RISK MARGINS FOR DISCOUNTED LOSS RESERVE

Committee on Reserves of the
Casualty Actuarial Society

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The purpose of this document is to outline the issues surrounding the uncertainty in estimating reserves for losses and loss adjustment expenses for property/casualty insurers (hereinafter labeled "loss reserves") and the appropriateness of presenting this uncertainty in terms of an explicit "risk margin". The particular context is where loss reserves are presented on a present value discounted basis.

This document was prepared by the Committee on Reserves of the Casualty Actuarial Society. The Committee has drawn upon several sources in preparing this document, including "Risk Theoretic Issues in the Discounting of Loss Reserves" by the CAS Committee on Theory of Risk and "Position Paper on the Methodologies and Considerations Regarding Loss Reserve Discounting" by the CAS Committee on Reserves, both published in the Fall 1987 Edition of the CAS Forum.

The Committee takes no position on the advisability of presenting loss reserves on a discounted basis and nothing in this document should be construed to imply otherwise.

I. Historical Perspective

Loss reserves comprise the largest liability item on a property and casualty insurance company's balance sheet. The associated liabilities by their nature are subject to uncertainty, making their exact determination difficult if not impossible. This is especially true of insurers and reinsurers writing long-tail casualty business where claims can remain unpaid for decades.

Traditionally, reserves have been stated on an undiscounted "full value" basis without explicit recognition given to the time value of money. There have been exceptions to this practice. One such example is workers compensation where most states allow some discounting of long term disability and fatal cases; another is the special treatment afforded by some states to limited purpose medical malpractice speciality companies.

Full value reserves have been viewed by many as containing an implicit margin (i.e., the difference between carried full value reserves and the "true" discounted reserves) which protects the balance sheet from unforeseen events. This margin varies in size according to the degree of conservatism used by the reserve analyst in the estimation of the full value reserves.

Full value reserves have historically been understated for the industry as a whole. Under-reserving has played a major role in several insolvencies where the reserve inadequacy has exceeded policyholders surplus by several multiples. There is the concern that, had explicit

loss reserve discounting been permitted - without accompanying changes in financial reporting and regulation - the problem would have been worse. This is particularly disturbing given the current interest in allowing discounting for many purposes. With the passage of the Tax Reform Act of 1986, the IRS now requires discounting for tax purposes. Furthermore, the AICPA is studying the implementation of discounting for GAAP accounting.

The balance of this paper discusses the issues surrounding an explicit margin for adverse deviations in loss reserves that have been discounted to a present value.

II. The Need for Explicit Reserve Margins

Generally, the longer the development tail for a line of business, the more uncertainty in the estimation of its loss liabilities. Thus a correlation exists between investment income opportunity and reserve uncertainty. While this relationship is more accidental than fundamental, it is true that discounting loss reserves removes a substantial, albeit imprecise, reserve margin. It is also true that the act of discounting does nothing to reduce the uncertainty in the underlying liabilities. Thus discounting loss reserves makes the need for an explicit recognition of risk more pronounced.

As mentioned earlier, industry loss reserve estimates have historically been inadequate. Compilations from the 1988 SEC Loss Reserve Disclosures for 58 publicly traded property/casualty companies indicate the following:

Reserve Date	Emerged Reserve Deficiency (as of December 1988)* Dollars (billions)	Percent of Carried Reserve
1978	$ 7.6	22%
1979	6.9	17
1980	6.2	13
1981	6.3	12
1982	8.5	16
1983	12.3	21
1984	15.9	24
1985	13.9	18
1986	7.6	8
1987	2.1	2

(Note that this table reflects actual emerged reserve deficiencies through the 1988 financial statement. Thus, the true ultimate deficiencies may be higher, particularly for the more recent reserve dates.)

There are numerous reasons for these results, including the following: poor reserve estimation techniques; implicit discounting (i.e., use of intentionally optimistic reserving assumptions); indirect discounting (e.g., use of financial reinsurance); unforeseen or extra-contractual liabilities (e.g., asbestosis, agent orange, DES, EIL, triple-trigger theories of liability, judge-made law, etc); "management" of results during underwriting cycles; and uncollectible reinsurance. Regardless of the reasons, it is clear that the theoretical "discount" has provided a much-needed cushion against adverse development.

