UNALLOCATED LOSS ADJUSTMENT EXPENSE RESERVES IN AN INFLATIONARY ECONOMIC ENVIRONMENT

By John Kittel

Reviewed by Richard Bill

In this paper Mr. Kittel has noted an apparent flaw in the traditional method of establishing unallocated loss adjustment expenses (ULAE) reserves. For a growing company in an inflationary economy, the traditional method of establishing ULAE reserves as a function of paid to paid ratios appears to overstate these reserves. Since the majority of companies probably use some form of the paid to paid ratio in establishing their ULAE reserves, the discovery of such an error would be an important contribution to the insurance industry.

In reviewing the paper I felt I should concentrate on examining this apparent error due to the potential impact on the industry's reserves. However, I would first like to make a few comments about the remainder of the paper. The first portion of the paper was devoted to defining allocated and unallocated loss expense as it relates to four major expense areas -- legal expenses, independents, field adjusters, and operations. After reading the various definitions of allocated and unallocated loss adjustment expenses, I was curious as to how they were defined for annual statement purposes. Regulation 30 states:

> The Statistical Plans filed by certain rating bureaus contain definitions of "Allocated Loss Adjustment Expenses" which exclude for rating purposes certain types of claim adjustment services as defined herein. For the lines of business thus affected, companies which are member of such rating bureaus shall maintain records necessary to the reporting of Claim Adjustment Services -- Direct, as follows:

a. As defined in Statistical Plans
b. Other than as defined in Statistical Plans

It would appear that this definition is either advertently or inadvertently vague and provides little help in defining the terms.

The next section of the paper provides a review of various methods presently used for calculating the ULAE reserve. It is probably safe to say that most property and liability companies compute their ULAE reserves by using some form of Method #3 in the paper; the familiar paid to paid ratio and the 50-50 assumption.

The latter part of the paper provides a detailed analysis of the characteristics and appropriate reserving methods for each of the four expense areas mentioned earlier -- legal, independent adjusters, field adjusters, and operations. This analysis is made separately for property and for casualty since the characteristics of the expenses are substantially different, thus requiring different reserving methods. I feel that a particularly important point is that a reserving method should not be used blindly because an expense is classified as unallocated or allocated. For example, assume a company classifies independent adjusters expense as unallocated, and billings are submitted after a claim is paid. In this case it would be inappropriate to combine these expenses with other unallocated expenses and use 50% of the paid to paid ratio since obviously the assumption that 50% of the expenses are incurred when the claim is reported is not true.

I would now like to address the apparent flaw in the paid to paid method of establishing ULAE reserves. Most methods of establishing ULAE reserves start with calculating the ratio of paid

ULAE to paid losses (paid to paid ratio). The author suggests substituting the ratio of paid ULAE to the average of paid losses and incurred losses (paid to paid/incurred). If paid losses were equal to incurred losses, the two ratios would be identical and the two methods would produce identical results. If paid losses are lower than incurred losses, the paid to paid/incurred ratio is lower than the paid to paid ratio and thus produces a lower reserve. Two major reasons why paid losses are usually lower than incurred losses are (1) growth in exposure units, and (2) affect of inflation. I will address the appropriateness of the proposed method for each of these items separately. All of the illustrative examples discussed below are based on the following assumptions before considering the affects of inflation:

1. All claims are reported in year of occurrence.
2. Unallocated loss adjustment expense incurred equals 10% of losses incurred.
3. 50% of ULAE is paid when the claim is incurred and 50% when closed.
4. Loss reserves are set at exactly the correct level.
5. The mix of business remains constant.

Exposure Growth

In a growing company, paid losses will normally be less than incurred losses assuming all other factors are equal. Since the number of exposure units in the current year is greater than previous years, there will be more losses incurred in the current year and paid in subsequent years than losses incurred in previous

years and paid in the current year assuming a constant frequency. Shown below is a simple example assuming a company is doubling exposures each year and all losses are paid exactly 12 months after the claim is incurred:

		1981	1982
1)	Losses Incurred	$1,000	$2,000
2)	Losses Paid	500	1,000
3)	Loss Reserve as of 12/31	1,000	2,000
ULAE Paid:			
4)	Current Accident Year (1)x10%x50%	50	100
5)	Prior Accident Year (2)x10%x50%	25	50
	Total	75	150
Paid to Paid Ratio		15%	15%
Paid to Paid/Incurred Ratio		10	10

As shown above the paid to paid ratio substantially overstates the true ratio of loss adjustment expense to losses. Using one half of the paid to paid ratio (7.5%) applied to the 1981 year end loss reserve of $1,000 produces a ULAE reserve of $75 which is 50% higher than the $50 ULAE which is ultimately paid. This example illustrates that the authors suggested paid to paid/incurred ratio is the correct method in this case since this method would produce a reserve of $50 (5% of $1,000).

