



PREDICTIVE MODELING: PITFALLS AND POTENTIALS

A CONSULTANT'S VIEWPOINT

Jeff Kucera
Senior Consultant
CAS Annual Meeting

AGENDA

- Purpose
- Benefits
- Pitfalls

❖ Purpose of Predictive Modeling

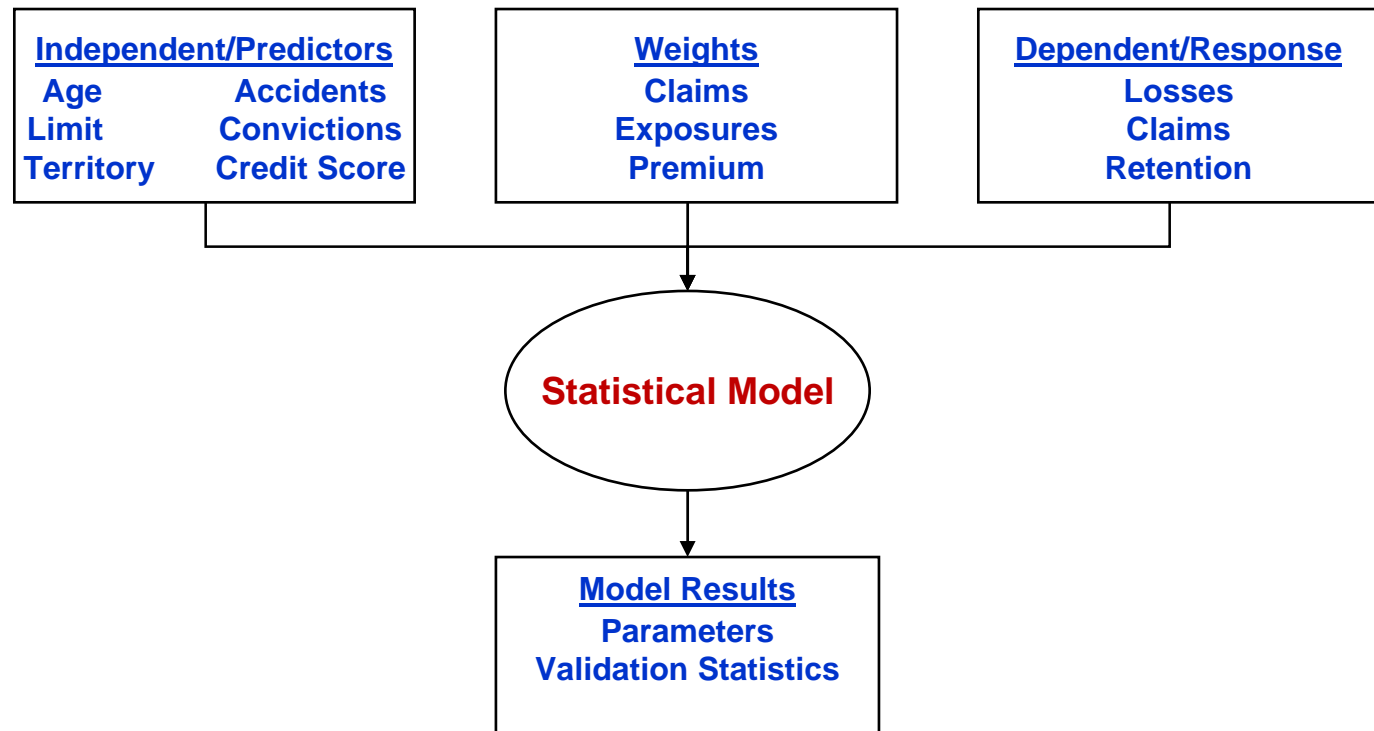
❖ Benefits of Predictive Modeling

❖ Pitfalls of Predictive Modeling

Purpose of Predictive Modeling

- Purpose
- Benefits
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- ❖ To predict a response variable using a series of explanatory variables (or rating factors)



- Purpose
- **Benefits**
- Pitfalls

Benefits of Predictive Modeling

- ❖ Multivariate pricing has significant advantages over traditional techniques
 - Corrects methodological flaws
 - Does more with limited data
 - Provides better diagnostics to support decision-making
 - Eliminates time-consuming adjustments
- ❖ Predictive modeling is being successfully applied within the insurance industry for a wide variety of applications including
 - Pricing
 - UW
 - Marketing
 - Claims

