes it to be understood that opinions put forward herein are not necessarily those of the Institute and the Council is not responsible for those opinions.

© Copyright Felix Tang

The Institute will ensure that all reproductions of the paper acknowledge the Author/s as the author/s, and include the above copyright statement:

The Institute of Actuaries of Australia
Level 7 Challis House 4 Martin Place
Sydney NSW Australia 2000
Telephone: +61 2 9233 3466 Facsimile: +61 2 9233 3446
Email: actuaries@actuaries.asn.au Website: www.actuaries.asn.au

Table of Contents

1. Why am I reading this?	3
2. Introduction.....	4
2.1. Risk margins in Australia.....	4
2.2. Risk margins outside Australia	4
2.3. The focus of this paper.....	5
3. What is the cost of capital approach, and how is it done?	7
4. What are the advantages of using the CoC approach to set risk margins?.....	8
4.1. Consistency with “exit value” concept	8
4.2. Desirable characteristics of risk margins approaches	9
5. What are some of the practical issues around its implementation?	13
5.1. Issues with profile of reference entity	13
5.2. Issues with capital required.....	14
5.3. Issues with pattern of future capital needs	15
5.4. Issues with cost of capital rate	15
6. What are the conceptual differences between using the percentile approach and the CoC approach, and what would be the dollar impact of a change?	17
6.1. Conceptual differences.....	17
6.2. Dollar impact	17
7. What are the global developments up to now? How relevant are these developments to Australia?	19
7.1. Global developments	19
7.2. Relevance to Australia	20
8. Given all these, can we answer the question “which approach should we use”?	22
8.1. Is this an important question?	22
8.2. Is this the “right” question?.....	22

1. Why am I reading this?

IFRS is quite likely to become operative in Australia by 2012 (author's estimate only). International discussions are still ongoing but it appears the "exit value" concept will become a fundamental part of valuing insurance liabilities, including risk margins. This is very different from how risk margins are currently analysed and set in Australia.

The Cost of Capital approach is believed to be one of the more viable approaches that fits in with the "exit value" concept, but there are still some practical challenges to be overcome. This paper aims to introduce the Cost of Capital approach to you.

2. Introduction

2.1. Risk margins in Australia

The accounting and prudential requirements of devising risk margins for insurance liabilities claims reserves are not new to Australian insurance companies and actuaries. The key requirements at this point in time can be summarised as follows:

	Accounting requirements on risk margins	Prudential requirements on risk margins
Relevant Standard	AASB 1023	GPS 310
Risk margins relate to...	inherent uncertainty of the central estimate	inherent uncertainty of the central estimate
Other considerations	effect of reinsurance and diversification are considered	effect of reinsurance and diversification are considered
Level of reporting detail	applied on a net basis for the entity as a whole (except for Liability Adequacy Test for which an allocation by class** is needed)	applied on a net basis and reported separately for outstanding claims liabilities and premiums liabilities by class
Probability of sufficiency ("PoS")	is not prescribed but needs to be disclosed	determined at 75% (and no less than half of overall standard deviation)

*Note** class is defined under Section 5.1.10 of AASB1023 as "portfolios of contracts that are subject to broadly similar risks and are managed together as a single portfolio."*

Since the introduction of these requirements, Australian actuaries have advanced in devising analyses useful for understanding the uncertainty of the central estimate. The risk margins determined are aimed at providing for specified levels of probability of sufficiency.

In general, the Australian and other similar frameworks to setting risk margins are commonly referred to as the "percentile approach" by the rest of the world.

2.2. Risk margins outside Australia

Requirements on risk margins differ greatly in other countries around the world, ranging from highly prescriptive to no clear requirements at all. In my view, the framework for Australia is between these two extremes.

Recently there has been much attention globally, especially in countries where an explicit risk margin has not been required until now, on the issues around the different approaches to setting risk margins.

This recent change can be attributed to an increased awareness of the need to advance in identifying, measuring and managing “risks” faced by financial institutions in general. International attempts to converge to a more consistent accounting and regulatory framework based on a common set of principles have also been prominent. In the specific context of insurance, the diverse views expressed by the stakeholders are increasingly held at an international level. The group of stakeholders represented includes standard setters and regulators, insurance companies and professional advisers. Familiar names include:

- IASB (of which AASB is a member)
- IAIS (of which APRA is a member)
- IAA (of which IAAust is a member)
- and countless others.

A brief background for each of the key stakeholders mentioned in this paper is included in Appendix A.

In much simplified terms, the common aim of these bodies appears to be the search for a unified approach to presenting insurance business information that is accurate, useful and consistent. However, the differing origins and objectives of these bodies make their preconceptions differ.

In these international discussions, especially in the context of IFRS reporting, besides the “percentile” approach familiar to Australia, the “cost of capital” approach (or CoC), based on the concept of “exit value”, has also found favour as an acceptable approach to calibrating risk margins. Some groups have expressed strong preferences for the CoC approach over the percentile approach, and it is of note that Switzerland has successfully introduced CoC as its mandated approach for some time.

