Actuarial Loss Models
A Valuable Tool in Captive Planning

Introduction

Utilization of captive insurance as an alternative risk transfer vehicle is well established. Forming a captive is one of several methods by which a corporation can fund that portion of its insurance risk that it wishes to retain. The decision by management to establish a captive insurance company involves the resolution of many issues.

Although there are many operational forms that are classified as captives, for the sake of simplicity and without the loss of relevance, the following discussion will be limited to consideration of a single parent captive. Typically, management, with the assistance of its risk management consultants, consulting actuaries, and others, will compile feasibility studies to review the economic advantages of several risk transfer alternatives. Often, some form of "bottom line" cost analysis will be performed to evaluate alternative risk transfer programs under consideration.

Projection of Aggregate Losses

One of the major components of any feasibility study is the analysis and quantification of losses and associated claim expenses related to exposure from the insurance risk under consideration. Henceforth, to simplify the discussion, "losses and loss expenses" will be referred to as "losses". Typically, loss forecasts will derive estimates for the first 12-month period of the captive. Loss estimates for subsequent years are often based upon anticipated changes in operations of the parent, changes in the economic and social environment, and changes in provisions of policy contracts issued by the captive.

Loss estimates for several years provide important input to management in the evaluation of the financial solidity of the captive insurance program. Multi-year projections of aggregate incurred losses are crucial to the proper construction of financial pro-forma balance sheets and income statements. Cash flow and projected investment earnings for the captive are impacted by assumed payout patterns.

In loss forecasting the actuary attempts to quantify all claims that the captive will be obligated to pay under the terms of a 12-month contract. Several forecasts are often necessary to properly evaluate different possible policy provisions under consideration. For example, alternate per occurrence and annual aggregate retentions might be reviewed. Further, variations in the manner in which the captive will issue contracts (e.g. direct vs. reinsurance of fronting carriers) and the form of excess insurance/reinsurance covers for the captive itself can lead to numerous iterations in the forecasts.

Review of the specific elements affecting the accuracy of loss estimates is beyond the scope of this discussion. These issues will form the basis of a future article. The

following discussion concentrates on dissecting possible uses for the results of the loss forecasts. In particular, the following will address best estimates in incurred losses, the pricing function, and quantification of capital requirements.

Best Estimates

The Casualty Actuarial Society has formally adopted principles relating to the establishment of loss reserves:

> "An actuarially sound loss reserve… is a provision, based upon estimates derived from reasonable assumptions and appropriate actuarial methods for the unpaid amount required to settle all claims…for which liability exists on a particular accounting date."

Loss forecasts involved in the captive planning process are different from loss reserves. There is no need from an accounting perspective to establish liability accounts before the captive has generated revenues as an operational insurance enterprise. But, these same principles should be applied when predicting future aggregate losses under prospective captive risk management programs.

The analytical methods and techniques employed in loss forecasts will be similar to those used in establishing reserves. For the planning process, management should concentrate on reviewing underlying assumptions, particularly those concerning intended operational procedures for the captive. Management must be comfortable that the forecasts properly reflect the operational structure and procedures under which the captive will function. For example, proper retentions and reinsurance/excess insurance programs should be explicitly recognized in the forecasting models.

Variability in Loss Projections

Loss forecasts are predictions of the monetary value of future contingent events. As such, they are subject to uncertainty. Therefore, it is often appropriate to consider ranges of values in addition to point estimates. The following is extracted from the aforementioned reserving principles adopted by the Casualty Actuarial Society:

> "The uncertainty inherent in the estimation of required provisions for unpaid losses or loss adjustment expenses implies that a range of reserves can be actuarially sound. The true value of the liability for losses or loss adjustment expenses …can be known only when all attendant claims have been settled."

When interpreting the results of loss forecasts it is important to keep in mind that there is a certain level of variability included in the predictions. As stated above, the actual monetary value of all losses will never be known until all claims have been settled and closed. But, point estimates in the forecast represent the "best estimate" of the ultimate settlement value of all claims covered by the provisions of the policy contract to be issued by the captive.

> "The most appropriate reserve within a range of actuarially sound estimates depends on both the relative likelihood of estimates within the range and the financial reporting context in which the reserve will be presented."