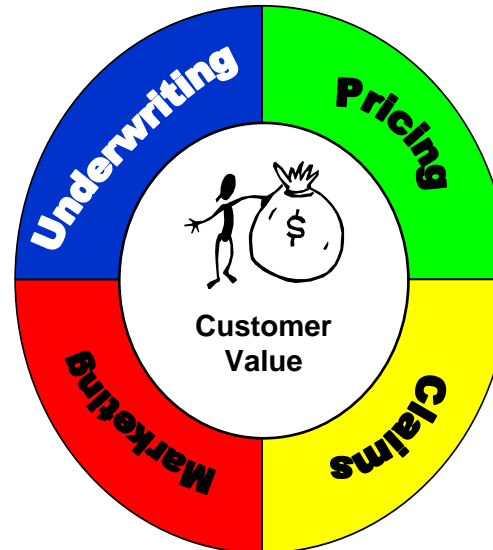
Uses of Predictive Modeling

- Purpose
- Benefits
- Pitfalls

❖ Predictive modeling can be used by all operational areas

- Determine underwriting rules
- Perform credit analysis
- Create profitability curves
- Evaluate agents/regions
- Target inspections

- Predict response rates
- Perform conversion analysis
- Determine retention

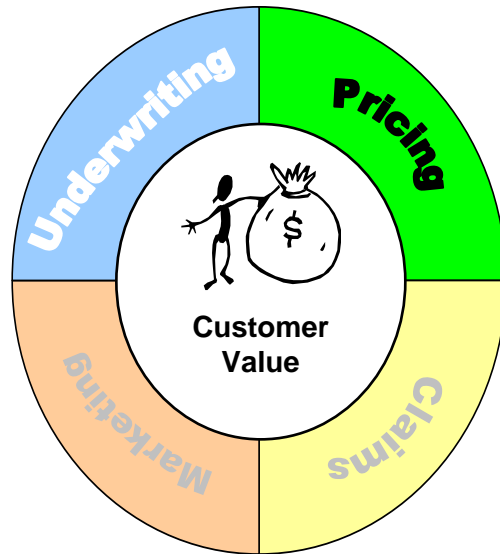


- Set base rates
- Identify predictors
- Quantify relationships
- Enhance current programs
- Special scores

- Set reserves
- Predict fraud
- Predict lawsuits

Pricing can...

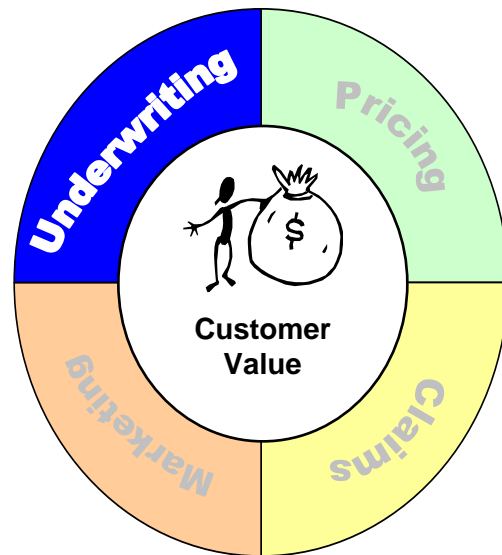
- Purpose
- **Benefits**
- Pitfalls



- ❖ Set base rates
- ❖ Identify predictors
- ❖ Quantify relationships
- ❖ Enhance current programs, e.g. make and model
- ❖ Special scores – e.g. fire protection score

Underwriting can...

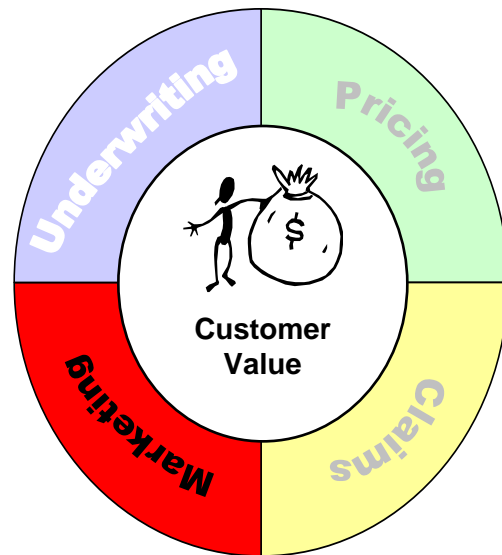
- Purpose
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- ❖ Determine underwriting rules
- ❖ Perform credit analysis
- ❖ Create profitability curves
- ❖ Evaluate agents/regions
- ❖ Target inspections

Marketing can...

