Learning from experience: A report from the Policyholder Behaviour Working Party
7-9 November 2010

Welcome

Policyholder behaviour is a subject attracting a lot of attention from different positions:
- Insurers seeking to gain competitive advantages and manage their risks
- Regulators looking to ensure that insurers are adequately protected (for example this is discussed in some detail in the QIS 5 specification on technical provisions)

The Policyholder Behaviour Working Party was established to answer the following questions:
- To investigate any evidence for policyholder behaviour changing in adverse market conditions in the UK as well as overseas
- To consider the impact of non-investment related factors on policyholder behaviour, such as decisions to affect premium increases or to renew a policy following a premium review
- To highlight calculations of liabilities and capital requirements that rely on assumptions about policyholder behaviour (in stress tests and stochastic calculations of liabilities)
- To highlight practical difficulties in modelling these and suggest potential approaches that might be reasonable
- To suggest approaches to setting assumptions, as well as tying assumptions in situations where there is little or no experience data available
- To identify management information that companies should collect in order to improve their models and assumptions

Our recent survey is the first stage of this work.

The vision: Modelling policyholder behaviour in the future

Traditionally life insurers have modelled policyholder behaviour by:
- Measuring the rate at which a decrement has occurred in the past
- Assuming that this same rate will apply in the future

But developments in other fields may suggest ways in which this could change:
- General insurers price risks and reserve using a wide variety of risk factors to describe the risk exposures
- This is increasingly true for health insurers as well
- Banks have increasingly sophisticated models to develop credit scores which can be used for both approval and reserving
- Prepayments can significantly influence the value of a traded mortgage portfolio

Further, both CEIOPS and the IASB have included requirements for the modelling of policyholder behaviour in their Solvency II and IFRS Phase II proposals.
The vision
Modelling policyholder behaviour in the future

Summary

Statistics

Single view for risk and capital

Uses all available information

Focussed on risk drivers

Forward looking

Policyholder behaviour

The vision
Modelling policyholder behaviour in the future

- Enhanced decision making
  - Better measurement of risk
  - More accurate pricing of risk
- Better customer service
  - Targeting of sales, servicing and retention activities
  - Better use of management time, effort and focus
- More efficient use of capital

There are a number of actual and potential competitive benefits which a more proactive approach to modelling policyholder behaviour delivers:

Our survey: A look at current practice

- Our survey was designed to provide a comprehensive view of current practice in the UK market and covered the following:
  1. Financial behaviours
  2. Non-financial behaviours
  3. Measurement and modeling
  4. The intended uses of information
  5. Future plans
- The survey was distributed electronically to all the actuarial function holders in the UK – for all types of life office – during March and April this year. In total we received 43 responses.
- This is a presentation of some of the highlights of what we have learned.
Survey participants

<table>
<thead>
<tr>
<th>Type of Office</th>
<th>Response Count</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual life office</td>
<td>37%</td>
<td>76</td>
</tr>
<tr>
<td>Proprietary life</td>
<td>61%</td>
<td>26</td>
</tr>
<tr>
<td>Reinsurer</td>
<td>2%</td>
<td>1</td>
</tr>
</tbody>
</table>

- Our survey respondents provide a good mix of large and small companies of different types.
- Companies taking part included:

General attitudes to modelling policyholder behaviour

The importance of behaviours

Modelling financial behaviours (1/5)
(i.e. those that trigger a monetary benefit for policyholders)

- Do you model guarantee take up rates/lapse rates dynamically for the purpose of regulatory reporting/economic capital?
- Organisations that do such modelling:
  - Split between mutuals and proprietaries
  - Almost entirely "large" (£5bn+)
Modelling financial behaviours (2/5)
(i.e. those that trigger a monetary benefit for policyholders)
• Why are guarantee take-up rates/lapse rates modelled dynamically?
  • Reflect accuracy/realism
  • Reflect “in the moneyness”
  • Realistic reserves only
  • Keep up with industry practice
• Effect on management decisions/business strategy
  • Limited evidence

To capture a more realistic value of the options/guarantees
To reflect the impact of interest rates on the assumed take-up rate
Realistic reserves only
Keep up with industry practice

Modelling financial behaviours (3/5)
• Dynamic functions used for modelling guarantee take-up rates:
  Rates vary with
  - value of guarantees [4]
  - long-term interest rates [1]
  - Binary function – assume take-up if in money [4]
  - Based on empirical evidence [4]
  or expert judgement [5]

Modelling financial behaviours (4/5)
• Dynamic functions used for modelling lapse rates:
  - Rates vary with
    value of guarantees [2]
    economic scenarios [1]
  - Based purely on expert judgement [3]
Modelling financial behaviours (5/5)

- Calibration of the guarantee take up rate and lapse rate stress test assumption in economic capital/ICA calculations

![Diagram showing take-up rates and lapse rates with different sources such as empirical evidence, expert judgment, and statistical graphs.]

