

Key Points Summary

- ☐ The margin is the result of a reserving philosophy (ie. how strong the reserves should be, however allocated and presented).
- ☐ Management may not realise that they have a reserving philosophy, but they do, even if it is not explicitly stated.
- ☐ The reserving process aims to determine the reserve consistent with that philosophy.
- ☐ Consistent reserving is more difficult than it seems and much of what is called a margin might really be part of the best estimate.
- ☐ The best estimate itself may have varying degrees of uncertainty attached. In practice, there is no single best estimate, the most you can say is that it is likely to lie within a range. The width of the range varies substantially by class of business.
- ☐ It is vital that those who rely on the reserves appreciate the variability and so level of comfort provided by the best estimate and the margins (ie. the implications of the reserving philosophy).
- ☐ The actuary has a responsibility to communicate the implications of the philosophy.
- ☐ The management has an obligation to understand those implications.
- ☐ The owners have an obligation to understand those implications.

PRUDENTIAL MARGINS

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1. INTRODUCTION

Anyone reading this paper to discover what margin on reserves would be prudent is going to be disappointed. There is no "correct" answer to this question and we do not presume to offer one.

The prime purpose is to discuss the philosophical issues and so to promote discussion both within and outside the actuarial profession. In particular, we hope that this will be of interest to regulators and insurance company management as well as those directly involved in reserving.

We have limited the discussion to margins on reserves, although much of it can be extended to margins on premiums, asset valuation etc. Indeed, the margins should be considered in the wider context of the risk taken in the company as a whole, not least the asset matching.

This paper is the view of the authors and does not necessarily reflect the opinions or practices of their employers.

1.1 Overview

Margins provide comfort - for management, for shareholders and owners, for policyholders and regulators among others, but more importantly, these margins may be needed. The uncertainty in the underlying estimate of the reserve is often greater than is realised by those who rely on the figures and so reliance on unmargined reserves can be misplaced.

The purist view is that reserves should always be a best estimate and that any "margins" should be disclosed as free capital. It is difficult to argue with this, but in practice such an approach can lead to problems. Prudence matters most when estimation is hard, (such as US liability or excess of loss reinsurance) - there has been a history of "best" estimates proving inadequate. To counter this, there may be more chance of achieving a "better" best estimate if a prudent approach is taken to determining it.

Insurance is inherently different from other industries in that, even after it has been sold, the cost of the product to the supplier (the claims cost) is unknown. The company must protect itself against unexpected losses to survive and so meet its policyholders' expectations. A margin (ie. excess provisions over best estimate of liabilities) is not just desirable, it is essential.

What constitutes a "prudent" margin is not something that can be calculated, it is a matter of judgement or philosophy. The more capital that is diverted to the past claims, the greater the constraints on business volumes and so on potential profitability. A company that plays safe in a profitable market can be accused of not working its owners' capital hard enough. (Of course, a company that

works its capital hard in an unprofitable market probably squanders it). On the other hand, a company with narrow margins endangers both owners' and policyholders' money. The issue is really a decision for the management based on the owners' risk-averseness, subject to satisfying themselves and the regulators (representing the policyholders) that this policy is not too risky.

Since management are responsible for selecting a margin, they need to understand the implications of this decision, as do shareholders. The reserving philosophy and level of risk implied needs to be communicated in terms that are clear and meaningful to the recipient in order to form the basis of the judgement.

The actuary therefore has a responsibility to go beyond calculating the reserves in line with an agreed reserving philosophy and to communicate the implications of such a philosophy for the company as a whole.

2. COMFORT MARGINS

2.1 What is an Estimate?

We make estimates of future claims cost because we do not yet know the true value. The term "estimate", without further qualification, is undemanding - just a rough calculation; there is normally no guarantee that an estimate will prove adequate or inadequate.

Reliance on estimates means that there will be surprises in the future as past estimates prove to be too high or too low and a prudent management will seek comfort that the net effect will not imperil the continued operation of the company. This involves using estimates that are believed to be higher than a central or best estimate.

One important problem is knowing what we mean by a "central" or "best" estimate. Common sense suggests that this should be sufficient on average and hence should be an expected value or mean. Since most claims distributions will be positively skewed, a median would be inadequate. However, in practice we can rarely be confident that the estimate is the mean, or that the assumptions on which the calculation is based are themselves reasonable. In many cases, there is little information from which to deduce an appropriate distribution for the ultimate cost and so deduce the mean. We are often left with a method which produces an estimate (or selecting from a number of methods producing a number of different estimates) with no indication of the adequacy of this estimate. In this paper, we will use "best estimate" to denote an estimate of the mean, unless the context dictates otherwise.

