Better pricing needs better underwriting

Our message:

Improvements in technical pricing are both good and inevitable, however, with analytical power comes underwriting responsibility.
Better pricing needs better underwriting

Agenda

• Introduction
• Distribution
• Bodily injury
• Other technical pricing advances
• Conclusion

Introduction

Better pricing needs better underwriting

• Recent years have seen advancements in pricing techniques and sophistication
• How has the role of underwriting changed and how does underwriting fit alongside pricing?

Getting the right balance
Introduction

Better pricing needs better underwriting

• Pricing definition
  – Setting prices to achieve target returns based on analysis of historic experience incorporating trending, risk knowledge and commercial expertise

• Underwriting definition
  – Ensuring risks written are consistent with the assumptions used in pricing
    – …generic pricing assumptions include:
      • utmost good faith;
      • no fraudulent intent;
      • the past can be used as a guide to the future;
      • customer behaviour not changing overnight.

For presentational effect we’re working with mental caricatures:

• Underwriting isn’t the preserve of Underwriters; it’s an activity that complements technical pricing
• What we now go on to describe as underwriting is delivered by actuaries, pricing teams and other insurance professionals as well as underwriters
Introduction

Better pricing needs better underwriting

- Applicability
  - Considerations based on commodity business supported by statistical pricing (i.e. think personal motor)
  - But the underlying principles apply much more widely
- Approach for today’s workshop
  - We’ll consider:
    - Examples of better technical pricing
    - Associated assumptions
    - Underwriting response

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Distribution

Pricing

- Elasticity modelling and price optimisation have become standard in recent years
- Price comparison sites have increased importance of a good understanding of customer behaviour
- Winners on PCS will have a low cost base and the best risk cost models
- Distribution changes the risk cost
- Pricing for the ultimate level of competition

Distribution

Pricing

- Elasticity modelling considers how demand changes with price

![Graph showing retention rate vs price with a low elasticity and high elasticity curve.](image)
Distribution

Pricing
- Different channels have different sensitivities to any change in price
- Elasticity = % Change in Demand / % Change in Price

![Graph showing elasticity for different channels: Phone, Web, Aggregator, Renewals.]

Distribution

Pricing
- Price optimisation considers both profit and volume
- Volume and profit can be traded to determine an optimal strategy

![Graph showing trade-off between profit and retention at different prices.]

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Retention Rate
- Maximise profit at current retention
- Increase profit and retention
- Retain retention at current profit

Premium for policy in question
- Expected profit
- Optimal price?
Distribution

Pricing

- Optimisation has shown to deliver material benefits
- Motor renewal optimisation for direct channel
- Pilot implementation vs. “business as usual”

Distribution

Pricing

- Distribution is causing pricing to cover more ground
  - More competitive, smaller margins, different objectives
- Modelling makes use of more than just risk factors
- Has to use external data effectively
- Optimisation needs quality inputs (GIGO)
  - risk premium models
  - cost models
  - elasticity and demand models
Distribution

Pricing
• Continued improvement of risk cost modelling embracing
  – Structure
  – Data
  – Latest techniques
• Explicit risk and behaviour modelling of distribution characteristics
• Second and third order elements of risk cost models need increasingly to be used

Distribution

Assumptions
• Web customer transaction is the same as telephone transaction (70% by phone in 2006, up to 70% on web in 2010)
• Business models are the same as they were
• Pricing data mean the same thing today as pre-web
• The level of anti-selection hasn’t changed
• Claims inflation is claims inflation
The underwriting view: The nature of customer access has changed

A sequence of quotes on an internet quote engine progressing from correct risk to deeply misrepresented and fronted………………….saving 87% of premium