Judgement influenced by external input and benchmarks and own experience.

Modelling non-financial behaviours (1/2)

(i.e. those that trigger changes policy conditions)

- Which behaviours are monitored?

![Bar chart showing various non-financial behaviors with percentages for each.]

Modelling non-financial behaviours (2/2)

(i.e. those that trigger changes policy conditions)

- Areas where non-financial behaviours are modelled other than (just) the actuarial calculations

- Which behaviours?
  - Premium changes and switching most common
Measurement and modelling (1/5)

Challenges

• Top Three Data Related Challenges:
  – Lapse Behaviours:
    – Volume of data available internally
    – Quality of data
    – Ability to demonstrate statistical credibility
  – Take up of Financial Options:
    – Volume of data available internally
    – Ability to demonstrate statistical credibility
    – Completeness of data

• Other Challenges:
  – Time
  – Systems
  – Staff

Measurement and modelling (2/5)

Investigations

• The Top Reasons for Monitoring Behaviours:
  – Reserving
  – Financial Reporting
  – Management Information
  – Pricing

• The Bottom Three Reasons for Monitoring Behaviours:
  – Marketing
  – Hedging
  – Reinsurance requirements

Measurement and modelling (3/5)

Investigations

• Frequency of monitoring firm’s experience as a result of the following behaviours
Techniques

- Lapse experience:
  - Drivers considered when modelling:
    - The two main drivers were Product type (10/33) and Duration in force (3/133)
    - Social groups, employment status, income, occupation and other products/services
      with the company were not selected as a driver in modelling by any of the respondents.
  - Models:
    - Most used method was Traditional actuarial (retrospective, binomial or Poisson model)
      approaches - by policy (18/30)
    - Least used method was Predictive modelling / generalised linear modelling approaches
      (2/30)
  - Setting future lapse assumptions:
    - The dominant method was Using expert judgment in light of recent experience (ie
      subjective judgment) (25/33)
    - Only 1 respondent said they used Detailed assessment of underlying risk drivers
      - This response came from a large company (Over £5 billion in reserves).

Techniques

- Take up of financial options:
  - Drivers considered when modelling:
    - The main driver was Product type (21/23)
    - Social groups, employment status, income, occupation and other products/services
      with the company were not selected as a driver in modelling by any of the respondents.
  - Models:
    - The most used methods (with 8/23 responses each) were:
      - Simple ratio approaches using revenue account data
      - Traditional actuarial (retrospective, binomial or Poisson model) approaches - by
        policy
    - Least used method was Predictive modelling / generalised linear modelling
      approaches (1/23)

Uses of information

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<th>Poor</th>
<th>Meets minimum</th>
<th>Very good</th>
<th>Superior</th>
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<tr>
<td>Pricing</td>
<td>3</td>
<td>22</td>
<td>4</td>
<td>0</td>
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<td>Product design</td>
<td>2</td>
<td>22</td>
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<td>ICA / capital</td>
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How do you rate your current usage of policyholder behaviour?

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How would more sophisticated models of policyholder behaviour improve results?

<table>
<thead>
<tr>
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<th>A significant improvement</th>
<th>A slight improvement</th>
<th>No improvement</th>
</tr>
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Next steps
A vision for modelling policyholder behaviour

Next steps
Firms future plans

NEEDS MUST
- In the short term the focus seems to be on Solvency II preparations:
  - 64% of respondents working to improve the setting of policyholder behavioural assumptions
  - 52% of respondents working to improve their analysis and process

LONGER TERM
- The focus is on structural changes to the modelling of behaviour:
  - Building in dynamic behaviour in relation to financial options
  - Linking switches and other non-financial behaviours to other variables

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.
Learning from experience:
A report from the Policyholder Behaviour Working Party

The Policyholder Behaviour Working Party is:

• Clayton Balkind
• Kuen Chik
• Matthew Edwards
• Yasmeen Husain
• Mark Peckson
• Simon Spencer

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