* Source: 1988 SEC Loss Reserve Disclosures, A Compilation and Analysis of the SEC Disclosure Data, A Tillinghast Publication.

If reserves are discounted, the reserve analyst and others relying on the financial statements can no longer take comfort in an implicit margin or rely on vague notions of "conservatism". In this situation, an explicit allowance for the uncertainty intrinsic to the reserving process is a necessary component in the presentation of the financial condition of an insurance enterprise.

As a practical matter, precedents exist for explicit margins, e.g., the statutory penalties contained in Schedules F and P of the Statutory Annual Statement.

III. Problems with Explicit Reserve Margins

A number of problems and issues need to be understood before an explicit margin for adverse deviations could be included in reserves.

First, practical methods which are easy to use for estimating margins have not been fully developed. One likely reason for this is that interest earnings associated with full value reserves have been viewed as a sufficient implicit margin.

Second, the inclusion of a specific margin may complicate financial statements and make it more difficult for regulators, industry analysts and others to understand them.

Third, many standards of measuring the solvency of a company by use of benchmarks (e.g., IRIS tests) would be complicated if an explicit margin is established in conjunction with discounting loss reserves.

Fourth, the inclusion of a specific margin could distort Annual Statement development schedules (e.g., Schedule P) as well as industry composites of these schedules.

Fifth, the probable lack of uniformity in approach of calculating margins among companies would make comparison of results and performance difficult.

Sixth, the inclusion of a specific margin might not improve the accuracy of the bottom line but simply move the subjectivity, imprecision and conservatism to a different level.

Seventh, unless there were uniformity of approach and recognition of the margin by the various accounting disciplines, the differences that currently exist among them would widen. It is unclear whether GAAP accounting will allow the additional expense item (reserve margin) because of the principle of matching income and outgo. Tax accounting may not allow the margin because it reduces income and, therefore, tax revenues.

These problems are viewed by some as reasons not to include a margin for adverse deviations. However, many of these problems arise equally with respect to loss reserve discounting. Perhaps the solutions to these problems could help the industry focus on the key underlying problem with reserves - uncertainty.

IV. Derivation of Explicit Margins

The theory of estimating reserve margins has not been developed fully and a technical discussion of current quantification methods is beyond the scope of this paper. European actuaries and academicians have conducted research in this area but the work is highly theoretical with limited applications. To date little work has been done on this subject in North America, although papers addressing the issue have recently emerged in the PCAS and CAS Discussion Paper transcripts.

The CAS Committee on Theory of Risk, in their discussion paper "Risk Theoretic Issues in the Discounting of Loss Reserves," has outlined several approaches. These and other potential methods include:

- Empirical study of historical variation in loss development patterns.

- Empirical study of historical reserve deficiencies.

- Confidence interval techniques which use size of loss distributions to establish probability of the actual losses exceeding an indicated level.

- Ruin theory application, which is the basis for solvency regulation in some European jurisdictions. Reserves are established such that the probability of the company's technical insolvency is reduced to a specified level.

- Utility theory. From a utility function and the distribution of aggregate losses, utility theory can be used to compute a "certainty equivalent". The difference between the certainty equivalent and the expected value reserve represents the risk margin.

- The margin set as the difference between the reserve discounted at a risk-related interest rate and reserve discounted at a riskless rate.

- The margin set at a level that a third party would require to commute the reserves.

Regardless of the method used to calculate a reserve margin, the following four issues remain:

First, a reserve margin should distinguish among the following sources of risk:

- Process risk inherent in any stochastic process.

- Parameter risk which includes such items as reinsurance recoverables, changing company management and practices, changing social-economic environment, etc.

- Risk caused by the use of non-optimal reserving techniques.

- Potential for abnormal, unforeseen liabilities such as extra-contractual obligations caused by retroactive legislation and court decisions.

