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Price Optimisation – A European Case Study

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Agenda

- Brief intro to Price Optimisation
- Walk-through of a real-life project
- Wrap-up & discussion

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What is Price Optimisation?

The **process** of setting prices to maximise a pre-defined measure of **customer value** subject to a company's **strategic and business objectives**

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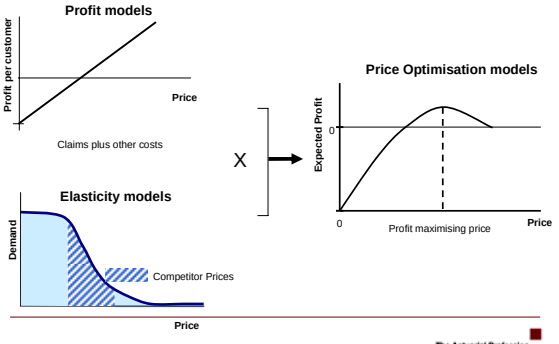
The Price Optimisation equation



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Optimisation Project focused on better management of the renewal portfolio

CLIENT CASE STUDY

Context

- The company was providing quotes for renewal considering only profitability, past claims experience and previous premium.
- The market entered a price war.

Objectives

- Improve the renewal process.
- Forecast the impact of different strategies on profitability and premium volume.
- Maximise retention and expected profit.

Solutions Provided

- Claims cost per policy.
- Competitive market analysis for the specific profile of the portfolio.
- Elasticity of demand study.
- Forecast tool to estimate renewal rate for a given pricing strategy.
- Provide directions for discounts granted to agents.
- Optimised prices subject to the objectives and restrictions of the company.
- Evaluate different pricing strategies.

Steps

- An analysis of claims (GLM model) and expenses was previously performed.
- The steps were the following:
  1. Agree to objectives and constraints
  2. Gap analysis
  3. Competitive Market Analysis
  4. Renewal analysis
  5. Measure and model customer price elasticity
  6. Optimisation
  7. Implementation

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Illustrative example

Agree to objectives and constraints Step 1

- Initial project workshop to further understand the company's strategy and financial objectives for the Price Optimisation process.
- Establish:
  - Maximisation/minimisation function: Maximise expected profits
  - Time horizon (One year)
  - Business constraints:
    - Global (Target retention rate: 85.0%)
    - Individual (Base on individual policy profiles):
      - Number of claims in the previous years (0, 1, 2, >2)
      - Tenure (< 4 years; >= 4 years)
      - Historical loss ratio (<45%; >= 45%)

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Gap analysis

Step 2

- Understand how much of the information and analysis is already available through previous work
- Use existing company pure pricing models based on expected cost of claims as an input to the Optimisation process. This is a fundamental part of the process and will have a significant impact on profitability
- Understand the current rating structure and what enhancements and additional flexibility might be required to meet the objectives

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Competitive Market Analysis (CMA) Step 3

- CMA is a fundamental part of an insurance company's pricing management processes and a key input into the Price Optimisation process:
  - Understand the positioning of the company's rates in the market at any point in time
  - Help identify segments where the company's prices are comparatively cheap/expensive relative to the market
  - Understand the intensity of competition in each segment
  - Understand the scope for price changes and what impact such changes would have on market positioning
  - Key input into later steps

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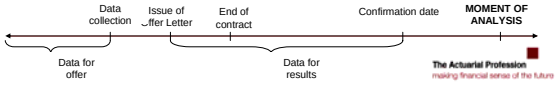
Renewal analysis

Step 4

- **What is it?**
  - The renewal rate is defined as a customer (who has been offered renewal) staying with the company 12 weeks after expiring date
- **How is it used?**
  - Assess how variable the renewal rate is across the portfolio and identify segments of the business that have higher/lower than average rates
  - Combine with the CMA to assess how good a predictor the competitiveness measure is of retention - by customer segment and over time
  - Provide initial insight into customer elasticity e.g. what happened to retention rates when previous price changes were implemented?
  - Assess how retention rate varies as a function of price change at renewal
- Data used for the statistical estimation of customer renewal demand:
  - All car policies renewed between May 2007 and July 2007.



