INSURANCE CONCEPTS

BENEFITS AND COSTS OF INSURANCE
ADVERSE SELECTION
and MORAL HAZARDS
INSURANCE TOOLS
PRICING
References

• Text books

Definition of an ideal (insurable) risk

- Insurable interest
- Expected loss (Place, time, cause and amount)
- Large number of independent units of the same value
- Loss calculable et accidental
Insurance definition

• A contract in which one party, the insurer, undertakes, for a premium or an assessment, to make a payment to another party, the policyholder or a third party, if an event that is the object of a risk occurs.

• It is defined as a conditional contract of indemnity.

• From the insured's point of view, insurance is a "transfer," from the insurer's point of view, insurance as a "pooling" mechanism.
Risks generated by an insurance contract

- Underwriting risk
- Asymmetric information
- Adverse selection
- Moral hazard (ex-ante and ex-post)
- Inversion of the production cycle
- Fraud
Benefits of insurance

• Indemnity
• Reduction of uncertainty
• Macro-economic effects
Costs of insurance

- Transaction costs
- Administration costs
- Moral Hazards (ex-ante, ex-post)
- Fraud
Loss control tools in Insurance

- Deductibles (aggregate or per case)
- Co-payments
- Co-insurance
- Franchise
- Waiting Period
- Threshold value
Insurance coverage (1)

1. Full coverage (100%)
2. Partial coverage: example 65% coverage
Insurance coverage (3)

3. Franchise ...then full cover

Social and Private Insurance

11/J.F. Outreville
Insurance coverage (4)

4. Franchise and partial coverage
**Example: coverage in health care insurance**

<table>
<thead>
<tr>
<th>Annual Franchise</th>
<th>100%</th>
<th>80%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Insurance coverage (5)

4. Franchise, partial coverage, full coverage

![Diagram showing insurance coverage with axes for Compensation and Loss (L), a threshold point d, and different coverage types: Franchise, partial coverage, and full coverage after a threshold.]
Why a deductible or a franchise? Why is it acceptable for the policyholder?

- Retention capacity of the policyholder
- Reduced pure premium
- Lower administrative expenses
- Reduced moral hazard
  - The policyholder gives a “signal” to the insurance company
Rand Corporation study
Health consumption as a function of co-payments 1975 to 1982
Manning, Newhouse et al., 1987
The price of insurance

RATE-MAKING
  Principles
  Concepts
  Methods
  Examples
Rate-making

• **Principles Requirements**
  – Adequacy
  – Reasonableness
  – Equity

• **Business Considerations**
  – Stability
  – Responsiveness
  – Reduction of Risk
  – Simplicity
Types of Rates

- Class Rates
- Individual Rates
- Experience Rates
- Merit Rates
Low variance and high homogeneity
High variance and low homogeneity
Criteria for Classification

- Causal relationship to claim exposure
- Homogeneity of risks
- Insured’s ability to control
- Adequacy of class size
- Overall practicability
Example in health insurance

Distribution of claims payments

- Out patient
- Hospital care

Social and Private Insurance
Pricing non-life insurance
Property, casualty and liability

Frequency and Severity
Catastrophic risks
Pricing life insurance and pensions

- Mortality tables
- Annuity tables
Pricing health insurance

- Class of risks
- Frequency and Severity
- Morbidity tables
- Annuity tables
Rate-making concepts (1)

- Pure Premium
- Risk-adjusted premium
- Commercial premium
- Ratios
  - Loss ratio
  - Expenses ratio
  - Combined ratio
Commercial premium

Gross premium = Pure premium / (1 - loading factor).

loading =

Additional risk
Administrative expenses
Commissions (premium based and contingent)
Taxes
Rate-making concepts (2)

• Rating bureaus
• Credibility factors
• Trends in loss ratios
• Prospective rates
• Merit rates
Credibility

- $PP\text{(acceptable)} = C \cdot PP_i + (1-C) \cdot PP^*$
  
  $PP_i$ is the pure premium derived from the insured's experience
  
  $PP^*$ is the pure premium that would be derived from the population real experience
  
  $C$ is the credibility factor, $0 \leq C \leq 1$. 
Construction of a prospective rate based on experience

- Actual loss ratio 87.1%
- Expected loss ratio 83%
- Adjusted rate \((87.1 - 83)/83 = 4.94\%\)
- X by Credibility Factor
- X by Trend factor
## Bonus-Malus rates

### Automobile insurance contact

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<thead>
<tr>
<th>Premium class</th>
<th>% of base premium</th>
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<tbody>
<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>1</td>
<td>90</td>
</tr>
<tr>
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<td>100</td>
</tr>
<tr>
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<td>110</td>
</tr>
<tr>
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<tr>
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<td>150</td>
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<tr>
<td>-5</td>
<td>180</td>
</tr>
<tr>
<td>-6</td>
<td>200</td>
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</table>
## Bonus-Malus rates

### Health insurance contact

<table>
<thead>
<tr>
<th>Nb of years without claims</th>
<th>Premium class</th>
<th>% discount on base premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
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</tr>
<tr>
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<tr>
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<td>45</td>
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</table>
Retrospective rates

- Premium is based on losses during the policy period
- Final premium is not known before the end of the period
- The range of the premium is fixed (subject to a minimum and a maximum)
- It may take several years before the final premium is determined