DISCUSSION BY JOHN J. KOLLAR

Some persons unfamiliar with the different purposes of insurance data have accused insurance companies of keeping "two sets of books." They point out that insurance companies report profits to their shareholders based on Annual Statement data and then file for rate increases based on ratemaking data. They ask, "How can the data be the same when the results are so different?" In his paper Mr. Miller shows that the data are the same by developing accident year data from calendar year data. That is, ratemaking data can be reconciled to Annual Statement data if sufficient detail and flexibility are maintained in a company's data processing system. Unfortunately, this may be beyond the scope of most companies.

While the data underlying calendar year and accident year reports are the same, the methods of compiling them are different because their purposes are different. Calendar year data reflects the past profitability of a company including inaccuracies in reserves established in earlier years. Whatever rate changes are indicated by the ratemaking formula do not change the past profitability, although they are important in anticipating future profitability.

Accident year data provides a matching of premiums with losses and expenses arising from the portions of policies in effect during a twelve month period. For ratemaking purposes these losses and expenses are then projected to future levels to determine what premiums are needed to pay these losses and expenses. Past profitability does not change the indicated rates, although it is an important consideration for a company that is under-capitalized.

Mr. Miller emphasizes the importance in ratemaking of anticipated loss and expense levels as opposed to past loss and expense levels. It is the appropriateness of the revised rates which will determine whether the ratemaker has been successful. While past trends provide a basis for future trends, it is informed judgment which leads to the selection of the appropriate trend factors or trend procedures.

As Mr. Miller indicates, there are several limitations to the use of Annual Statement Page 14 data for ratemaking. To overcome them, his fictional company compiles its data in expanded detail. A company with the necessary data processing capabilities could elect to compile data in additional detail: coverage, basic limits, catastrophe, deductible, territory, class, etc. Such data could then be summarized on either an accident year or calendar year basis, or both. With monthly or even quarterly reserves, this company could increase credibility and avoid the sea-

sonality problem of using a fraction of a year by using the two latest fiscal years of data that are available.

While Mr. Miller's paper does not discuss the use of an IBNR factor, it is of course implicit in calendar year incurred data. This factor, which is used to include reserves on unknown claims and reserve inaccuracies on known claims, is probably the most imprecise part of using an adjusted calendar year for ratemaking. The IBNR factor is comparable to a loss development factor which adjusts an accident year's losses from the twelve month evaluation to their ultimate value. As this factor can be quite large for the liability coverages, particularly bodily injury liability, it is necessary that it be accurately determined. (The IBNR factor is even larger for a fraction of a year.) As with loss development this can probably be best accomplished by considering recent historical patterns in IBNR factors. Much has already been written about establishing IBNR reserves.

Mr. Miller expresses a preference for incurred claim frequency over paid claim frequency because it eliminates the impact of revised claim payment procedures on claim frequency trend. Changes in the procedures for establishing reserves could cause distortions in the incurred claim frequency trend. On the other hand, incurred claim frequencies are more responsive than paid claim frequencies. One can make arguments pro and con for other trend procedures, such as the use of more than one company's data for trend, exponential curve fits, or exponential projections. As Mr. Miller emphasizes in his paper, however, the use of specific ratemaking procedures is not as important as the ratemaker's use of informed judgment in selecting trend factors.

Mr. Miller's application of the selected trend factor is much different from most of today's approaches. (See Exhibit IX.) First, the latest actual trend point (Column 1) is projected (Column 3) for the desired period by the selected annual trend factor (Column 2). This gives very much weight to *one actual* trend point. Second, the loss projection factors (Columns 6 and 7) are used to adjust the 1977 and annualized first quarter 1978 trend points (Columns 4 and 5) to the value of the one projected trend point. This reduces a sample set of two points with different values to a *single* value. That is, if this data were used in determining the indicated rate level changes, the projected incurred loss and allocated loss adjustment expense ratios for 1977 and the first quarter of 1978 would be identical except for average rate differences. Third, however, the loss projection factors based on incurred claim frequencies and paid claim costs are applied to incurred claim frequency and cost data. Although the loss projection factors measure the difference in paid claim costs between two *specific* points in time, they are not necessarily

appropriate for measuring the differences in incurred claim costs between the same two *specific* points in time.

A more typical approach to trend would be to extend the selected trend factors for the projection period, combine the cost and frequency factors, and combine the bodily injury and property damage factors. This would result in factors of 1.068 and 1.047 for 1977 and the first quarter of 1978, respectively. (See Appendix for the determination of these factors.) These can be contrasted with Mr. Miller's loss projection factors of 1.037 and 1.276, respectively. Clearly much different rate level indications would result.

As Mr. Miller says in his conclusion, there are many areas of ratemaking on which he comments only briefly. Although I chose to comment on some of these, they are secondary to the purpose of his paper. The key point of Mr. Miller's paper is that financial data and ratemaking data are the same. Mr. Miller proves it by developing accident year data from calendar year data. This is the essence of Mr. Miller's paper and the reason why he has made a valuable contribution to ratemaking theory.

APPENDIX

This section contains an alternate calculation of trend factor with only one difference from Mr. Miller's trend calculation. The selected annual trend factor is extended for the projection period, and then all other calculations are performed in the same fashion.

The proposed effective and trend projection dates are July 1, 1978 and July 1, 1979, respectively. For 1977 the average date of accident is July 1, 1977 yielding a projection period of 2 years. For the first quarter of 1978 the average date of accident is February 15, 1978 yielding a projection period of 1.375 years. For bodily injury the annual trend factors are +5% and −2% for cost and frequency, respectively. For property damage the annual trend factors are +6.5% and −2% for cost and frequency, respectively. The loss weights are assumed to be 60% for bodily injury and 40% for property damage. The loss projection factors are then calculated as follows:

For 1977:

$$.6\{[1+(2x.05)][1+2(-.02)]\} + .4\{[1+(2x.065)][1+2(-.02)]\} = 1.068$$

For the first quarter of 1978:

$$.6\{[1+(1.375 \times .05)][1+1.375(-.02)]\}$$
$$+ .4\{[1+(1.375x.065)][1+1.375(-.02)]\} = 1.047$$