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**“Use of GLM in Rate Filings”**

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# General Outline

- Background
- Rating Laws
- Public Record Laws
- Consumer Education

# Background

- Just a few years ago, the majority of the industry maintained the decades-old practice of univariate analysis to revise rating factors or to propose new rating factors.
- In PA, we have seen an increase in personal lines insurers using very sophisticated risk segmentation algorithms developed through predictive modeling.
- We have received filings that contain individual combinations of rating factors in the tens of thousands.

# Rating Laws – Standards

- Rates shall not be excessive, inadequate or unfairly discriminatory
- Companies must submit support to demonstrate compliance with the first bullet
- Every rule and rate, every rating plan and every modification...shall be filed
- The use of some criteria is prohibited

# Rating Laws - Practices

- New business vs. Renewal business
  - In PA, we consider new business tier placement to be an underwriting activity
    - Underwriting criteria are not filed for prior review and approval in a rate filing
  - We consider renewal business or in-force tier placement to be a rating activity
    - Rates and rules must be filed for review and approval

# Rating Laws - Practices

- New business – underwriting tier placement
  - Must use mutually exclusive criteria
  - Must keep criteria on file at the company
    - Criteria not filed for review & approval in a rate filing
    - May be reviewed by Market Conduct in an Exam
  - Must not be increased at renewal (without filing)
  - Must not be duplicative of other rating criteria
  - All tier factors (with labels) must be filed

# Rating Laws - Practices

- Renewal business – und'g tier placement
  - (Similar to new business, but...)
  - Renewal business includes In-force business
  - Must not be increased, unless renewal tier placement algorithm has been filed & approved
  - Acceptability of renewal criteria is more limited than new business criteria
    - Use of consumer credit information
    - Use of non-surchageable accidents & violations

# Rating Laws - Support

- Filing support
  - New business vs. Renewal business
- Specific areas of concern
  - Common Sense
  - Philadelphia vs. R.O.S.
  - Socio-economic variables
- Histograms – dispersion
  - Capping



# Rating Laws – Filing Support

- Here's one approach (New business only)
  - All selected factors (with labels) must be filed
  - Indicated factors (i.e., model output) must be filed
  - Differences must be explained (even when accepting minimal support “selections” don't always easily reconcile with “indications”)

# Rating Laws – Filing Support

- Here's another approach (New & Renewal)
  - All criteria that go into the model must be filed to establish that prohibited criteria are not used
  - Modeled factors must be shown as well as detailed discussion of the data and methods used to create the model so actuarial soundness of the resulting rates can be established
  - The filed materials must provide enough information to rate a policy

# Rating Laws – Filing Support

- Here's a third approach
  - Selected variables
  - Goodness of fit
  - Graphs
  - Sensitivity testing

# Public Record Laws

- It appears that different states have significantly different requirements
- It also appears that different information may be subject to different requirements
  - Credit information/models vs. Non-credit info.
  - Rates/rating factors vs. Supporting documentation

# Consumer Education

- My agent can't explain to me why...
- We want consumers to make informed coverage choices & make decisions to minimize risky behavior
- Transparency - information

## Other Issues

- The Principle of Parsimony
- Competition, confidentiality & public info
- Internal programming issues
- Model “output” is only as good (and relevant) as model “input”

**Questions???**