<table>
<thead>
<tr>
<th>Quote</th>
<th>Driving</th>
<th>Age</th>
<th>Garaging</th>
<th>Claims</th>
<th>NCD</th>
<th>Postcode</th>
<th>Premium</th>
<th>% of correct premium</th>
<th>Notes</th>
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<tr>
<td>1</td>
<td>IOD</td>
<td>24</td>
<td>Road</td>
<td>1</td>
<td>0</td>
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<td>£3,425</td>
<td>100%</td>
<td>Correct details</td>
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<td>24</td>
<td>Road</td>
<td>0</td>
<td>0</td>
<td>SE18 1PT</td>
<td>£2,960</td>
<td>86%</td>
<td>Accident was on someone else’s policy</td>
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<tr>
<td>4</td>
<td>2 Named</td>
<td>24/51</td>
<td>Road</td>
<td>0</td>
<td>0</td>
<td>SE18 1PT</td>
<td>£2,890</td>
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<td>Add parent as driver</td>
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<td>Road</td>
<td>0</td>
<td>2</td>
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<td>£2,168</td>
<td>63%</td>
<td>Named driver NCD(?)</td>
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<tr>
<td>5</td>
<td>2 Named</td>
<td>51/24</td>
<td>Road</td>
<td>0</td>
<td>5</td>
<td>SE18 1PT</td>
<td>£1,026</td>
<td>30%</td>
<td>Fronting</td>
</tr>
<tr>
<td>6</td>
<td>2 Named</td>
<td>51/24</td>
<td>Garaged</td>
<td>0</td>
<td>5</td>
<td>SE18 1PT</td>
<td>£1,026</td>
<td>27%</td>
<td>Fronted address has garage</td>
</tr>
<tr>
<td>7</td>
<td>2 Named</td>
<td>51/24</td>
<td>Garaged</td>
<td>0</td>
<td>5</td>
<td>NR13 5NN</td>
<td>£435</td>
<td>13%</td>
<td>Insure at fronting address</td>
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</table>

- Very significant threat: estimated 5-10% more premium on internet transactions lost to underwriting fraud compared to phone transactions
- Areas for motor underwriting fraud include: fronting, location, NCD, claims, mileage, garaging, use, driving restriction, claims, convictions
- Household underwriting fraud tends to focus on previous claims, NCD and underinsurance
- Underwriting needs to find a way of making quotation engines tamper-resistant

The underwriting view: Business models have changed:

- Insurer
  - Technical premium + street pricing adjustment

- Intermediary
  - % Commission

- Customer

- Aggregator
  - + paying flat rate fee
  - + looking to increase churn

- Customer
  - + cashback from Quidco

- What does all this added complexity mean?
  - Distance between insurers and their customers has increased
  - Would expect reduced loyalty and increased willingness by customers to play games
  - Price paid by customer is only tenuously based on risk premium + distribution cost
  - Underwriting needs to reappraise wordings, acceptance criteria and underwriting rules
The underwriting view:
Data doesn’t mean the same as it did

Distribution changes have to some degree compromised:
• Mileage
• NCD and past claims
• Occupation (Money Saving Expert advice on cheapest way to describe yourself)
• Driving restrictions
• Agent

• Underwriting needs to call the future trend on these and find improved means of validation where necessary

The underwriting view:
The winner’s curse has changed profitability

Motor: Margin Benefit by Panel Size

• The more competitors the lower the average price
• When an insurer is the cheapest of many, are they more likely to have a pricing error than when they’re average?
• Underwriting can help to manage the extremes of pricing error by developing tighter underwriting and contributing to the pricing model on areas of unintentional overfitting
The underwriting view: When is claims inflation not claims inflation?

Any unidentified increase in risk mix results in an increase in claims cost that will be misattributed to claims inflation.

Underwriting must be wise to this and ensure that the Claims Director isn’t sacked for an element of claims inflation he has no control over.

Acid test is whether market claims costs increase in line with the high claims inflation rates identified by insurers.

Better pricing needs better underwriting

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- Distribution
- Bodily injury
- Other technical pricing advances
- Conclusion
Bodily Injury

Pricing

• Proportion of bodily injury has increased significantly
• Have modelling approaches adapted sufficiently?

Proportion of TPBI and TPPD Buring Cost over time

Proportion of bodily injury has increased significantly
Have modelling approaches adapted sufficiently?

Bodily Injury

Pricing

• Enhance risk models
  – Consider different model structures
  – Split by type of event: Rear shunt, Head-on, …
  – Tiered capping levels: 0-10k, 10k – 25k, …
  – Split by injury type: Whiplash vs other
  – Propensity for BI given TPPD
  – Inferences from AD & TPPD severity for BI frequency and severity
  – Reflect geographic and socio-demographic influences
    – Best use of external data
    – Up to date geographical classification
Bodily Injury

Pricing
• Enhance risk models
  – Understand range of uncertainty in risk estimates
• Utilise available fraud data
  – Fraud models and fraud scoring
    – Policy underwriting and claims underwriting
  – Impact of any changes in fraud approach
    – How does increasing fraud screening impact claims cost?

