Predictive Modelling
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CELTIC MANOR RESORT, NEWPORT, WALES
Agenda/Contents

- What is Predictive Modelling
- Insurance Applications
- What can you do
Predictive Modelling

It’s about getting the data to talk to you ...
Predictive modelling is:

- Predictive modelling attempts to predict the probability of an outcome or outcomes.
- It does this by building a statistical model based on a sample of data with known outcomes.
- The model can then be applied to similar data for which the outcomes are not yet known.
Data Mining – Predictive Modelling Continuum

- **Univariate Analysis**: One & Two way tables, graphs
- **Data Mining**: SAS / CART
- **Predictive Modelling**: CART / GLM
- **Testing & Validation**: Goodness of fit, Hold out data
- **Calibration**: To future market conditions
Predictive Modelling

Two sides of the same coin

- Prediction
- Segmentation
Predictive Modelling

It’s more widespread, but not new …

Fair Issacs – credit scores

Tesco Club Card

… and many others
Insurance Applications

- Personal Lines Pricing
- Commercial Lines Pricing
- Marketing & Retention
- Claims Modelling & Reserving
Personal Lines Pricing

Predictive modelling is well established in calculating the premium rates for personal lines policies

- High levels of direct sales
- Large amounts of data
- Commodity market
- Policyholders who shop on price
Commercial Lines Pricing

Has lagged behind Personal Lines due to greater diversity in customers and policies and data issues.
Best opportunities seen in small commercial packages

- Better identify target segments
- More sophisticated rating structures
- Enhanced auto-rating rules – less manual input
Using data mining for builders warranty business

Decision trees are useful for handling data with many categories and data which is sparse.

Predicting claim frequency for building warranty

Exploratory work with builders warranty claims data highlighted a number of key business issues:

- High levels of claims from new risks
- Lower frequency from larger properties, partially offset by higher claim costs
Marketing & Retention

Aiming to combine
- Customer segmentation
- Customer behaviour
- Customer profitability

Customer segmentation
- Widely used for marketing (Experian’s 40+ named demographics)
- Responding to promotional material
- Product design

Customer Behaviour
- Purchase of additional products
- Retention rates
- Price sensitivity

Customer profitability
- Don’t want to acquire and retain unprofitable customers
Retention – Personal Lines

- Policy mix matters!
- Retention
- Expenses
- Claims experience
- 10-20% of those with house policies didn’t hold a contents policy

<table>
<thead>
<tr>
<th>Policies Held</th>
<th>Retention Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third Party Only</td>
<td>60%</td>
</tr>
<tr>
<td>Motor</td>
<td>80%</td>
</tr>
<tr>
<td>Motor + 2nd Car</td>
<td>90%</td>
</tr>
<tr>
<td>Motor + House</td>
<td>90%</td>
</tr>
<tr>
<td>Motor + Contents</td>
<td>85%</td>
</tr>
<tr>
<td>Motor + H + C</td>
<td>95%</td>
</tr>
</tbody>
</table>

Example: Possible effect of policy mix on 12 month retention
Claims Modelling & Reserving

Claims processes
- Data mining to understand and quantify changes in process
- Identify key drivers
- Long-tail classes

Periodic payments
- Assist in setting accurate and up-to-date case estimates
- Large amounts of data
- Larger claims
Example – Mortgage Guarantee Insurance

- States are aligned with bank’s systems and thought processes.
- States are observable
- Transition rates relate to processes the bank is interested in

**BUT**
- Key drivers are macro-economic

State model courtesy of Robert Brooks
Example – Consumer Credit

- Aligned model to bank’s processes.
- Micro-event are significant predictors.
- Still have macro factors, but they don’t destroy usefulness.
What Can You Do?

- Use of predictive modelling driven by
  - Increasing data availability
  - Better modelling tools
  - Competition

- Find data already gathered – and put to new uses
- Pick easy goals first
- Tools – GLMs / Decision Trees
Questions / Discussion