Finding a Balance Between Rate Stability and Adverse Selection Avoidance

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Pace of Change

- In the past decade, the pace of understanding of risk segmentation has increased dramatically.

Opportunities for Enhancements

- Improvements in defining internal data requirements
- Improvements in software/hardware capacity
- Vendors building capabilities to understand risk
- Improvements in mining capabilities
- External data sources more readily available
- Competition yields new ideas
- Actuaries experience with tools available is increasing

Foresight

- Our best estimate is at this point in time.
- Given the likelihood of improvements, we should keep the near future in mind.
  - If our current estimate is wrong, there is a cost to making the wrong decision…dislocation of customers, possibly leading to retention loss.

An Example to Illustrate

- Assume you create a new class plan based on your best information, but given the restraints you have in place.
- But you know you can do better.
- So you build the better model.
- Measure the impact on customers' rates with the two changes.

Distribution of Changes

	Change from Second Model							
Change from First Model	< -20%	(-20%, -10%)	(-10%, -3%)	(-3%, 3%)	(3%, 10%)	(10%, 20%)	> 20%	Total
< -20%	1.3	2.6	2.8	2.6	3.0	3.2	5.5	20.8
(-20%, -10%)	0.9	2.0	2.1	1.9	1.8	1.7	2.0	12.4
(-10%, -3%)	0.8	1.8	1.8	1.5	1.4	1.2	1.3	9.8
(-3%, 3%)	0.9	1.6	1.5	1.2	1.1	0.9	1.0	8.3
(3%, 10%)	1.1	2.1	1.8	1.4	1.1	1.0	1.0	9.4
(10%, 20%)	1.6	2.7	2.2	1.6	1.3	1.1	1.1	11.6
> 20%	6.3	7.0	4.5	3.1	2.4	2.1	2.3	27.7
Total	12.9	19.8	16.6	13.1	12.2	11.2	14.1	100.0

Summary of Results

- First model was an improvement.
- Second model was an improvement.
- Despite the differences, there was a high degree of correlation between the two models.

Pearson Correlation Coefficients of log of Premiums between Plans			
	Log_Change2	Log_Change1	Current
Log_Change2	1.000	0.941	0.855
Log_Change1	0.941	1.000	0.850
Current	0.855	0.850	1.000

Ramifications

- You need to determine how to make decisions when presented with a new model.
- The decision should really vary by policy, and would vary based on:
  1. Indicated loss ratio
  2. Anticipated impacts to retention and conversion
  3. Organizational goals
  4. Risk that loss cost/expense models will change
  5. Market changes influencing individual demand curves

Price Optimization

- Intended to account for all the variables in the decision.
  - Indicated loss ratio by policy
  - Anticipated impacts to retention and conversion (demand curves)
  - Organizational goals
- But the following have been explored less
  - Risk that loss cost/expense models will change
  - Market changes influencing individual demand curves

Model Yields a Point Estimate

- When we build models, we can provide a rate indication for each risk type in our portfolio.
- Our rate indication is a point estimate with probabilities that the true loss cost is above or below our estimate.
- Predictive modeling has allowed the overall variance in our projections to be reduced, though we rarely speak of that.

The Power of Knowledge

- There are likely risks where we are more confident in the result and those where we are less confident.
- Sharing that information with management could be extremely powerful as you attempt to balance rate stability and adverse selection avoidance.

Getting Practical

- Through your analysis you identify a poor performing segment.
- Options are to attack through underwriting or through pricing.
  - Depending on your situation, you may be able vary your impact on new business and renewals.
  - Assume we proceed with pricing.

Varying Pricing on New vs. Renewal

- Introducing new companies with your new model
- Change rates/relativities and introduce rate capping on renewals
- Rate relativities vary by customer characteristics, e.g. by tenure of customer

Adverse Selection on New Business

- Relatively simple to find.
- Compare new business mix by levels of variables over time and compared to renewals.
- Compare close ratios by segments of business.
  - Look for sudden changes that may be related to a recent change in rates or internal processes.
  - With close ratios, be careful to understand:
    - How your quote data is recorded to get meaning in your results.
    - A priori expectations on high and low close ratios.
- Review loss ratios

Adverse Selection on Renewals

- Review retention ratios
  - Watch for counterintuitive results
- Review loss ratios