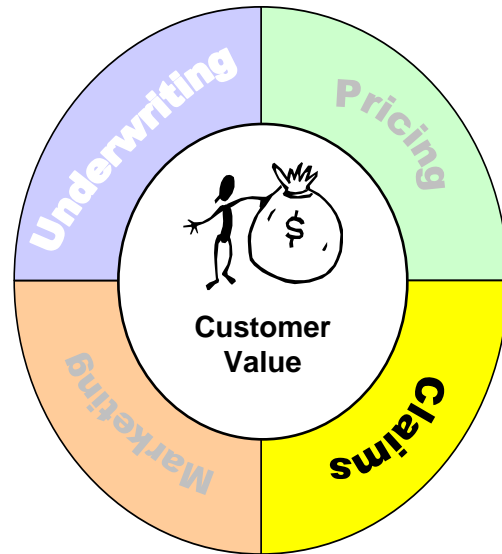
- Purpose
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- ❖ Predict response rates
- ❖ Perform conversion analysis
- ❖ Determine retention

Claims can...

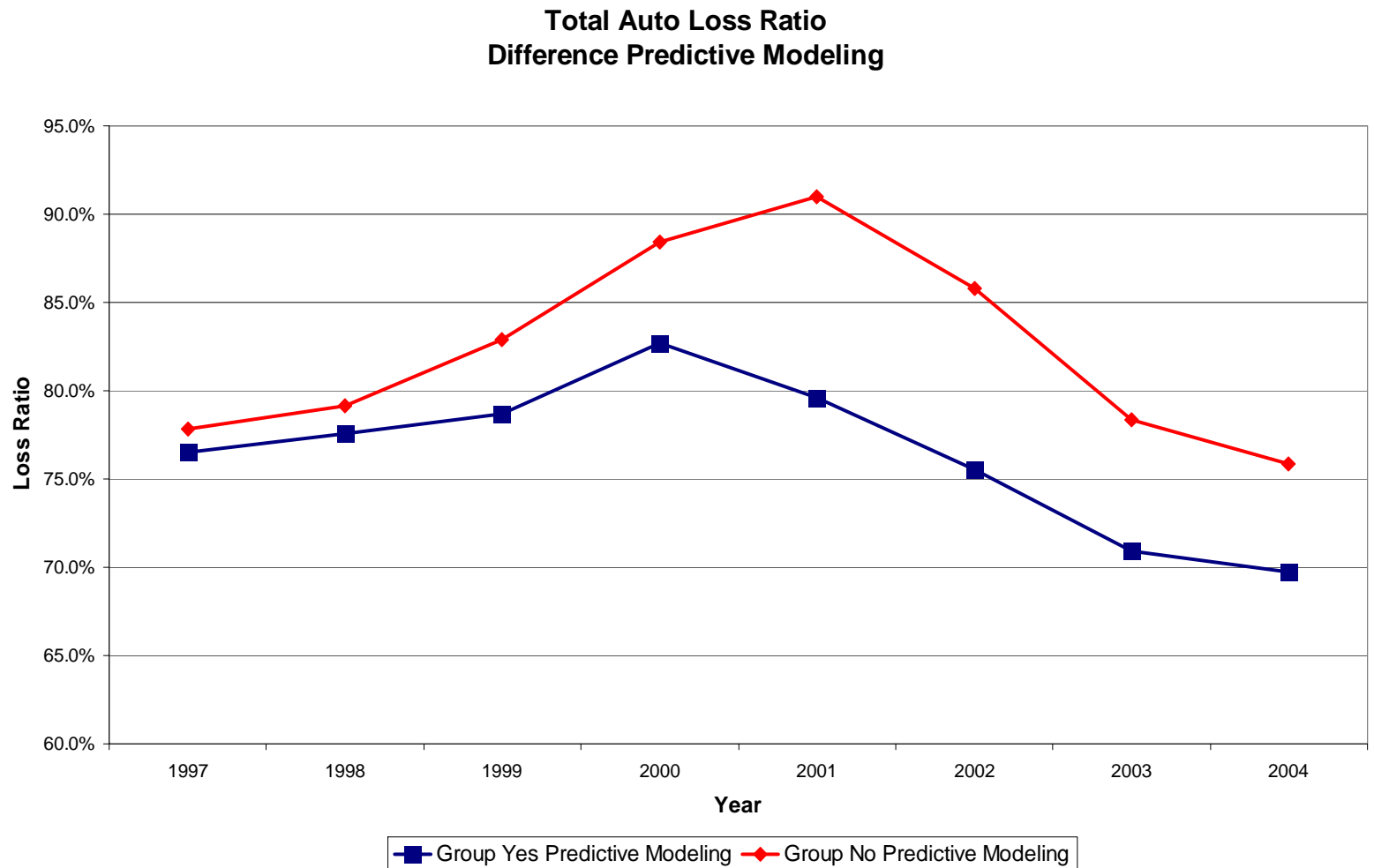
- Purpose
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- ❖ Set reserves
- ❖ Predict fraud
- ❖ Predict lawsuits