Inflation Growth

Inflation also tends to produce paid losses less than incurred losses. Losses paid in the current year and incurred in

previous years will tend to be lower than the same type of losses incurred in the current year and paid in subsequent years. One's first reaction is that this situation would be similar to the exposure growth example discussed above and thus the paid to paid/incurred method would likewise be applicable. However, this is not the case due to one important reason. If we assume that the so-called 50-50 assumption applies in a period of no inflation the same assumption would not be true in an inflationary economy. To illustrate, assume we have one claim incurred in 1981 which will eventually be closed in 1985 for $100. Using the 50-50 assumption and the 10% ratio of ULAE to losses, the ULAE paid would be $5 in 1981 and $5 in 1985, assuming no inflation. However, if we assume 50% inflation for the four year period, claim department salaries and other expenses will have increased such that the claim will actually cost $7.50 to close in 1985. The original 50-50 relationship has now actually become 40-60. Although the paid to paid ratio tends to overstate the ratio of ULAE to losses, the change in the 50-50 relationship tends to understate the reserve.

It should be noted that (1) the higher the inflation rate and (2) the longer the loss payout distribution, the more the 50-50 relationship is distorted. For example, for property insurance where claims are paid out relatively soon after the claim is incurred, the 50-50 relationship would be only marginally affected.

Combination of Exposure Growth, and Inflation

If a company is growing rapidly in an inflationary environment, the correct ratio to use is between the paid to paid and the paid to paid/incurred, assuming that losses incurred are affected by future inflation. A relatively simple formula to approximate the correct ratio is presented in Exhibit III for the interested reader.

Detailed Example

To elaborate and compare various assumptions, a detailed example is presented in Exhibit I. Column (1) contains the basic data assuming no exposure growth and no inflation. In this case paid losses equal incurred losses and both methods produce identical results. Columns (2), (3), and (4) begin with the data in Column (1) and adjusts each item based on various assumptions. Column (2) assumes that exposures have grown at a constant 10% annual rate and will continue to grow at the same rate in the future. Column (4) assumes a constant 10% inflation rate and a constant number of exposure units. It is also assumed that claims paid in the future will not be affected by future inflation, i.e., a claim incurred in 1981 is a fixed value regardless of the level of future inflation. The same assumptions were made for Column (3) except it was assumed that claims incurred in one year and paid in a subsequent year would be affected by the inflation rate.

For the base year of 1981, note that loss adjustment expenses are exactly the same as Column (1) with one exception -- $18.18 shown in Column (2) for 1980 accident year. Regardless of our assumptions about future inflation, actual claim department

expenses are identical for Column (1), (3), and (4) since all three columns assume the same number of claims. 1980 accident year ULAE in Column (2) paid in 1981 calendar year is only $18.18 since there are 9.1% fewer claims to close in 1981 for 1980 accident year.

Annual Statement Development

Distribution of ULAE paid to accident year is specified in footnote g of Schedule O and Schedule P.

Forty five percent of the ULAE paid is assigned to the current accident year, 5% to the previous accident year and the balance is assigned to all years (including the most recent) in proportion to losses paid. This is based on the 50-50 assumption and the underlying assumption that 10% of the loss units received in a calendar year are IBNR and belong in the prior accident year. Exhibit II presents an annual statement development of the data contained in Exhibit I for each of the four assumptions for the 1981 year end reserve.

Summary of Results

Shown below is a summary of the results from Exhibits I and II:

			ULAE Reserve 12/31/81		Development	
Case	Exposure Growth	Inflation	Paid to Paid Method	Paid to Paid/Inc. Method	Annual Statement	Actual Development
#1	0%	0%	$20.00	$20.00	$20.00	$20.00
#2	10	0	20.36	20.00	20.36	20.00
#3	0	10*	22.00	21.56	22.00	22.00
#4	0	10**	20.74	20.36	20.74	22.00

*Paid Claims Affected by Inflation

**Paid Claims Not Affected by Inflation

The following are conclusions that can be drawn from this example:

1) In all cases the traditional paid to paid method exactly equaled the annual statement development.
2) The paid to paid/incurred was the theoretically correct method for the exposure growth assumption (Case #2). However, the annual statement produces a development higher than the actual development.
3) In the 10% inflation examples (Case #3 and #4) the traditional paid to paid method produced a more accurate result than the paid to paid/incurred method.

Conclusions

Assuming a relatively stable book of business, the traditional paid to paid approach appears to produce a more accurate reserve than the suggested alternative. One other advantage is that the paid to paid method produces a reserve that is consistent with the subsequent annual statement development, which admittedly is not always correct.

If a company is growing rapidly during a period of low inflation, the application of the paid to paid method with the 50-50 assumption substantially overstates reserves. The longer the tail in the loss payout distribution the greater the discrepancy between paid losses and incurred losses and thus the larger the overstatement of reserves. The author's suggested paid to paid/incurred ratio produces a better estimate of the correct reserve, although the subsequent annual statement development will incorrectly indicate that the reserve was inadequate.