On the one hand, actuaries often feel uncomfortable declaring their estimate to be a mean or median on the basis of little information. On the other, the meaning of central or best estimate, although statistically imprecise, is clear enough to the layman to whom it may imply a reasonable probability of adequacy. The extent to which this inconsistency matters varies, depending on the opportunity to explain the intention and the underlying uncertainty.

It is likely that, although the layman feels that best estimate is a simple enough concept, it could mean something different to different people. As well as the confusion between the mean and median, so-called "best estimates" might well exclude provision for claims handling expenses or reinsurance failure say. Strictly speaking, the former is an inevitable cost and the latter certainly has an expected value greater than zero, so both should be provided for as part of the best estimate.

In view of this uncertainty surrounding the adequacy of the best estimate, a margin gives a feeling of comfort that together they are likely to be adequate or at least not too inadequate.

2.2 What is a Margin?

The true margin on the reserves is the surplus in what is available to meet outstanding claims and associated costs over their true underlying cost. However, since the true cost is unknown, so is the true margin.

An estimate of the "true" solvency margin is the difference between the value of the assets and the insurance liabilities, where the liabilities consist of a best estimate of the claims, unearned premium reserve and other foreseeable costs. This difference can be considered as an estimate of the total margin, since ultimately all this money would be available to meet the claims. This would include not just capital allocated to the technical reserves, but much of the free assets too. In practice, free reserves are required to absorb possible losses on future business and investment as well as past claims. A margin in excess of a (prudent) best estimate is an artificial allocation of assets. It depends on how comfortable the management wishes to appear.

The total level of comfort is determined by the total of margins and free reserves, rather than just the claims reserves. There is an argument that claims provisions should be discounted best estimates and the surplus allowed to fall through into a central pot, where its adequacy can be assessed in aggregate.

However theoretically correct, there are a number of practical problems with taking the approach to such an extreme.

- ❑ It would be difficult to negotiate the initial tax bill down to the level that undiscounted or margined reserves would produce as a matter of course.
- ❑ The company would appear artificially strong compared with its competitors.
- ❑ The potential for pressure to distribute the margins or to use them to support new business would be considerably greater.

In principle, if it were market practice and if the level of understanding of potential for loss was uniformly high, this would be a workable system.

2.3 When is a Margin Not a Margin?

Often reserves are deemed to include margins when in practice they do not, because the best estimate is demonstrably likely to be inadequate. One way of categorising these non-existent margins could be as follows:-

- Probable Improbabilities - since there are normally many possible contingencies which could lead to a claim (albeit are unlikely to do so), it is likely that one or more will (even though it is not possible to say which in advance) and therefore the best estimate should include some provision for the expected value of contingencies. For instance, even if it is anticipated that a court case for a given liability claim will be won, there is still a non-zero expected claim cost, which when aggregated over a number of such cases could involve a considerable sum.
- Lazy Margins - the so called best estimate may exclude items which are either very likely or inevitable costs (eg. claims handling reserves). Therefore a margin for such items is not really a margin.
- Imaginary Margins - those which are included because of known inadequacies in the methods or assumptions used for the best estimate. For instance, in assessing the net cost of catastrophes capable of exhausting an excess of loss programme, a "margin" may be added to the gross to reflect the greater skewness of the net distribution. This is not a margin, but a necessary part of the best estimate.

2.4 When is a Margin a Margin?

There are two (genuine) reasons why the best estimate might prove inadequate:-

- Underestimation - events which were provided for, but cost more than expected.
- Contingencies - events which were either unforeseen or deemed too unlikely to reserve for fully. This is the cost in excess of the expected value covered under probable improbabilities.

Each of these is a source of risk and so represents a threat to the company. To ensure an acceptable likelihood of continued operation, the company needs to keep margins related to these threats. These margins protect new business from the effects of deterioration in past claims and are independent of the levels of new business - in principle, they could swamp the new business. The margins will be needed if the best estimate proves inadequate, although the best estimate may prove excessive.