The underlying issues in these two main approaches are very different. This paper aims to highlight as many of the important differences as possible.

Although the focus of this paper is the topic of risk margins, understandably there are many other issues involved under IFRS. The issues involved are not necessarily independent of each other. In my view, Australia is well placed to contribute meaningfully to these international developments.

2.3. The focus of this paper

This paper aims to answer the following questions:

- What is the cost of capital approach, and how is it done?
- What are some of the practical issues around its implementation?
- What are the advantages of using it to set risk margins?
- What are the conceptual differences between using the percentile approach and the cost of capital approach and what would be the dollar impact of a change?
- What are the global developments up to now? How relevant are these developments to Australia?

- Given all these, can we answer the question “which approach should we use”?

As may become more apparent later in this paper, I believe at the heart of the issues lies the dichotomy between the policyholders’ view of risk margins and the shareholders’ view of risk margins.

3. What is the cost of capital approach, and how is it done?

Let's look at the mechanics of the CoC approach to calculate risk margins from a simple numerical example.

For illustration purposes, some simplifying assumptions have been made. The issues around these assumptions will be discussed in more detail later in this paper.

Mechanically, the CoC risk margin is the present value of the future costs of capital required over the run-off of the liability.

The calculation steps are as follows:

Step 1 – determine current capital requirements

For simplicity, only outstanding claims liabilities are considered. Assume the central estimate is assessed at 100 units, and assume that the required capital to support this class of business is estimated to be 50 units.

Step 2 – project pattern of capital requirements at each future point in time

Assume capital requirement is always proportional to the central estimate, i.e. always 50% of central estimate, and the central estimate is expected to run off at 20 units p.a., then the pattern of capital requirement is 50, 40, 30, 20 and 10.

Step 3 – determine the cost of capital at each point in time

Ignoring tax, assume the cost of capital is always 10% of the capital held at the balance date, therefore the pattern of the costs of capital is 5, 4, 3, 2 and 1.

Step 4 – discount cost of capital to get risk margin now

Assume the risk free rate is the appropriate rate to use and that it remains constant at 5% p.a., then CoC risk margin is calculated as:

$$5 + \frac{4}{1.05} + \frac{3}{1.05^2} + \frac{2}{1.05^3} + \frac{1}{1.05^4} = 14.1 \text{ units}$$

Therefore for the current balance date:

Central estimate = 100 units

Risk margin = 14.1 units

Required capital = 50 units

It is important to note this example attempts to illustrate, in simple terms only, the “mechanics” of a probably over-simplified application of the CoC approach. The numbers used are purely fictional. The fact that the calculated risk margin of 14.1 units appears within a “reasonable range” of risk margins typically seen in Australia is a coincidence, rather than an indication that the CoC approach tends to produce similar results with the percentile approach. In fact, as will be discussed later, in my view there are little theoretical reasons for why they should be expected to produce the same risk margin in general.

4. What are the advantages of using the CoC approach to set risk margins?

I suggest there are two main reasons:

- 1 The CoC approach is deemed to be theoretically consistent with the concept of an “exit value” for liabilities under IFRS
- 2 The CoC approach appears to satisfy the desirable characteristics of “good” risk margin approaches as put forward by the various stakeholders

I will discuss each one in turn.

4.1. Consistency with “exit value” concept

Under IFRS, liabilities are required to be reported at their exit values. Similar to the concept of market value for an asset, an exit value for a liability is the amount another party is willing to accept in order to take on the uncertain obligations. IASB’s definition for current exit value is “the amount the insurer would expect to pay at the reporting date to transfer its remaining contractual rights and obligations immediately to another entity” [16].

It is interesting to note there appear to be no explicit restrictions on who this “another entity” may be, and the circumstances in which this hypothetical transfer is assumed to occur are also left open. Some of these restrictions may be important in ensuring the current exit values calibrated using the CoC approach are consistent and comparable. For example:

- Whether the transferee entity should also be a regulated insurance company? Or it can be other types of institutions, such as banks?
- Whether the transfer is assumed to occur at “arm’s length”? Or does it assume that either or both of the entities in the transfer are in financial distress?

Notwithstanding the above, it may often be taken for granted that such a transfer of insurance obligations would occur between insurance companies at arm’s length. In some cases this is enforced by regulations governing the integrity and conduct of such transactions. For example:

- It is expected that only authorised and solvent companies should be allowed to conduct insurance business. Therefore it is difficult, if not impossible, to transfer insurance liabilities to a non-insurance entity.
- Under “fair value” accounting, which appears to be the general underpinning concept for “exit value”, transactions are generally assumed to occur at arm’s length between willing and knowledgeable parties. It is of note that in Switzerland, under the Swiss Solvency Test (“SST”) required by the Swiss prudential regulator FOPI (see Appendix A), the Market Value Margin (the technical term used for the risk margin) is defined specifically as “the additional amount on top of the best estimate which is required by a willing buyer in an arms-length transaction to assume the liabilities the loss reserves are held to meet” [21].

