3.1 Summary

10m

To stay competitive long-term, companies must ensure rates are accurate at both the aggregate and individual risk levels. If rates for individual risks are inaccurate compared to competitors, the company may lose low-risk customers and face adverse selection.

For most lines, setting rates per risk isn't practical. Instead, companies use rating variables to group policyholders into homogeneous, credible segments. Rating variables should be chosen based on statistical, operational, and social factors, along with legal considerations.

After defining rating variables, companies apply univariate analysis (e.g., pure premium, loss ratio) to calculate rate differentials. However, these methods can introduce distortions, so many companies now use multivariate techniques, which leverage modern technology. The next section discusses multivariate methods, although some companies still use univariate approaches with adjustments to address distortions.

Importance of Charging Equitable Rates

Process of adverse selection:

1. Insurer fails to implement a rating variable that other competitors are using to segment risks.
2. Insurer experiences a distributional shift toward higher-risk insureds.
3. The rate charged is inadequate, and the insurer becomes unprofitable.
4. Insurer raises the average rate.
5. The cycle from steps 2 to 4 will continue until the insurer improves its rate segmentation, becomes insolvent, or focuses solely on higher-risk insureds.

Skimming the cream: Using a risk characteristic to identify, attract, and select the lower-risk insureds that exist in the insured population.

Criteria for Evaluating Rating Variables

Statistical criteria:

1. Statistical significance
2. Homogeneity

3. Credibility

Operational criteria:

1. Objective
2. Inexpensive to administer
3. Verifiable

Social criteria:

1. Affordability
2. Causality
3. Controllability
4. Privacy concerns

Legal criteria: Compliance with applicable laws and regulations

ASOP NO. 12

Considerations in the selection of risk characteristics:

1. Relationship with expected outcomes
2. Causality
3. Objectivity
4. Practicality
5. Applicable law
6. Industry practices
7. Business practices

Considerations in establishing risk classes:

1. Intended use
2. Actuarial considerations: homogeneity, credibility, practicality
3. Other considerations: applicable law, industry practices, business practices
4. Reasonableness of results

Considerations in testing the risk classification system:

1. Effects of adverse selection
2. Risk classes used for testing
3. Effect of changes
4. Quantitative analyses

Univariate Classification

Traditional univariate methods:

1. **Pure premium approach**: Calculate the indicated relativities to base as the pure premium of each level divided by the pure premium of the base level.

2. **Loss ratio approach**: Calculate the indicated relativities as the product of the indicated change factor and the current relativity, where the indicated change factor is the loss & ALAE ratio of each level divided by the total loss & ALAE ratio. The indicated relativity to base is the indicated relativity for each level divided by the indicated relativity for the base level.

3. **Adjusted pure premium approach**: Adjust exposures by the weighted average current relativity from other rating variables. Then, calculate the indicated relativities to base as the adjusted pure premium of each level divided by the adjusted pure premium of the base level.

The output of the pure premium approach is distorted by any distributional bias in other rating variables.

Univariate Classification with Credibility

Calculate the credibility-weighted average of the indicated relativities and:

- the current relativities, if the complement is no change, or
- the competitors' relativities.

Before calculating the credibility-weighted average, make sure the two sets of relativities have the same basis. To re-base a set of relativities to the total,

1. Calculate the weighted average of the relativities.
2. Divide each relativity by the average calculated in step (1).
3. The re-based relativities should have a weighted average of 1.

Note:

- The pure premium method uses the exposures as weights.
- The adjusted pure premium method uses the adjusted exposures as weights.
- The loss ratio method uses the premium at base as weights.

Pure Premium Approach

1. Re-base the current (or competitor's) relativities to total.
2. Re-base the indicated relativities to total.
3. Calculate the credibility-weighted average of the relativities from steps (1) and (2).
4. If necessary, re-base the credibility-weighted average relativities by dividing them by the credibility-weighted relativity for the base level.

Adjusted Pure Premium Approach

The steps are the same as in the pure premium approach, except we use the **adjusted exposures** as weights.

Loss Ratio Approach

The steps are the same as in the pure premium approach, except we use the **premium at base level** as weights.

Additionally, if the complement is no change:

- Re-basing can be skipped.
- Instead of calculating the credibility-weighted average between the indicated relativities and the current relativities, we can calculate the credibility-weighted average between the indicated change factors and 1.