Session 1: Commercial Pricing & Rate Adequacy
1. What is Commercial Insurance?
2. SME and Large Enterprises
3. Characteristics of Commercial Policies
4. The Pricing Actuary
5. Key Roles in Commercial Pricing
6. How is a Commercial Lines Policy Priced?
7. Methodologies Used to Calculate Technical Premium
8. Methodologies Used to Check Rate Adequacy
9. What’s Next For Actuaries?
# What is Commercial Insurance?

## Commercial Insurance
- Refers to insurance policies sold to businesses

## Property Insurance
- Buildings
- Contents
- Stock
- Glass Cover
- Goods in Transit
- Motor Own Damage
- Machinery Breakdown
- Computer and Electronics

## Liability Insurance
- Employers Liability
- Public Liability
- Motor 3rd Party
- Product Liability
- Professional Liability
- Directors and Officers Liability
- Employment Practices Liability
- Fiduciary Insurance

## Financial Loss Insurance
- Fidelity Guarantee
- Business Interruption
- Money Cover

## Specialty Insurance
- Marine
- Aviation
- Cargo
- Construction/Engineering
- Crop
- Special Crime

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4.9 Million Businesses in the UK
2.1 SME and Large Enterprises

Small-Medium Enterprise (SME)

- Employ fewer than 250 employees
- Annual turnover of less than €50m and/or Annual balance sheet less than €43m
- Accounts for 99.9% of all businesses in the UK
- Split further into Micro / Small / Medium

Large Enterprise

- Very large corporations such as the top 500 FTSE companies.

Note: The above definition applies to countries within the European Union. Non-EU countries will have different definitions or terminology.
3.1 Characteristics of Commercial Portfolios

**A Large Number of Products/Covers**
- Non-standard policy wordings and tailored products
- Policy exclusions are often applied

**Heterogeneity**
- A large number of different industries and occupations
- Big variation in the types of process performed by the insured
- Big variation in size of risk

**Volatility**
- High proportion of large claims
- Exposure to latent claims
- High deductibles (commercial entities are often prepared to retain some insurance risk)

**Lack of Quantity and Quality of Data**
- Policies typically sold through Brokers who:
  - Want to reduce administrative costs
  - Try to limit inconvenience for their customers
  - Often provide bulk entered policies or claims
- Lack of structured data – data is often provided as free form text field.
- Limitations of insurance system to record all relevant risk information
- Lack of investment

**A Large Number of Soft Factors**
- Pricing is heavily influenced by the underwriting cycle
- Relationship with intermediaries
- Significant case underwriting
- Individual policies may also have a material impact on GWP volumes and expense ratio
4.1 The Pricing Actuary

The Personal Lines Pricing Actuary

- Over the last 20+ years, Personal Lines has been a very attractive area for pricing actuaries.
- The characteristics of these portfolios meet the requirements for statistical analysis.
- This has enabled actuaries to add significant value through technical analysis.

The Commercial Lines Pricing Actuary

- The role of actuaries within Commercial Lines is much less established.
- Characteristics of these portfolios mean that actuaries have found this area to be much less accessible.
- Lack of investment in Actuaries within Commercial Lines.
- Is there an opportunity for actuaries to add value?
5.1 Key Roles in Commercial Pricing

The Portfolio Manager
Responsibilities:
- Responsible for designing the product and coverage
- Develop and implement the overall strategy
- Issue underwriting guidelines and book rates

The Case Underwriter
Responsibilities:
- Makes a judgment on whether the level of risk is acceptable
- Determines an appropriate level of premium
- Negotiates final premium with the intermediary

The Pricing Actuary
Responsibilities:
- Calculating a technical premium
- Monitoring key performance indicators
- Provide an understanding of the impact of pricing changes
How is a Commercial Lines Policy Priced?

