## DISCUSSION BY MATTHEW RODERMUND

Mr. Ferguson has done such a thorough job of discussing the effects of inflation on the insurance business, and explaining all the ramifications of the index clause, which is one of the solutions to the inflation problem, that there is little for a reviewer to comment on. Nevertheless, there are practical aspects of the problem that interest this reviewer and that may be useful as a supplement to Mr. Ferguson's paper.

As readers of the paper know, the index clause is a device to distribute between reinsurer and reinsured, on a reasonably equitable basis, the effects of inflation on excess insurance losses. The device consists mainly of applying an index factor to the primary company's retention, so that the company's share of a large loss increases with inflation. Mr. Ferguson has provided a comprehensive treatment of the application of such an index factor.

The index clause, so far, has had relatively little impact in the United States, although American reinsurers have been well aware of it. In Western Europe, however, including the British Isles, the index clause has been used extensively since the mid-sixties. In fact, on the continent it is difficult for a primary insurer to get an excess of loss contract without the index clause.

Why should this difference exist between the U.S. and Europe? For one thing, Europe's problem arrived sooner. In the 1960's, when the U.S. was complacent with an inflation rate of 3% to 6%, England's and Germany's inflation rate was running between 8% and 15%. Thus, the need for the index clause was being felt acutely by European reinsurers.

But even now, when inflation in the U.S. has become painful, American reinsurers have had difficulty peddling the index clause. One of the reasons is that there is greater competition among reinsurers in the U.S. than in Europe. In Europe there is a growing consensus among reinsurers that attaching an index clause is the thing to do. There is no such consensus in this country. American reinsurers have on their books only a relative handful of contracts with index clauses.

The facts of life in the U.S. are that a primary insurer generally will not accept an index clause if he can find a reinsurer who won't insist on it. And he always can.

Why the resistance? Mostly, companies don't like to increase their re-

tentions except of their own free will. Since 1970 this reviewer has been talking about the index clause to groups of insurers around the country. Not infrequently an underwriting executive will comment privately that if he broached this idea to his president and insisted on it, he'd probably get fired.

It can be demonstrated that the final cost of excess loss protection with an index clause is less than the cost without one. But the demonstration assumes the insurer realizes that eventually, and in the long run, he will have to pay for his own excess losses at least at the working level, where the index clause is generally applied. Without an index clause he will pay such losses plus the reinsurer's loading. With an index clause he will retain more losses, but on those he will save the loading.

For example, using the losses suggested by Mr. Ferguson in Tables IV and V of his paper, the rate developed in Table IV, with no index, averaged 4.17% for the three years shown. Loaded by 25% for expenses and contingencies, this rate becomes 5.21%. If it were quoted for 1978, when the expected subject premium would be $14,600,000, the reinsurance premium would be $761,000.

On the other hand, if the 1.46% rate in Table V, using the index, were loaded by 25%, it would become 1.83% and the premium would be only $267,000. But with the index clause the ceding company would retain additional losses which, based on the experience from 1974 to 1976, represent an unloaded rate of 2.71%. This, added to the 1.83% reinsurance rate, produces a total excess loss cost of 4.54%, or 0.67% less than the rate of 5.21% with no index. The saving obviously is 25% (the loading) of the 2.71% rate represented by the additional losses expected to be retained after the index clause is employed. The cost saving is about $98,000.

But all of the foregoing presupposes that the ceding company can't get reinsurance without an index clause for less than 5.21%, or even less than 4.54%. In the real U.S. world he probably can do better than that. There are any number of reinsurance markets which, for the sake of landing a contract, will refuse to concede that losses will develop as badly as current and predicted inflation rates suggest they will.

Even if excess losses do develop as predicted, the primary insurer may be hoping he won't have to pay them back. Maybe he can move from one reinsurer to another fast enough to avoid it. Moreover, with an index clause the increase in retained losses is immediate and certain, whereas without it the pay-back to the reinsurer, plus the loading, might be somewhere in the future.

The reduction in reinsurance premium due to the index clause seems not to be an attraction.

The pity is that loss projections based on the current inflation, and assumptions of the duration of the settlement period, are very likely even less pessimistic than they ought to be, so that rates both with and without the index clause turn out to be too low, and the divergence between them should be greater than is indicated by present trended data. Nevertheless, primary insurers and many reinsurers alike tend to be wishful thinkers.

Thus, in this country at this moment, Mr. Ferguson's exposition is an admirable description of a vital reinsurance device whose day, unfortunately, has not yet come.

I'm afraid that Mr. Ferguson's paper turns into an actuarial exercise he gets into pricing, and into the calculation of the discount from the no-index price to the with-index price. The same may be said for the cogent comments by Mr. Charles F. Cook in his review of Mr. Ferguson's paper.

Mr. Ferguson's and Mr. Cook's algebra, and their logic, are impeccable. But it's hard to imagine any reinsurance underwriter, or actuary, using this algebra in connection with an actual reinsurance quotation. Mr. Ferguson's discount formula is developed in his Appendix II. He sets up an algebraic expression for the price of a contract with an index, and the price of a contract without index, and subtracts the quotient of these from unity. However, the price of the contract with index is tied to the "average excess loss trended and indexed" ($\overline{X}$), and this in turn depends on both the average number of years (t) from occurrence to settlement, and the average number of years (u) from occurrence to mid-point of the new exposure period. The price of the contract without index also depends on t and u. Mr. Cook's improvements on these formulas use the same terms.

This reviewer submits that in a book of excess losses covering three to five accidents years, the size of losses, their frequency, and their settlement periods normally have such great variance that no reinsurance underwriter would ever trust the assumed averages ($\overline{X}$, t, and u) sufficiently to employ them in an actual quotation.

This is not to say that the reinsurance underwriter, using an empirical approach, won't make other equally vulnerable assumptions. He will. (Mr. Ferguson makes this point.) Using the same book of losses, which have little credibility, he will assume that the loss development picture of the past will be repeated in the future — a dubious proposition. But typical. Loss rating

in the reinsurance business is generally un-actuarial. (For example, one excess loss of $250,000 is given the same rating value as five excess losses of $50,000 each.) A more refined actuarial procedure tends to produce a higher reinsurance rate for good experience than the underwriter's methods will, and a lower rate for bad experience. The customer won't like the former, and the reinsurance underwriter or his president won't like the latter. The point is, in the real world the underwriter is comfortable with an empirical approach, and probably will tolerate Mr. Ferguson's and Mr. Cook's formulas only as material for an actuarial paper.

The foregoing observations notwithstanding, Mr. Ferguson's paper is a valuable one. The Proceedings needs it.