Bruin Actuarial Society
Seventh Annual Case Competition

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Overview

- Background
- Driver Averaging VS. Driver Assignment
- GLM
- Data Issue and Adjustments
- Future Model Enhancement
- Challenges for the Company
Driver Averaging VS. Driver Assignments
Driver Averaging VS. Driver Assignment

<table>
<thead>
<tr>
<th>Profile</th>
<th>Driver Averaging</th>
<th>Driver Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile 1</td>
<td>$3,132</td>
<td>$2,656</td>
</tr>
<tr>
<td>Profile 2</td>
<td>$3,878</td>
<td>$3,012</td>
</tr>
<tr>
<td>Profile 3</td>
<td>$1,068</td>
<td>$1,068</td>
</tr>
</tbody>
</table>
Generalized Linear Model
What is a GLM?

- Generalized Linear Model
- Class of models that describe the relationship between response variable and predictors
GLM’S Advantages

1. Easy to interpret

2. Can handle more complicated situations

Premium = 100 - 2 * Years of Driving + 4 * Driver Point + ...

Response(Y) can follow exponential family distribution
Data Issue and Adjustments
## Data Issue - Driver Point

<table>
<thead>
<tr>
<th>Driver point</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1.423</td>
</tr>
<tr>
<td>2</td>
<td>1.160</td>
</tr>
<tr>
<td>3+</td>
<td>1.785</td>
</tr>
</tbody>
</table>
Model Year

Add a new variable “Model Price”
## Vehicle Use

<table>
<thead>
<tr>
<th>Vehicle Use</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure</td>
<td>1</td>
</tr>
<tr>
<td>Commute</td>
<td>0.923</td>
</tr>
<tr>
<td>Business</td>
<td>1.154</td>
</tr>
<tr>
<td>Others</td>
<td>1.086</td>
</tr>
</tbody>
</table>

**Risk of Anti-Selection**

25%
Future Model Enhancement
Considerations of Selecting Time Period of the Data

- Use the latest data
  - Inflation
  - Advanced Technology
- Legislative changes
- Level of economic activities
Using One Countrywide Model
Pros & Cons

Pros:

● Easy to carry out
● Save human resources
Using One Countrywide Model
Pros & Cons

Cons:

- Differences between states ----> hard to form a unity
  - environments → levels of car damage
- Might not be competitive regionally
Challenges for the Company

- Retention dropped
- Close ratio for young drivers is low
How to Increase Retention?
- Adjust Variable Selection
  ● Decrease premium/cash benefit for safer drivers
  ● Install devices to track insured drivers
    ○ Driving behaviors
  ● Non-rating factor
    ○ Decrease expense ratio
How to Have More Young Driver as Policyholder?

- Psychology survey
  - Temper (anxiety/depression)
  - Decrease premium if the young driver has high achievement in the survey
Thank you !