Premium is typically calculated by applying a \textit{Rate} to a measure of \textit{Exposure}:

$$\text{Premium} = \text{Rate} \times \text{Exposure}$$

- Underwriters will often talk about premiums in terms of pence per £100 exposure:
  - E.g. A policy was written at a rate of 3p
  - Usually calculated subjectively

- The exposure measure used will depend on the type of policy:
  - EL - Wage role
  - PL - Turnover
  - Property - Sum Insured
  - Fleet - Number of vehicles
### How is a Commercial Lines Policy Priced?

| Technical Rate | A specified or ‘book’ rate applied to exposure  
|               | - For some products this may be based on as few as one or two rating factors  
|               | - Others products may have a sophisticated pricing structure  
|               | Based on technical analysis of historic performance |
| Experience Rate | A rate is calculated based on a burning cost of the insured’s own claim experience  
|                | Assumptions are needed around:  
|                | - Inflation  
|                | - IBNR/IBNER Factors  
|                | - Large Loss Loadings  
|                | - Commissions / Expenses / Reinsurance / Profit |
| Underwriter Rate | Underwriters may have the authority to apply loadings / discounts based on their own assessment of the risk  
|                  | They may use information gathered from on-site surveys performed by risk engineers |

### Final Rate

- In practice a blend of methods will be used depending on the class of business / individual insured / underwriter judgment
- For SME business the technical rate may used without further consideration  
  - Case underwriting is often uneconomic due to small average premium size
- For a large commercial risk the rate may be based entirely on the insured’s own experience  
  - There is no set rule for ‘large’, but there needs to be a meaningful claims pattern
Small and Medium Enterprise

- Characteristics tend to be closer to standard Personal Insurance portfolios
- Case underwriting is often uneconomic due to small average premium size
- Large portions of these portfolios are typically auto-rated using sophisticated pricing structures
Technical rate is typically derived from simply one-way or two-way analysis, along with underwriter judgment.
## Methodologies Used to Check Rate Adequacy

### Overview
- For large commercial risks, it is usually not possible to calculate a risk premium based on statistical analysis.
- Instead, a more ‘re-active’ approach is taken to assess the adequacy of the rates charged on Commercial Lines portfolios.

### Useful Analysis

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate Change</td>
<td>Directly monitor the change in rate strength over time.</td>
</tr>
<tr>
<td>Actual vs. Technical Rates</td>
<td>Monitor the actual premium charged against the technical price.</td>
</tr>
<tr>
<td>Renewal / Conversion Rates</td>
<td>Monitor renewal and conversion rates.</td>
</tr>
<tr>
<td>Exposure Tracking</td>
<td>Monitor exposure to certain segments of the book.</td>
</tr>
<tr>
<td>Loss Ratio Monitoring</td>
<td>Monitor the emerging loss ratio experience.</td>
</tr>
<tr>
<td>Lapse vs. Renewals</td>
<td>Monitor the performance of lapsed and renewed policies.</td>
</tr>
<tr>
<td>GWP Volumes</td>
<td>Directly monitor premium volumes.</td>
</tr>
</tbody>
</table>

**Note:** Commercial policies are typically sold through intermediaries - this reduces pricing transparency within the market.
8.2 Method 1: Rate Change

Rate Change

- Directly monitor the change in rate over time
- Useful to track rate change against the financial plan
- Useful as information is available when risk is written rather than when claims start to emerge

### Written Rate Increase (Month of)

<table>
<thead>
<tr>
<th>Rate Increase</th>
<th>Jan-14</th>
<th>Feb-14</th>
<th>Mar-14</th>
<th>Apr-14</th>
<th>May-14</th>
<th>Jun-14</th>
<th>Jul-14</th>
<th>Aug-14</th>
<th>Sep-14</th>
<th>Oct-14</th>
<th>Nov-14</th>
<th>Dec-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>1.0%</td>
<td>4.6%</td>
<td>2.1%</td>
<td>2.3%</td>
<td>5.1%</td>
<td>3.2%</td>
<td>4.4%</td>
<td>2.0%</td>
<td>5.8%</td>
<td>5.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>
8.2 Method 1: Rate Change

How to Calculate Rate Change?

**Auto-rated Business**
- If all business is auto-rated then you can simply apply the old and new rating structures against the portfolio

**Renewals (non auto-rated)**
- This is relatively straightforward as you have a previous state to compare the rate charged.
- The rate change can be crudely calculated by: \( \text{Rate Change} = \frac{\text{Change in Premium}}{\text{Change in Exposure}} - 1 \)
- Need to be careful as exposure may not be completely correlated with risk.

