Bruins Mutual

Executive Summary

Team 19

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The Bruins Mutual actuarial team performed a study on its four main auto insurance coverages: Bodily Injury Liability (BI), Physical Damage Liability (PD), Comprehensive (COMP), and Collision (COLL). Using the given rating steps and factor data, an Excel rater was set up to accommodate premium audits that followed the company's rating rules and functionalities. Another version of the rater using "Driver Assignment" instead of "Driver Averaging" was developed to compare the two methodologies to consider which rater the company should choose. A Generalized Linear Model (GLM) was run on selected rating variables for the collision coverage in order to re-evaluate the effectiveness of the existing rating structure since the current algorithm is outdated and relatively simple. Furthermore, the company has been facing key business issues that are affecting the company's growth and profitability. Our methodologies and solutions are discussed below.

Methodology for a New Rater

The rating steps given were followed to create the raters that display the rating factor at each step and the total premium for each vehicle for each type of coverage. Each rating factor was given in the factor tables, while the Driver Age factor came from calculating relativities from a log-linked GLM. The two methods used to calculate the total premium for each vehicle are the "Driver Averaging" and the "Driver Assignment." The first method takes the average rating factor of all the drivers in the policy, whereas the second method only considers the primary driver of that vehicle. Each method gives different total premiums for the policy depending on the profiles of the drivers and their vehicle assignments.

Key Business Issues and Potential Causes

The following are key business issues put forward by management and our solutions to them:

- **Low close ratios from young drivers**: Consecutive rate increases have driven away young customers from business. With young customers being the most cost-minded segment, Bruins Mutual has lost out due to non-competitive prices. Furthermore, ride-sharing has lead to a significant decrease in the proportion of young adults purchasing cars, which in turn takes away business from the auto insurance industry. The decrease in private passenger auto premium however is offset by the increase in business on the commercial side, so part of the decrease in business from younger drivers can be explained by the increase in premiums in commercial lines of business. Our proposed solution will focus on improving business for personal lines auto.
- **Low Retention**: Retention has been a major issue for Bruins Mutual, which has had a major impact on the company's growth. Growing with a diminishing customer base becomes expensive because retaining customers is cheaper than acquiring new ones. Solutions are provided below to improve our retention rate.

Implications

Two variables became an issue when evaluating the GLM output: Good Student and Driver Points. We suspect that Good Student has potential for high predictive power, but underlying data issues seem to be prevalent causing the variable to show up statistically insignificant. Over 97% of policyholders seem to be classified as bad students, which seems improbable. We recommend regrouping this variables into 3 categories (Good Students, Not Good Students, and Not Students). In terms of Driver Points, the indicated factor for drivers with two points is substantially lower than that of drivers with one point and does not fit the larger pattern or what is expected. Underlying data issues are a source of concern for this issue. When considering recommendations for the collision model, we believe the addition of Vehicle use and Multipolicy would significantly improve the predictive power. Furthermore, we can categorize levels of certain variables to make them more relevant -- for example, there is low expose for and similar indicated factors of cars prior to 1990 and between 1991 and 2000. These levels can be combined for a simpler model.

Recommendations

We believe that we can solve the retention and young driver issue through strategic marketing initiatives and creative product offerings. We have three initiatives to improve retention. First, we will offer discounts to those who pay their bills in full ahead of the policy start date. We can expect better retention from policyholders that opt into the full-pay program as paying a bill only once a year significantly reduces the number of shopping moments a customer faces. Also, we plan to offer special loyalty incentives, either through policy discounts or complementary policy features (such as accident forgiveness). We can justify the cost of these because we can see from the collision model that customers with higher persistency incur less loss. Instead of giving them a discount factor through the rating system, we can market an accident forgiveness feature at purchase that the policyholder would receive 3 years into their policy.

To combat the diminishing business for younger drivers, we recommend developing a mobile based app to purchase policies, enact a referral system for younger drivers, and offer a good student discount. New startup insurance companies (commonly known as Insurtechs) have all had a major dent on larger and more traditional insurance companies by developing easy to use internet tools and mobile apps that make purchasing a product and filing a claim simple -- this has been increasingly popular amongst younger shoppers. We recommend developing similar tools. Furthermore, we can implement a referral program where policyholders can get a referral bonus for signing a young driver. The cost of the bonus can be justified by agent commission savings. Lastly, we can give discounts to students that do well academically as industry research has shown that students who excel academically tend to be more responsible and pose less risk.

We believe that the above recommendations could help Bruins Mutual solve its key business issues, as well as develop more accurate models, both of which are key to steady, profitable growth.