If a company is experiencing a high growth rate during a period of high inflation, the approximation method in Exhibit III could be used. Although beyond the scope of this review, I am sure a formula could be developed that would produce the exact reserve which could be the subject of a paper for the proceedings. However, the advisability of developing a complex formula is questionable since the underlying 50-50 assumption is approximate at best. When one considers that this same assumption is used for all lines of business regardless of the size of loss, age of claim, or type of claim, the resulting reserve is somewhat less than precise.

As an alternative, it would appear that a transaction based method as described in the paper should produce an accurate result. However, in most cases very few companies are willing to devote the great deal of work that would be required to apply this method.

I feel Mr. Kittel has provided us with a thorough discussion of methods for establishing ULAE reserves. This is particularly useful since this subject has received little attention in actuarial literature. More importantly, he has brought to our attention a fallacy in the age-old method of establishing ULAE reserves. Many actuaries, including myself, had taken for granted a method that has stood the test of time without really questioning the theoretical foundation. Hopefully, this paper will stimulate solutions to a whole new set of problems created by the discovery of this fallacy.

UNALLOCATED LOSS ADJUSTMENT RESERVING METHODS

Basic Assumptions (before applying the effects of inflation):
1) All Claims are reported in year of occurrence.
2) 60% of incurred losses paid in year of occurrence; 40% in first subsequent year.
3) Unallocated loss adjustment expense equals 10% of incurred losses.
4) 50% of unallocated expense is incurred when the claim is opened and 50% when closed.
5) Loss reserves are set at exactly the correct level.

	(1) No Growth No Inflation		(2) 10% Exposure Growth		(3) 10% Inflation Paid Claims Affected		(4) 10% Inflation Paid Claims Unaffected	
	1981	1982	1981	1982	1981	1982	1981	1982
Claims Incurred	$1,000	$1,000	$1,000	$1,100	$1,040	$1,144	$1,000	$1,100
Claims Paid:								
Current Accident Year	600	600	600	660	600	660	600	660
Prior Accident Year	400	400	364	400	400	440	364	400
Total Paid	1,000	1,000	964	1,060	1,000	1,100	964	1,060
Year End Loss Reserve	400	400	400	440	440	484	400	440
Unallocated Loss Adj. Paid:								
Current Accident Year	80.00	80.00	80.00	88.00	80.00	88.00	80.00	88.00
Prior Accident Year	20.00	20.00	18.18	20.00	20.00	22.00	20.00	22.00
Total Paid	100.00	100.00	98.18	108.00	100.00	110.00	100.00	110.00
Paid to Paid Ratio	10.00%	10.00%	10.18%	10.18%	10.00%	10.00%	10.37%	10.37%
Paid to Paid/Incurred Ratio	10.00%	10.00%	10.00%	10.00%	9.80%	9.80%	10.18%	10.18%
Unallocated Loss Adj. Reserve:								
Paid to Paid Method	$ 20.00	$20.00	$ 20.36	$ 22.40	$ 22.00	$ 24.20	$20.74	$22.81
Paid to Paid/Incurred	20.00	20.00	20.00	22.00	21.56	23.72	20.36	22.40

Notes:
1) Column (3) assumes that losses incurred in the current year and paid in the subsequent year are affected by inflation.
2) Column (4) assumes that losses incurred in the current year are not affected by future inflation regardless of when the loss is paid.

Exhibit II

ANNUAL STATEMENT DEVELOPMENT
1981 ULAE RESERVE

Case #	50% of 1982 Paid ULAE*	Ratio of 1981 Accident Year Loss Payments to Total 1982 Payments	1982 ULAE Payments Allocated to 1981 Accident Year by Annual Statement	Correct Development*
1	$50	40.0%	$20.00	$20.00
2	54	37.7	20.36	20.00
3	55	40.0	22.00	22.00
4	55	37.7	20.74	22.00

*From Exhibit I

NOTE: For the purpose of this example it was assumed that all claims were reported in the year of occurrence, therefore, 50% of ULAE was distributed to the current accident year and 50% to all accident years in proportion to loss payments.

Exhibit III

APPROXIMATION METHOD OF ADJUSTING PAID TO PAID/INCURRED RATIO FOR INFLATION

The paid to paid/inccured ratio would be calculated as proposed by the author.

This ratio would then be adjusted as follows:

$$\text{(paid to paid/incurred ratio)} \times \frac{\frac{1}{2}\text{ (Adjusted Paid Loss + Incurred Losses)}}{\text{Adjusted Paid Losses}}$$

Adjusted paid losses are determined by applying the following formula to the calendar year paid losses:

$$Py + \frac{Ey}{Ey-1} \cdot Py-1 + \frac{Ey}{Ey-2} \cdot Py-2 + \ldots$$

where:

Py-i = Loss paid in y calendar year for y-i accident year

Ey-1 = Earned exposure unites in year y-i