

# BAS 2020 Block Dental Case Competition

---

Team 28

Wilson Yu, Yunqi Shi, Boyang Wan, Hengyuan Qi

# C O N T E N T

**1** Probability Model

**3** Final Strategy

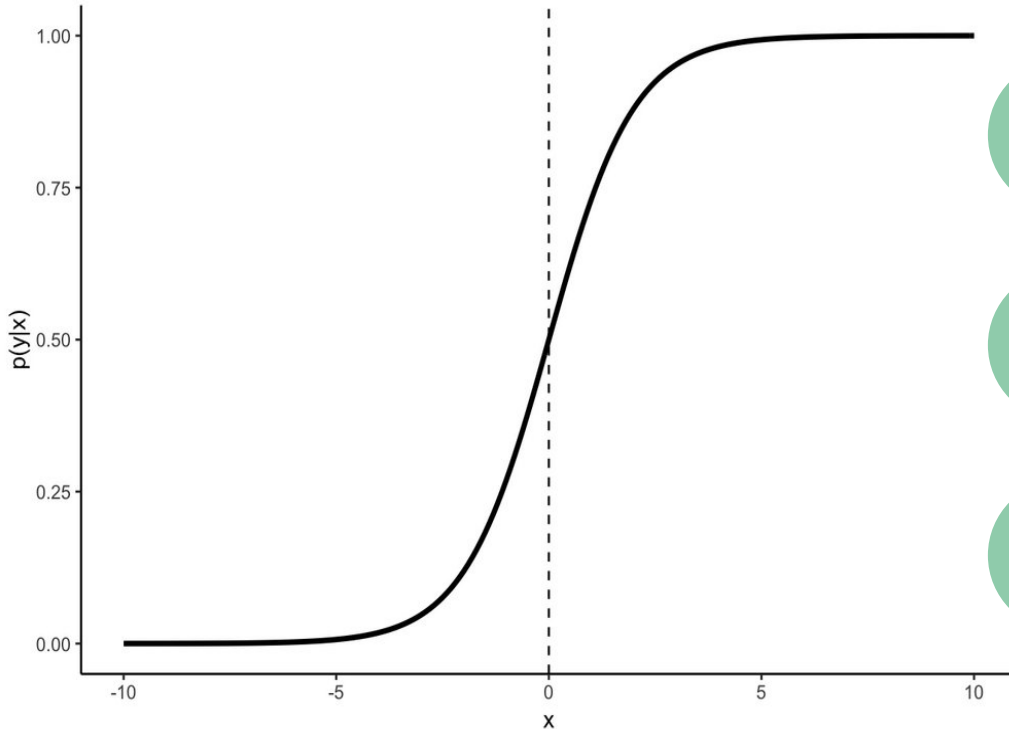
**2** Profit &  
Revenue Optimization Strategies

