

Loss Modeling Considerations The Management Perspective

Introduction

In the spring edition of the Palmetto Captive Insurance Journal we explored the use of loss forecasts in planning and managing a captive program. In this paper we wish to expand on those ideas to address several issues that must be considered when employing the results of loss modeling in implementing and operating a captive insurance program. All that follows will be directed towards the owner (or manager) of a captive insurance facility. We will assume that a loss analyst has been engaged by the captive insurance company management to produce loss forecasts for use in feasibility studies, pricing analyses or reserve adequacy tests.

Corporate governance and the proper role that management should play in reviewing financial statements has become an important issue with Washington, Wall Street and the general public. With regard to financial issues effecting captives, it is management's role to act in a responsible fiduciary capacity. Since, in general, the size of the captive operations is limited, it would make little business sense for captive management to retain a full time loss analyst or actuary on staff. In most instances, it is prudent for management to engage the services of an independent reserving/loss specialist, who has the experience and technical expertise necessary to complete meaningful loss forecasts for captive insurance programs. "Using the Work of a Specialist" is a fundamental precept that has been recognized by the American Institute of Certified Public Accountants as an important auditing standard for many years. Management's role should be to review the key considerations and assumptions underlying the loss study and to determine the impact of the predicted results on captive operations.

Although it is not necessary to grasp the mathematical complexities involved in the loss modeling performed by the engaged loss analyst, there are certain elements affecting the accuracy of loss estimates that management must understand. We will discuss three of the key issues associated with loss forecasting accuracy.

Definitions

Before proceeding, it is worth defining several concepts to remove any possibility of ambiguity.

Accident year loss experience refers to dollar amounts associated with all claims that have occurred within a twelve month time period. Actuarial models typically analyze aggregate loss experience, as opposed to individual claims. Results are often presented on an *accident year* basis. Although there are exceptions, captives generally provide coverage for all claims that have occurred within a twelve month period, i.e. on an accident year basis.

Incurred losses refer to losses paid to date plus all outstanding case reserves as of the same date. *Incurred losses* are valued as of a given date. In the case of *accident year incurred losses*, the evaluation date typically would be the last day of the twelve month period under review, or annually thereafter. Case reserves are those amounts established by the captive's claims adjuster, or engaged third party administrator, on an individual claim basis, as a best estimate of the settlement value for that claim.

Ultimate losses refer to the ultimate settlement value after all claims have been paid in total. Generally, actuarial loss models are employed to estimate *accident year ultimate losses*. The difference between *incurred losses* and *ultimate loss* amounts is referred to as *incurred but not reported*, or IBNR. IBNR is, in essence, a balance sheet account that represents an important accrual on financial statements.

Loss modeling for captives usually involves forecasting ultimate losses on an accident year basis. The models consider the manner in which coverage is provided by the captive insurance program, the type of coverage and the way in which financial results are recorded.

Line of Business

The type of coverage provided by the captive directly impacts the accuracy of forecasts. Intuitively, we all feel that it must be harder to predict loss exposure for a medical malpractice insurer as opposed to a captive covering automobile physical damage claims. To understand why, we will disassemble loss experience for further analysis. Aggregate accident year losses can be separated into two major components: the number of claims, or frequency; and, the size of individual losses, or severity.

$$\text{Accident Year Losses} = \text{Frequency} \times \text{Severity}$$

Consider the following two cases to illustrate how the decomposition of aggregate losses into these two basic components can help in accessing results of loss forecasts. We will assume that the organization in our examples is a hospital entity, call it Palm Tree Medical, that wishes to explore the possibility of establishing a single parent captive insurance program.

First, suppose that Palm wants to provide workers compensation coverage to its employees through some form of a fronting program. That is, the Palm captive would reinsure workers compensation coverage provided on a primary basis by an accredited casualty insurance carrier. Workers compensation exposure for most organizations can be characterized as high frequency (large number of claims) with low to moderate severity. Although catastrophic events, such as those associated with infectious disease contamination in the case of Palm, can lead to high severity claims, proper structuring of specific excess coverage can reduce the impact of infrequent incidences. Net of such extreme cases, each claim contributes a relatively small amount to the overall loss

experience. It makes intuitive sense that incurred loss projections based upon aggregate experience will be stable. When all claims have closed and final settlement payments completed for the projected accident year, management can expect aggregate losses to be close in monetary value to forecasted amounts. Since the ultimate value of aggregate losses is not expected to vary significantly from projected, the need for additional surplus as a percentage of expected incurred losses would be small.