Margins can be seen as an allocation of capital to past business and therefore not available to support new business. The money is effectively given by the company to past business, with a good probability of receiving it back once all claims have been settled. If the best estimate proves ultimately to have been inadequate, then the margin will not be returned in full. If it proves to have been excessive, then more than the original margin will be returned. This investment is made by the company largely because of its obligation to new policyholders to remain in business in order to meet their claims and is necessary to attract those new policyholders. In return, the company has the potential for profits from that new business.

These margins can take two forms:-

- Adequacy Margins - to increase the probability of the reserves proving adequate for known or anticipated events.
- Contingency Margins - to provide for abnormal claims or types of claim, or other contingent liabilities such as reinsurance failures

These margins can either be held explicitly (which may appear strong, but be tax inefficient) or implicitly in the claims reserves (which may appear weak, but be tax efficient).

2.5 Future Risks

There are a number of items which may be falsely associated with the past claims reserves.

These include:-

- ☐ Equalisation reserves
- ☐ Cost of running off the company over and above the cost of administering the past liabilities.

If capital is allocated to these, it is not a margin on the claims reserves.

2.6 Adequacy Margins

These margins are required because there is uncertainty in the ultimate cost of claims for which a reserve is being established.

Possible sources of uncertainty include the following:

- Range and quality of available data. The data available may be sparse, may not be reconciled to accounts figures, or may contain undetected errors.
- Actuarial model. The model(s) chosen for analysis and projection will never exactly match the actual claims process, but the choice of an inappropriate model will increase the probability of variation from the projected cost.
- Model parameters. Past claims fluctuations will result in uncertainty in estimating the parameters of the model. The less stable the historic experience, the greater the uncertainty.
- Model assumptions. The projection of future claim payments will involve assumptions as to the level of future inflation, the trends in economic, legal, political and social factors and possibly future investment returns. The actual trends experienced are likely to differ from those assumed.
- Random variation. Future fluctuations would result in the actual payments differing from the predicted, even if the true parameter values could be found for a perfect model.

In attempting to quantify the uncertainty and assess the level of margin which might be established, one or more of the following techniques may be used:

- statistical analysis
- sensitivity analysis - testing the effect of changes to the model assumptions and/or the models themselves
- analysis of different scenarios/what-if testing
- judgement

An explicit margin may be established based on the outcome of this analysis. If statistical analysis has been carried out, it may be possible to assess the probability of adequacy associated with a particular level of margin, although it must be borne in mind that not all the sources of uncertainty listed above lend themselves to statistical quantification.

In particular, the risk of selecting an inappropriate model cannot be quantified and so any margin to allow for this uncertainty must be arbitrary.

Alternatively, an implicit margin may be established by deliberately using cautious parameter estimates and assumptions in the reserving calculation, always assuming we can be sure that we are being "cautious".

As part of the "best estimate" reserve calculation, it may be appropriate to make allowances for factors such as the following, which represent a deviation from past experience and for which no historical data may be available:

- the emergence of types of claim which are not included in historical experience because of changes in policy cover or limits
- the emergence of new types of claim where the loss had not previously been recognised as covered by insurance (eg. latent disease claims)
- types of claim where the legal position is unclear (eg. pollution claims)

The adjustments to be made for such factors are likely to be difficult to calculate because of the lack of relevant historical data and considerable judgement will be required in the selection of suitable assumptions. In order to make provision for such factors, it will be necessary to make assumptions as to the possible cost, the probability of the cost actually being incurred and the timing of any resultant payments, all of which will be difficult to quantify. However, we can be confident that to make no provision at all would be over-

optimistic, not cautious.

As mentioned earlier, strictly speaking many of these adjustments should in whole or part be included in the best estimate, since the expected cost is greater than zero (eg. failure of reinsurers).

2.7 Contingency Margins

It would not be reasonable to expect all events which could possibly lead to claims to actually do so and even reserves with prudent margins will prove inadequate in the worst case scenario. However, although a reserve for each of these events cannot be justified, the aggregate expected cost of a large number of unlikely events can still be significant.

There are two types of such low probability risks - those which are known and identifiable and those which are not.

The possibility of future reinsurance failures is a known risk. A given reinsurer might be seen as acceptably secure, but if the programme is spread over several "secure" companies, the chance of one becoming insolvent can become worth reserving for. With such risks it may be possible to assess the amount of any potential loss, but the likelihood is considerably more difficult. By definition, these events are rare and so there will be little experience on which to base a best estimate let alone a margin, but to leave them out altogether would result in a negative margin.