**New Business (non auto-rated)**
- This is much harder as you are not looking at consistent risks - changes in business mix will distort the rate charged.
- Can look at changes in the book rate (Although these rates do not necessarily reflect the final premium charged)
- Can apply a GLM with
  - Rate as the response variable
  - A number of explanatory variables to remove effect of business mix (e.g trade, SI, etc.)
  - Time as an explanatory variable \( \leftrightarrow \) this will give you an view of how rate changes over time
8.3 Method 2: Actual vs. Technical

**Actual vs. Technical**

- Rate Index = actual premium / technical premium
- Monitors if there is any consistent over or under pricing of risks
- Can also be useful to look at the distribution of rate index to make sure a small number of large policies are not distorting the underlying trend.
8.4 Method 3: Renewal and Conversion Rates

Renewal Rate
- \( \frac{\text{no. of renewals}}{\text{no. of policies offered renewal}} \)
- A high renewal may suggest that the insurer's premiums are low relative to their competitors.

Conversion Rate
- \( \frac{\text{no. of policies converted}}{\text{no. of quotes offered}} \)
- Conversion rates tend to react quicker than renewal rates as it is generally easier for intermediaries not to place new business than to move significant volumes of existing business.
- If the insurer is known to be overpriced in a particular segment, then intermediaries may not even request a quote. This may distort the conversion rate.

Notes
- The above assumes that price is the key driver of business volumes. It does not account for:
  - The strength of the relationship with the intermediary
  - Brand strength of the advertiser (e.g. advertising)
  - Attractiveness of the policy wording (e.g. certain covers included/excluded)
Exposure Tracking

- Directly monitoring how exposure is changing over time
- This will give you an idea of how your business mix is changing over time
- Needs to be considered in conjunction with the LR performance in each segment.

**Number of Policies by Sum Insured Band**

<table>
<thead>
<tr>
<th>SI Value</th>
<th>Jan-14</th>
<th>Feb-14</th>
<th>Mar-14</th>
<th>Apr-14</th>
<th>May-14</th>
<th>Jun-14</th>
<th>Jul-14</th>
<th>Aug-14</th>
<th>Sep-14</th>
<th>Oct-14</th>
<th>Nov-14</th>
<th>Dec-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>£1 - £1000</td>
<td>315</td>
<td>405</td>
<td>548</td>
<td>1,042</td>
<td>520</td>
<td>1,002</td>
<td>910</td>
<td>943</td>
<td>1,024</td>
<td>730</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£1001 - £2000</td>
<td>2,709</td>
<td>2,719</td>
<td>2,139</td>
<td>2,139</td>
<td>2,254</td>
<td>2,917</td>
<td>2,901</td>
<td>2,738</td>
<td>2,799</td>
<td>2,280</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£2001 - £3000</td>
<td>2,792</td>
<td>2,400</td>
<td>2,169</td>
<td>2,873</td>
<td>2,842</td>
<td>2,012</td>
<td>2,117</td>
<td>2,757</td>
<td>2,455</td>
<td>2,174</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£3001 - £4000</td>
<td>2,047</td>
<td>2,819</td>
<td>2,882</td>
<td>2,000</td>
<td>2,088</td>
<td>2,835</td>
<td>2,075</td>
<td>2,036</td>
<td>2,300</td>
<td>3,054</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£4001 - £5000</td>
<td>2,501</td>
<td>2,368</td>
<td>2,009</td>
<td>2,259</td>
<td>2,149</td>
<td>2,453</td>
<td>2,322</td>
<td>2,802</td>
<td>2,196</td>
<td>2,612</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£5000+</td>
<td>1,265</td>
<td>934</td>
<td>979</td>
<td>1,400</td>
<td>1,515</td>
<td>2,716</td>
<td>3,253</td>
<td>3,794</td>
<td>4,251</td>
<td>4,717</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.6 Method 5: Loss Ratio Monitoring

Loss Ratio Monitoring

- Monitor the emerging claims experience
- Usually ultimate loss ratios are provided by the reserving team
- Can assess whether past rates were adequate

