



CASUALTY ACTUARIAL SOCIETY

Ratemaking, Product, and Modeling Seminar



Banking & Insurance Group®

MORE INFORMATION. BETTER DECISIONS.

2018 RATEMAKING, PRODUCT AND MODELING SEMINAR
PRODUCT MANAGEMENT WORKSHOP

Part 7: Product Monitoring

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CARFAX Banking & Insurance Group

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CASUALTY ACTUARIAL SOCIETY

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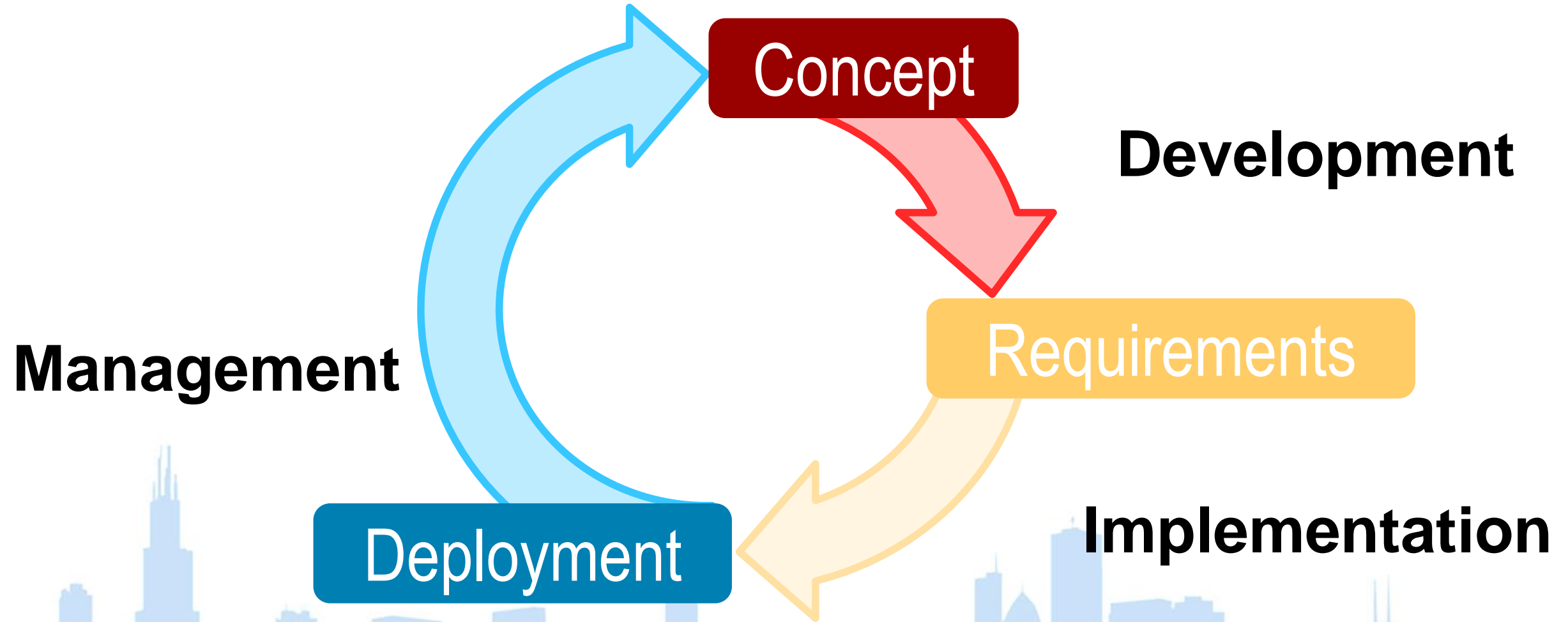
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Outline

- Metrics
 - Prospective vs. Retrospective Metrics
 - Subjective vs. Objective Metrics
 - Lift and the Value of Lift
 - Establishing Metrics
- Product Monitoring
 - Identifying successes and failures
 - A tool you can use
- Group Discussion



Product Life Cycle



Prospective Evaluation

Identify your goals *before the product change.*

- Start with some benchmarks.
- Use standard objective *and* subjective metrics.