The risk of a new latent claim type, not yet recognised is an example of a risk which is impossible to reserve for with any reasonable accuracy and yet there will always be unforeseen events which lead to claims and their cost can be significant.

Calculating contingency margins is a very inexact science and often a thankless task. They are as difficult to justify or defend as they are to calculate in the first place and so if they are explicit, they become easy targets for criticism by the Inland Revenue or those inside the company who would see the reserves reduced.

Since there have always been unexpected or unforeseen events the expected value of these "contingency margins" sits better in the best estimate. However, this amount may be small in comparison with the full cost of any one event and so a contingency margin greater than the expected value may well be justified.

2.8 Over-Use of Margins

Often the margin is not attributed to specific items, but each is implicitly covered. There is a danger with any implicit margins that they can be used

repeatedly. The existence of a margin becomes an excuse not to estimate one specific cost, then another, and another. As long as these items are not costed, the adequacy of the margin to cover all of them can never be tested. It is therefore difficult to justify using implicit margins for miscellaneous items instead of estimating their value, (until that is, the number of and difficulty of estimating such items is appreciated).

Discounting

The most common form of implicit margin is the future investment income earned on the reserves. This is very appealing, making the calculation of the best estimate simpler, avoiding the need to debate interest assumptions with the Revenue and having the force of common market practice. However, with interest rates falling, this margin is reducing and in short-tail classes could be dangerously low for the miscellaneous items it has covered in the past.

3. INSURANCE IS DIFFERENT

3.1 The Uniqueness of Insurance

In the financial reporting of businesses in other industries, the general accounting concepts of prudence, going concern, consistency and accruals (matching) will be applied. However, there are no general regulatory controls, which restrict the ability of businesses to trade if their financial position is unsatisfactory.

Insurance is different. No other industry has the twin characteristics of payment in advance and that the cost, timing and even the delivery of the product is unknown. However, it is vital to the buyer that if the product (the claim) does need to be delivered, the insurer will be around and able to deliver it. The primary aim of much of the insurance regulation is policyholder protection.

3.2 Existing Regulation

The accounts of most companies are required by the Companies Act to give a true and fair view; and auditors certify whether or not the accounts, in their opinion, do so.

In the case of insurance companies, there are certain exemptions and Schedule 9/10 of the Companies Act provides that accounts should not be deemed to be other than true and fair just because they take advantage of the exemptions. This would appear to mean that auditors could give a "true and fair" certificate to accounts which would not be true and fair for a non-insurance company. In practice, auditors certify that the accounts conform to the Acts relating to insurance companies.

Regulation 52 of the Insurance Company Regulations 1983 requires that DTI Returns are compiled in accordance with generally accepted principles, which would seem to imply that subject to the exemptions, the Returns should give a true and fair view.

Although it is not a closely defined concept, "true and fair" is generally understood and could not be claimed for provisions containing material margins.

On the other hand it is accepted that there is usually no one "true and fair" view; it is possible that several different views could all be "true and fair". Provisions are based on estimates and when there are several estimates all legitimately claiming to be a "best estimate", a high best estimate could be used in the accounts without necessarily being thought to contain a margin.

From the actuary's point of view, the major anomaly is that provisions can be based on undiscounted estimates, so that there could, in practice, be a significant margin in provisions for claims which are not going to be paid for a number of years. However, it can be seen that there are effectively negative margins in some parts of the industry from time to time, which themselves serve to reduce or eliminate the margin arising from not discounting.

Implicit discounting, under which an allegedly undiscounted provision is established which is inadequate on an undiscounted basis, but which would be sufficient if future investment income were taken into account, is forbidden by, inter alia, the ABI SORP and is generally regarded as improper.

The Inland Revenue take the view that they are not directly concerned with the provisions which companies establish in their Companies Act accounts or DTI returns. They may contend, however, that part of a provision is not allowed in tax computations and it is highly unlikely that they would agree to a provision which is greater than that in the accounts and returns.

The tax law relating to insurance companies is, in principle, the same as that which applies to other companies, but may appear different due to the uncertainty in the provision for claims.