**4** Implications

# Probability Model

# Logistic Regression

The logistic function

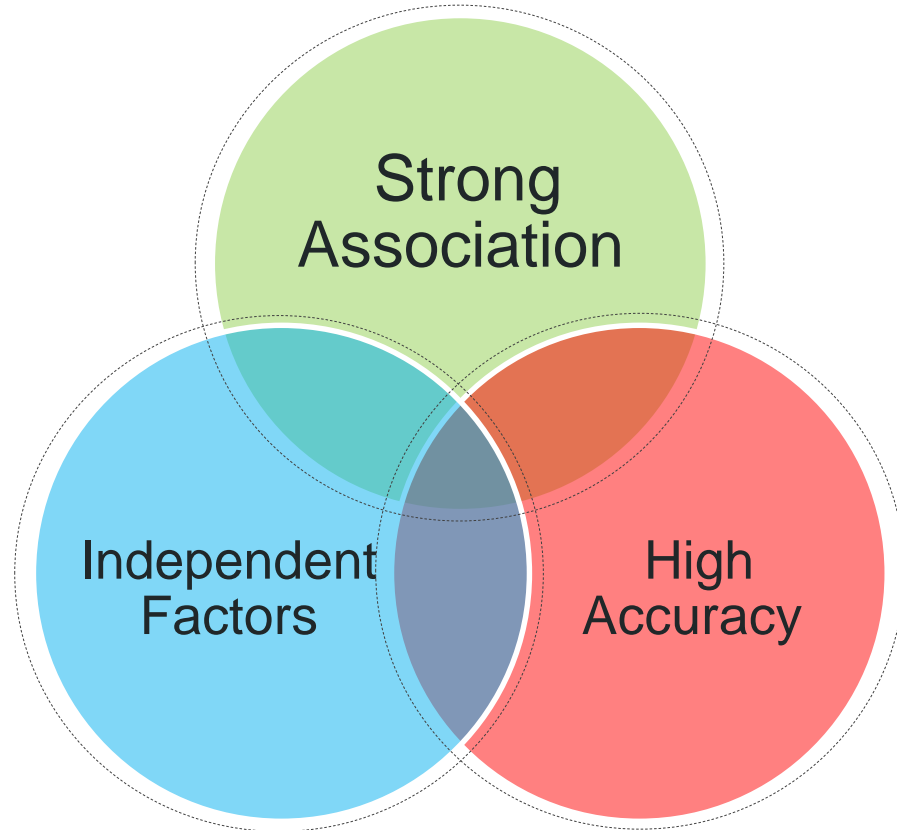


Probabilistic model

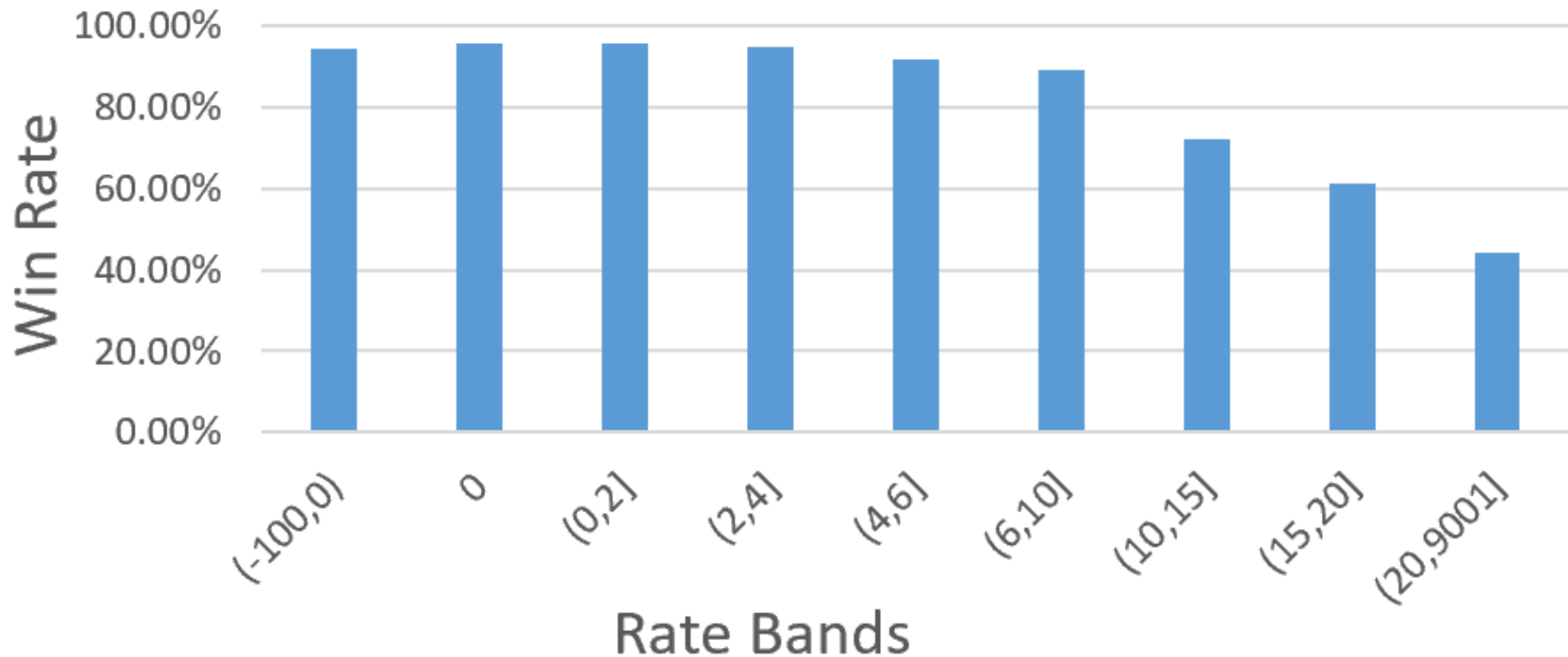
Binary dependent variable