If there is a deep and liquid market for liabilities, then the exit value will be the observable market price. However, since such a market does not exist for insurance liabilities, the exit value has to be estimated or “modelled”.

Under a risk based capital framework, a level of capital that is commensurate to the risks involved is required to support the uncertain obligations. Therefore, it is expected that when an uncertain obligation is transferred to another party, the transferee will also need to set up a commensurate level of capital. Capital employed this way demands a return for as long as it remains exposed to this risk. Some therefore argue that a “risk margin” over the central estimate will be demanded as “compensation”, and that this risk margin should equate to the amount required at the time of transfer in order to adequately service the expected future cost of capital.

The risk margins derived from a CoC approach is therefore consistent with the “exit value” concept under IFRS.

On the other hand, other approaches such as the percentile approach may also be “calibrated” to levels representing an exit value of liabilities. The 75% level selected by APRA was intended to be as a proxy to “fair value”, which represents that, “in the absence of a deep market for insurance liabilities, a level of certainty which the market would require in estimating the value of the liabilities” [24]. Therefore some have argued that APRA’s 75% PoS level should provide a broadly similar risk margin to the CoC method, for many portfolios. However, percentile approaches have little or no conceptual link to an exit value based risk margin.

Solvency II, the capital adequacy regime for the European insurance industry, goes one step further to classify liability components that are hedgeable and non-hedgeable [6]. CEIOPS (the “regulator”, see Appendix A) indicates that only non-hedgeable risks require a risk margin. For hedgeable risks, by definition one can theoretically construct a replicating portfolio of assets with observable market price, therefore assuming the principle of no arbitrage there is no further explicit risk margins required beyond the central estimate. For non-hedgeable risks, a margin for risk is required, and CoC is put forward as the preferred approach. In simple terms, the components of the liabilities relating to market risk and credit risk may be deemed hedgeable, but there can be some components, say relating to insurance risks, that are regarded as non-hedgeable.

In QIS4 (Quantitative Impact Study 4, conducted by CEIOPS to assess impact of Solvency II regulations to the insurance industry), specification examples are provided for hedgeable (life) insurance obligations as “some options and guarantees embedded in life insurance contracts, some unit-linked (equity-indexed for instance) life insurance contracts, cash flows where there is no uncertainty in the amount and timing, etc”. However, it is acknowledged that in practice “perfect hedge” is rare, and some basis risks will remain and a risk margin is still required if material.

4.2. Desirable characteristics of risk margins approaches

In these discussions there have been various “criteria”, or “desirable characteristics”, put forward for setting and reporting risk margins. These are briefly outlined as follows for each main stakeholder group.

I have not attempted to reproduce the discussions behind the evaluation of the CoC and percentile approaches (and indeed other approaches) against these desirable characteristics. However I note that to date, the CoC and percentile approaches are both deemed to possess

most of these desirable characteristics and hence both are regarded as valid candidate approaches for setting risk margins.

Accounting

The key views are represented by the International Accounting Standards Board (“IASB”). The overall principle is that the risk margin should be “an explicit and unbiased estimate of the margin that market participants require for bearing risk” [16].

Some of the important criteria put forward by the IASB to be considered when selecting an approach for determining risk margins include:

- Because insurance liabilities are measured at current exit value, the risk margin should be consistent with the margin that would be expected if the insurer were to transfer its contractual rights and obligations to another party.
- Should be explicit, not implicit.
- Should reflect all risks associated with the liability, but should not reflect risks that do not arise from the liability, e.g. investment risk, asset-liability mismatch risk or general operational risk.
- As consistent as possible with observable market prices (risks associated with market variables and non-market variables to be treated differently).
- Should make it easy to provide concise, informative and consistent disclosures.
- Should not overlook model risk and parameter risk.

Regulatory

The key views are represented by the International Association of Insurance Supervisor (“IAIS”), who believes one of the key characteristics of the margin is to reflect the level of uncertainty in the calculation of the central estimate.

The desirable characteristics include:

- Similar obligations with similar risk profiles should result in similar liabilities.
- “Law of large numbers” and diversification considerations should be reflected.
- (All else being equal) the less that is known about the current estimate and its trend; the higher the risk margins should be.
- (All else being equal) risks with low frequency and high severity will have higher risk margins than risks with high frequency and low severity.
- (All else being equal) for similar risks, contracts that persist over a longer timeframe will have higher risk margins than those of shorter duration.
- (All else being equal) risks with a wide probability distribution will have higher risk margins than those risks with a narrower distribution.

- (All else being equal) to the extent that emerging experience reduces uncertainty, risk margins will decrease, and vice versa.

Actuarial

The key views are represented by the International Actuarial Association (“IAA”).

