Summary **10m**

This section covers methods to adjust premiums and losses to reflect current rate and benefit levels. It outlines techniques for aligning historical data with present standards, using both precise recalculations and simplified methods depending on available data and complexity.

Examining Effects of Rate and Benefit Changes

Changes in rates affect premiums, while changes in benefits or coverage impact losses. Both direct effects—immediate changes to premium or losses—and indirect effects—behavioral adjustments by claimants—play a role in these adjustments.

Adjusting Historical Premiums

To align historical premiums with current rate levels, insurers use two primary methods:

- **Extension of Exposures**: This method recalculates each policy's premium based on current rates, making it highly accurate. However, it requires extensive data and computing power, making it resource-intensive.
- **Parallelogram Method**: This simpler approach applies an on-level factor to earned premiums by considering the timing and extent of rate changes. While faster to implement, it assumes uniform policy writing throughout the period, which may require adjustments if policies are unevenly distributed.

Adjusting Historical Losses

To account for changes in benefits or coverage, the parallelogram method is adapted for losses. Here, an adjustment factor is used to scale historical losses to current benefit levels, ensuring losses are consistent with present-day coverage standards.

Examining Effects of Rate and Benefit Changes

Premium can be affected by rate changes, while losses can be affected by benefit or coverage changes. These changes include those mandated by law.

Direct effects from rate and benefit changes are direct and obvious impacts on premium or losses, while indirect effects are changes in claimant behavior that impact premium or losses.

DIRECT EFFECTS ON PREMIUM

The direct effects of rate changes on premium can be calculated by comparing the historical premiums for all in-force policies to the premium that would be charged using the current rates.

DIRECT EFFECTS ON LOSSES

Three approaches for calculating the direct effects of benefit/coverage changes on losses are:

1. Restating each claim individually.
2. Simulating losses.
3. Using loss distributions.

Adjusting Historical Premium

Premiums can be adjusted to the current rate level, or made on-level, using one of the following approaches:

1. Extension of exposures method
2. Parallelogram method, a.k.a. geometric method

EXTENSION OF EXPOSURES METHOD

The steps for the extension of exposures method are:

1. Re-rate every policy using the current rates. Take the rating characteristics of each policy from the historical period and recalculate the premium based on the current rates.
2. Recalculate the earned premiums for each period using these updated rates.

The extension of exposures method is the most accurate current rate level method, but it also has the following challenges:

- The necessary detailed data needed may not be readily available.
- It requires a significant amount of calculations, and thus, computing power.
- Assumptions will need to be made for new rating variables that have no available data.
- Changes in schedule rating guidelines for commercial lines products may be difficult to incorporate.

PARALLELOGRAM METHOD

The steps for the parallelogram method are:

1. Determine the timing and amount of the rate changes.
2. For each rate level group, calculate the cumulative rate level index.
3. For each time period, calculate the portion of premium that corresponds to each rate level group.
4. For each time period, calculate the weighted average cumulative rate level index.
5. For each time period, calculate the on-level factor:

$$\text{On-Level Factor} = \frac{\text{Current Cumulative Rate Level Index}}{\text{Avg Rate Level Index for Historical Period}}$$

6. Apply the on-level factor to the earned premium for the relevant time period.

The parallelogram method can be implemented more easily and quickly than the extension of exposures method, but it has the following limitations:

- It assumes policies are written uniformly throughout the time period.
- The method is typically applied at an aggregate level using a series of overall average rate changes. This can be problematic for class-level ratemaking, where the impact of rate changes can vary by class.

If policies are not written uniformly throughout the time period, the parallelogram method can be adjusted by:

1. Using shorter periods of time than a year, such as months or quarters.
2. Calculating the actual distribution of policy writings.

Adjusting Historical Losses

The steps of the parallelogram method can be applied when adjusting losses for benefit or coverage changes. Instead of an on-level factor, calculate the benefit change loss adjustment factor as

$$\text{Adjustment Factor} = \frac{\text{Current Loss Level}}{\text{Avg Loss Level of Historical Period}}$$