Linear method

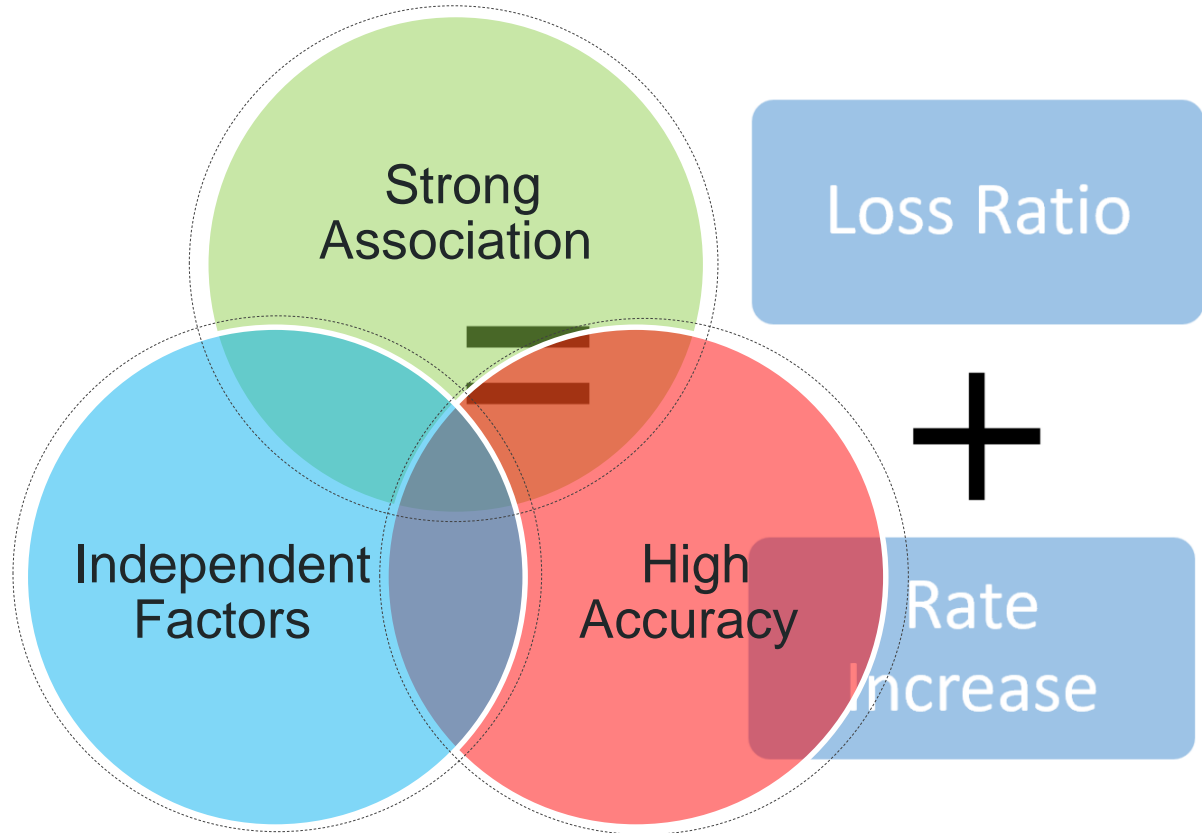
# Considerations For Factors



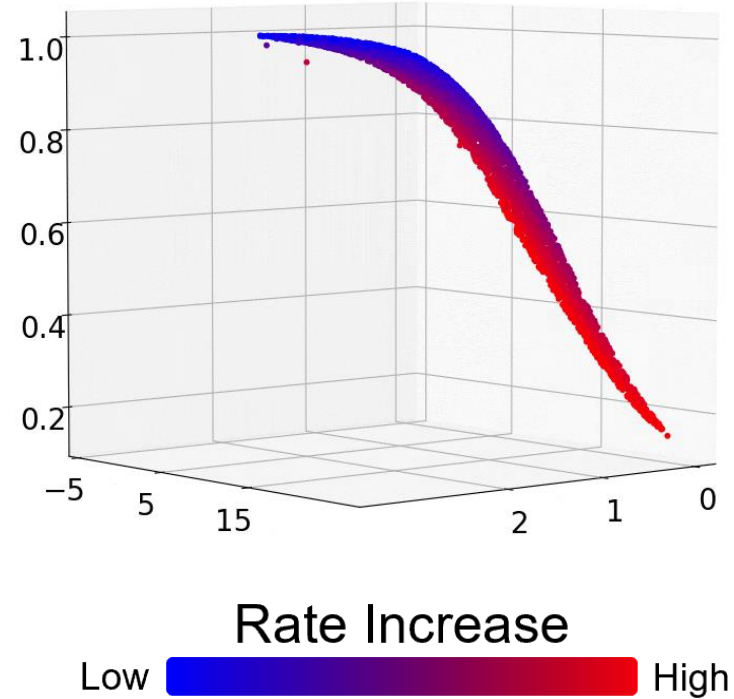
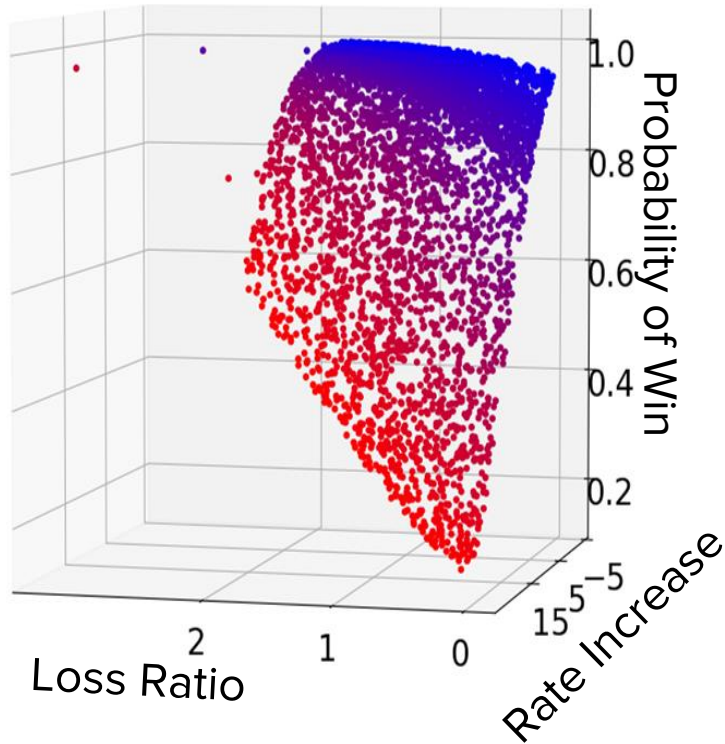
# Win Rates of Rate Bands