In addition to the views put forward by the IAIS and IASB, the IAA also identified the following characteristics as relevant:

- Applies a consistent methodology for the entire lifetime of the contract.
- Uses underlying assumptions consistent with those used in the determination of the corresponding current estimates.
- Is consistent with other financial contracts.
- Where possible, is determined in a manner consistent with accepted economic and actuarial pricing methodologies.
- Facilitates disclosure of information useful to stakeholders.

Insurance Industry

The views are represented by many different groups including the CEA, CRO Forum, GNAIE, etc (see Appendix A), and the views are currently very diverse. Understandably, due to the differences in backgrounds and preferences, there are some groups which are more neutral in these discussions, while there are some groups which have been advocating very strongly one specific approach against the other.

The following desirable characteristics can be distilled from the diversity of views:

- Where an appropriate market exists this should be used, i.e. a “mark to market” approach, which is the case for market risk
- Where an appropriate market does not exist, an appropriate proxy (“mark to model”) should be used, but should not be unnecessarily complex, involve arbitrary assumptions and should be calibrated to achieve a reasonable estimate of the market price of risk
- Ease of calculation and unnecessary complexity should be avoided as there is not a “right answer” – a reliable market from which to determine a correct price does not exist
- Diversification effects should be fully allowed for, with a sensible proxy for this being the current entity specific diversification effects
- Where market data is either unavailable or it doesn’t adequately reflect the characteristics of the insurer’s portfolio of risks, entity specific assumptions should be used.
- The market value margin should not include any allowance for profit over and above the expected cost of capital for non-hedgeable risks.
- Stability of calculation between classes and years – more stable if factors are externally prescribed regardless of which approach

- Consistency between different companies and harmonise across different jurisdictions (in particular Europe in the context of Solvency II)
- Consistency with overall solvency system
- Consistency with future IFRS Phase 2
- As close as possible to market consistency
- Sit on top of best estimate (defined as mean value of discounted reserves)
- Capture uncertainty in parameters, models and trends to ultimate
- Provide a sufficient level of policyholder protection together with the required statutory level of capital

5. What are some of the practical issues around its implementation?

As illustrated in the previous simple example, the CoC risk margins for the purpose of exit value is effectively a function of four elements:

- Profile of reference entity who's hypothetically assuming the portfolio
- Capital requirements
- Pattern of future capital needs
- Cost of capital rate

Let's consider the issues involved for each of these in turn.

5.1. *Issues with profile of reference entity*

The other party assumed to be taking your liability is called the "reference entity". In CoC within the context of exit value, it is the profile of the reference entity that primarily determines the level of risk margin required. However, what should a "reference entity" look like? There is not a simple answer to this question, and in my view there is also not a "correct" answer to this question. However, without a reliable market of insurance liabilities, the profile of this imaginary reference entity can be crucial in determining an appropriate proxy for exit value. The configurations required to be decided can include size, degree of diversification, local/foreign, if also a licensed insurer, etc.

Some of the possible configurations of the reference entity might be:

- The entity itself – under this configuration, the entity's own measure of capital based on its own assessment of portfolio's experience, and its own required return on capital are arguably the most appropriate assumptions to use in this case. But this can be potentially inconsistent with "exit value", especially if the industry is characterised by a wide range of different insurers with heterogeneous risks.
- The whole industry – the reference entity in this case is as diversified as an "insurer" can be, and it is likely to be very large by comparison to any single entity trying to determine the risk margin for one portfolio. The cost of capital to adopt is likely to be the industry average return on capital. But in practice this effectively means some form of an "industry fund", potentially funded by levies to share the cost of any insolvencies, exists to act as the ultimate transferee. If this arrangement is not in place then the calibration is purely artificial, and likely to be understating the compensation required in an actual transfer to, say, an average industry player. Risk margins on a "net" of reinsurance basis will have limited meaning.
- The average industry player – this partly addresses the issues from the above point, that it still assumes industry level diversification, but with the entity size being that of the average player rather than the whole industry. This appears more realistic and plausible, although in practice transfers often occur between insurers of comparable size, or from smaller to a larger insurer, and more rarely from large to small. The key issues for this configuration will be around equity of treatment for insurers larger or smaller than the "average". In some cases this may lead to a tendency towards trying to be "close to the

average”, and at the extremes may mean disincentives for insurers to grow beyond a certain size, or inappropriate barriers to entry for smaller insurers or startups. Again treatment of reinsurance can be problematic.

- Prescribed characteristics – this is potentially highly artificial but likely to be relatively static over time. This configuration also means that portfolios with similar risks are more comparable because the calibration is not subject to shifts in the industry (unless the prescribed profile changes). But how practical is it to unify different jurisdictions to use the same reference entity over the world? Also there is a risk of the reference entity’s profile becoming “obsolete”, and there would be an inevitable step-change impact if it was updated or redefined.

It is of note that CEIOPS (see Appendix A) has recently published guidelines on reference undertaking (or entity) for Solvency II [5]. The key features are that the reference entity is assumed to be an “empty” entity – therefore allowing no diversification, and assumes reinsurance is transferred in the process, with a prescribed CoC rate by different insurance classes of business preset by the regulator.

