CAL Ninth Annual
Actuarial Case Competition

Property & Casualty

Team Members

Yunliang (Lawrence) Chen

Brandon Cheng

Serene Supakkul

Kevin Zhu

Team 13

I. Loss Ratio Analysis

We did not include the January 1, 2017 rate change in our loss ratio analysis. When analyzing the loss ratios, it is important to use on level premium to avoid overstating projected premiums (Werner, Geoff, and Claudine Modlin). When we say “premium”, written premium refers to the total premium policyholders have paid for the policy period. Earned premium, however, is the portion of an insurance premium that covers the portion of the policy period that has already expired (i.e., the period of time over which coverage has been provided).

We also need a method to quantify losses. Incurred loss ratio is the ratio of incurred losses (both paid and reserved) to earned premiums. On the other hand, paid claims loss ratio is the ratio of only the paid claims to earned premiums. In our analysis, we use incurred loss ratio (hereafter referred to as “loss ratio”) to analyze rate adequacy by segment. Although this adds an additional degree of uncertainty to our analysis, this is a necessary step because roughly one-third of the estimated losses are in case reserve, an amount we do not wish to neglect.

II. Proposed Rating Algorithm and Results

Looking at the loss ratios implied by AllProvince’s data, we determined that credit factor and territory are the two factors that need adjustments. We noticed that the loss ratios for territories 2, 3, and 4, specifically, were much higher than the weighted average, and the factors did not adequately account for this discrepancy. Additionally, the loss ratio for low-credit policyholders is extremely high (greater than 1, in fact), while the loss ratio for high-credit policyholders is less than 0.25. However, we decided on a modest change to the credit factors to reduce the policy-level premium dislocation. Because multi-policy holders have a lower loss ratio, we also decided to implement a 7.5% discount for them. This has the added benefit of encouraging AllProvince’s current customers to sign more policies with them, increasing their profits. There is no penalty for only having a single policy. Table 2.1 below summarizes our results.

Territory	1	2	3	4	5
2017 Factor	1.05	1.11	0.97	0.94	1.2
2019 Factor	1.02	1.13	1.13	1.03	0.97

Credit Score	High	Medium	Low
2017 Factor	0.9	1	1.1
2019 Factor	0.875	1	1.25

Multipolicy	Yes	No
2017 Factor	1	1
2018 Factor	0.925	1

Table 2.1: Previous factors for territory, credit score, and multipolicy, and new proposed factors

When modifying the base rate, we will assume that, despite the drastic increase in policyholders between 2016 and 2017, the population distribution in 2017 is reflective of the population we will face in 2019. Under this assumption, the base rate necessary in 2019 for a 10% overall premium increase is $856, a 7% increase from 2017. The median policyholder will see a 9.3% increase in their premiums, while the maximum increase is 41%. Figure 2.2 below shows the distribution of policy-level premium dislocation.