Concept

Development

Requirements

Implementation

Retrospective Evaluation

Management

Deployment

Look back to gauge your success.

- Based on prospective benchmarks.
- Advantage: historical data is usually available for comparison.
- Don't get sidetracked.

Prospective Evaluation

What are you trying to accomplish?

- Why are you making this product change?
 - Is there a problem that you are trying to address?
 - Is there a specific area you want to target for growth?
 - Are you trying to protect a particular portion of your current book of business?
 - How should this impact your current book of business?

Prospective Evaluation

What are you trying to accomplish?

- What metrics can you use to gauge success?
 - Improved business profile.
 - Customer or agency satisfaction.
 - Image in the market.
 - Growth, profitability, retention.
 - Lift.



Retrospective Evaluation

Monitor your progress

- Always take a look back to see if your change was successful.
- Use what you learn.
- Refine your tools as new information comes to light.



Objective Metrics

UNDERWRITING METRICS

- Loss or combined ratio
- Service times
- Mix of business
 - Proportion in high-performing tiers
 - Multi-policy business
- Amount of coverage
 - Insurance-to-value
 - Average deductible or retention

MARKETING METRICS

- Total growth
 - Premiums written
 - Exposures (units)
 - Policies
- Hit Ratios
 - Percentage of quoted business that is bound
- Retention
 - Percentage of last year's business that renewed.

Subjective Metrics

CUSTOMER FEEDBACK

- “Customers are satisfied, but not extremely satisfied.”
- “The most important thing is price.”
- “I’d like a better mobile app.”

AGENCY FEEDBACK

- “The company serves its niche.”
- “They have always been easy to work with.”
- “You’re just too out-of-touch with younger generation.”

COMPANY IMAGE

- Excellent claims service.
- Innovative product offerings.
- Insurance for teenagers.





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MORE INFORMATION. BETTER DECISIONS.

A silhouette of a city skyline, including several prominent skyscrapers, is shown in a golden-brown color against a white background. The skyline is reflected in a blue gradient that transitions from light blue at the top to a darker blue at the bottom.

RPM INSURANCE COMPANY

Case Study

RPM Insurance Company

YEAR	PREMIUMS	LOSS RATIO	RETENTION	HIT RATIO	GROWTH
2011	\$ 21,100	67.8%	85.1%	25.2%	3.6%
2012	21,897	68.3%	84.6%	24.4%	4.2%
2013	23,020	69.5%	83.5%	25.8%	4.7%
2014	24,240	71.2%	81.2%	27.4%	5.3%
2015	26,034	74.1%	79.6%	28.3%	7.4%
2016	28,403	77.1%	78.9%	29.6%	9.1%

What are we trying to accomplish?

Set Objective Goals



Quantify your target impact up front

PROJECTED IMPACT OF PRODUCT CHANGES

METRIC	CURRENT	TARGET	DIFFERENCE
Loss Ratio	77.1%	72.0%	-5.1%
Retention	78.9%	75.9%	-3.0%
Growth Rate	9.1%	1.5%	-7.6%
Lift		Uhhhhh...	

Goals must be set up *before implementation*



Set Subjective Goals

AGENCY FORCE

- Minimize complaints
- No book rolls
- No impact on application time
- Minimal training
- Easy to explain to customers
- Seamless AMS Implementation
- Shift target toward high-value homeowners

CUSTOMER SERVICE

- Minimize complaints
- Easy to explain to customers

CORPORATE

- Change perception in marketplace
- Employee buy-in
- Minimum training costs

Goals must be set up *before implementation*

Show of Hands

Who has heard the term 'lift' when talking about a predictive model?

Who knows what it means?

What does it mean?



Lift: Statistical Definition

- Measure of the *effectiveness* of a targeting model at predicting or classifying cases as having an enhanced response with respect to the population as a whole.
- Quantitative measure of how well a model segments observations.