Many parties have proposed to research further to assist in finding the optimum calibration of a reference entity, but my view is that it is unlikely that deeper research will see a most “correct” configuration emerge. A reference entity calibrated appropriately for a particular context, jurisdiction or even point in time can become inappropriate in another. In my opinion the exit value concept can become artificial if the reference entity is purely fictional.

5.2. Issues with capital required

The practical question here is which measure of capital should be used. There are at least three different measures, namely:

- Allocated net assets – this represents the difference between total assets and total liabilities, approximately allocated by an indicative weighting such as written premiums or other turnover type measures. This is rarely used in practice due to its primitive nature.
- Regulatory capital – this may also be referred to as the solvency capital, often determined by a formula-based method set by the regulator as the minimum level of capital required to remain in business. In practice, insurance companies tend to operate at levels higher than the regulatory minimum.
- Economic capital – determined by internal capital modelling such as Dynamic Financial Analysis (“DFA”), which reflects more appropriately the true level of capital required to support the business. This is usually a notional amount for management purposes rather than a real amount that can be physically tracked.

In practice the decision of which capital measure to use often depends on the purpose of the calculations. Regardless of which measure is selected, it is usually taken for granted that it is one’s own capital requirements that are being determined. However in the “exit value” context, it is important to realise that instead of one’s own capital levels, it is the capital levels of the reference entity that determines the CoC risk margins.

Therefore for any chosen capital measures, there are two plausible alternatives in determining the capital requirements for the purpose of calibrating the CoC risk margins:

- Completely exogenous – in this case one’s actual capital requirements are irrelevant and the CoC risk margins need to consider the capital required by the reference entity based

on its assumed profile. This is potentially problematic and may lead to reduced incentives for insurers to diversify, resulting in ineffective use of capital.

- Partly exogenous – in this case at least some considerations are given to one’s actual capital requirements which is probably appropriate. However, depending on the weighting used, this is potentially inconsistent with calibrating “exit value” based risk margins. There may not be a “perfect” solution and a compromise is likely to be required.

5.3. Issues with pattern of future capital needs

In addition to the issues surrounding capital requirements discussed before, there are potentially many ways a “run-off” pattern of future capital requirements can be determined. The obvious alternatives are:

- A run-off pattern in accordance with the run-off of the central estimate – this assumes that the level of capital required reduces in proportion to claims payments. This does not tend to be true in practice due to a disproportionate level of volatility is often exhibited in the “tail”, where the size of the central estimate becomes a poor indicator of capital needs.
- A run-off pattern in accordance with the level of volatility or “uncertainty” – this appears to be an appropriate alternative because capital needs are often a function of the extent the uncertain liabilities may deviate from their estimated levels. This uncertainty tends to reduce over time in absolute terms as claims are paid and settled, development matures and the potential for deteriorations diminishes, but it may increase over time as a proportion of the central estimate.
- A prescribed run-off pattern – most likely based on a benchmark (industry research or regulator publishes data) or other prescribed pattern.

In my view there are advantages in projecting future capital needs in accordance with the level of volatility or “uncertainty”, as there is a strong theoretical link between capital and risk. However, there is no current consensus as to how the uncertainty surrounding the central estimate may run off over time. The concept of splitting total variability into systemic and independent components may be a useful starting point, as these are expected to behave differently as the portfolio matures, but the distinction between the two can become somewhat blurred and arbitrary in practice.

5.4. Issues with cost of capital rate

The fundamental issue is to decide whose cost of capital should be used. On this point there are broadly two alternatives:

- The reference entity’s cost of capital – this is the natural alternative given the exit value paradigm, however it is extremely difficult to calibrate because the cost of capital of the (imaginary) reference entity is not observable. One practical compromise is to adopt the cost of capital rate as prescribed by a central body with the relevant regulatory power. However, it is important to ensure the cost of capital rate is defined consistently with the capital requirements.
- One’s own cost of capital as a proxy – this is arguably a more practical alternative, but in my view this is only achieved at a considerable compromise to the intent of “exit value”, namely the transferee is unlikely to have the same cost of capital as you unless by chance. Although in practice the cost of capital will often be quite similar for different players in

the same market or industry. The topic of assessing one's own cost of capital is extensively covered in many literatures in the fields of finance, investments, capital management and more recently Enterprise Risk Management ("ERM"). There are many nuances in its definition and many ways to determine its level, which is likely to be problematic when comparing the financial position of one insurer with another.

There are also other important issues, of which the resolutions for some may depend on which of the above alternatives is adopted. These issues include:

- Whether a single cost of capital rate is sufficient, or different rates should be used for different, say, class of business or other sub-categorisations.
- The extent to which the cost of capital rate can be calibrated by reference to the observable rates derived from the industry.
- Whether the cost of capital rate should be constant over time, or should respond in accordance with the economic or insurance cycle or some other measures.
- The relevance of reinsurance, tax and other entity-specific aspects, and their impact on how the cost of capital should be determined.