In general, the Revenue Authorities will normally allow provisions which are a reasonable estimate of the ultimate cost, on the basis that a run-off loss is as likely as a profit (ie. a median). The Revenue contend that to conform with the law, long-tail liabilities (at least) should be discounted for the time value of money but the view is not accepted by much of the insurance industry and its tax advisers.

3.3 Limitations of Existing Regulation

There are a number of themes behind the regulation for financial strength of insurers. In the UK, for general insurers, they include the following:-

- ❑ Assets and liabilities should be assessed prudently.
- ❑ The insurer should be able to meet all future liabilities in the event that it ceased immediately to write new business.
- ❑ A "margin" of "solvency" is required before any new business may be written.
- ❑ The quantum of new business which may be written is limited, the limit being governed principally by the available (explicit) margin. The calculation requires a test related to both premiums and claims.
- ❑ There may be absolute minimum levels of explicit margin (in this context also referred to as capital) that are required as a condition of continuing in business, or of starting in business as an insurer.

This is a fairly comprehensive list, but by no means as comprehensive as the requirements relating to life insurers. For instance, life insurers are required to have regard to the terms at which new business is being written and the effect of this business on the company's future financial strength. They are required to have regard to the nature, term and suitability of the assets to the liabilities when preparing their financial statements. They are also required to test the financial position of the company in the event of sharp changes in investment market conditions. These additional requirements and prudential supervision generally of life insurers are implemented through certain duties delegated to appointed actuaries.

The only explicit margin requirement in existing legislation is against new business (ie. the Required Minimum Margin). Increasingly, regulators are considering "risk based" capital requirements which are intended to reflect the principal threats to insurers' finances, including reserve inadequacy.

The theory is easy enough to grasp; the practice is far more difficult:-

- ❑ How prudent is prudent given varying skewness and variance of loss distributions?
- ❑ Given the vested interests, why should the public trust the published figures?

- ☐ Can outside experts, armed with DTI Returns, advise with any confidence on the financial strength of a company?
- ☐ How can regulators ensure a company does not trade recklessly and turn a satisfactory position quickly into an unsatisfactory one?

3.4 Confidential Statutory Reporting

There is a case for complementing the DTI Returns with a confidential Financial Strength/Health report. This might cover areas such as investments held, a statement of reserving philosophy but also include a series of broad comparative tests on the reserves including the effect of variation in certain assumptions for the main classes of business a company writes.

This would be complex, in that it necessitates the DTI determining what is a fair/reasonable level of variation to test, what assumptions to vary and how to take account of the variety of reserving methods in use. However, the report could be the first stage in a sensitive screening process to indicate which companies are in need of further investigation. The successful implementation of this, however, relies heavily on the professionalism of the person providing the information for the report.

Such a requirement could have a profound impact on the management of the company. Once the regulator addresses (or appears to address) the strength of the company from this perspective, the management would do too, if only in order to be able to answer the DTI's questions. This in turn would generate questions inside the company and promote a wider understanding of the issues involved.

This cuts across the principle of freedom with information, but the balance between adequate policyholder protection and overly-restrictive regulation is hard to achieve. Policyholders and shareholders have a right to know information about the company finances which affects their decisions to deal with it. However, publicly available information is potentially subject to misinterpretation and could incorrectly suggest financial difficulties which could lead to undue concern and perhaps hasten an unnecessary closure of the company. Equally, such detailed information may be of considerable value to a competitor.

The question of achieving a balance between protection and freedom is inextricably linked with that of actuarial certification of reserves, although it is wider, since adequacy of the reserves is not the only potential cause of insolvency. In terms of communicating the strength of reserving outside the company, the issues become considerably more complex and the possible solutions cannot be attractive to all concerned.

3.5 Who is Interested in Margins?

Different interested parties will have different views, sometimes widely diverging, about where the lines should be drawn. Broadly, a "safe" company with high reserves will appeal to different people than one which cuts margins to the minimum and presumably takes similar risks in other aspects of its business.

Policyholders, Potential Policyholders and Regulators

Their interests are clearly in a secure company that has the ability to meet liabilities as they occur. This suggests that the reserves should be as high as possible. In practice, high reserves must be financed and the cost would be high premiums in the short-term.

