Professionalism for Predictive Modelers

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Agenda

- Quick Review of the Code of Conduct
- Scenario Based Discussions. Audience Participation Greatly Encouraged!

Ground Rules

- Stay away from company specifics
- We may limit discussion on an item for the sake of time
- Remember: In most of the scenarios there are no right or wrong answers

U.S. Code of Professional Conduct

- The Code contains **14 Precepts,** along with annotations providing further guidance on adhering to the Precepts.
- The **Precepts are standards that must be followed by credentialed actuaries** who are members of one of the U.S.-based organizations or whose member organizations require their members to follow the U.S. Code.

U.S. Code of Professional Conduct

Precept 1: Professional Integrity

An actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession.

U.S. Code of Professional Conduct

Precept 2: Qualification Standards

An Actuary shall perform Actuarial Services only when the Actuary is qualified to do so on the basis of basic and continuing education and experience and only when the Actuary satisfies applicable qualification standards.

U.S. Code of Professional Conduct

Precept 3: Standards of Practice

An Actuary shall ensure that Actuarial Services performed by or under the direction of the Actuary satisfy applicable standards of practice.

U.S. Code of Professional Conduct

- **Precept 4–6:** Communications and Disclosure
- **Precept 7:** Conflict of Interest
- **Precept 8:** Control of Work Product
- **Precept 9:** Confidentiality
- **Precept 10:** Courtesy and Cooperation
- **Precept 11:** Advertising
- **Precept 12:** Titles and Designations
- **Precept 13–14:** Violations of the Code of Professional Conduct

Ratemaking SOP – 4 Principles

- **Principle 1:** A rate is an estimate of the expected value of future costs
- **Principle 2:** A rate provides for all costs associated with the transfer of risk
- **Principle 3:** A rate provides for the costs associated with an individual risk transfer
- **Principle 4:** A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer

Other Relevant References

- **ASOP 12:** Risk Classification
- **ASOP 23:** Data Quality
- **ASOP 25:** Credibility Procedures
- **ASOP 30:** Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking
- **ASOP 41:** Actuarial Communications
- **Statement of Principles:** Risk Classification
- **AAA Monograph:** On Risk Classification
- **ASB (Exposure Draft):** Modeling

Scenario 1

You finished building a GLM for personal auto loss costs. You feel like the indicated factors on the driver age curves are not high (steep) enough for youthful drivers

You are considering these options:

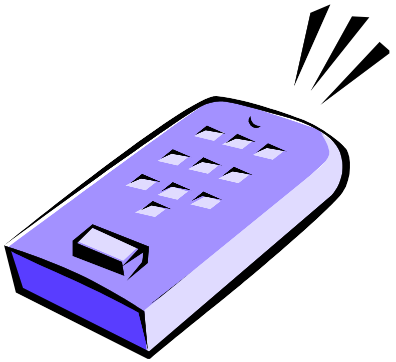
1. Alter your factor simplification such that the curve you fit to age is steeper at youthful ages than perhaps you otherwise would have chosen without consideration of business judgment

2. Keep the model the same but recommend that the selected rate relativities be higher (than indicated by your model) for youthful drivers

What do you do?

1. Alter your factor simplification such that the curve you fit to age is steeper at youthful ages than perhaps you otherwise would have chosen without consideration of business judgment

2. Keep the model the same but recommend that the selected rate relativities be higher (than indicated by your model) for youthful drivers



Option 1: Use judgment to alter factor simplification

- No ASOP or SOP provides *explicit* direction on how to fit a curve within a GLM context

ASOP #12: Risk Classification

Reasonableness of Results: When establishing risk classes, the actuary should consider the reasonableness of the results that proceed from the intended use of the risk classes (for example, the consistency of the patterns of rates, values, or factors among risk classes).

SOP Ratemaking - Considerations

Is the past experience predictive of the future?

- **Operational changes:** consideration should be given to operational changes such as changes in the underwriting process, claims handling, case reserving and marketing practices that affect the continuity of the experience.

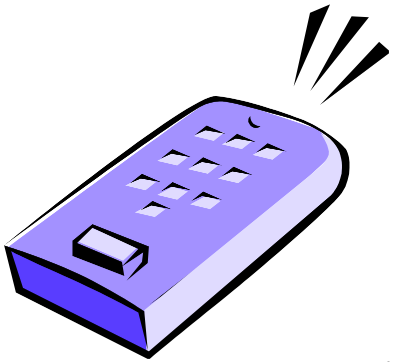
- **Other influences:** the impact of external influences on the expected future experience should be considered. Considerations include the judicial environment, regulatory and legislative changes, guaranty funds, economic variables, and residual market mechanisms including subsidies of residual market rate deficiencies.