# Considerations For Factors

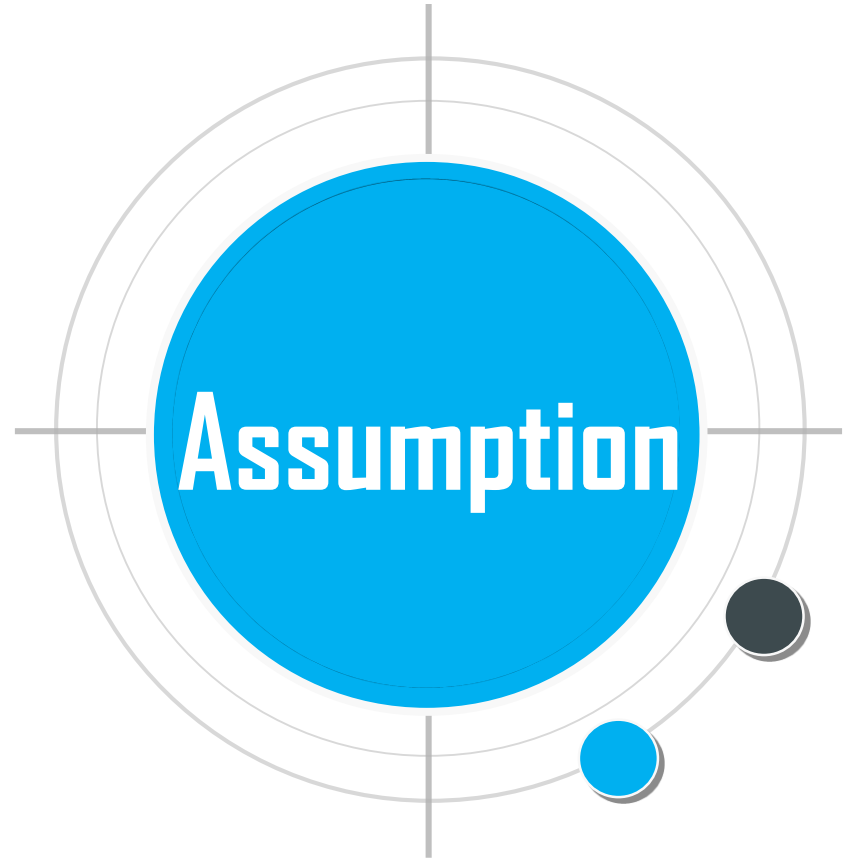
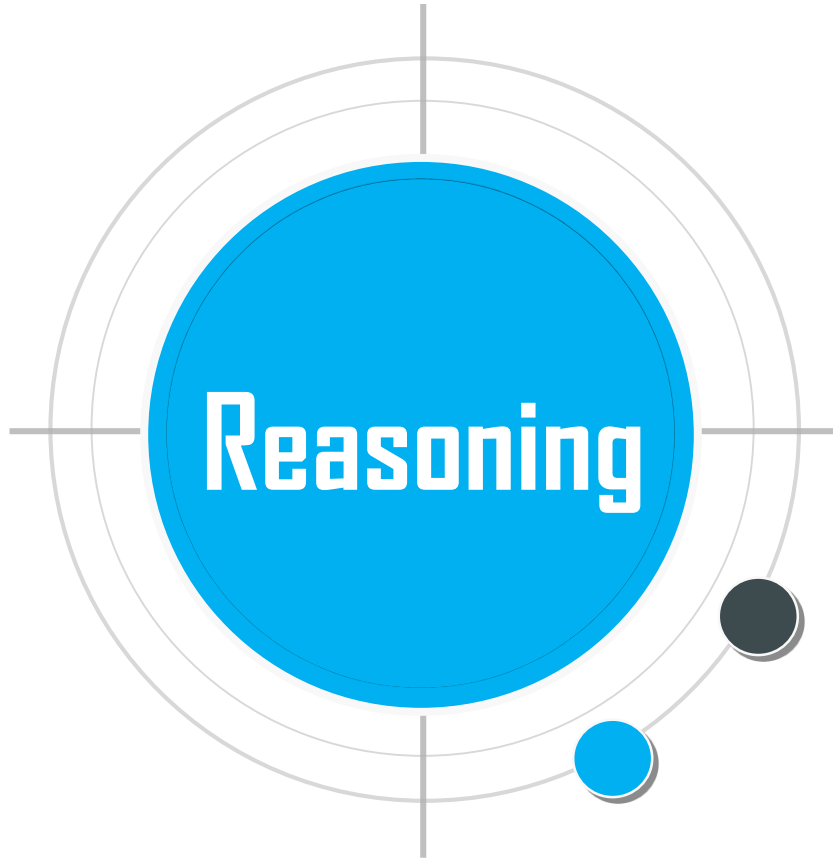