6. What are the conceptual differences between using the percentile approach and the CoC approach, and what would be the dollar impact of a change?

The underlying issues in the percentile approach and the cost of capital approach are very different. I will discuss some of the qualitative areas where these two main approaches differ and the quantitative impacts.

6.1. *Conceptual differences*

For the readers familiar with the Australian framework and the percentile approach, it is likely that the preceding sections of this paper have already demonstrated there are considerable differences between the CoC and percentile approaches in both the underlying concepts and practical issues involved.

In my view, an underlying theme that is common to these differences is a dichotomy between the policyholders' perspective and the shareholders' perspective of the purpose of risk margins. In other words, it appears their most "natural" contexts of application are quite different.

This apparent dichotomy is discussed at some lengths in the IAA's RMWG (Risk Margin Working Group) Exposure Draft paper [7], and is increasingly being recognised in the international discussions. It considers the following two different perspectives of risk margins:

- Policyholders' perspective – the main concern of policyholders relates to the adequacy of reserves. The purpose of the risk margins is to provide an element of prudence, thereby to increase the chance that an insurer is able to pay when obligations fall due. The percentile approach to setting risk margins provides a mean to articulate and compare the different levels of prudence by the measure "probability of sufficiency". The theoretical basis appears to relate best to those found in the subject of statistics (e.g. confidence intervals).
- Shareholders' perspective – the main concern of the shareholders relates to the adequacy of returns at a given level of risk. The purpose of the risk margins is to serve as a provision for compensation that another party will require for bearing this risk. The CoC approach to setting risk margins provides a mean to assess the different levels of compensation given the specific profile of a transferee. The theoretical basis appears to relate best to those found in the subject of finance (e.g. risk and return).

It may be possible to construct arguments to the effect of "equating" these two perspectives, that in "many" ordinary circumstances and with little assumptions, both approaches will tend to produce the same level of risk margins. However in my opinion the link between these two apparently opposite views, if it exists, is not obvious.

6.2. *Dollar impact*

For us in Australia who are currently using the percentile approach, the key practical question is "what is the dollar impact of switching to using a CoC approach?". An alternative question is "to what probability of sufficiency (PoS) does a CoC risk margin equate?". In my view

these are very important and valid questions for insurance companies and actuaries to be asking in Australia.

To date, there have been some numerical examples put forward by various stakeholders that try to compare the two methods under different simplifying assumptions. The assumptions used for each numerical example can be very different, and the results are wide-ranging. To the extent possible, I believe the common observations from these numerical examples can be (very approximately) summarised as follows:

- For short-tailed risks, the numerical examples tend to produce CoC risk margins that are lower than the 75% PoS (around 60% to 65% PoS).
- For long-tailed risks, the numerical examples tend to produce CoC risk margins that are higher than the 75% PoS (around 80% to 90% PoS).

These results are very sensitive to the assumptions underlying the numerical examples.

The underlying concepts and the associated inputs and parameters between the two approaches also appear to be very different, so that the result of a comparison can arguably be made as close or far away as one wished by selecting the “right” scenario for each approach. In many cases this can be done without producing significant inconsistencies in the assumptions. In my view this is a key contributing factor to the apparent dichotomy between the policyholders’ view and the insurer’s view of risk margins.

7. What are the global developments up to now? How relevant are these developments to Australia?

7.1. Global developments

Accounting

The key developments pertain to the IFRS, which represents major attempts at convergence in accounting approaches at an international level. The concept of “fair value” has been given significant consideration on the asset side, and now also being considered on the liability side. These discussions are captured under the IASB Project “Insurance Contracts”.

As noted in the October 2008 agenda papers for the IASB Insurance Working Group, the concept of “exit value” has been facing significant challenges to date, mainly because insurance liabilities are not usually transferred. The underpinning supposition of having a “deep and liquid market” for insurance liabilities also seems to be quite a remote possibility at this moment.

As an alternative to “exit value”, the concept of settlement value (or fulfilment value), that refers to the fact that an insurer generally expects to settle its liabilities over time by paying benefits to policyholders as the benefits fall due, is now being considered [1]. In my view the concept of settlement value is the underpinning concept of our current practice, therefore is not unfamiliar to Australian actuaries.

Regulatory

The development of a global framework for insurer solvency assessment and the associated capital requirements had been one of the initiatives of the IAIS as early as 2002. This process is in parallel with the IFRS developments for insurance contracts.

The IAIS, has also continued to provide input to and work with the IASB on the Insurance Contract project, with the aim of developing “methodologies for calculating items in general purpose financial reports can be used for, or are substantially consistent with, the methodologies used for regulatory reporting purposes, with as few changes as possible to satisfy regulatory reporting requirements” [9].

To date the IAIS has published a number of working papers outlining the principles involved and the issues to be considered in their implementations. Collaboration with the IASB is expected to continue.

Actuarial

The IAA RMWG paper is in my view probably the most significant document capturing many aspects of the relevant discussions and issues relating to the measurements of insurance liabilities. This paper is still in its draft form, but has already played a significant role in contributing to the ongoing developments seen in the accounting and regulatory fronts noted above.