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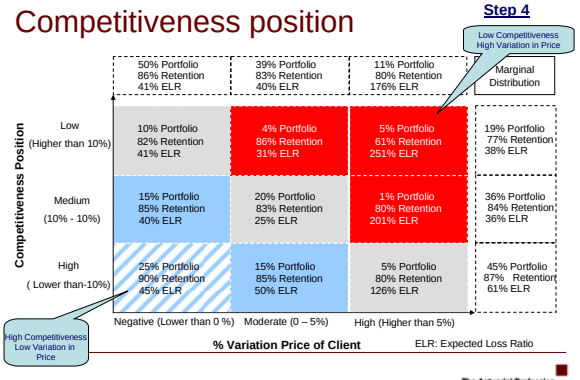
Price Variation vs. Competitiveness position

Illustrative example

Step 4



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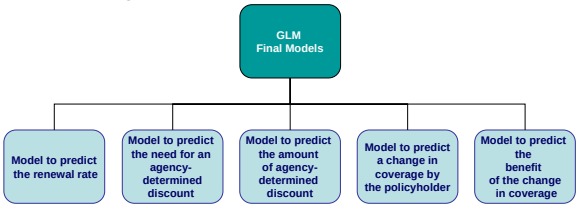
Customer price elasticity Summary of models

Step 5



Note: in Europe, agencies are given discretionary "budgets" to offer discounts to insureds – sometimes referred to as "commercial discounts"

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Customer price elasticity
Possible explanatory variables

Step 5

Policy characteristics	Risk characteristics (Driver)
% Premium change	Years without claims
Renewal month	Driver's age
Discounts	Driver's gender
Coverage	Driver's license age
Actual premium	Driver's occupation
Absolute change in premium	Additional driver presence
Amount of difference with market	Additional driver's age
Percent of difference with market	Additional driver's licence age
Number years policy held	…..
Number years client in company	
Bonus/malus TPL	
…..	

Risk characteristics (Vehicle)	Others
Type of vehicle	Payment type
Age of vehicle	Payment term
Usage	Distribution channel
Value	Cross sell
…..	Amount of agency-determined discounts
	Broker classification
	……

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Customer price
Elasticity base profile

Illustrative example

Step 5

Variables	Base Profile	Relativities Range	Explaining Capacity
Cross sell	ONLY MOTOR	0.40 - 1.00	31.0%
Premium offered	400-600 €	0.35 - 2.15	20.8%
Product	THIRD PARTY + WINDSCREEN	0.50 - 1.20	9.3%
% change premium	0% - 2%	0.40 - 1.60	8.4%
Payment type	BANK ACCOUNT	1.00 - 1.80	6.8%
Competitiveness	< -5% MARKET	1.00 - 1.75	6.3%
Distribution channels	BROKER	0.80 - 2.10	4.1%
Province	Zone 2	0.70 - 1.30	3.4%
Num. years policy held	3-4	0.75 - 1.15	2.4%
Commercial classification of broker	2	0.80 - 1.35	2.3%
Years without claims	5	0.80 - 1.25	2.2%
Sex – Age	H40-54	0.70 - 1.25	1.3%
Age of driver license	>20	1.00 - 1.50	0.9%
Type of Vehicle	Automobiles	0.85 - 1.45	0.4%

Intercept	0.15
Xb=Lineal Predictor	0.15
Lapse probability= Xb/(1+(Xb))	13.4%
Renewal probability= 1-Xb/(1+(Xb))	86.6%

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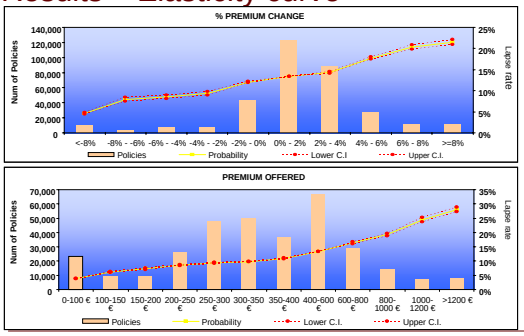
Customer price elasticity
Results – Elasticity curve