Investors, Capital providers and Potential investors

Some investors look for stable long-term profits, some look for high short-term returns, while others look for maximum long-term profits with little concern for volatility. The strategy chosen by management should match the risk/reward profile of the owners within reason. For publicly quoted companies, this tends to work the other way round, ie. risk-averse investors will be attracted to companies that are seen as safe and vice versa. Investors should expect to know the level of risk being taken and therefore to understand (in broad terms) inter alia, the implications of the reserving philosophy. This assumes that sufficient, comprehensible information is available to them, or at least to their investment analysts.

Many investors are less risk-averse than management, since the impact to them of insolvency can be reduced by diversifying the portfolio over several companies.

Profitable Companies and Unprofitable Companies

Prudence dictates that some profit should be held back for margins on the reserves. This point may be clearer to a profitable company, than to an unprofitable one. In poor years, optimistic reserving is very tempting. Massaging the results is not easily defensible, however understandable and there is a great danger is that it could be done repeatedly. If each layer of management decides to lessen potential criticism by reducing the reserves slightly, without realising that this has already been done to the figures that they received, the ultimate published reserves could be severely inadequate.

Management

Theoretically, management should have the same objectives as shareholders. However, if the shareholders demand high short-term returns, this may not be consistent with prudence and may not be appropriate for managing an insurance company.

Staff

The continued profitable operation of the company provides the staff with employment and so prudent management is crucial to them. However, growth is normally good for employment prospects, though it may run contrary to prudence. Most will understand growth more easily than the implications of the reserving philosophy and so will equate success with growth, even if stronger reserves would really be preferable.

Auditors

Often, auditors would prefer to err on the side of stronger reserves, since the main danger for them is being sued if a company becomes insolvent. Indeed, with reserves scrutinised at a detailed level, they may argue that the reserves on each class of business should be prudent in isolation. This could lead to very substantial margins over the whole company.

Inland Revenue and Other Tax Payers

The Revenue's position was discussed earlier. If they are unduly generous to insurance companies, the additional revenue must be found from other tax payers. These are likely to object if insurance receives special treatment.

4. IF PHILOSOPHY COULD FIND IT OUT

4.1 Reserving Philosophy

The reserving philosophy is an integral aspect of the financial management of the company. The level of the reserves directly affects the level of free assets and so the solvency margin. This in turn affects the level of future new business and investment risk the company can afford to take. If the reserves are too comfortable, then the company may be constrained in other places so limiting the potential for profit.

Similarly, other factors will influence the need for a margin on reserves. If the assets and liabilities were perfectly matched (say through a reinsurance policy with a secure reinsurer, which covered any deterioration), then there would be no need for margins on reserves.

The management therefore needs to decide on a risk/reward strategy, based on a holistic view of the company's financial structure, incorporating new business levels, nature of the risk, reinsurance requirements and of course reserving philosophy. Ultimately, mathematical techniques (including the calculation of the reserves) are decision support tools, not decision-making tools and the decision comes down to judgement based on whatever information can be obtained.

Essentially, the reserving philosophy boils down to finding a criterion for drawing a line between capital allocated to the past claims and the solvency margin. There are several factors which are likely to influence the judgement, including:-

- (a) The overall financial strength of the company
- (b) The hardness of the market
- (c) The risk-averseness of the owners
- (d) The confidence of the management in the reserving

This is somewhat misleading since the effect of these factors can be to tempt the management away from prudence.

(a) would suggest that if the company is sound, the level of the margins is less important than if claims volatility could lead to insolvency. However, if a company reserves weakly, while it is strong, it will be very painful to strengthen reserves during loss-making years. Again, allocation of capital to margins on reserves is artificial and affects the perceived strength more than the true strength of the company.

(b) can pull in any direction. In a hard market, the demand for capital to support profitable new business is at its height. However, this is the easiest time to build up financial strength. In a soft market, the temptation on management is (wittingly or unwittingly) to permit the true finances of the company to weaken.

(c) is almost impossible to measure in most cases, but may be inconsistent with the more informed view of management (eg. demand from shareholders for short-term profits).

(d) is the only factor which consistently directs judgement appropriately. If management lacks confidence in the reserving either because of inadequate information or a track record of under-reserving, then they will be inclined to allocate more capital to past claims.

5. REPRESENTATION OF MARGINS

5.1 How Could Margins be Expressed?

The existence of the margins offer a degree of comfort to all those mentioned above. They therefore need to understand the form and extent of that comfort and so need to understand the significance of the margins. This in turn requires the margin to be expressed or explained in a form that is both meaningful (intuitively appealing?) and comprehensible.