The procedures employed in reviewing loss and loss adjustment expense reserves for insurance company year-end financial reports provide a perspective as to the proper interpretation of projections for the captive insurance company. The principles described above imply that there is variability in reserve estimates. If each estimate within the range of projections were equally likely to occur, audit principles state that reserves should be set at the minimum value. Typically, reserving actuaries derive point estimates, which represent the most probable outcome based upon assumptions consistent with coverages applicable to the insurance program under consideration. Within the context of a captive feasibility study, point estimates represent the actuary's best forecast as to the level of anticipated aggregate losses.

Point estimates and the variability of loss projections, either implicitly or explicitly, form critical elements in the planning process leading to the determination of the feasibility of establishing a captive insurance program. The remainder of this article will concentrate upon the roles loss forecasts play in these studies.

Loss Projections in the Planning Process

Loss projections enter the captive planning process at several steps. Bottom line analysis of the economic feasibility of alternative risk transfer programs is one of the first steps in this process. Losses represent the largest component of expenses associated with the insurable risks under consideration.

Trial financial statements, incorporating cash flow analyses, balance sheets and income statements are important in any economic feasibility study considering the establishment of a captive insurance program. As management reviews potential balance sheet projections, point loss forecasts represent best estimates of values for the loss components of the liability accounts. But, the planning should also include reviewing scenarios based upon ranges of estimates resulting from the variability in loss forecasts. In order for this phase of the planning process to provide meaningful information, the variability in loss forecasts has to be manageable. The question is often asked as to what is the maximum swing in the range about the point estimate that should be allowed. There is no set standard and management should be guided by the reasonableness of the assumptions employed by their actuary and the nature of the insurable risk. For example, the range of estimates would be larger for medical malpractice exposure than for automobile physical damage for the same volume of business.

Pricing involves developing the annual premium that the captive will charge under its insurance contract to the parent. Establishing premium level flows naturally from the previous step of reviewing loss and claim expense projections. Premiums should equal an estimated loss component loaded for anticipated operational expenses, including

reinsurance charges. Variability in loss projections will lead to different premium scenarios.

Determination of the amount of initial capitalization for the captive insurance company is critical to financial solidity. Obviously, the amount of capital must satisfy regulatory standards. In addition, loss projection models can assist management in arriving at an acceptable level for initial capitalization. Loss ranges described above are reasonable estimates of ultimate settlement values. In addition to these forecasts, actuarial models can be employed to derive loss amounts at levels that are possible, but not probable. One technique commonly employed involves simulation models that quantify acceptable upper limits to ultimate settlement values for losses. For example, the results might predict levels where fully settled losses are expected to be less 95 times out of 100. The difference between that estimate, commonly referred to as "the 95% confidence level", and the best estimate, described above, represents an amount that might be chosen as the required capitalization of the captive.

In the in-depth feasibility study it is essential that management review several required capitalization scenarios and associated loss estimates. For example, the minimum regulatory capitalization standard can be equated to losses associated with a confidence level. Other capitalization levels should also be considered before arriving at an amount that is prudent to management.

Final Results

To sum up, actuarial loss estimates are key elements in financial and underwriting feasibility studies of the proposed captive program at three junctures. First, loss forecasts form the basis of projected losses that are a major component of the liabilities the captive will incur on annual basis. Second, the loss amounts from the first step, loaded for administrative and operational expenses, will be integral in establishing premiums that the captive will charge to cover ultimate settlement values under the policy contract issued to the parent. Third, loss models should be employed to develop adequate initial capitalization available to absorb any adverse underwriting results. In this regard, management must be comfortable that the level of capital will be sufficient to protect the financial integrity of the captive against unforeseen events.

The above discussion has not considered discounting of losses and the impact of investment earnings upon the results. Investment results can be measured through consideration of proposed payout patterns and cash flow. If investment earnings are to be incorporated into feasibility planning, it is important to remember that only invested assets will generate income.

Finally, the planning processes described in this note stress the importance of management's active participation in all major decisions. In this regard the role of the actuary in the loss forecasting steps is crucial. Management must feel comfortable with the assumptions and techniques that the actuary employs in modeling losses. It is not essential that the managers understand all mathematical algorithms in the actuarial

models. Rather, management should be confident that all assumptions and procedures underlying the loss models anticipate major operational aspects of the captive insurance program. In this manner, loss models and your actuary can be a valuable asset in the captive feasibility planning process.