While these last two items are parameter risks, we list them separately to highlight their importance.

Second, the reserve margin should consider the best estimate of the undiscounted reserve and the corresponding discount. This requires the reserve analyst to make an assessment of payment pattern and interest rate risk.

Third, the reserve margin should vary by line of business and maturity. For example, long tail lines of business generally require a larger reserve margin than short tail lines. Similarly, older more mature accident years may require a smaller reserve margin than younger, less mature accident years.

Fourth, the advisability and/or need for a mandated standard calculation approach should be explored. Is there a compelling need for uniformity among companies?

V. Implications for Financial Reporting

The development and isolation of an explicit risk margin raises many questions in accounting for the margin.

- How should the risk margin be booked: as a liability item or a segregated part of surplus?

- Should it be on the balance sheet at all?

- Should there be different methods for accounting for the risk margin under GAAP; SAP, Tax; and Purchase accounting?

A partial list of the arguments for and against booking the risk margin as a liability item, as a surplus item, and as an off balance sheet item are:

AS A LIABILITY ITEM

Arguments for:

- It becomes more affordable since it may result in reduced taxes
- It corresponds with current practice
- Intuitively reasonable to postpone income until it is certain
- It should be considered a real cost of doing business
- It creates a cushion of solvency

Arguments Against:

- Companies are already being taxed on the present value discount of the liability under the Tax Reform Act of 1986 (TRA 1986)
- Some consumer advocates believe that insurers suppress reported profits by artificially inflating reserves
- It fails to match income and expenses
- It fails to fully recognize the time value of money

AS A SEGREGATED SURPLUS ITEM

Arguments For:

- It maintains cushion for solvency if incorporated as segregated surplus
- It encourages unbiased statement of discounted reserves
- It does not add income incentive for understating reserve margin

Arguments Against:

- If earmarked as segregated surplus, it may restrict dividend payments to investors
- It may confuse potential buyers of the net worth of the company if no standard exists on setting the reserve margin

OFF BALANCE SHEET

Arguments For:

- It does not require funding, but enumerates a measure of risk for discounted loss reserves

- There is historical precedent for other items of this native in the statutory blank (e.g., Schedule P discounting disclosure; Schedule D disclosure of market vs. book value of securities)

- It causes the least amount of accounting disruption

Arguments Against:

- Realistically, it results in no change in current practice

Different issues pertain to different accounting contexts, i.e., GAAP, Statutory (SAP), tax and purchase accounting. Each of the different contexts is discussed below:

GAAP ACCOUNTING

The purposed of GAAP accounting is a direct matching of income and expenses. Therefore, if a discounted reserve provides more relevant information, can be calculated with sufficient reliability, and is measurable, then it should replace the use of a full-value reserve. Not all these attributes are met with sufficient reliability since discounted reserves can vary as much or more than full-value reserves. Therefore, there is sufficient reason to incorporate a reserve margin under GAAP accounting. The direct matching of income and expenses may require the reserve margin to be booked as an item of segregated surplus or as an off-balance sheet item if it is not expected to be utilized.

The reserve margin that is utilized as determined by various adequacy testing can require a "true-up" in the current period or an amortization over the remaining life of the asset or liability.

SAP ACCOUNTING

Under SAP Accounting, the reserve margin needs to be considered to fulfill the basic theory underlying such accounting: conservatism. The reserve margin would be considered as an additional buffer against insolvency for any insurer. The most likely way to account for this margin is to earmark it as a reserve account similar to an Mandatory Securities Valuation Reserve (MSVR) in life insurance or as restricted surplus needed to maintain the solidity of an insurer. As restricted surplus, similar to the surplus for loss portfolios

under Regulation 108 in New York, the funds are not available for paying dividends and must be amortized as loss payments are made. Given the conservatism that is the hallmark of SAP reporting, it is critical that reserve margins be considered concurrent with any permission/requirement of discounting.