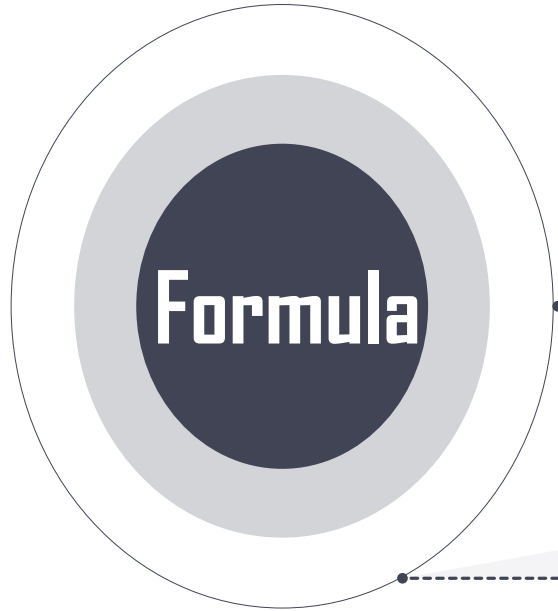
# Probability Model





# Profit & Revenue Optimization Strategies





Formula

$$\text{Revenue} = \text{Premium} \times \text{Probability}$$

$$\text{Profit} = (\text{Premium} - \text{Claims}) \times \text{Probability}$$

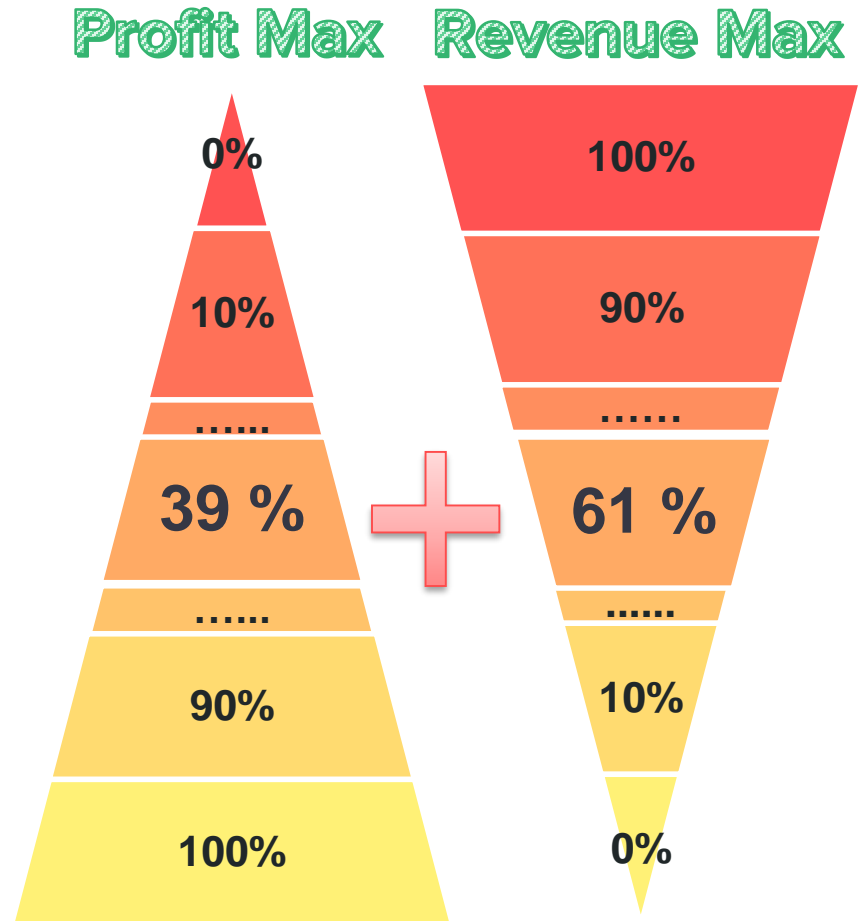
Revenue Max			
	Year 1	Year 2	Year 3
<b>Expected Loss Ratio</b>	86%	84%	<b>81%</b>
<b>Expected Premium</b>	\$102m	\$98m	<b>\$95m</b>
<b>Expected Claim</b>	\$88m	\$83m	\$78m

Profit Max			
	Year 1	Year 2	Year 3
<b>Expected Loss Ratio</b>	71%	60%	<b>53%</b>
<b>Expected Premium</b>	\$87m	\$74m	<b>\$64m</b>
<b>Expected Claim</b>	\$62m	\$45m	\$34m