Commercial Motor Loss Ratio by Accident Year

<table>
<thead>
<tr>
<th>Year</th>
<th>FbyF</th>
<th>Phased</th>
<th>Difference</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>71.0%</td>
<td>71.0%</td>
<td>0.0%</td>
<td>71.0%</td>
</tr>
<tr>
<td>2011</td>
<td>76.0%</td>
<td>77.0%</td>
<td>1.0%</td>
<td>77.0%</td>
</tr>
<tr>
<td>2012</td>
<td>68.0%</td>
<td>67.0%</td>
<td>-1.0%</td>
<td>67.0%</td>
</tr>
<tr>
<td>2013</td>
<td>80.0%</td>
<td>81.0%</td>
<td>1.0%</td>
<td>81.0%</td>
</tr>
<tr>
<td>2014</td>
<td>88.0%</td>
<td>85.0%</td>
<td>-3.0%</td>
<td>85.0%</td>
</tr>
</tbody>
</table>
Lapse vs. Renewals

- Compare historic LR performance of lapsed and renewed business.
- This will give you an idea of whether your renewed risks are a better risks than those that lapsed (i.e. mix of business).
- Not directly a measure of rate adequacy, but gives you an idea of whether the existing rate increases are adequate for the new mix of business.
- Needs to be considered in conjunction with rate strength. 
  e.g. It will be easier to achieve rate increase on poorly performing / underpriced risks. Therefore we may be achieving a 10% rate increase but retaining all the poor risks – this could actually reduce the loss ratio.

<table>
<thead>
<tr>
<th>Trade Family</th>
<th>1yr Lapsed Loss Ratio</th>
<th>3yr Lapsed Loss Ratio</th>
<th>5yr Lapsed Loss Ratio</th>
<th>1yr Renewed Loss Ratio</th>
<th>3yr Renewed Loss Ratio</th>
<th>5yr Renewed Loss Ratio</th>
<th>1yr Lapsed vs Renewed</th>
<th>3yr Lapsed vs Renewed</th>
<th>5yr Lapsed vs Renewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture Forestry and Fishing</td>
<td>55.0%</td>
<td>54.5%</td>
<td>58.3%</td>
<td>40.0%</td>
<td>43.0%</td>
<td>33.0%</td>
<td>-15.0%</td>
<td>-11.5%</td>
<td>-25.3%</td>
</tr>
<tr>
<td>Building Materials and Glass</td>
<td>31.0%</td>
<td>30.4%</td>
<td>32.5%</td>
<td>49.0%</td>
<td>32.0%</td>
<td>58.0%</td>
<td>18.0%</td>
<td>1.6%</td>
<td>25.5%</td>
</tr>
<tr>
<td>Chemical</td>
<td>30.0%</td>
<td>27.6%</td>
<td>26.8%</td>
<td>53.0%</td>
<td>59.0%</td>
<td>39.0%</td>
<td>23.0%</td>
<td>31.4%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Clothing and Textiles</td>
<td>59.0%</td>
<td>57.8%</td>
<td>60.1%</td>
<td>44.0%</td>
<td>44.0%</td>
<td>44.0%</td>
<td>-15.0%</td>
<td>-13.8%</td>
<td>-16.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>62.0%</td>
<td>57.7%</td>
<td>53.0%</td>
<td>36.0%</td>
<td>34.0%</td>
<td>60.0%</td>
<td>-26.0%</td>
<td>-23.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Health and Social Welfare</td>
<td>72.0%</td>
<td>77.0%</td>
<td>79.4%</td>
<td>41.0%</td>
<td>60.0%</td>
<td>54.0%</td>
<td>-31.0%</td>
<td>-17.0%</td>
<td>-25.4%</td>
</tr>
<tr>
<td>Electrical and Optical</td>
<td>30.0%</td>
<td>29.1%</td>
<td>28.2%</td>
<td>40.0%</td>
<td>34.0%</td>
<td>45.0%</td>
<td>10.0%</td>
<td>4.9%</td>
<td>16.8%</td>
</tr>
<tr>
<td>Food and Drink</td>
<td>43.0%</td>
<td>43.9%</td>
<td>45.2%</td>
<td>36.0%</td>
<td>46.0%</td>
<td>39.0%</td>
<td>-7.0%</td>
<td>2.1%</td>
<td>-6.2%</td>
</tr>
<tr>
<td>Hotels and Catering</td>
<td>70.0%</td>
<td>76.3%</td>
<td>76.3%</td>
<td>41.0%</td>
<td>47.0%</td>
<td>50.0%</td>
<td>-29.0%</td>
<td>-29.3%</td>
<td>-26.3%</td>
</tr>
<tr>
<td>Machinery and Equipment</td>
<td>34.0%</td>
<td>35.4%</td>
<td>37.1%</td>
<td>57.0%</td>
<td>33.0%</td>
<td>54.0%</td>
<td>23.0%</td>
<td>-2.4%</td>
<td>16.9%</td>
</tr>
<tr>
<td>Metalworkers</td>
<td>70.0%</td>
<td>74.2%</td>
<td>74.9%</td>
<td>33.0%</td>
<td>56.0%</td>
<td>44.0%</td>
<td>-37.0%</td>
<td>-18.2%</td>
<td>-30.9%</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>36.0%</td>
<td>33.5%</td>
<td>30.1%</td>
<td>35.0%</td>
<td>56.0%</td>
<td>40.0%</td>
<td>-1.0%</td>
<td>22.5%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Paper and Printers</td>
<td>80.0%</td>
<td>72.8%</td>
<td>80.1%</td>
<td>39.0%</td>
<td>53.0%</td>
<td>43.0%</td>
<td>-41.0%</td>
<td>-19.8%</td>
<td>-37.1%</td>
</tr>
<tr>
<td>Personal and Community Services</td>
<td>46.0%</td>
<td>42.3%</td>
<td>42.7%</td>
<td>43.0%</td>
<td>31.0%</td>
<td>40.0%</td>
<td>-3.0%</td>
<td>-11.3%</td>
<td>-2.7%</td>
</tr>
<tr>
<td>Plastics and Rubber</td>
<td>48.0%</td>
<td>50.9%</td>
<td>53.9%</td>
<td>32.0%</td>
<td>37.0%</td>
<td>60.0%</td>
<td>-16.0%</td>
<td>-13.9%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>
8.8 Method 7: Premium Volumes