Possible ways of expressing margins include:-

- (a) As a confidence interval
- (b) As a % or multiple of the standard error
- (c) As the difference between discounted and undiscounted reserves
- (d) As some arbitrary amount/percentage of reserves
- (e) No explicit definition

All of these could be considered either in aggregate over all classes or separately for each distinct class of business, although for (a) and (b) the latter will normally lead to higher reserves.

Key to the choice of a method of expression will be the role and sophistication of the audience for the reserve and so the margin. The choice will also depend on whether they require a range {(a) and (b)} rather than a point estimate {(c)-(e)} to indicate the level of comfort (and likelihood of discomfort) and whether they wish to concern themselves with the reserving philosophy or are content to rely on others' judgement as regards adequacy.

(a) Confidence Intervals

This is a widely understood concept - or at least an easily explained one. The idea that on average, the answer will be outside the range one time in 20 should be familiar to the clientele of most betting-shops. However, the method is the most demanding of assumptions.

A confidence interval requires a probability distribution - for example the error term in a model could be assumed to be some standard parametric distribution or an empirical claim distribution could be calculated from past data. This makes heavy assumptions about the continuing suitability of the models and distributions chosen, assumptions which are unlikely to be understood by many of those interested in the reserves. The models can also be criticised for restricting the variability to a narrow range of the possible events (eg. that of which there is experience in the past data) and so incorrectly stating the inherent variability.

In practice, such arguments could convince you not to leave bed in the morning

and those unlikely to understand the assumptions will be more content with a range that they can at least partially understand than none at all or something incomprehensible.

One apparent problem with the approach is that with sparse or erratic data, the range is likely to be exceptionally large, which will inhibit decision-making on the basis of the reserves. If there is that degree of uncertainty in the reserving process (although not necessarily the claims experience) this is an important point to be communicated, not covered up.

(b) Multiple of the Standard Error

A poor man's confidence interval - it offers a range, but one which it is difficult to communicate meaningfully to the layman.

The demands on the assumptions are less, in particular there is no need for an explicit distribution, however the figures may be misleading with highly skewed distributions.

(c) Difference between Discounted and Undiscounted Reserves

This is relatively simple to quantify and has the force of widespread practice, especially for tax purposes. The trouble is that it is a somewhat arbitrary calculation independent of the inherent variability and possible sources of unpleasant surprises. Although (luckily) many short tail claims are reasonably stable and many long-tail claims are highly volatile, the method is at best a compromise and it is difficult to communicate the level of comfort implied or relate it to an intuitively appealing reserving philosophy.

(d) Arbitrary Amount/Percentage of Reserves

This is very simple and calculation is trivial and although the amount of the reserve is simple to communicate, the practical consequence of it is not. This starts with an estimate of the true reserve and adds the explicit margin.

A fundamental communication problem with this is that having given a best estimate, this can often be taken as the true level in that the margin is regarded as the true margin. So this margin for prudence is seen a spare capital that might otherwise be spent rather than a provision for claims that might well be needed.

(e) No Explicit Margin

Examples of this include using the implicit (unquantified) margin held by not discounting or assuming future development which is worse than average/expected. Such an implicit margin can be assumed to offset items such as claims handling expenses and the risk and cost of reinsurer failure without actually estimating whether this implicit margin is in fact sufficient.

In practice, the existence of a wide range of methods in practical use indicates that there is no right method. They all have advantages and limitations. By and large the more powerful they are as communication tools, the more demanding the reliance on (possibly false) assumptions and data.

6 CONCLUSION

6.1 How Far Can We Go?

The reserves form an integral part in the financial strength of the company and there is a real need, particularly of the management and regulator for a clear indication of the level of comfort that they offer. The actuary has an obligation to do more than just estimate the level of the reserves, but also to communicate in meaningful terms the level and implication of their strength.

Many of the tools available for communication such as stochastic reserving methods and simulation techniques have theoretical weaknesses in some circumstances, but then so do more basic techniques and so does judgement! The reserving may look complex and unrewarding to management, but it is the actuary's responsibility to translate and so convey the spirit of the message if the message itself is inaccessible.

The question we started with was what constitutes a prudent margin. The answer is generally, if you define prudent, I'll give you the margin. Most actuaries would feel uncomfortable with that since the definition of prudent would be often be too demanding (eg. the worst case scenario). This is therefore a communication exercise - to explain and interpret from the range of legitimate representations of the margin, with caveats where necessary. It would be easier to leave the definition of the margin as vague and non-committal as possible, but the credibility of actuaries in general insurance has always rested on providing a service that is of use.