LIFT ON A OF x

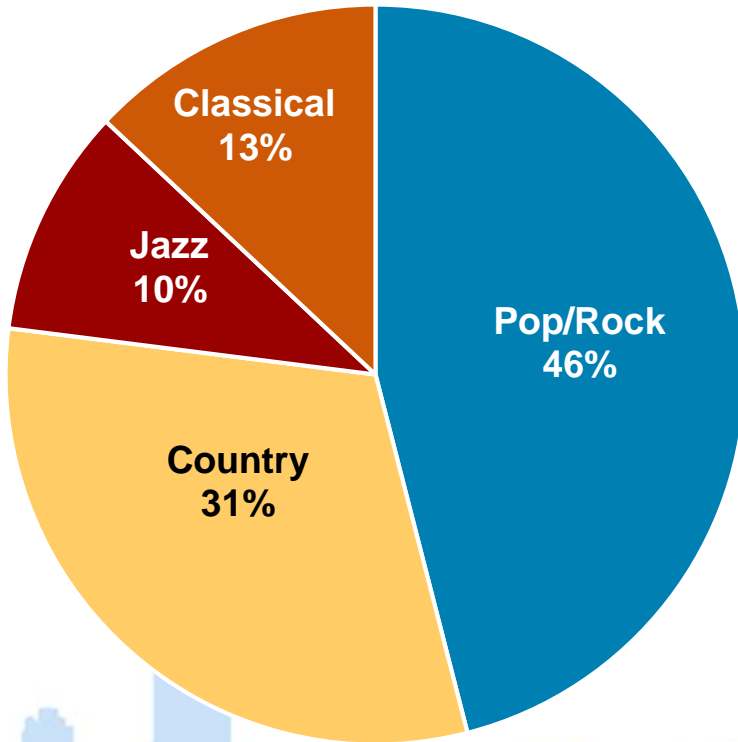
$$L_A(x) = \frac{\Pr(x = A \mid \hat{x} = A)}{\Pr(X = A)}$$

$$= \frac{\Pr(X = A \cap \hat{x} = A)}{\Pr(X = A) \times \Pr(\hat{x} = A)}$$

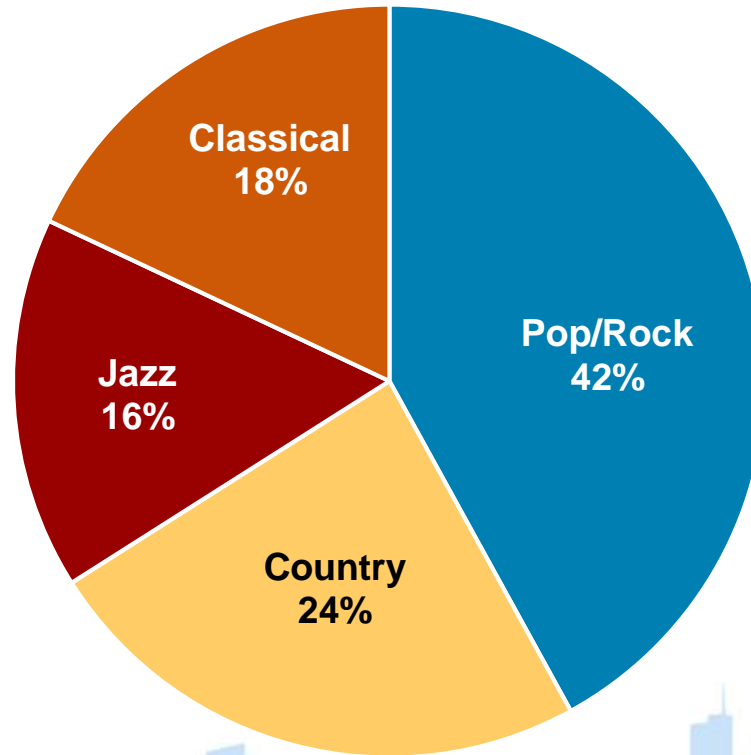
LIFT IS NOT A MEASURE OF CHANGE IN LOSS RATIO!