TAX ACCOUNTING

Under the Tax Reform Act of 1986 (TRA 1986), an explicit risk margin may be considered a contingency reserve and therefore would not be tax deductible. Also under TRA 1986, an insurer that discounts loss reserves, resulting in a discount which is larger than the discount resulting from the IRS methods, would pay taxes based on the higher discount (and income) amount. The introduction of discounting and an explicit risk margin could result in significantly higher tax payments for insurers.

PURCHASE ACCOUNTING

Purchase accounting requires that all values be at fair market value. If full-value financial statement reserves are the starting point, they are re-stated at present value. The reserve margin (consisting of the difference between the full-value and the present value loss reserves) would be required to be discounted at an interest rate equal to a threshold rate of return considered necessary to attract a willing purchaser. This is necessary whether the reserve margin is booked as a liability or surplus item. The mechanics of the calculation require:

- Establishing the interest earned on assets backing the discounted loss reserves on a time line

- Selecting an investment rate to present value the interest earned

- Calculating the present value of the reserve margin

VI. Implications for Reserve Testing

If an explicit reserve margin is incorporated in the balance sheet and reserves are discounted, many reserve tests based on the statutory Annual Statement will not change or require a minimal effort to place the results on a pro-forma basis with previous results. The IRIS Tests and A.M. Best analysis can be adjusted to add the reserve margin to the discounted reserves for most leverage testing.

To maintain Schedule P testing; reserves would have to be stated at full-value without risk margin. This is the method now used for Schedule P even under circumstances where discounting is permitted.

As for the reserve runoff schedule under SEC Form 10K, this schedule shows either statutory results or GAAP results. If statutory results are not at full-value and are used, then there will be an adverse runoff equal to an amount approximating the discount in these reserves. If GAAP results are used, then this schedule is seriously impaired unless a supplementary schedule is provided showing the accretion of interest on discounted loss reserves. This calendar year test would require knowing the interest accreted by report year which can be very vague since

interest rates earned vary from year to year on cash received. To avoid problems in the use and the calculation of the schedule, the statutory results should be incorporated at full-value. Currently, the SEC form already is filled out with distortions due to discounting loss reserves for some lines of business and the inclusion of loss portfolios within reported results.

Similarly in the Canadian P&C 1 and P&C 2, discounted reserves would have to be restated to a full value basis for use in the runoff schedule (formerly Exhibit 34). In addition for the Minimum Asset Test (or the Test of Adequacy of Deposits in Canada in P&C 2), full value reserves should be used when determining the margin required for Unpaid Claims and Unearned Premiums. Use of discounted reserves would understate the required margin.

If discounting reserves is accepted, other testing of results to assure solvency should be established. Under GAAP, the testing of assumptions such as actual versus expected loss payout and the actual versus expected interest earned need to be initiated to "true-up" discounted loss reserve estimates.

In addition to tests of the adequacy of full-value reserves, new tests and criteria would need to be established to measure departures from expectations with respect to:

- assumptions underlying the discounting calculation (interest rate, payout pattern, etc.)

- assumptions underlying the risk margin

VII. Conclusion

1. The purpose of a risk margin should be to enhance reporting of the financial condition of an insurer, including the disclosure and (to the extent possible) quantification of the uncertainty surrounding reported values.

2. In quantifying and disclosing risk margins within the appropriate reporting context, the reserve analyst should consider the following elements of the process:

   - the best-estimate full-value reserve;

   - the amount of discount for anticipated investment income;

   - a provision for stochastic uncertainty (i.e., process risk); and

- a provision for "future unknowables which are virtually certain to occur." (See David Hartman, Centennial address on "Reserving for Liability Claims," June 1989.)

3. The amount of risk margin should be explicit.

4. Uniformity of approach for establishing at least minimum explicit risk margins should be encouraged. Departures from this uniform approach should be disclosed.

5. Further research in the quantification of appropriate risk margins should be encouraged among the Casualty Actuarial Society membership.

In summary, the Committee on Reserves believes that the issues pertaining to explicit reserve risk margins cannot be isolated from those surrounding reserve discounting. Unfortunately, the techniques for quantifying risk margins are not as well advanced. However, we do not believe that this is a valid reason for ignoring or deferring consideration of risk margins.

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