IAA RMWG draft minutes of the meeting in June 2008 have noted that further analysis is required on a number of issues associated with the cost of capital method of risk margins, including “the method of deriving capital, its cost, the effect of diversification and group

diversification, the use of a reference entity, and the interaction between risk margin and regulatory capital if used” [2].

Insurance Industry

To date, there is still a clear preference among the various industry groups around the world with the CoC approach over the percentile approach to setting risk margins. Many have also suggested that there are needs to conduct further research in the various aspects of the CoC approach, including the calibration of the reference entity and what cost of capital rate to use. The introduction of the settlement value concept may impact on the direction of some of the proposed research.

7.2. Relevance to Australia

It has now been six years since the introduction of the requirements to have a risk margin in Australia. The requirements were expressed in percentile terms, therefore the percentile approach has been the natural approach to adopt. It is my observation that the percentile approach has been well accepted by Australian actuaries and insurers. The findings from the 2006 Australian reserving practices survey seems to support this [19]. Advanced analysis within the percentile framework has also been developed over these years, e.g. copula approach to modelling tail-dependencies at high probabilities of sufficiency.

It may perhaps be surprising to some that the cost of capital approach is in fact not unfamiliar to Australian actuaries, but arguably more in the pricing context than in the reserving context. Namely, in certain forms of “sound rating”, where a margin for profit is determined as a function of adequate return on capital, the profit margin is analogous to a cost of capital risk margin [23]. But this is perhaps not considered to be an appropriate proxy to “exit value”, without some adjustments, as it refers to one’s own cost of capital and capital level.

In the other parts of the world where CoC approach is preferred, various areas of research have been proposed and should soon commence. As far as I am aware there appears to be little research efforts in Australia aimed at understanding this “new” way of doing risk margins. However, more research is being done to further advance our understanding and sophistication in the percentile world.

If the exit value concept and use of CoC approach are to be introduced for general insurance in Australia, then what things need to be changed from what I’m doing now? I venture a guess that some or all of the following changes may take place:

- A new solvency capital framework and financial reporting requirements may be introduced, within which the calibration of the “reference entity” and the cost of capital rate will be of vital importance
- Research efforts in understanding and modelling current and future capital needs may increase, as a result the use of percentile approaches to understand claims uncertainty should continue to advance rather than becoming obsolete
- The study of observable portfolio transfers and merger transactions may increase and the “actual risk margins” from history may be used to evaluate how well the exit value based reporting framework assesses the “expected risk margins”
- A greater exposure to the market cycles and volatilities is introduced into the reserving process for general insurance liabilities as a result of “exit value” considerations, this may be exacerbated as and when a “market” for insurance liabilities comes into being

- A greater level of public criticism may be expected if an insolvency occurs and the exit value based CoC risk margins are found to be insufficient to support an actual transfer of liabilities to a third party

There is a chance that CoC may be introduced in the future as a valid approach to setting risk margins in Australia. But in my view it appears there are still a number of significant conceptual and practical challenges to be addressed before the CoC to become a feasible approach to use in Australia.

8. Given all these, can we answer the question “which approach should we use”?

8.1. *Is this an important question?*

Probably.

As outlined in this paper, there are advantages and disadvantages in either approach to setting risk margins. However, the percentile approach as we know it perhaps does not provide a very strong link to the concept of “exit value” under IFRS compared to the CoC approach.

8.2. *Is this the “right” question?*

Not really.

I believe the heart of the issues lies in the dichotomy between the policyholders’ view of risk margins and the shareholders’ view of risk margins. In my view the percentile approach is the more natural approach to adopt under the policyholders’ view of risk margins, which concerns adequacy of reserves. On the other hand the exit value based CoC approach is the more natural approach under the insurer’s view of risk margins, which concerns adequacy of return as compensation for exposing capital to risk. The link between these two views is not obvious.

Given the apparent dichotomy at a fundamental level, insisting on deciding between these two approaches may end up missing the point.

In some situations they can be calibrated to give largely similar levels of risk margins. However the assumptions involved are often somewhat artificial.

Perhaps the question is really “is exit value the right concept to use for insurance liabilities?” Given the difficulties presented under the “exit value” concept, the IASB will be considering whether “settlement value” or other alternative concepts may also be suitable under IFRS. This decision will clearly impact on where efforts will be devoted.

In my opinion the CoC and percentile approaches do not appear to be rivals of each other as implied by some of the international discussions to date. I believe they are most useful when viewed as supplements of each other in the greater context of useful financial and regulatory reporting.