What is your favorite type of music?

All Responses



People Wearing Suits



LIFT OF TIES ON JAZZ

$$\begin{aligned} L_J(t) &= \frac{\Pr(m = J \mid t = Y)}{\Pr(m = J)} \\ &= \frac{16\%}{10\%} \\ &= 1.6 \end{aligned}$$

Lift: Real-Life Definitions

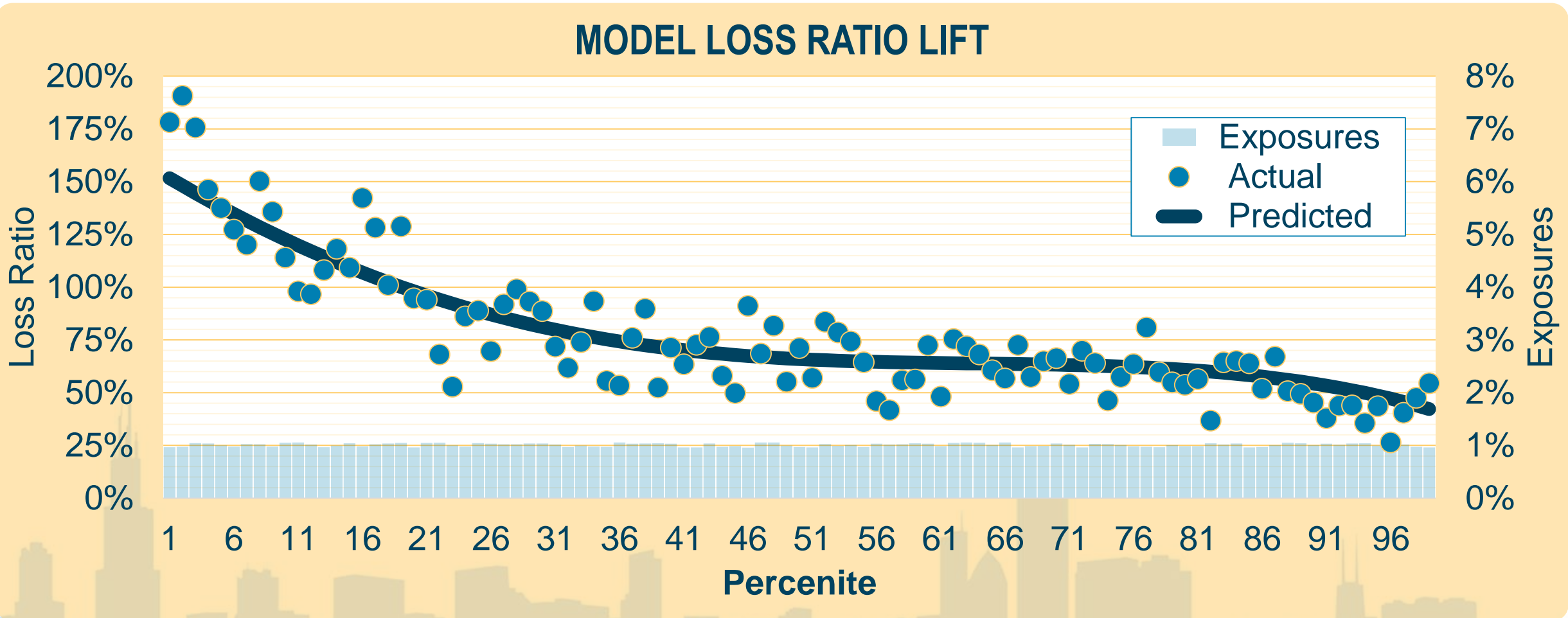
- What the model does for me?
- *Often not the same* as the statistical definition.
- Does not equate to change in loss ratio or profit.