- Expected Loss Ratio, Claim & Premium Based on Two Strategies

# Final Strategy

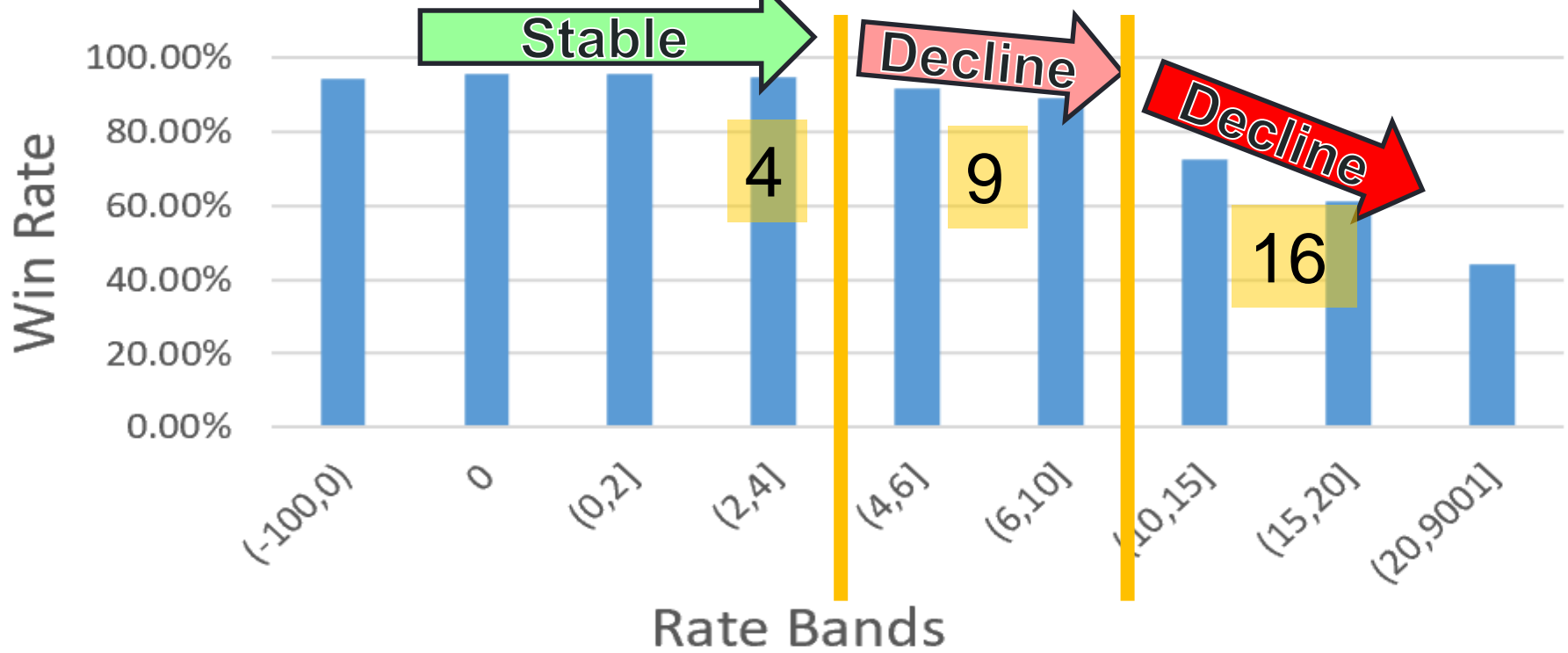
# Blend of 2 Strategies



## Average of Rate Increase

LR Bands	Year 1	Year 2	Year 3
<b>(0,25]</b>	<b>-2.3</b>	<b>-2.3</b>	<b>-2.2</b>
<b>(25,50]</b>	<b>0.4</b>	<b>0.5</b>	<b>0.7</b>
<b>(50,70]</b>	<b>3.3</b>	<b>3.5</b>	<b>3.6</b>
<b>Benchmark : LR = 70%</b>			
<b>(70,100]</b>	<b>9.2</b>	<b>9.0</b>	<b>8.8</b>
<b>(100,150]</b>	<b>17.2</b>	<b>16.1</b>	<b>15.3</b>

# Win Rates of Rate Bands





## Average of Rate Increase

LR Bands	Year 1	Year 2	Year 3	
(0,25]	-2.3	-2.3	-2.2	
(25,50]	0.4	0.5	0.7	
(50,70]	3.3	3.5	3.6	4
<b>Benchmark : LR = 70%</b>				
(70,100]	9.2	9.0	8.8	9
(100,150]	17.2	16.1	15.3	16