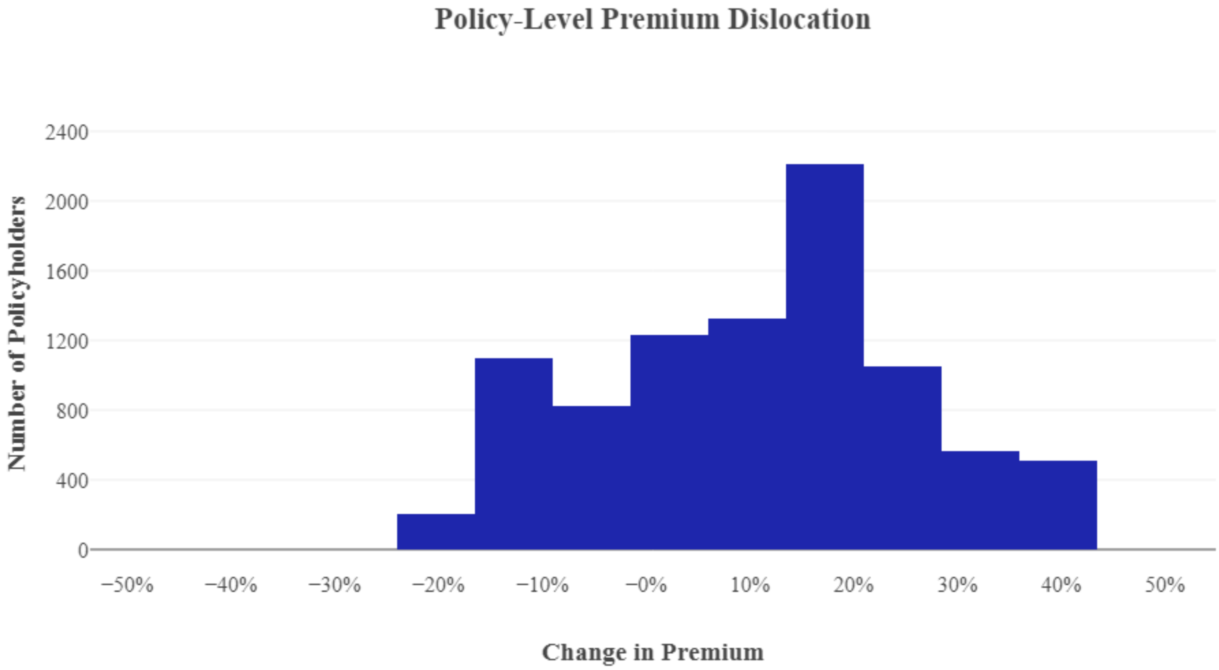

Figure 2.2: Policy-level premium dislocation, as estimated by the 2017 population distribution

III. Business Concerns

As we would hope, AllProvince's lower-risk pool will see a decline in premium, while their higher-risk pool will see an increase in premium. The main reason we see such a high premium dislocation on the upper end is because the data showed a distribution of roughly 34%-33%-33% of high-medium-low credit scores instead of the expected 50%-35%-15%, which is extremely damaging to AllProvince's bottom line. Since low credit policyholders are losing AllProvince money under the current rates, we must increase the premium they pay drastically. Although management may be concerned the potential decline in membership that may result, any low-credit policyholders who choose to leave their plan will actually decrease the loss ratio, increasing profits. Even after this change, their loss ratio is higher than average. Similarly, decreasing the premiums for the lower-risk population, such as those with high credit and those with multiple policies, will encourage other people of similar low-risk standing to join AllProvince's plan, putting downward pressure on the average loss ratio.

That being said, it is important to keep state regulations in mind, and ensure that credit score does not become the singular determining factor of premium calculation. In fact, we decided on a conservative change in credit score factor to avoid potential issues with regulators, but this is ultimately management's final decision. Additionally, under these proposed rates, we must recognize that the population may shift, causing average premium per member to decline to less than 10%. Therefore, it is important to reevaluate the rating algorithm on a regular basis to reflect the changes in population that may result.

IV. Other Recommendations

A variety of natural disasters, such as tornadoes, blizzards, and hail storms, are common occurrences in Kansas. Like flood insurance, it might be beneficial to have customers buy coverage for these as add-on policies instead of covering it in a standard policy. This will lower losses from these events and increase revenue if people choose to purchase them.

Enforcing deductibles is a standard practice in insurance. For example, implementing a deductible of 2% of the insured property's value could save roughly 2.6 million, lowering the paid losses by 40%. However, this does not account for the lowered premium rate that is typically accompanies increasing deductibles.

In order to protect the company from big losses, we recommend diversification and/or reinsurance. If a natural disaster strikes Kansas, but AllProvince has homeowners from a variety of states, their premiums could help offset losses in Kansas. The company can also choose to purchase catastrophe reinsurance. If a natural disaster happens, the reinsurer would help AllProvince cover the damages. In exchange, AllProvince will need to give a portion of the premiums it received to the reinsurer. This is a significant consideration for new and quickly-growing insurance companies that do not yet have large reserves to cover damage from catastrophes.

References

Werner, Geoff, and Claudine Modlin. “Basic Ratemaking.” May 2016.