Assumptions
• Assumptions
  – Fraud doesn’t need to be considered because detected fraud has £0 cost and so excluded from cost models
  – BI fraud is an unpredictable, random occurrence perpetrated by unknown third parties, so fraud propensity in claim unrelated to first party characteristics (other than geography)
  – Number of injuries per accident is constant over time
The underwriting view: Bodily Injury

- The expertise of Claims need to be brought into future pricing and underwriting
- Are underwriting rules, acceptance criteria, policy terms and conditions aligned with the preponderance of third party property damage and bodily injury claims? Many will target AD and theft risk.
- Are there policyholder characteristics that make bodily injury claims outcomes more likely – what should be done about them?
- The significance of Distribution on BI claim frequency – and what to do about it?
- Can lessons be taken from motor markets such as Texas where the injury rates are even higher than the North West?

The underwriting view: Bodily Injury and Fraud

- Critical for underwriting to understand changing fraud risk
- Claims expertise is a vital input
- Establish acceptable means for potential fraud to be identified
- Establish data requirements associated with fraud in order to better underwrite and mitigate it
- Underwriting must assist the BI claims function
- Establish the links between underwriting fraud and claims fraud
- Learn from the past – if fraud wasn’t a major issue ten years ago what lessons can be learnt?
- Using fraud propensity scores in underwriting and claims handling
Better pricing needs better underwriting

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Other technical pricing advances

Geographic classification using spatial smoothing
- Pricing
  - Spatial smoothing is common practice for geographical analysis
  - Best results enhance effect of external factors
  - Geographical effects change over time and need to be maintained
Other technical pricing advances

Geographic classification using spatial smoothing

- **Assumptions**
  - Distance based
    - Influence of a postcode inversely proportional to distance away
  - Adjacency based
    - Postcodes are similar to neighbouring areas

Vehicle or Trade Smoothing

- Spatial smoothing can be extended to vehicle or trade codes
Other technical pricing advances

Example adjacencies

Power

Length

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Other technical pricing advances

**Vehicle Smoothing**
- Delivers material benefit

<table>
<thead>
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<th>Percentage change between proposed and current group</th>
<th>Proposed Vehicle Group vs ABI 50 Group</th>
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</table>

**Saddles**
- Systematic review of interactions can be simplified into “saddle spotting”
- This can be designed to work equally well at 2, 3, 4, 5, … dimensions without losing process efficiency
- Can rapidly build list of possible interactions for inclusion in models
Other technical pricing advances

Saddles

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Other technical pricing advances

Saddles
Other technical pricing advances

Saddles
Other technical pricing advances

Saddles
The underwriting view: Geographic Spatial Smoothing

- Which geographic elements should over-ride spatial smoothing?
  - Motorways
  - Rivers
  - Boundaries
- Predictable characteristics:
  - Theft near ports
  - Windscreen claims in broader East Anglia
- What to do without exposure
- What competitors are doing geographically and why

The underwriting view: Vehicle or Trade smoothing

- Virtual spatial smoothing is broadly equivalent to a traditional underwriting approach
- Risk is assessed in a broader, more holistic way with experience being developed more generally than on particular trades or vehicles
- The approach leans toward partial implementation in terms of underwriting rules
- Underwriting input will include:
  - What to do without exposure
  - What competitors are doing and why
The underwriting view: Saddles

- There should be an underwriting rationale for each interaction adopted into risk cost models.
- Underwriting will propose deep interactions that appeal:
  - Teachers living in rural areas with more than one vehicle in the household doing a low mileage?
- Underwriting will manage the balance between pricing complexity and its ease of interpretation and maintenance.

The underwriting view: Saddles ↔ Deep interactions

- Have you ever wondered what “Occupation” was doing in motor and home rating?
- Deeper interactions have always been part of the underwriter’s armory.
- Consistency is the key.
- Increased sophistication hasn’t delivered the ability to spot the real risk from the fraud.
- The case underwriter scrutiny is badly missed and needs to be reinvented.

Consistency?
Better pricing needs better underwriting

Conclusion

We started off defining underwriting as ensuring risks are consistent with pricing assumptions

• Technical pricing development is vital to general insurance
• Technical pricing developments are rarely assumption free and generally add to the cumulative assumptions already in play
• We’ve shown lots of instances where pricing assumptions need to be supported by underwriting
• Underwriting provides a context that allows technical pricing development to be highly technical
• Insurers don’t necessarily need Underwriters but they do need Underwriting
• What would our new underwriting world look like?
Conclusion

What does this new underwriting world look like?

- Commercial motivation
- Micro and macroeconomic insight
- Risk expertise
- Insurance expertise
- Numerate
- Legal skills and knowledge
- Lateral thinking
- Project and relationship management
- Worldly
- Pragmatic

An analogy from popular culture?

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.