Ratemaking Call Paper Program

Price Elasticity Applications

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Applications

Price/Market Simulation

Price Optimization

Revenue Impact

Example: Personal auto insurer wants to measure the revenue impact from a proposed rate change

Inforce Premium	Rate Change	Traditional Revenue Impact	Retention	Actual Revenue Impact
$1M	+10%	+100k	90%	+90k

Scenario Testing

Example: Personal auto insurer is pursuing a 5% rate decrease in state X. An insurer would like to simulate two scenarios to help determine which one should be implemented.

- Scenario 1 – 5% base rate decrease
- Scenario 2 – 15% decrease for operators aged 25-30 off-balanced to an overall decrease of 5%

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Assumptions

- Conversion/Retention Models
- Quote Growth Rate – 5%
- Quote distribution constant over time
- Aging – Vehicles & operators age by one every other period

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Running the Simulation: Quotes

	Period	Policies Offered	Policies Written	Conversion Rate	Policies Retained	Retention Rate	Profit Margin	Elasticity
Scenario 1 (Base Rate Change only)	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1	20,000	5,493	27.5%	4,669	85.0%	1.9%	1.8
	2	21,000	5,767	27.5%	4,902	85.0%	1.9%	1.8
Scenario 2 (Targeting Ages 25-30)	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1	20,000	5,646	28.2%	4,743	84.0%	1.8%	2.4
	2	21,000	5,928	28.2%	4,980	84.0%	1.8%	2.4

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Running the Simulation: Renewals

	Period	Policies Offered	Policies Retained	Retention Rate	Profit Margin
Scenario 1 (Base Rate Change only)	0	50,000	44,000	88.0%	2.5%
	1	44,000	41,287	93.8%	2.4%
	2	45,956	44,162	96.1%	2.3%
Scenario 2 (Targeting Ages 25-30)	0	50,000	44,000	88.0%	2.5%
	1	44,000	41,287	93.8%	2.4%
	2	46,030	44,155	95.9%	2.5%

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Running the Simulation: Total

	Period	Policies Offered	Policies Written	Policies Retained	Earned Premium	Profit Margin	Absolute Profit
Scenario 1 (Base Rate Change only)	0	50,000	50,000	44,000	$35,250,000	2.5%	$881,250
	1	64,000	49,493	45,956	$34,486,258	2.3%	$810,152
	2	66,956	51,723	49,064	$36,412,258	2.3%	$822,930
Scenario 2 (Targeting Ages 25-30)	0	50,000	50,000	44,000	$35,250,000	2.5%	$881,250
	1	64,000	49,646	46,030	$34,729,064	2.3%	$812,026
	2	67,030	51,958	49,135	$36,692,114	2.4%	$891,271

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Structural Optimization

- Optimizes on the rating structure directly
- Easy to implement
- Fails to identify gaps in the rating structure
- Regulatory constraints

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Individual Optimization

- Optimizes premium at the individual insured level
- Provides opportunity to identify gaps in the rating structure
- Produces an efficient frontier
- Requires more time
- Some benefit lost during reverse engineering process
- Regulatory constraints

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Benefit Function

$$BF_i = CD_i * (Q_i - L_i - E_i)$$

Where BF = Benefit Function

CD = Cumulative Demand

Q = Proposed Premium

L = Pure Premium

E = Expenses

i = i^{th} insured

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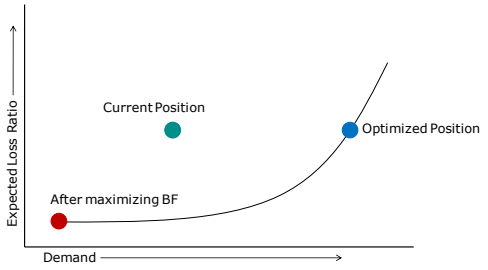
Efficient Frontier



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Implementing Optimized Rates

- Potential conflict with traditional ratemaking
- Serves as a pricing tool
- Deviation from indicated

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