APPENDIX

Summary of Overseas Papers and Proposals

In the course of researching this paper, we were given a number of papers from abroad which deal, to some extent, with the adequacy of claim reserves. The following is a brief summary of the relevant sections. It is not comprehensive, since many covered considerably wider issues and there are undoubtedly other relevant papers. The main purpose is to alert readers to the existence of these papers. Moreover, this is merely our interpretation and may differ from the views of the authors. The comments are not intended to be critical or judgemental in any way and readers are advised to read the papers themselves before drawing any conclusions.

The choice faced by the authors of such papers (including ourselves) is between making firm statements about what constitutes an adequate reserve, which is likely to sound overly simplistic and leaving the definition of adequacy to the judgement of the reader (as we have done) which might be seen as opting out.

AUSTRALIA

1. Outstanding Claims in General Insurance: Institute of Actuaries of Australia - Discussion Draft of Professional Standard 300 (for comments March 1991)

This mainly discusses the issues for consideration when setting reserves in broad terms. It recommends specifying a "central estimate" - median present value (paragraphs 1.1 & 1.4) and then reserving more strongly, the difference being the "prudential margin".

Quotations from the paper are:-

- ☐ The actuary should not spread the effect of any changes (of valuation assumptions) over more than one valuation. (3.8)
- ☐ The risk free rate of return will normally be the appropriate discount rate. (3.11)
- ☐ The actuary should not recommend or support a provision which is less than the central estimate of the present value of the corresponding liabilities. (5.4)
- ☐ The actuary should not recommend or support a provision which is excessive. The actuary should not include, as part of the central estimate or prudential margin, any provision for contingent events which have a remote probability of occurrence. (5.5)
- ☐ The actuary has a responsibility to consider the reasonableness of the provisions adopted or recommended including the extent of any prudential margins. (5.6)

2. Margins for Prudence in Outstanding Claims Provisions by JR. Cumpston (for 8th General Insurance Seminar of the Institute of Actuaries of Australia 13-16 September 1992)

The paper illustrates the theory of estimating confidence intervals using run-off tables published by the Australian Insurance and Superannuation Commission 1977-89. The confidence intervals are expressed as the percentage margin required for reserves with a chosen probability of adequacy.

3. Prudential Margins and Claims Reserving Policy in General Insurance by JR. Trowbridge (for 8th General Insurance Seminar of the Institute of Actuaries of Australia 13-16 September 1992)

A general discussion of the principles and options as well as the problems involved. The paper makes some suggestions for percentages which would constitute high or low margins for certain classes of business.

CANADA

4. Recommendations for Property and Casualty Insurance Company Financial Reporting (Canadian Institute of Actuaries - 10 January 1990)

This includes an outline of reserving practice and considerations. There is little direct comment on what margins would be appropriate. There is a comment about language in the reports that:

"...proper provision..." is more than barely sufficient. It (ie. proper provision) is a good and sufficient provision determined from:

- a. adequate and appropriate assumptions and methods consistent with sound actuarial principles...
 - b. where more conservative, applicable statutory requirements.
- (Sections 6.06 and 7.06)

5. Discussion Draft on Provision for Adverse Deviations (Canadian Institute of Actuaries - 5 November 1992)

This gives firmer guidance than most on what constitutes a suitable margin. Companies are defined as being in either a "high" or "low margin situation" depending on whether a number of "significant considerations" apply. A guide high margin factor (applied to discounted reserves) would be 15% and a low factor would be 0%. If two or more "significant considerations" exist, then at least the average of the high and low should be used.

USA

6. Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves (Casualty Actuarial Society May 1988)

"A reserve should take into account the degree of uncertainty inherent in its projection. A reserve stated at its ultimate value may include an implicit provision for uncertainty due to the time value of money. If a reserve is to be stated at present value, it may be appropriate to include an explicit provision for uncertainty in its undiscounted amount. Further, an explicit provision for uncertainty may be warranted when the indicated ultimate reserve value is subject to a high degree of variability." (Line 308)

There was a discussion of risk margins in loss reserves at the CAS Spring 1993 meeting at Dallas, although we understand that no paper was produced.