SOP Risk Classification

These statistical considerations – homogeneity, credibility and predictive stability – are somewhat conflicting. For example, increasing the number of classes may improve homogeneity, but at the expense of credibility. Consequently, **there is no statistically correct risk classification system.** In the final analysis, the system adopted will reflect the relative importance ascribed to each of these considerations. **The decision as to the relative weights to be applied will, in turn, be influenced by the nature of the risks, the <u>management philosophy</u> of the organization assuming the risk and the judgment of the designer of the system.**

Option 2: Recommend that the selected rate relativities be higher (than indicated) for youthful driver

- **Principle 1:** A rate is an estimate of the expected value of future costs.
- Does this mean:
  - Insurance prices should be based solely on costs
  - This standard on “rates” is referring to the actuary’s estimation of future costs



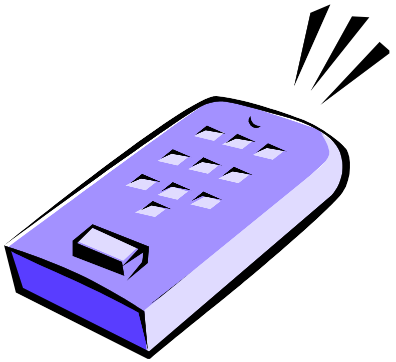
SOP Ratemaking

Ratemaking is the process of establishing rates used in insurance or other risk transfer mechanisms. This process involves a number of considerations including <u>marketing goals, competition and legal restrictions to the extent they affect the estimation of future costs associated with the transfer of risk.</u> ***This Statement is limited to principles applicable to the estimation of these costs.***

Has anything changed?

1. Alter your factor simplification such that the curve you fit to age is steeper at youthful ages than perhaps you otherwise would have chosen without consideration of business judgment

2. Keep the model the same but recommend that the selected rate relativities be higher (than indicated by your model) for youthful drivers

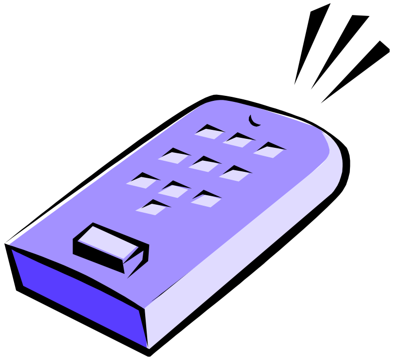


Scenario 2

Your company is on the cutting edge – you've just built a pricing model that systematically adjusts the indicated loss cost relativities in consideration of customer price elasticity.

Is this consistent with the SOPs and ASOPs?

1. Yes
2. No



SOP Ratemaking

Principle 4: A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.

Does this principle refer to:

1. The loss cost point estimate
2. The range of reasonable loss cost estimates
3. The price the company selects to charge

SOP Ratemaking

Principle 4: A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.

- Are we violating Principle 4 any time we charge a price that deviates from our cost indications?
- How about if we choose to ignore an indicated surcharge for customers with safety features (theft alarm, airbags, fire alarm, work safety program)?
- How about if we force a surcharge to be a discount (new car discount)?

ASOP 30: Profit & Contingency Provision…

- **ASOP 30:** Profit & Contingency Provision & Cost of Capital in P&C Insurance Ratemaking
- **Appendix 2:** Comments on the 1996 Second Exposure Draft and Task Force Responses…

"…**one commentator believes that the standard should not limit actuarial practice in setting profit margins that are either explicit or implicit in actual prices in the marketplace.** The commentator further raises potential legal issues were the actuarial profession to engage in limiting actuarial practice in this area. **The task force agrees with the commentator that the standard does not apply to final (market) prices—the standard is entirely focused on the evaluation of costs.** In fact, the task force has consistently and consciously focused on costs (not on prices) in its deliberations in consideration of the legal environment and has obtained competent legal advice as appropriate."

ASOP 30: Profit & Contingency Provision…

- Scope of the ASOP:

  "… as is true of the Statement of Principles, this standard is limited to defining a *rate* as the estimation of future costs and does not address other considerations that may affect a price, such as marketing goals, competition and legal restrictions."

ASOP 30: Profit & Contingency Provision…

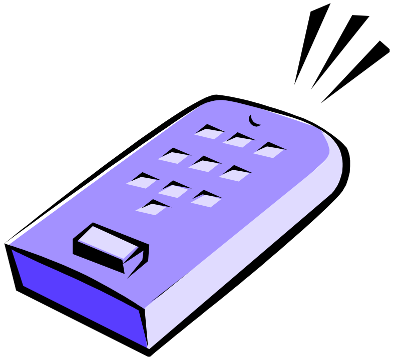
- Purpose: “According to the Statement of Principles Regarding Property and Casualty Insurance Ratemaking (hereafter the Statement of Principles) of the Casualty Actuarial Society, insurance rates should provide for the cost of capital through underwriting profit and contingency provisions. **This standard of practice provides guidance to actuaries in estimating the cost of capital and evaluating underwriting profit and contingency provisions.”**
- Does this Standard address the average profit margin (to the portfolio) or individual risk profit margins?
- When is it appropriate to vary the profit margin by individual risk?

Has anything changed?

Your company is on the cutting edge – you've just built a pricing model that systematically adjusts the indicated loss cost relativities in consideration of customer price elasticity.

Is this consistent with the SOPs and ASOPs?

1. Yes
2. No



Scenario 3

You are building a model to identify potentially fraudulent personal auto claimants for further investigation.