# Implications to Management



# Implications to Management



Revenue Maximization

# Implications to Management

Accepting Customers ← Revenue Maximization

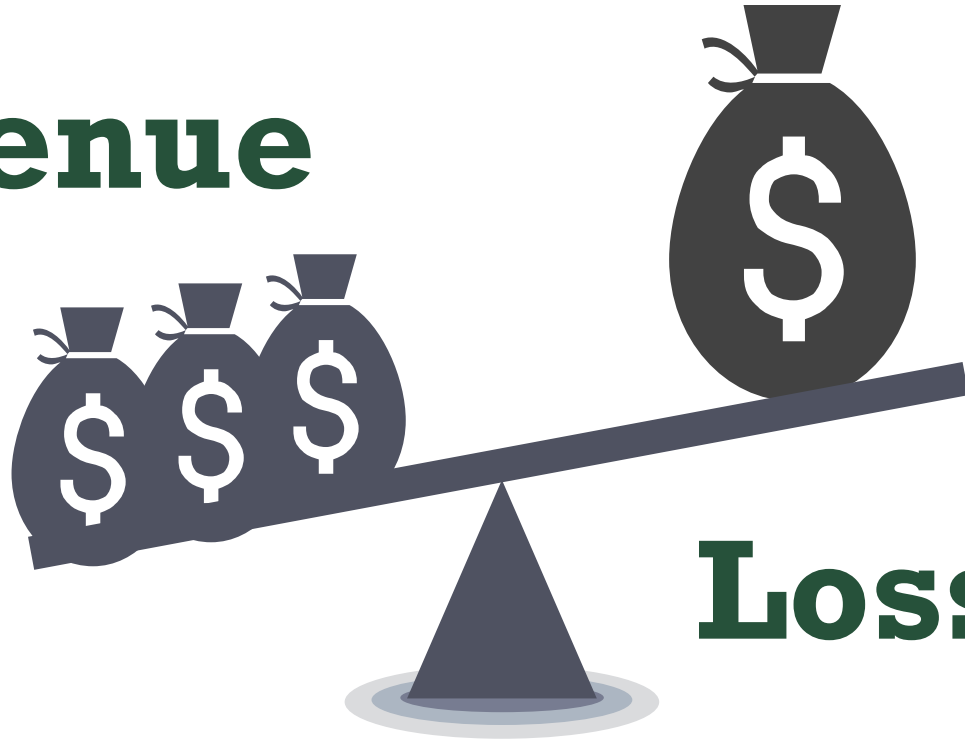


# Implications



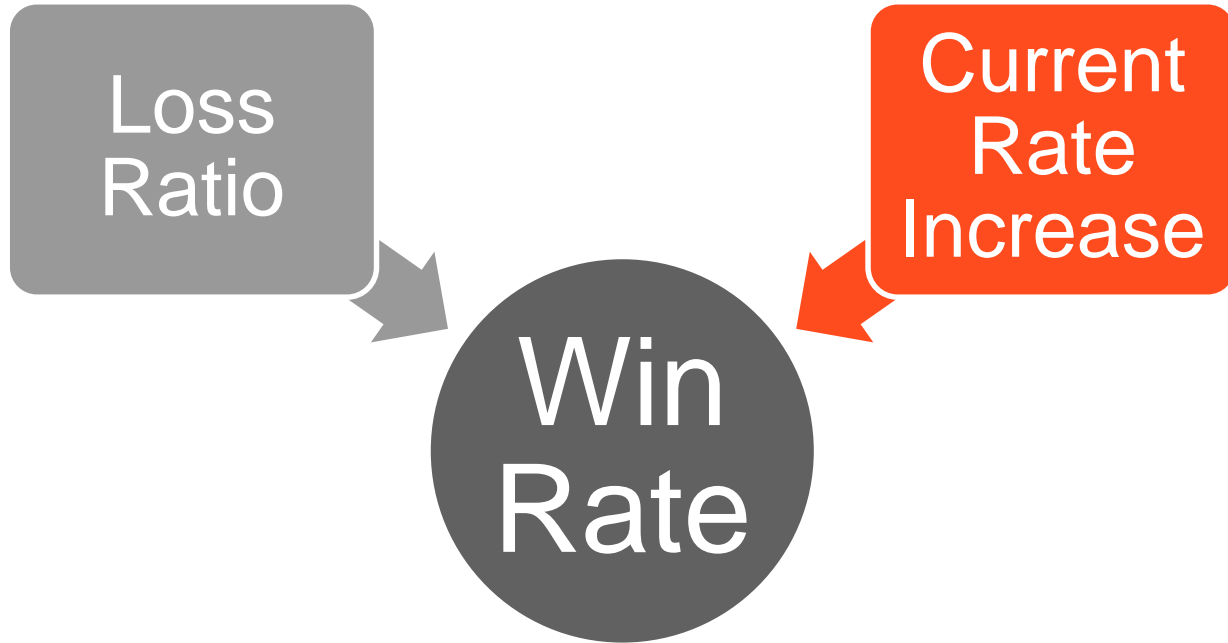
# Trade-off?