In the second scenario, suppose that Palm is endeavoring to cover hospital professional liability exposure through its captive program. Hospital professional liability exposure can be characterized as low frequency (low number of claims) associated with high severity (some claims can be large). Large claims can arise from such unfortunate events as procedures causing injuries or fatalities in delivery rooms. Typically, hospitals will not experience a large number of professional liability claims in any 12 month accident period, but each claim can have a significant impact upon the overall accident year losses. Contrary to the situation portrayed for workers compensation, annual loss estimates are much harder to predict and can be subject to much larger variance of final results from forecasted ultimate values. Often, actuaries will use complex modeling techniques to complete forecasts. Management must take into consideration increased variability inherent in loss forecasts for this type of insurance program. In the planning process, management will therefore be forced to address the issue of additional surplus as a cushion against less predictability in ultimate losses.

Size of Business

The size of the loss portfolios will logically influence precision involved in loss forecasts. The smaller the volume of business the more impact individual claims will have on aggregate loss experience. This situation is similar to the hospital professional liability example described above.

In addition, the question also arises as to the reliability of forecasts based upon a small volume of historical data. To address this issue of reliability, actuaries often turn to other, larger sources of data to augment limited experience of the actual captive insurance program. For Palm, insurance industry experience, or experience from other medical associations, might be employed in the loss forecasting process. When reviewing forecasts using data and experience external to the captive program under consideration, it is important for management to assess the relevance of such data to the future operations.

Loss History

Typically, loss models employed in the captive planning process, or in reviewing the adequacy of reserves, depend upon historical data to predict expected losses for the accident periods under review. Since management understands the procedures and processes that comprise the operations to be covered, they play a critical role in assessing whether past loss scenarios can adequately describe the contemplated captive program under review. The relevance of past experience is an important key to designing loss

forecasting models. For example, back injuries to nurses and other medical personnel can be significant problems at medical care facilities, such as Palm. Medical staff often must physically lift or assist patients under their care. Designing and implementing educational programs on the proper techniques for lifting heavy objects, along with distributing some forms of back braces or supports can drastically reduce such worker related injuries at Palm. The institution of these safety procedures coincident with the development of the captive program would make past experience less relevant to future predictions.

An ancillary issue in judging the accuracy of forecasts is the need for consistency in the historical experience employed in the loss models. For example, if several different third party administrators had been used by Palm during the time span of the historical claim experience used in the forecasting models, inconsistencies in reserving procedures and claim settlement rates could distort historical loss patterns. Since historical loss patterns form the basis of many loss models, such inconsistency could adversely impact precision in forecasts.

In addition, suppose that historical claims data employed by Palm in loss forecasts spans several different alternative risk transfer programs. For example, workers compensation coverage for Palm might have been provided by paid loss retrospectively rating contracts for the last three accident years and guaranteed costs with high deductibles for the previous two years. Settlement and reserving patterns can be quite different under these two programs.

Management's Role

The above discussion has mainly concentrated upon issues associated with accuracy in loss forecasting for the feasibility planning process. We have discussed captive insurance programs in which individual claims can have a significant impact upon the total ultimate value of aggregate loss portfolios. We have suggested that such a program would require more financial assets to absorb unexpected contingencies than situations where each claim contributes little to the overall results. We have also discussed several additional situations in which the relevance of past experience as a guide to future results would lead to elements of imprecision in forecasts. Increased variability in forecasts will require additional capital as a percentage of assets for financial solidity. Determination of the relative capital requirements for a captive program is an important element in management's planning process.

With regard to an on-going captive insurance company, predictability in loss estimates directly impacts the relative ranges in ultimate loss estimates, or corresponding IBNR, that underlie liabilities posted to financial statements. For example, ranges on a percentage basis in reserve estimates will be larger for a hospital professional liability than for workers compensation. Management should make certain that forecasted losses underlying posted IBNR fall within a reasonable range of estimates. Quantification of reasonable ranges is open to different interpretations, but one aspect of financial reviews

by independent auditors is to determine or verify that the range of loss estimates underlying posted reserves for a captive insurance program is not too large.

Finally, although much of procedures and techniques that form the backbone of loss forecasts and reserve analyses are foreign to owners or managers of captives, the final financial decisions rest with them. Common business sense, knowledge of unique aspects of their own operations, and reliance upon expert advice and assistance will allow management to properly assess loss projections and related financial issue. In any event resolution of these financial issues remains the fiduciary responsibility of the managers or owners.