Premium Volumes

- Not directly a measure of rate but GWP volumes can give you an idea of your position in the market
- Again, this should be compared against the financial plan
- This is a key metric used by underwriters and often distracts from profitability.

Gross Written Premium (Month Of)

<table>
<thead>
<tr>
<th>GWP</th>
<th>Jan-14</th>
<th>Feb-14</th>
<th>Mar-14</th>
<th>Apr-14</th>
<th>May-14</th>
<th>Jun-14</th>
<th>Jul-14</th>
<th>Aug-14</th>
<th>Sep-14</th>
<th>Oct-14</th>
<th>Nov-14</th>
<th>Dec-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>1,190,000</td>
<td>924,000</td>
<td>1,104,000</td>
<td>1,635,000</td>
<td>1,344,000</td>
<td>1,392,000</td>
<td>1,104,000</td>
<td>960,000</td>
<td>1,056,000</td>
<td>984,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan</td>
<td>1,000,000</td>
<td>1,100,000</td>
<td>1,200,000</td>
<td>1,500,000</td>
<td>1,200,000</td>
<td>1,200,000</td>
<td>1,200,000</td>
<td>1,200,000</td>
<td>1,200,000</td>
<td>1,100,000</td>
<td>900,000</td>
<td></td>
</tr>
</tbody>
</table>
Keep The Big Picture In Mind

Rate Adequacy

1. Rate Change
2. Conversion / Retention
3. Premium Volumes
4. Business Mix
5. Loss Ratio (Profitability)
6. Broker Relationship
What’s Next For Actuaries?

1. Actuaries should research the area to ensure they understand the products and the risk drivers of the portfolios that they will work on (Read policy wordings, spend time with portfolio/case underwriters and claim managers).

2. Actuaries should look to initially work on SME (in particular micro business) as these portfolios fit well with an actuarial skill set and is a natural entry into Commercial Pricing.

3. Actuaries should develop a suite of reports to aid the portfolio underwriter understand the dynamics of their account.

4. Actuaries should understand that any analysis is not an exact science and understand and communicate any limitations and uncertainty.

5. Actuaries should lead the way in Data. Encouraging investment in data by demonstrating the benefits it can bring and building support at executive level.

6. Actuaries are relatively unestablished in this area and there is an opportunity for the profession to add value by technical analysis.
Thank You