INDIVIDUAL RISK RATING STUDY NOTE

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This study note expands on some of the examples found in Chapter 3, "Individual Risk Rating," by Margaret Wilkinson Tiller in Foundations of Casualty Actuarial Science.

Roller Skating Risk Risk Retention Group Schedule Rating Plan (page 104)

The student will not be responsible for the details of this plan.

Insurance Services Office (ISO) Commercial General Liability Experience and Schedule Rating Plan: Experience Rating (page 112)

Basic Limits, MSL's, and D-Ratios

An experience rating plan motivates participation in risk control activities by giving the subject of the plan the financial consequences of its claim experience. However, it is unrealistic to subject the affected entities to large fluctuations in cost from one year to the next due to unusual or catastrophic experience. Consequently, the ISO Commercial General Liability Experience and Schedule Rating Plan uses basic limits losses and limits losses and allocated loss adjustment expenses (ALAE) to a maximum single loss limitation (MSL). This makes the plan more responsive to frequency (number of occurrences per exposure unit) than severity (size of occurrence).

Note that the MSL is applied to losses **and** ALAE, while the basic limits apply to losses only. For the plan as revised in July 1988, the MSL is set so that the maximum impact of any single occurrence is +0.30 on the resulting experience modification factor. Consequently, MSL's increase as the size of the risk (as measured by premium or credibility) increases.

Because actual basic limits losses and (unlimited) ALAE are limited by the MSL, the expected losses and ALAE must be limited so that the comparison is consistent ("apples to apples"). The expected basic limits losses and (unlimited) ALAE are multiplied by the D-ratio (and a factor to correct for plan off-balance, if necessary) to arrive at adjusted expected losses and

ALAE. The adjusted expected loss and ALAE ratio (AELR) is then the adjusted expected losses and ALAE divided by the basic limits earned premium for the experience period (subject premium).

The D-ratio adjusts for the impact of the MSL by reducing the expected basic limits losses and ALAE for expected losses and ALAE higher than the MSL. D-ratios are developed from a large volume of historical claim data. A sample D-ratio derivation from raw claim data adjusted for economic inflation, case reserve development, and unreported occurrences is shown in Exhibit 1. As a practical matter, ISO derives indicated D-ratios in this manner and then fits a curve to the indicated D-ratios to smooth the numbers and interpolate between limits.

Expected Unreported Losses and ALAE

The expected unreported losses and ALAE are estimated using an exposure approach. The expected unreported losses and ALAE are the product of the following three quantities:

1. subject premium,

2. adjusted expected loss and ALAE ratio, and

3. expected percentage of basic limits losses and ALAE with MSL unreported at the appropriate evaluation date.

An alternative approach would be to multiply (1) reported basic limits losses and ALAE limited by the MSL and (2) development factors to ultimate. However, the latter approach will magnify the impact of any unusual claim reporting or case reserving practices. For example, if claims are reported quicker than expected, reported losses and ALAE should be at their ultimate level sooner than expected, and multiplying the reported losses and ALAE by factors larger than 1.000 will result in unreported losses and ALAE that are too high (and, in fact, are higher than would be expected in a typical situation). In this example, the unreported losses and ALAE should be lower than would be expected in a typical situation.

The approach used by this plan mitigates the impact of any unusual claim reporting and case reserving practices by basing expected unreported losses and ALAE on adjusted expected losses and ALAE. In particular, this approach recognizes that an entity with no occurrences reported at a particular time may still have occurrences that have occurred and that have not yet been reported. A development factor approach would assign such an entity $0 for expected unreported losses and ALAE.

Credibility

The credibility factor for this plan is calculated as $P/(P+K)$, where P is subject basic limits earned premium and K is $100,000. This formula produces a curve of the "correct" shape.

National Council on Compensation Insurance (NCCI) Experience Rating Plan (page 123)

Primary Loss

The Revised Experience Rating Plan (RERP) defines primary loss as follows:

o   for an occurrence with reported loss less than $5,000, primary loss equals the reported loss; and

o   for an occurrence with reported loss equal to or greater than $5,000, the primary loss is $5,000.

In other words, every occurrence is limited to $5,000 of losses per occurrence.

Ballast Factors

The RERP use the same general modification formula as the old plan:

$$M = \frac{A_p + [w \times A_e] + [(1-w) \times E_e] + B}{E + B}$$

A denotes actual; E denotes expected. Subscripts p and x denote primary and excess portions of loss, respectively.

B is often called the "ballast factor"; it stabilizes the formula from being impacted "too much" by usual experience.

w is the weighting factor between the actual and expected excess losses.

The RERP uses different theories and methodologies to determine B and w than does the prior plan. For a detailed discussion of these changes, see "Parametrizing the Workers' Compensation Experience Rating Plan" by William R. Gilliam and published in the CAS's 1990 Pricing Discussion Paper Program book and "An Actuarial Evaluation of the NCCI Revised Experience Rating Plan" by Howard C. Mahler and published in the Winter, 1991, Casualty Actuarial Forum.

NCCI Retrospective Rating Plan (page 130)

In the NCCI Retrospective Rating Plan, the basic premium provides for all expenses except taxes and expenses provided by the loss conversion factor. Specifically, the basic premium provides for the following costs:

1. insurer expenses such as acquiring and servicing the insured's account;

2. risk control services, premium audit, and general administration of the insurer;

3. loss adjustment expenses in excess of those provided for by the loss conversion factor;

4. a net charge for limiting the retrospective premium between the minimum and maximum retrospective premiums; and

5. an allowance for the insurer's possible profit or for contingencies.

Item (4) is often called the "insurance charge." The formula underlying the insurance charge has been changed recently to compensate for the overlap with the excess loss premium and to reflect differences in hazard group and state experience. The overlap was caused by not recognizing that limiting individual large loss occurrences could flatten the aggregate loss ratio distribution, thus reducing the needed insurance charge.

Exhibit 1

Sample D-Ratio Calculation

Loss Range		Number of Occurrences	Basic Limits Losses & Total ALAE for Occurrences in Range	Average Occurrence Size for Occurrences in Range	Basic Limits Losses & Total ALAE in Range	Basic Limits Losses & Total ALAE Limited to Range Maximum	D-Ratio
(1)		(2)	(3)	(4)	(5)	(6)	(7)
$ 0		1,000	0	0	0	0	0.000
1-	6,000	7,500	18,750,000	2,500	40,950,000	40,950,000	0.536
6,001-	9,000	1,500	11,250,000	7,500	8,850,000	49,800,000	0.652
9,001-	12,000	1,000	10,000,000	10,000	4,600,000	54,400,000	0.712
12,001-	15,000	300	4,350,000	14,500	3,450,000	57,850,000	0.757
15,001-	20,000	350	6,825,000	19,500	4,325,000	62,175,000	0.814
20,001-	50,000	500	20,000,000	40,000	11,500,000	73,675,000	0.964
50,000+		50	5,250,000	105,000	2,750,000	76,425,000	1.000
Total/Average		12,200	76,425,000	6,264			

Notes: (4) = (3) / (2).

(5) = (3) + (number of occurrences over range maximum x (range maximum - range minimum))
     - ((2) x range minimum).
E.g., 8,850,000 = 11,250,000 + (2,200 x (9,000 - 6,000)) - (1,500 x 6,000).

(6) = (sum of (5) through and including current range)
E.g., 49,800,000 = 0 + 49,500,000 + 8,850,000.

(7) = (6) / (Total (3)).
E.g., 0.652 = 49,800,000 / 76,425,000.