$$L = \sum \frac{\Pr(x = A \mid \hat{x} = A)}{\Pr(X = A)}$$

$$L = \frac{r_{max} - r_{min}}{2}$$

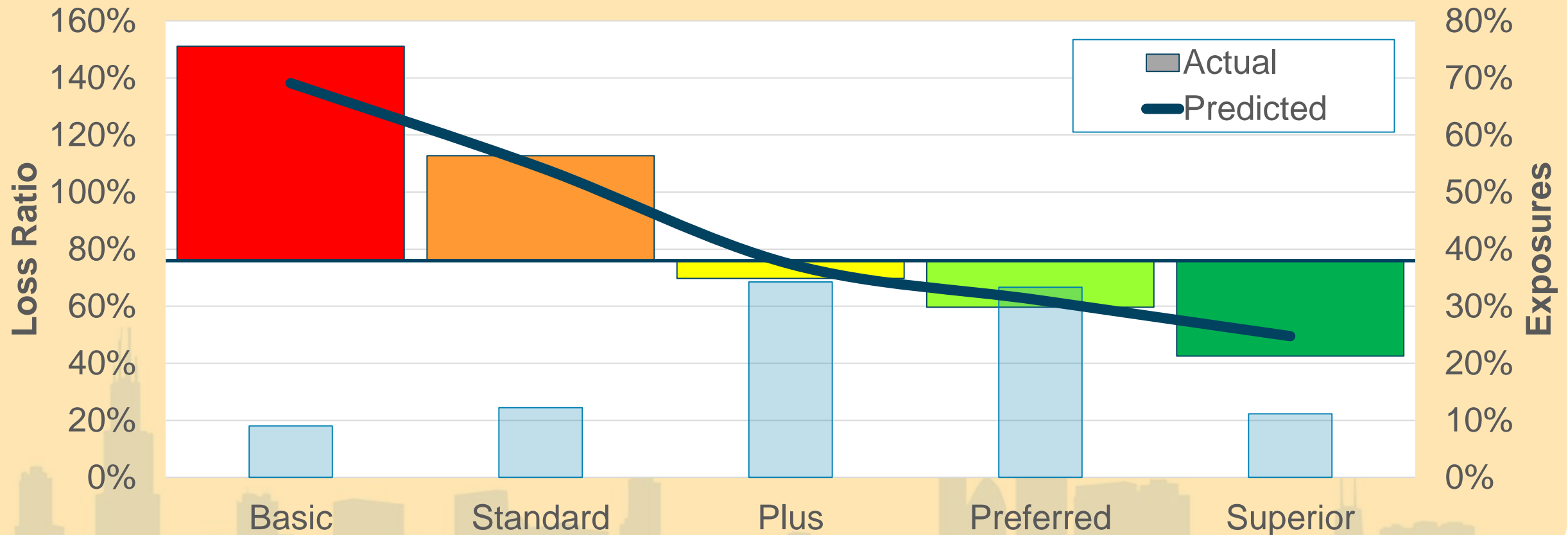
$$L = \frac{\sum_i |r_i - 1| P_i}{\sum_i P_i}$$

Lift: How it is communicated



Lift: A different way to display it

PREDICTED AND ACTUAL LOSS RATIO BY TIER



Lift: A different way to talk about it

Value of Lift

- Shows expected impact of segmentation
- Prospective metric
 - Based on expected outcomes
 - Can be used retrospectively as a success measure
- Translates into standard objective metrics
 - Loss Ratio
 - Growth
 - Retention
 - Profit



Base Rate Increase

IMPACT OF BASE RATE CHANGE

Current
Loss Ratio

77.1%

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(1

Selected
Rate Change

+5.5%

)

New
Loss Ratio

79.9%



Base Rate Increase

IMPACT OF BASE RATE CHANGE

Tier	Superior	Preferred	Plus	Standard	Basic	Total
Current Loss Ratio						77.10%
Expiring Premium	3,162	9,469	9,736	3,472	2,564	28,403
Rate Change	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%