Adverse Selection

No Growth Mode										
		Experience Period								
Variable A	Variable B	Quotes	Close Ratio	Mix New	Mix Inforce	New Policies	Inforce	Loss Ratio	Retention	Rate Indication
1	1	1,000	24%	10%	8%	240	960	64%	81%	6.7%
1	2	1,000	14%	6%	4%	144	480	61%	78%	1.7%
1	3	1,000	5%	2%	1%	48	120	58%	76%	-3.3%
2	1	1,000	31%	13%	15%	312	1,800	58%	82%	-3.3%
2	2	1,000	19%	8%	10%	192	1,200	56%	82%	-6.7%
2	3	1,000	10%	4%	5%	96	600	61%	80%	1.7%
3	1	1,000	41%	17%	20%	408	2,400	57%	80%	-5.0%
3	2	1,000	29%	12%	15%	288	1,800	61%	82%	1.7%
3	3	1,000	19%	8%	10%	192	1,200	58%	79%	-3.3%
4	1	1,000	29%	12%	6%	288	720	76%	75%	26.7%
4	2	1,000	12%	5%	4%	120	480	62%	74%	3.3%
4	3	1,000	7%	3%	2%	72	240	56%	74%	-6.7%
			20%			2,400	12,000	60.00%	80.0%	

Adverse Selection

Growth Mode										
		Experience Period								
Variable A	Variable B	Quotes	Close Ratio	Mix New	Mix Inforce	New Policies	Inforce	Loss Ratio	Retention	Rate Indication
1	1	2,000	24%	10%	9%	480	1,080	64%	81%	6.7%
1	2	2,000	14%	6%	5%	288	600	61%	78%	1.7%
1	3	2,000	5%	2%	1%	96	120	58%	76%	-3.3%
2	1	2,000	31%	13%	14%	624	1,680	58%	82%	-3.3%
2	2	2,000	19%	8%	9%	384	1,080	56%	82%	-6.7%
2	3	2,000	10%	4%	5%	192	600	61%	80%	1.7%
3	1	2,000	41%	17%	19%	816	2,280	57%	80%	-5.0%
3	2	2,000	29%	12%	14%	576	1,680	61%	82%	1.7%
3	3	2,000	19%	8%	9%	384	1,080	58%	79%	-3.3%
4	1	2,000	29%	12%	9%	576	1,080	76%	75%	26.7%
4	2	2,000	12%	5%	4%	240	480	62%	74%	3.3%
4	3	2,000	7%	3%	2%	144	240	56%	74%	-6.7%
			20%			4,800	12,000	60.63%	79.8%	

Results

	Year 1		Year 2		Year 3		Policy
No Growth Mode	Policies	Loss Ratio	Policies	Loss Ratio	Policies	Loss Ratio	Rank
Option 1 - Do Nothing	12,000	60.2%	11,993	60.3%	11,981	60.5%	
Option 2 - Base Rate Change to Offset Adverse Selection	11,969	60.0%	11,930	60.0%	11,887	60.0%	1
Option 3 - Take All Rate Indications	11,838	60.0%	11,776	60.0%	11,726	60.0%	5
Option 4 - Eliminate Largest Adverse Selection	11,885	60.0%	11,808	60.0%	11,753	60.0%	4
Option 5 - Attack Adverse Selection, but Moderately	11,943	60.0%	11,886	60.0%	11,836	60.0%	2
Option 6 - Move in the Direction of All Indications	11,926	60.0%	11,862	60.0%	11,822	60.0%	3
	Year 1		Year 2		Year 3		Policy
Growth Mode	Policies	Loss Ratio	Policies	Loss Ratio	Policies	Loss Ratio	Rank
Option 1 - Do Nothing	14,375	60.8%	16,259	60.8%	17,755	60.9%	
Option 2 - Base Rate Change to Offset Adverse Selection	14,192	60.0%	15,975	60.0%	17,387	60.0%	3
Option 3 - Take All Rate Indications	14,068	60.0%	15,838	60.0%	17,253	60.0%	5
Option 4 - Eliminate Largest Adverse Selection	14,120	60.0%	15,871	60.0%	17,280	60.0%	4
Option 5 - Attack Adverse Selection, but Moderately	14,206	60.0%	15,982	60.0%	17,403	60.0%	2
Option 6 - Move in the Direction of All Indications	14,181	60.0%	15,974	60.0%	17,417	60.0%	1

Considerations

Rate Stability ⟷ Avoid Adverse Selection

- Low Growth Mode
- Minor Exposure
- Expect it won’t get worse
- New Business Only

- Growth Mode
- Major Exposure
- Expect it will get worse
- All Business

Market Niche

Environmental Factors

Product Design

The Capping Option

- Premium capping is often a desired strategy because:
  1. Allows company to get closer to indicated rate on new business where adverse selection is more common.
  2. Allows company to “control” rate impact to a manageable amount for customers.
  3. It shortens the timeline to implement, both internally and with regulators.
  4. Relatively simple to implement.

The Impact of Capping

- Premium capping should lead to an increase in retention relatively speaking.
- It may also lead to adverse selection on the renewal book.
  - In order to validate this, review the policies that were capped at a certain amount, e.g. 10%. Look at the retention ratios by indicated rate change. If the retention ratios are lower on policies priced near the cap than those that were further from the cap, you may be subject to adverse selection.
  - Suggests a “one size fits all cap” may be inappropriate.