- Your company collects insurance scores (in states where it's allowed) for use in rating
- This credit information gets used with other, non-credit information to form underwriting tiers
- You would like to incorporate some notion of credit into your fraud model because it is very predictive
- You know you want to speak with your legal department, but would like to come to the discussion ready with a proposal

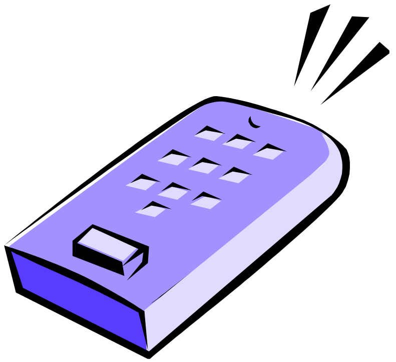
What would you propose?

1. Use the raw insurance score that was used in rating (for both modeling and implementation)

2. Use the underwriting tier for fraud prediction (for both modeling and implementation)

3. Build a model that seeks to predict the insurance score using non-credit variables (use credit in modeling, but non-credit in implementation)

4. Stay away from credit altogether



Discussion: Fair Credit Reporting Act

Permissible purpose is defined in Section 604 of the Fair Credit Reporting Act (FCRA). [15 U.S.C. § 1681b]

“. . . any consumer reporting agency may furnish a consumer report under the following circumstances <u>and no other</u>:

. . .

To a person which it has reason to believe

. . .

C) intends to use the information in connection with the <u>underwriting of insurance</u> involving the consumer;”

Discussion: Precept 1

"An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession."

- What is our responsibility to the public?
- Would the public's opinion differ based on their credit score?

Discussion: Precept 1, Annotation 1-2

"An Actuary shall not provide Actuarial Services for any Principal if the Actuary has reason to believe that such services may be used to violate or evade the Law or in a manner that would be detrimental to the reputation of the actuarial profession."

- Does Precept 1 imply a responsibility even if the statute does not explicitly rule out possible loopholes?

Has anything changed?

1. Use the raw insurance score that was used in rating (for both modeling and implementation)

2. Use the underwriting tier for fraud prediction (for both modeling and implementation)

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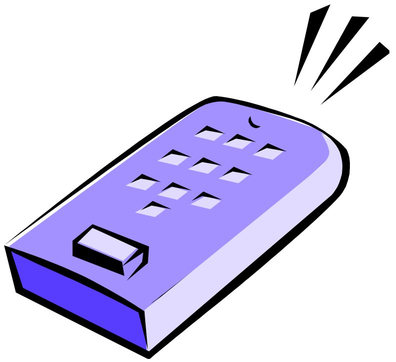


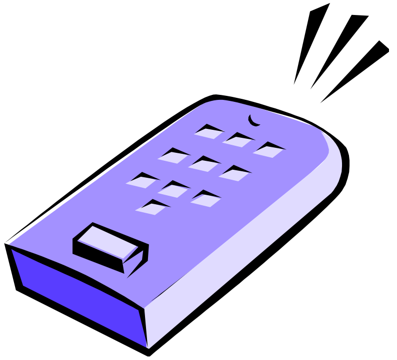
Scenario 4

You are building a predictive model to help you decide which types of auto claims require onsite appraisal by a claim handler vs. receiving an estimate from a repair shop.

- One of your concerns is the artificial inflation of costs where you do not physically examine the vehicle
- The model uses various territorial variables
- The model you build determines that repair shops in urban areas are more likely to inflate costs vs. repair shops in rural areas

What do you do?

1. Leave model as is
2. Remove territorial variables from your model



Discussion

- Is there an adverse impact?
- Is this adverse impact or adverse treatment?
- Who would potentially be discriminated against? (customer or repair shop owner)

Discussion

- **Actuarial Services** defined by the code of conduct as:

  "Professional Services provided to a Principal by an individual acting in the *capacity of an actuary*. Such services include the rendering of advice, recommendations, findings, or opinions based upon actuarial considerations."

- Is this an Actuarial Service?

Discussion

- **ASOP 12:**

  “Risk Classification System – A system used to assign risks to groups based on expected cost or benefit of the coverage or services provided.”

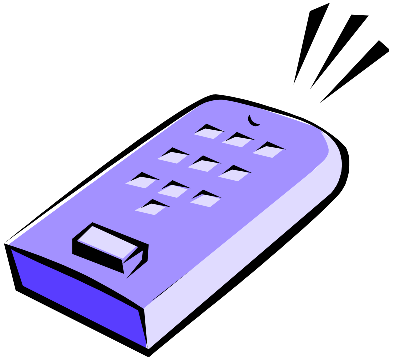
- **SOP on Risk Classification:**

  “The grouping of risks with similar risk characteristics for the purpose of setting prices”

- Does ASOP 12 (Risk Classification) Apply?

Has anything changed?

1. Leave model as is
2. Remove territorial variables from your model



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This presentation is based on previous presentations given by Claudine Modlin and Kevin Mahoney in the CAS RPM Seminar