Comprehensive Data Review in a Pricing Analysis

Brian D. Haney, FCAS, MAAA
Kinsale Insurance Company

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Stereotype of Pricing Analysis

Expenses

Rate Change History

Premium

Paid Losses

Case Reserves

Rates need to go up 20%

Components of Comprehensive Data Review

1. Review the non-quantitative information
2. Review the available data that ISN'T a traditional input to your pricing analysis
3. Review the quality of the data
4. Review the profiles of the book over time (change in mix of business)
5. Sample the underwriting and claims files
6. Comparison of Actual versus Expected Development by segment
7. Your output as data

Different Levels of "Review"

- Familiarize
  - Know that it is, what it is, where it is, and why it is, but don't review the data itself
- Examine
  - Look at/analyze yourself, and have in your work files
- Document
  - Put in data/exhibits portion of report
- Discuss
  - Discuss in person with key constituencies
- Disclose
  - Write some commentary about the data and the quality thereof in the text of your report, with specific details on how it can be improved

Actuarial Standard of Practice 23

- "data that are completely accurate, appropriate, and comprehensive are frequently not available".
- "The actuary may rely on data supplied by others"
- "the actuary should review the data for reasonableness and consistency"

http://www.actuarialstandardsboard.org/pdf/asops/asop023_097.pdf

What ASOP 23 Says you AREN'T required to do

- Determine whether data or other information supplied by others are falsified or intentionally misleading
- Develop additional data compilations solely for the purpose of searching for questionable or inconsistent data, or
- Audit the data

http://www.actuarialstandardsboard.org/pdf/asops/asop023_097.pdf

Review of non-quantitative information

- Underwriting Guidelines
- Claims Manual
- Prior Analyses
- Reinsurance Treaties
  - Especially understand any loss-limiting or loss-sensitive features
- Significant Court Decisions
- Unique Policy Forms
- Significant Legislation
- Allocation Method for Expenses
- Contingent Commission Agreements with Agents?

Review of non-input data

- Submission, Quote, Bind statistics
- Form Usage
  - Policy
  - Claims
- External Data
  - FOIA requests
- Claims Data
  - Lawsuit and resolution data

Red Flag

Hit Ratio by Quarter Ending for Business Segment

	31-Mar	30-Jun	30-Sep	31-Dec
Company Total	20%	26%	21%	24%
Business Segment #1	55%	57%	56%	56%

Red Flag

Hit Ratio by Quarter Ending for Business Segment

	31-Mar	30-Jun	30-Sep	31-Dec
Agent 1	20%	26%	21%	24%
Agent 2	22%	21%	20%	19%
Agent 3	21%	23%	20%	21%
Agent 4	19%	19%	18%	23%
Agent 5	33%	30%	29%	30%

Red Flag

Hit Ratio by Quarter Ending for Business Segment

	31-Mar	30-Jun	30-Sep	31-Dec
Agent 1	17%	19%	20%	24%
Agent 2	21%	19%	20%	23%
Agent 3	21%	21%	22%	24%
Agent 4	23%	23%	21%	23%
Agent 5	18%	17%	18%	26%

Red Flag

		Year 2006	2007	2008	2009
Book 1	Punitive Damages Exclusion				
	Policy Ratio	100%	95%	90%	50%
	Claims Ratio	0.8%	1.3%	1.0%	0.5%
Book 2	Punitive Damages Exclusion				
	Policy Ratio	60%	60%	60%	30%
	Claims Ratio	30.0%	27.0%	28.0%	31.0%

Red Flag

		Year 2006	2007	2008	2009
Book 1					
	% of Policies with Per Location Aggregate	0%	1%	5%	20%
	Average Locations Per Policy	15.00	16.00	20.00	21.00
	Average Limit per Policy	1,000,000	2,000,000	3,000,000	4,000,000
Book 2	% of Policies with Per Location Aggregate	0%	1%	5%	20%
	Average Locations Per Policy	1.50	1.50	1.50	1.50
	Average Limit per Policy	1,000,000	1,000,000	1,000,000	1,000,000

Data Quality

- Exception Reporting
  - Data Errors
  - Process Errors
  - Values outside normal parameters
- Usage
  - Consistent definitions
  - Treatment of non-answer, unknown, not applicable
- Any important fields missing?
  - If you rate by it, underwrite by it, or use it in handling a claim, it ought to be captured

Exception Examples—Data Errors

- "Date Reported" occurs before "Date of Occurrence" for a claim
- Negative Reserves/Negative Payments
- Month to date fields don't reconcile with "year to date" fields
- Fields break pre-defined mathematical relationships (Loss and LAE field should be sum of Loss and DCC and AO fields)
- Duplicate Records
- Latitude/Longitudes not on map
- Zip Code/County/City/State mismatch
- Lat Long/Territory Mismatch

Exception Examples—Process Errors

- Limit sold in excess of company's maximum limits
- Excess Limits sold without facultative reinsurance support
- Policy sold in state where insurance company does not operate or isn't licensed
- Coverage sold that company isn't licensed to sell or doesn't write.
- Underwriter no longer with company with written premium in current month

Exception Examples—Anomalies

- Number of Physicians > 1000
- Sales for single account < $50,000 or >$10 billion
- Habitational account: Implied Rent (Revenue/Units) < $100/month
- Losses over Policy Limit/Sublimit
- Large Claims

Exception Log

Exception #2: Missing Class Code
Table: Premium

Exception #3: Missing Zip Code
Table: Property Locations

Record #	Policy Number	Street Address	City	State	Zip
20	0568	201 Main Street	Peoria	IL	NULL
203	0123	411 Park Street	Springfield	MA	NULL
750	0360	11/15/2008	11/16/2008	Work Comp	NULL
...		...	...	...	...