- Purpose
- Benefits
- Pitfalls

Multivariate Analysis Makes a Difference



Pitfalls of Predictive Modeling

- Purpose
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- **Pitfalls**

- ❖ Reliable Data
- ❖ IT Availability
- ❖ Shortcutting the Process
- ❖ Treating Predictive Modeling as a Black Box
- ❖ Senior Management Understanding/Buy-In

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Pitfalls of Predictive Modeling

Reliable Data

- ❖ What is available?
- ❖ Where do I go for additional items?
- ❖ How soon can I have data ready for analysis?
- ❖ Failure to make incremental improvements?

- Purpose
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Pitfalls of Predictive Modeling

IT Availability

❖ True Pitfalls

- Changes are likely to occur
- Eventually, significant changes occur
- Must be part of the process

❖ False Pitfalls

- All changes must be a monumental task
- Nothing can be accomplished in the current framework

- Purpose
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Pitfalls of Predictive Modeling

Shortcutting the Process

- ❖ Modelers should get proper training on the tools to be used
- ❖ Practitioners performing loss ratio modeling sacrifice valuable information that can be gleaned from proper analysis
 - Made worse by failure to put premiums on level at the “cell” level
 - Best to perform analysis on underlying frequency and severity for same reasons actuaries select loss trends on this basis
 - Diagnostics are compromised as practitioner cannot have an a priori expectation
- ❖ Predictive modeling should not be considered an automated process. For example, stepwise regressions should compliment not replace proper modeling

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Pitfalls of Predictive Modeling

Treating Predictive Modeling as a Black Box

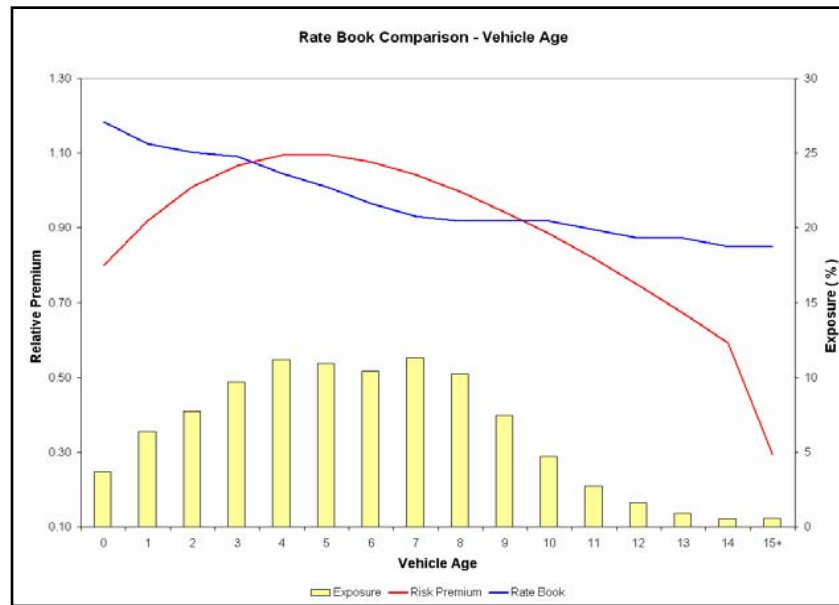
- ❖ Practitioners should apply appropriate judgment and understand the model
- ❖ Modelers oftentimes build models that are unnecessarily complex
 - UK models (and rating algorithms) tend to be much simpler
- ❖ Appropriate diagnostics can ensure model is not just explaining the past, but will be predictive of the future

Pitfalls of Predictive Modeling

Treating Predictive Modeling as a Black Box

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- ❖ Some companies implement results blindly
 - Do the indications make sense?
 - What is the impact on the policyholder?
 - What will the changes do to competitiveness? Profit level?
 - Would the “problem” be better addressed by another action?



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Pitfalls of Predictive Modeling

Senior Management Understanding/Buy-in

- ❖ Need to be informed throughout process
- ❖ May not understand cultural changes to be made, e.g. some risks previously considered uninsurable may now be insurable
- ❖ Still have “favorite” risks that they want to heavily discount
- ❖ Desire to “tinker” with the results



Predictive Modeling – Pitfalls and Potentials

Contact Information:

Jeffrey L. Kucera

Senior Consultant

EMB America

50 Seneca West

Hawthorn Woods, IL 60047-1921

Telephone 847/393-7618

jeff.kucera@embamerica.com

www.embamerica.com