General Insurance Pricing Seminar
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Seasonality and issues of the season
Agenda

Issues of the season

• New claim trends
• Legislative changes
• Equality Bill
• Economic recession and new government

Seasonality

• Fitting round the circle
New claim trends

- Number of claims
  - Theft has decreased due to increases in vehicle security
  - Accidental damage frequency generally reducing
  - Frequency of bodily injury claims increasing
  - Fraud rates expected to increase in recession
New claim trends

- Average claim size up
  - Average payout for bodily injury increasing – number of claimants up per claim
  - Increase in repair costs
    - complexity of modern car design eg electronics
    - valuable items eg satellite navigation tools
  - Increase in no-win, no-fee personal injury law firms → increasingly litigious
- Credit hire - increased provision of replacement vehicles
- Catastrophe losses eg storms and floods related to climate change
New claims environment has led to a 50% increase in bodily injury costs over 2 years
Legislative changes

- Ministry of Justice Reforms to Road Traffic Act (30 April 2010)
  - Fixed stages and costs with set deadlines for personal injury claims between £1,000 - £10,000
  - Cease to make success fees recoverable from unsuccessful opponents
  - Jackson Review: Ban referral fees?
  - Legal Services Act 2007: ABS=>Claims management Co’s?
- New vehicles now taxed according to emissions
  - Incentive for people to drive more efficient cars
- Equality Act 2010
History lesson: EU Gender Directive

- Implemented 13 December 2004
- Access to and supply of goods and services
- Applied to insurance contracts from 21/12/07
- Difference evident in assessment of risk
- Reliance on published data
- Proportionality of premiums (or benefits)
- Recognition of current differences across EU
History lesson: EU Gender Directive – UK implementation

• Response to consultation published in November ‘07
• UK law updated
• Data published:
  – Aggregate data allowed
  – Female Risk / Male Risk reported to "secure consistency" and so that "publications are intelligible"
  – By age band, not exceeding 5 years, 80+ one band
  – Updated regularly, at least every 3(2) years
History lesson: EU Gender Directive – UK implementation

• Proportionate:
  – "some tolerance around the degree"
  – "should be symmetrical above or below a data point"
  – "fair and reasonable"
  – "close relationship between the underlying data and the assessment of risks"
  – "unlikely to be expressed as a clear linear relationship between a data table and the premiums"
  – "aggregate tables may represent an industry average"
Current situation:
EU Gender Directive – Where are we now?

- Retain for risk pricing
- Retain for marketing
- Impact on optimised premiums?
  - What is male-female relativity?
- Other EU countries have implemented in different ways
Future impact: EU Gender directive

- Hard to see how motor prices would be challenged
- Existing pressure groups focus on equal rights for women, who usually receive lower premiums
- Added bureaucracy marginal cost, unlikely to impact significantly on premiums or profitability

Insurance industry seems to have escaped relatively unscathed from this directive
Future impact: UK Equality Bill

- Covers wide range of discrimination in all areas including age in financial services
- Age will be allowed in insurance, subject to limitations similar to Gender Directive
- Passed in “wash-up” at end of last parliament
- Implementation in 2012
  - Solvency II
  - Olympics
UK Equality Bill

- Published data on industry-wide or individual basis
- Premiums not proportional to risk (allowance for fixed costs)
- Discounting to gain/retain business allowed
- Age bands permitted
  - Recognise that this benefits older customers
  - Cost/benefit of individual ages for travel not clear
- Universal coverage not required
  - Age limits should be very clear
  - Companies to refer customers to suitable provider(s)
  - Recognise no shortage of insurance, just hard to find
UK Equality Bill

- Portfolio management
- May limit price optimisation
  - Currently still scope to optimise over things other than age
  - Indirect discrimination may be an issue (age of licence)
- Additional reporting requirements will increase costs
  - Higher premiums will follow
  - Some companies may withdraw from market?
- EU Directive is also in the pipeline
  - UK actively engaged in EU discussion on this, is happy to lead the way
- What next?
  - Occupation, area …
Economic recession and the new government’s policy

- Squeeze in public spending likely to increase unemployment
- High inflation will lead to higher interest rates (timing uncertain)
- Tax rises likely
  - IPT doubling?
  - VAT to 20%?
  - Direct taxation?
- Current low investment returns
Economic recession and the new government’s policy

• Likely to result in:
  – More fraud
  – Increased claims cost (via inflation)
  – Increased claim cost (structured settlements more attractive)

• Premiums will need to rise:
  – By how much?
    – Motor premiums increased 18.7% during 2009 for comprehensive cover (Axco 2010)
  – When?
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Seasonality

• Fitting round the circle
Where do we find seasonality?

• Anything where weather or daylight has an effect:
  – Driving (harder)
  – Escape of water (colder)

• Anything where absence has an effect
  – Driving (more)
  – Theft (emptier)
Why model seasonality?

• Accurate pricing of less than annual business
• Understand effect of changes in volume
  – Improved modelling of accident year loss ratios
• Early warning of systematic changes
Seasonality plus trend

Seasonality investigation
Investigating seasonality - Month spline, year spline

[Graph showing seasonality investigation with exposure months from January 2006 to November 2009, with log of multiplier and exposure values on the y-axis and x-axis respectively. The graph includes lines for exposure, seasonality estimates, and 95% confidence intervals.]
Seasonality plus trend

Seasonality investigation

Spline seasonality
Seasonality plus trend

Seasonality investigation

Trend effect
Fitting round the circle

- Inflation and trend effects can be dealt with as a “force of interest” approach:
  - \((1+i)^t = \exp(t \ln(1+i))\)
  - Just a GLM with (continuous) time as a variate
  - Linear spline allows variation between years
- Seasonal effects require more sophisticated handling to avoid unnatural step changes
  - Circular splines can achieve this
Seasonality
Practical issues

- Take care with definition of variates
  - Model will struggle with 2010.08 versus 2010.50
  - Splines can help here
- Knot position still important
- Year and seasonality confusion from “arbitrary” trend changes
- Where does the noise go?
  - Consider using two annual effects
- Balance complexity and number of parameters
Seasonality PLUS Trend

Seasonality Investment
Seasonality: Factor or Spline?

Exposure month
Log of multiplier
Exposure

-0.9 -0.7 -0.5 -0.3 -0.1 0.1 0.3

Jan-06 Mar-06 May-06 Jul-06 Sep-06 Nov-06 Jan-07 Mar-07 May-07 Jul-07 Sep-07 Nov-07 Jan-08 Mar-08 May-08 Jul-08 Sep-08 Nov-08 Jan-09 Mar-09 May-09 Jul-09 Sep-09 Nov-09

Exposure - Investigating seasonality - Individual month
Unsmoothed estimate - Investigating seasonality - Individual month
Unsmoothed estimate - Investigating seasonality - Monthly pattern
Unsmoothed estimate - Investigating seasonality - Month spline, year factor
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Seasonality
• Fitting round the circle
And, of course …

- Will England win the World Cup?
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