Exception Log

Run Time	Exception Number	Description	Table	Record ID	Reference Type	Reference Number
12/31/2010	1	Date Reported Prior to Date of Occurrence	Claims	275	Claim Number	000010
12/31/2010	1	Date Reported Prior to Date of Occurrence	Claims	3053	Claim Number	000267
12/31/2010	1	Date Reported Prior to Date of Occurrence	Claims	5874	Claim Number	000455
12/31/2010	1	...	...			
12/31/2010	2	Missing Class Code	Premium	576	Policy Number	0120
12/31/2010	2	Missing Class Code	Premium	588	Policy Number	0139
12/31/2010	2	Missing Class Code	Premium	955	Policy Number	0201
12/31/2010	2	...	...	...	...	...
12/31/2010	3	Missing Zip Code	Property Locations	20	Policy Number	0568
12/31/2010	3	Missing Zip Code	Property Locations	203	Policy Number	0123
12/31/2010	3	Missing Zip Code	Property Locations	750	Policy Number	0360
12/31/2010	3	...	...	...	...	...

Data Profiles

- Typical information people will be looking for
  - Geographic profile
  - Class distribution
  - Limit distribution
  - Deductible profile
  - Claims Made Year (if applicable)
- Put profiles of information that the reader will typically ask for or want to know somewhere in your report (the appendix)
- Review the data profiles with the product manager.

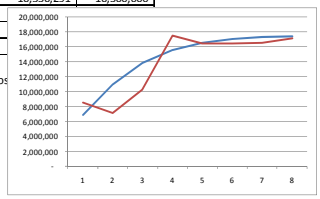
Sampling

- Underwriting Files
- Claims Files
- Applications
- Inspection Reports
- Location Data

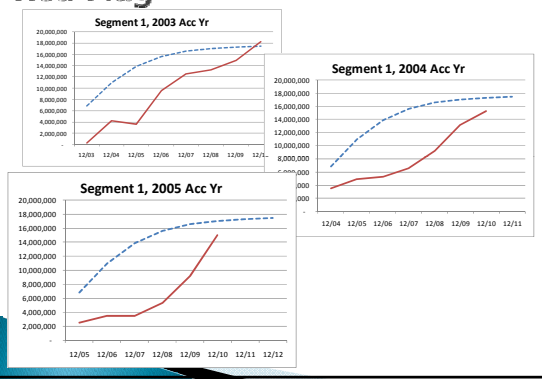
Actual Versus Expected Loss Development

Eval Period	ATU	Reported %	Expected Reported Loss	Actual
1	2.551	0.39	6,860,055	8,500,000
2	1.594	0.63	10,978,670	7,125,000
3	1.260	0.79	13,888,889	10,250,000
4	1.121	0.89	15,611,062	17,500,000
5	1.057	0.95	16,556,291	16,500,000
6	1.026	0.97		
7	1.011	0.99		
8	1.004	1.00		

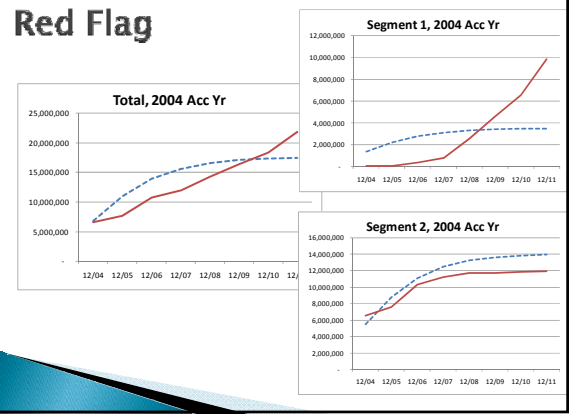
Expected Los
Premium



Red Flag



Red Flag



Your Output is Data

- Treat the key output/input of your analysis as Data
- Track over time
  - Measure unexpected changes in values (this is a last cross check)
  - Measure accuracy of your predictions
- System to allocate results to policy level?
  - Policy level results may not have much value, but if you allocate all the components of profitability to policy level, you can then reaggregate the data in any way you choose.

Dealing with Erroneous Data

Ideal	Have fixed at point of entry, so data warehouse is corrected in next cycle
Good	Create adjustment table, and use in your queries
OK	Adjust manually (hard-code) and footnote
Bad	Adjust with no documentation

Example: Adjustment Table

Loss Table

Record ID	Eval Date	Accident Year	Paid Loss	Case Reserve	Open Claims	Closed Claims
1	12/31/2005	2005	150000	250000	4	5
2	12/31/2006	2005	175000	345000	4	5
3	12/31/2007	2005	225000	196000	3	6
…	…	…	…	…	…	…

This record is wrong, and the data needs to be adjusted.

Loss Adjustment Table

Record ID	Eval Date	Accident Year	Paid Loss Adjustment	Case Reserve Adjustment	Open Claims Adjustment	Closed Claims Adjustment	Reason for Adjustment
2	12/31/2006	2005	0	-100000	0	0	Claim with $100,000 reserve was closed with no pay, and not correctly reflected in data
…	…	…	…	…	…	…	

Final Thoughts

- Strike a balance between being thorough and timely
- Use your judgment about what level of review is appropriate in each situation
- Document, document, document!
- Let the computer do the heavy lifting, when it comes to checking data reasonability and quality.

Questions?

Brian.haney@kinsaleins.com