Methods to Identify and/or Mitigate Bias

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Introduction

- [Issue brief](#) discusses principles to be considered that might assist regulators in selection of suitable methodologies for identifying and/or mitigating bias.

- Structure of issue brief
    - Actuarial standards of practice
    - Definitions of unfair discrimination and disproportionate outcomes
    - Principles for approaches to identify and address unfair discrimination
    - Data collection, classification, and other considerations
    - Methods of identifying potential bias
    - Methods of preventing and addressing potential bias

Actuarial Standards and Guidance

- ASOP No. 12, *Risk Classification*—Requires correlation between risk characteristics and losses and expenses, not the establishment of a cause-and-effect relationship

- ASOP No. 23, *Data Quality*—Provides guidance around the use of data

- ASOP No. 56, *Modeling*—Provides guidance with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models

Principles for Identifying and/or Mitigating Bias

- Understandable to public
- Rates that continue to differentiate based on expected cost
- Adaptable to new data, innovation, and technology
- Consider intersectionality of protected classes
- Consistent application to all insurers
- Consider multivariate effects
- Assess impact to insurance marketplace
- Monitor results after initial approval
- Continually refresh data on protected classes

Other Considerations

- Protected class data collection
  - Directly from insureds
  - Third-party databases
  - Impute using statistical methods
- Classification
  - Classes that are capable of being objectively determined
  - Practical limitations in data collection (e.g., cost, efficiency)
  - Credibility of results
  - Frequency of reviewing definitions
- Others
  - Unintended impact to insureds (affordability, availability)
  - Multiple methods could be considered
  - Small companies could face additional challenges

Methods for Identifying Bias

- **Disproportionate Impact Analysis**—Study the impact that each rating variable has on each protected class's premiums. How much does each rating attribute cause higher premiums for each class of insureds?

- **Fairness Metrics**—Compare model predictions to actual outcomes. Is there bias (by protected class) in the prediction error in the loss model that supports the rating plan?

- **Insurance Data Disclosure**—Require insurers to release data on protected classes (such as loss ratios, bind rates, rejection rates, etc.). Allow the public to see whether there is bias in an insurer's practices.

Methods for Identifying Bias

- **Loss Ratio Test—**Compare loss ratios by variable of interest to demonstrate whether they are materially different by protected class.

- **Proxy Test—**Include protected class data in the rating model and see if the variable of concern continues to have predictive power.

- **Rational Explanation—**Require carriers to describe a potentially causal relationship between the variable of concern and losses.

Methods for Mitigating Bias

- **Allow Only Pre-Approved Variables—**States would provide a list of variables that companies are allowed to use in policy rating.

- **Prohibit Named Variables—**Each state would provide a list of variables that cannot be used in policy rating.

- **Limit Rate Spread—**Limit the spread of rating factors (e.g., no surcharge can exceed 30%) or limit the spread of premiums (e.g., the highest premium cannot be 3x greater than the lowest premium).

Methods for Mitigating Bias

- **Rate Factor Adjustment—**Adjust rate factors (manually or algorithmically) until a test to identify bias has been passed.
- **Solidarity Tax and Rebate—**Collect a tax from all policyholders and redistribute that tax as a rebate to those that have been identified as deserving a subsidy.
- **Statistical Model—**Build an initial model using all rating variables and the protected class variables; then, algorithmically remove any proxy effects from the rating variables (and the protected class variables).

Conclusion

- Growing discussion around unintended bias and unfair discrimination
- There are many potential methods to identify and/or mitigate bias that have been discussed
  - There are likely to be even more methods in the future as discussions continue
- The American Academy of Actuaries is ready to assist regulators in their review of the technical components of these methods as well as in identifying strengths and weaknesses, particularly in relation to the principles noted in this presentation
- We hope these observations are helpful and we welcome further discussion

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