Illustrative example

Step 5



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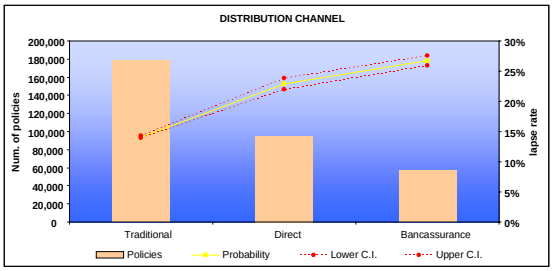
Customer price elasticity Results – Distribution Channel

Illustrative example

Step 5



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Optimisation

Step 6

- This step involves combining the cost models (claims and expenses) with the customer price elasticity models derived in previous steps in order to determine the optimal profit loading by customer type
- The optimal price will be the one that satisfies the company's objectives and constraints maximising profitability subject to a certain volume of business.

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Optimisation: Individual constraints

Illustrative example

Number Of claims	Tenure	Loss Ratio	Minimum Limit	Maximum Limit	Group
0	>4 years	<45%	-5.00%	4.00%	A
		>45%	-2.00%	4.50%	B
	<4 years	<45%	-3.00%	5.00%	C
		>45%	-1.50%	5.50%	D
1	>4 years	<45%	0.00%	6.50%	E
		>45%	0.00%	8.00%	F
	<4 years	<45%	0.00%	10.00%	G
		>45%	0.00%	13.00%	H
> 2	>4 years	<45%	0.00%	13.00%	I
		>45%	0.00%	17.00%	J
	<4 years	<45%	0.00%	22.00%	K
		>45%	0.00%	25.00%	L

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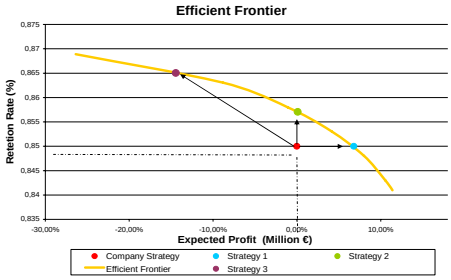
Alternative Strategies: Efficient Frontier

Illustrative example

Step 6



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Alternative Strategies: Results

Illustrative example

Step 6

	Retantion Rate	Average Premium	Expected Profit	Average Discount
Actual	85,0%	417	50,9	4,0
Strategy 1	85,0%	420	54,6	4,3
Strategy 2	85,7%	414	50,5	4,1
Strategy 3	86,5%	407	42,8	3,5

	Policy Renewal	Volume Premium	Expected Profit	Volume Discount
Actual*	86.596	36.082	4.411	345
Strategy 1*	86.584	36.336	4.724	376
Strategy 2*	87.329	36.195	4.409	355
Strategy 3*	88.161	35.850	3.776	311

* Thousand €

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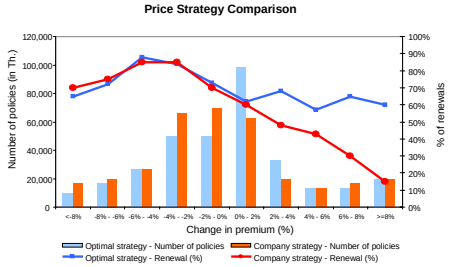
Optimisation
Strategy 1: Maintain Retention/Increase Profits

Step 6

- Comparison of company and optimised pricing schemes



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Optimisation
Strategy 1: Maintain Retention/Increase Profits

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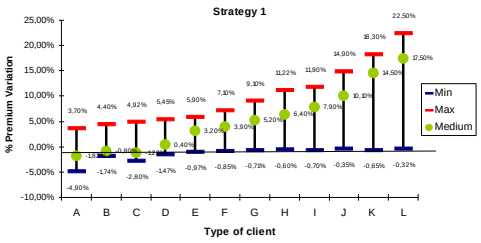

Implementation

Step 7

- Optimised rates can be implemented in different ways:
  a) An algorithm that calculates the optimised price per individual customer based on their particular rating attributes. The algorithm can be built into the rating structure and operate in real-time
  b) A set of optimised premium rates that would fit into a tabular rating structure
- Given the IT investment, lead time, and other operational considerations that need to be made for option (a), our current recommended approach for the company is (b)

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Summary

Price Optimisation is.....

- A process by which insurers can improve profitability
- Getting to know your customers and your market better
- Integrating this knowledge with risk models
- A dynamic process
- Happening now!

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