References

- 1 IASB 2008, Education session: Overview of comments on the measurement attribute (Agenda Paper 3A), IASB Board Meeting October 2008.
- 2 IAA ad hoc Risk Margin Working Group 2008, Draft Minutes from Meeting in Québec City – 11 June 2008
- 3 IAAust 2008, Response to IAA's Measurement of Liabilities of Insurance Contracts: Current Estimates and Risk Margins dated 3 June 2008
- 4 CEA 2008, Cost of capital methodology (reference: Annex to ECO 8128) dated 30 May 2008
- 5 CEIOPS 2008, The Fourth Quantitative Impact Study (QIS4) background document Guidance on the definition of the reference entity for the calculation of the Cost of Capital dated 1 April 2008
- 6 CEIOPS 2008, QIS4 Technical Specifications (MARKT/2505/08) dated 31 March 2008
- 7 IAA ad hoc Risk Margin Working Group 2008, Re-exposure Draft of Measurement of Liabilities for Insurance Contracts: Current Estimate and Risk Margins dated 24 March 2008
- 8 IASB 2008, Overview of comments (Agenda paper 2A), IASB Board Meeting February 2008.
- 9 IAIS 2007, Comments to IASB's Discussion Paper: Preliminary Views on Insurance Contracts (Ref: 7/265) dated 18 December 2007
- 10 IAAust 2007, Comments on IASB Discussion Paper – Preliminary Views on Insurance Contracts dated 26 November 2007
- 11 Institute of Actuaries (UK) 2007, Response to the IASB's discussion paper on Insurance Contracts – Response from the Actuarial Profession dated 16 November 2007
- 12 CEIOPS 2007, The Third Quantitative Impact Study (QIS3) for Solvency II – Public Report (CEIOPS-DOC-19/07) dated November 2007
- 13 IAIS 2007, Summary of IAIS Positions on the Valuation of Technical Provisions, dated October 2007
- 14 Leigh, Kaufman, & White 2007, Risk Margins in Reserves – What's Going On, Who is Doing What, presented to the 34th Annual GIRO Convention
- 15 Kaufman, Broughton, Buchanan & Meyers 2007, Cost of Capital Method of Determining Risk Margins – Dealing with Neglected Issues: Observations from Three Empirical Analyses, GIRO October 2007
- 16 IASB 2007, Discussion Paper Preliminary Views on Insurance Contracts
- 17 FOPI 2006, Technical document on the Swiss Solvency Test, Federal Office of Private Insurance, Version of 2 October 2006

- 18 Marshall, O'Dowd, & Ward 2006, Report from the Risk Margins Taskforce, presented to the IAAust Reserving for General Insurers Seminar 22 September 2006
- 19 Gibbs & Hu 2007, Australian Reserving Practices An Analysis of the 2006 General Insurance Claims Reserving and Risk Margins Survey, on behalf of the General Insurance Practice Committee of the Institute of Actuaries of Australia
- 20 CRO Forum 2006, A market cost of capital approach to market value margins – discussion paper dated 17 March 2006
- 21 FOPI 2006, The Swiss Experience with Market Consistent Technical Provisions – the Cost of Capital Approach dated 28 March 2006
- 22 FOPI 2004, White Paper of the Swiss Solvency Test, dated November 2004
- 23 Hart, Buchanan, & Howe 2007, The Actuarial Practice of General Insurance 7th Edition
- 24 APRA 2001, Prudential Supervision of General Insurance Policy Discussion Paper March 2001

Appendix A

Included below are “one-paragraph” descriptions of each of the key stakeholders mentioned in this paper. Please refer to their websites or other more detailed sources for a fuller understanding. Please note there are definitely other stakeholders not included in this list.

IASB – International Accounting Standards Board (www.iasb.org), who sets the international financial reporting standards (IFRSs) for general purpose financial statements.

IAIS – International Association of Insurance Supervisors (www.iaisweb.org), who issues global principles, standards and guidance papers on insurance supervision.

IAA – International Actuarial Association (www.actuaries.org), who represents the collective views of the global actuarial profession.

AASB – Australian Accounting Standards Board (www.aasb.com.au), who sets the Australian financial reporting standards for general purpose financial statements. A member of the IASB.

APRA – Australian Prudential Regulation Authority (www.apra.gov.au), who is the prudential regulator of the Australian financial services industry. A member of the IAIS.

FOPI – Federal Office of Private Insurance (www.bpv.admin.ch), who monitors the business operations of private insurance companies in Switzerland. A member of the IAIS.

IAAust – Institute of Actuaries of Australia (www.actuaries.asn.au), who represents the collective views of the Australian actuarial profession. A member of the IAA.

CEIOPS – Committee of European Insurance and Occupational Pensions Supervisors (www.ceiops.org), who represents the supervisory authorities of the European Union Member States and conducts the Solvency II project. A member of the IAIS through the European Commission (www.europa.eu.int).

CEA – Comité Européen des Assurances (www.cea.assur.org), who represents the European insurance industry, with members accounting for approximately 94% of total European premium income.

CRO Forum – Chief Risk Officer Forum (www.croforum.org), who represents the Chief Risk Officers of its European insurer and other members.

GNAIE – Group of North American Insurance Enterprises (www.gnaie.net), who represents 18 insurer members from the United States, Mexico, Canada and Bermuda.