Base Rate Increase

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Rate Change	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%
Quoted Renewal Premium	3,336	9,990	10,272	3,663	2,705	29,965
Expected Retention	64.00%	73.40%	77.50%	82.10%	97.30%	76.98%
Retained Premium	2,135	7,332	7,960	3,007	2,632	23,067

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Retained Premium	2,135	7,332	7,960	3,007	2,632	23,067
Quoted New Business Premium	2,056	6,157	6,331	2,258	1,667	18,469
Expected Hit Ratio	15.82%	19.14%	24.89%	31.44%	43.94%	24.49%
Expected New Business Premiums	325	1,179	1,576	710	733	4,522

Base Rate Increase

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Expected Premiums	2,460	8,511	9,536	3,717	3,365	27,589
Expected Loss Ratio	42.5%	59.7%	69.8%	112.8%	151.2%	



Base Rate Increase

IMPACT OF BASE RATE CHANGE

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Expected New Business Premiums	325	1,179	1,576	710	733	4,522
Expected Premiums	2,460	8,511	9,536	3,717	3,365	27,589
Expected Losses	1,046	5,078	6,653	4,191	5,086	22,054
Expected Loss Ratio	42.5%	59.7%	69.8%	112.8%	151.2%	79.94%

A smarter approach...

IMPACT OF TARGETED RATE CHANGE

Tier	Superior	Preferred	Plus	Standard	Basic	Total
Current Loss Ratio						77.10%
Expiring Premium	3,162	9,469	9,736	3,472	2,560	28,403
Rate Change	-26.6%	3.1%	0.2%	33.6%	58.3%	5.51%
Quoted Renewal Premium				4,620	3,494	29,967
Expected Retention Ratio				13.05%	50.74%	78.95%
Retained Premium				3,045	1,773	23,659
Quoted New Business Premium				2,850	2,147	18,469
Expected Hit Ratio	15.1%	11.1%	21.5%	22.5%	22.9%	21.77%
Expected New Business Premiums	233	1,044	1,618	636	492	4,021
Expected Premiums	2,451	10,030	9,254	3,681	2,647	27,680
Expected Losses	1,468	6,249	6,663	3,107	2,507	19,999
Expected Loss Ratio	59.9%	62.3%	72.0%	84.4%	110.9%	72.25%

**5.5% RATE INCREASE YIELDS A 6.3%
IMPROVEMENT IN PERFORMANCE!**



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ONE YEAR LATER

Review Subjective Impact

AGENCY FEEDBACK

- No longer the company you were.
- Business practices seen as “unstable.”
- More competitive for working professionals.

BRAND IDENTITY

- Concern we abandoned our market.
- Value proposition is better for high-retention risks.
- Market niche has changed.
- Market leader for lawyers and accountants.



Review Objective Metrics

	Initial	Target	Model	Actual	Variance
Loss Ratio	77.1%	72.0%	72.1%	73.1%	+1.1%
Retention	78.9%	75.9%	79.1%	78.4%	+2.5%
Growth Rate	9.1%	3.0%	-3.2%	-2.3%	-5.3%

- Are variances within acceptable range?
 - Missed significantly on growth target.
 - Others look OK.
- Extenuating circumstances?
 - Market changes.
 - Underwriting criteria.
- What tweaks might improve performance?

Product Monitoring

Subjective Metrics

- Must be solicited to get multiple viewpoints.
 - Often one-sided.
 - Can be contradictory.
 - Shouldn't be dismissed out-of-hand.
- Can be just as important as objective metrics.

Objective Metrics

- Should be reviewed regularly.
 - Easier to attain
 - Set up standard report
- Subject to market conditions.
 - Can change rapidly.
- Can be used to verify or counter subjective metrics.



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YOUR NEW PRODUCT



1. What are some subjective goals for your product? What is a success?
2. What are some objective goals?
3. What kind of tools can you set up in advance? What kind of resources will you need to set these up?
4. What if subjective feedback is negative, but objective metrics meet your initial goals?

