While the model might not be able to provide all the answers in situations such as those described above, it could be very useful by providing a baseline from which additional questions can be raised.

CONCLUSION

Mr. Sturgis's paper provides us with a new and powerful valuation technology. His paper illustrates the model's use in its "normative" state, but the model's uses extend to many different contexts, both within and outside the acquisition arena.

DISCUSSION BY ROBERT ROTHMAN AND ROBERT V. DEUTSCH

Introduction

The valuation of property/casualty insurance companies is a topic that has been neglected in the actuarial, financial, and economic communities. As Mr. Sturgis points out, there has been a notable increase in property/casualty insurance company acquisition and merger activity. Hence, his paper represents a needed and timely addition to the existing body of literature, and we hope that it provides the impetus for further research in this area.

Mr. Sturgis makes a number of points that we believe are important and that we will highlight in the following discussion. He concludes that a model based on a statutory earnings stream is appropriate for measuring the economic value of a firm. The use of statutory earnings to value an insurance company dates back to James Anderson's 1959 paper[1] and, to our knowledge, has not been contested as an accurate measure of value.

As an alternative, we believe that a model based on discounted cash flow has several advantages. Although such an approach has not been applied specifically to the property/casualty insurance industry, the use of discounted cash flow as a valuation technique has been well addressed and accepted by the business community, particularly in a capital budgeting framework. An application of this concept to a property/casualty company is discussed later in this review.

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[1] James C. H. Anderson, "Gross Premium Calculations and Profit Measurement for Non-Participating Insurance," *Transactions, Society of Actuaries*, Vol. XI (1959), p. 357.

Valuation Measures

One of the objectives of Mr. Sturgis's paper is to focus on a valuation concept that determines what a purchase price "ought to be." His paper presents definitions of five alternative valuation measures and selects economic value as the most suitable in terms of the stated objective. We agree with this point, particularly from a potential buyer's perspective. Although the actual purchase price may differ from economic value, a determination of the economic value can provide the buyer with a useful benchmark from which to negotiate.

Mr. Sturgis defines economic value as "the book value plus the present worth of expected future earnings." He further points out that earnings should include only those available to the buyer and translates this to mean after-tax statutory earnings. We believe economic value is better defined as the present value of future cash flow. If the only cash flow available to the investor is the dividend stream, and dividends are limited to statutory earnings, then the two definitions of economic value result in essentially the same valuation. The treatment of book value is the only item that may cause the two definitions to produce different results.

Cash flow valuations frequently are used by the insurance industry for purposes other than the valuation of a company as a whole. For example, an actuary pricing a portfolio reinsurance transaction often will estimate the discounted value of the future loss payments.

In general, the property/casualty insurance industry is placing more emphasis on investment income in pricing its products than it has in the past. This shift in emphasis has been due to high interest rates, which reduce the present value of future loss payments and, therefore, reduce the premium required to produce a target rate of return. This concept of pricing for total return rather than underwriting profit—often called "cash flow underwriting"—is another example of the insurance industry's use of cash flow valuation techniques.

Why, then, has the insurance industry been reluctant to use cash flow techniques in valuing a company as a whole? Perhaps the reluctance stems from the belief that cash flow available to the investor is limited to statutory earnings. However, limiting cash flow to statutory earnings is unrealistic. It ignores the value of internally generated cash that can be invested by the owner at his discretion, within certain regulatory constraints. For example, excess cash can be used to finance further acquisitions or a wide variety of other investments.

Implications of Cash Flow Valuation

To develop further the concept of discretionary cash and some implications as to its use, assume that an owner invests a portion of his insurance company's portfolio to purchase another company that is not necessarily another insurance company. The remaining portion of the portfolio is invested in traditional securities such as government or corporate bonds. We submit that the value of the newly acquired company must be considered in the valuation of the property/casualty insurance company. The new company's assets, future earnings, and accumulation of wealth become available to the owner because the insurance company has provided the means of financing. Cash flow analysis permits the owner to measure properly the results of this concept.

Both uses of cash for investments, namely for discretionary investment and for traditional investment, can be valued by analyzing cash flow, but the discount rates used may be significantly different for different types of investments. The concept of valuing in-force business apart from new business also can be viewed in terms of cash flow. The value of in-force business is primarily the discounted investment portfolio runoff, net of the discounted loss payments. The discounted investment portfolio runoff is a function of the assets currently on the books and the rate at which those assets will be converted to cash. Net cash flow for new business is the discounted premium income less the discounted loss and expense outgo. Since greater uncertainty normally is associated with cash flows on new businesses, the discount rate for new business usually would be higher than the discount rate for business already on the books.

In summary, to analyze properly cash flow one must distinguish between cash that is available to the investor for use at his discretion and cash that is locked into traditional investments in terms of both in-force business and new business. It is important to note that future investment income that could have been earned on discretionary cash is not a component of cash flow available to the buyer, since investment income is considered implicitly in the discount rate used to calculate the present value. This differs significantly from statutory income, which includes investment income explicitly. However, investment income is considered when determining the cash flow relating to locked-in assets since the cash invested in these assets is not a part of the cash flow; however, these assets do constitute cash flow upon reaching maturity.

Cash Flow Model

We developed a model to simulate both statutory earnings and cash flow with the ability to vary premium growth rates. For comparison purposes, the model utilized essentially the same assumptions employed by Mr. Sturgis. We analyzed the results of the model under three different premium growth patterns: constant premium volume, premium increases of 20% per year, and premium decreases of 20% per year. Valuations were made at two different valuation dates in order to consider a new company situation versus an established company with historical operating results. In addition, valuations were made using various discount rates.

We made the following observations:

—The results of the statutory and cash flow models differ dramatically depending on the valuation date and the discount rate.

—As one would expect, at a 0% discount rate the cash flow gain is negative because there is an underwriting loss.

—The impact of the underwriting loss is mitigated by the use of a positive discount rate and may become inconsequential depending on the premium growth rate.

—The cash flow is a function of premiums written and the loss payout pattern; the effect of a deferred payout of losses, generally considered beneficial, actually is contingent upon the premium growth rate.

In general, there is a tendency for statutory valuations to undervalue a company that is experiencing premium growth and to overvalue a company that is experiencing premium deterioration. The reason for this is that statutory accounting principles do not recognize revenues and expenses in the proper periods, i.e., premiums and losses are recognized over the policy period, while actually premiums are received at the beginning of the policy period and losses are paid over several years.

Other Considerations

As Mr. Sturgis notes, the selection of discount rates significantly affects the valuation. There are, of course, many reasonable discount rates from which to select, such as the opportunity cost, the cost of capital, etc. We suggest that a different discount rate be used for projected earnings many years after the valuation date because of a lack of credibility.

In addition to the discount rate, two other significant items are the underwriting assumptions and the variability of loss payouts. The latter, combined with historical investment decisions, becomes particularly important when valuing the in-force business using a cash flow analysis of assets and liabilities. Additional adjustments may be made based on many other factors, including underwriting risk, opportunity cost, the prospective buyer's utility function, and regulatory constraints.

Conclusions

The valuation of property/casualty insurance companies is a complex area that deserves more attention than can be afforded here. As Mr. Sturgis states, a significant component of valuing a property/casualty company should be a determination of the entity's economic value. To address this issue, he presents a model based on a discounted statutory earnings stream. We believe that the true economic value is more adequately measured by discounted cash flow than by discounted statutory earnings. We hope that the paper and this discussion stimulate further development of this important topic.