**Revenue**

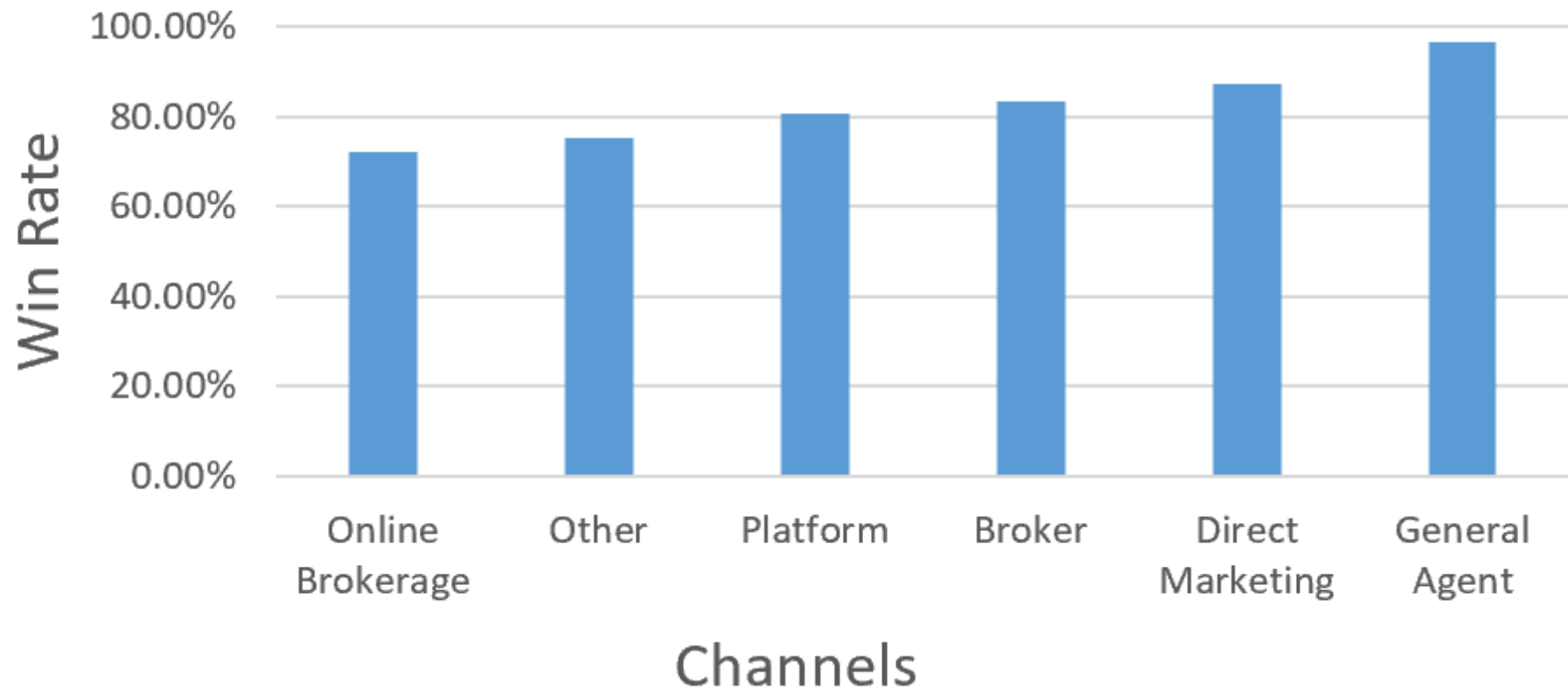


**Loss ratio**

# Model Improvements

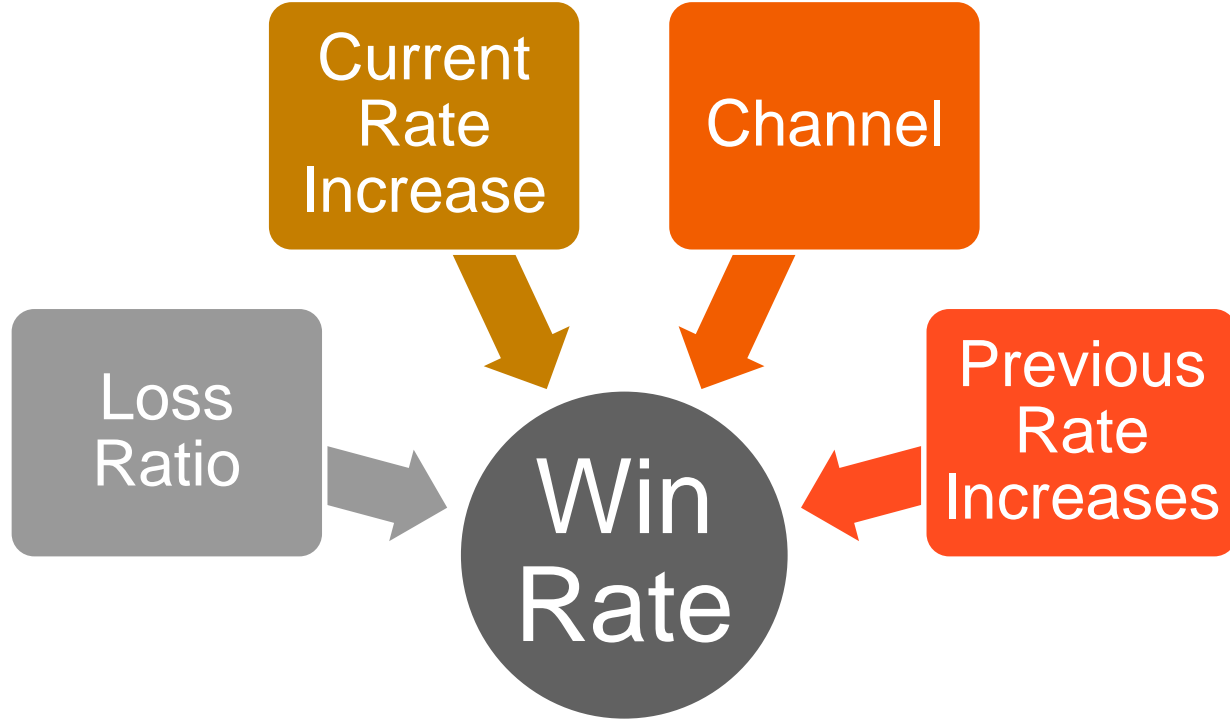


# Win Rates of Channels

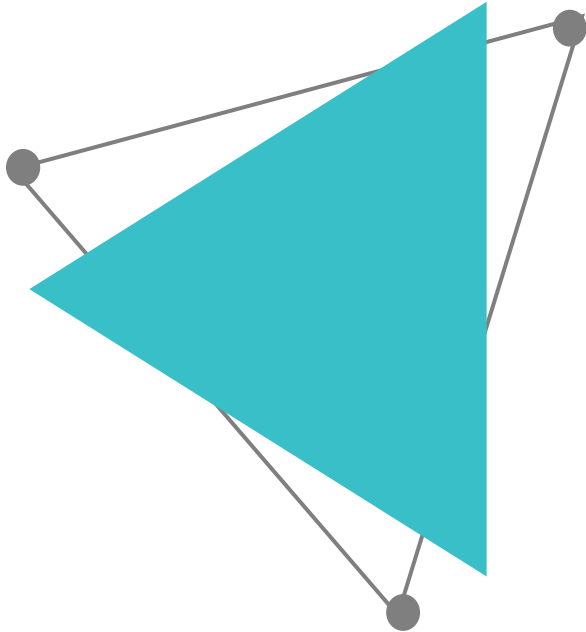




# Model Improvements



# Strategy Improvement



Current

3 Weights

Fast

Proposed

15,000+  
Rate  
Increase

Flexible



Other way to reduce loss  
ratio?

New  
Product

Underwriting  
Guideline

Thank you!

---

Q&A