13th Annual

BAS Case Competition

Team 18: Ashley Li, Grace Yang, Otilia Olson, Patricia Lansang

Overview

01 **The Loss Model**
Monte Carlo Simulations

02 **The Insurance Plans**
Three Quoted Insurance Policies

03 **Performance**
Total Retainment, TCOR, Loss Ratio

04 **Recommendations**
Additional Metric, Insurance Plan

1 THE LOSS MODEL

The Loss Model:

Annual Aggregate Losses (median)

Fire: 9.5M

NWS: 786K

EQ: 0M

Total: 12.9M

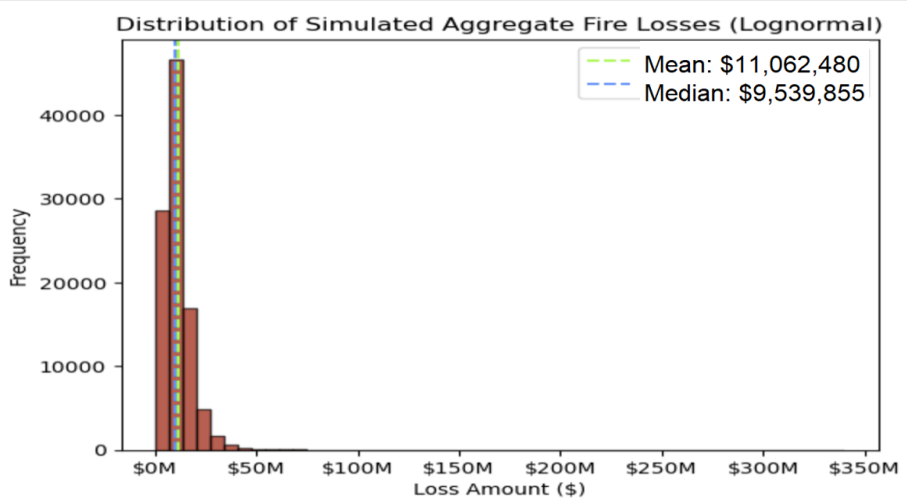
Annual Aggregate

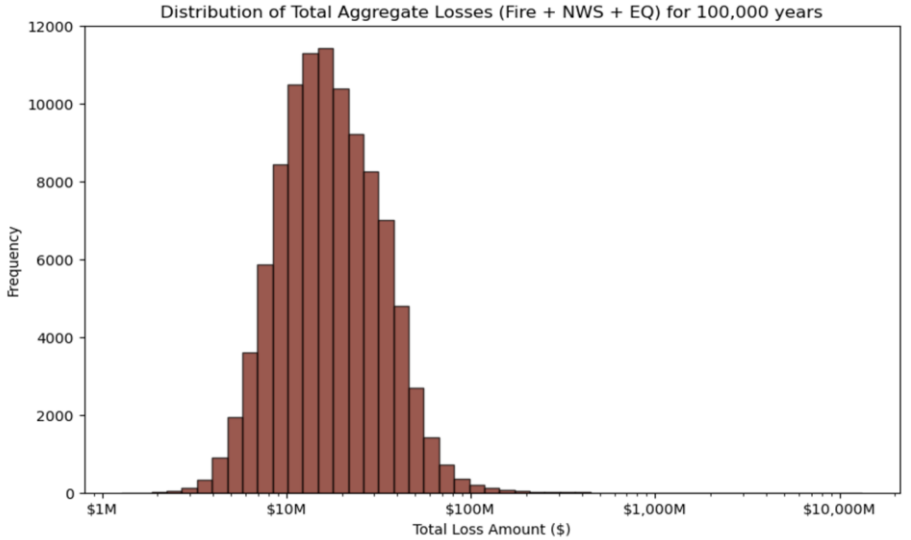
Percentile	Fire	NWS	EQ	Total
75	13,724,395	1,473,269	2,927,033	19,039,993
90	19,010,306	2,558,629	10,353,974	27,757,495
95	23,436,596	3,629,923	17,567,183	35,683,766
99	35,362,962	7,522,785	44,158,114	61,788,076

Histograms

Right-Skewed Distributions

- Median is slightly lower than mean
- Losses are close to below the median
- Presence of rare but severe loss events





02

The Insurance Plans

The Insurance Plans

Retention: 10M

Fire Limit: 1B

NWS Limit: 100M

↳ Aggregate: 100M

EQ Limit: 500M

Premium: 51,270,000

Retention: 10M

Fire Limit: 1B

NWS Limit: 100M

↳ No Aggregate Limit

EQ Limit: 1B

Premium: 54,095,800

Retention: 1M

Fire Limit: 1B; 30% coinsurance

NWS Limit: 100M

↳ Aggregate: 100M

EQ Limit: 1B

Premium: 59,411,000

Insurance 1

Conservative plan that prioritizes NWS/EQ

Insurance 2

Great plan for EQ concerns

Insurance 3

Prioritizes Fire Losses

03 PERFORMANCE

COMPARING THREE INSURANCE PROGRAMS

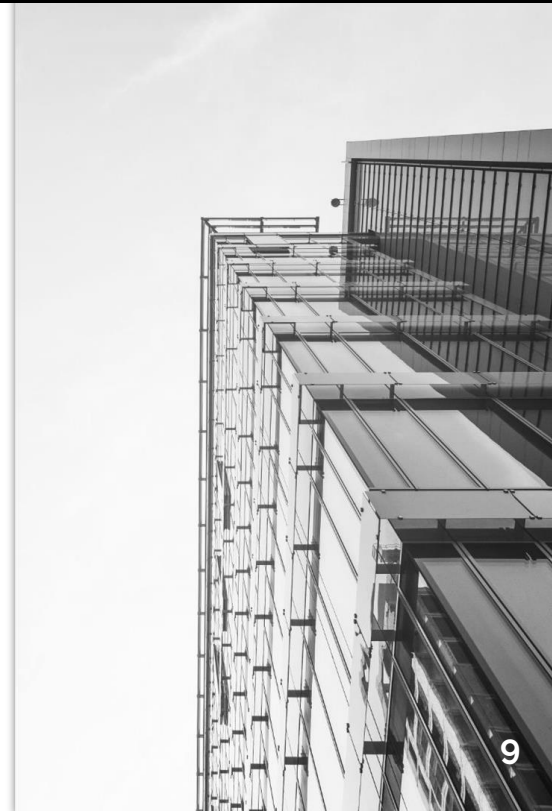
Based on the historical data, we can calculate:

01 Total Retained Loss 02 TCOR 03 Loss Ratio

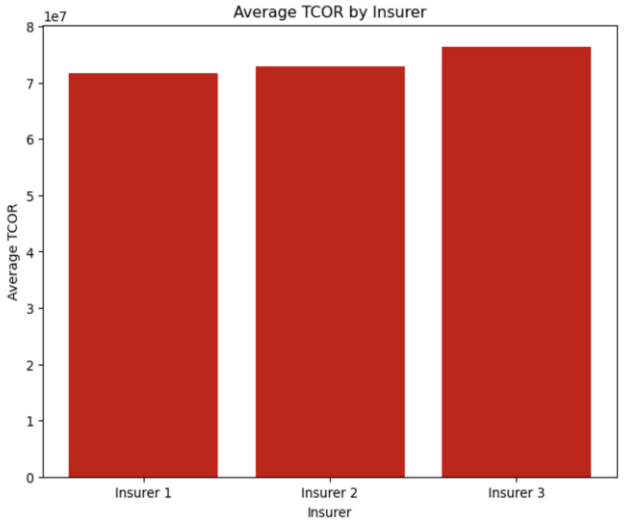
We'll end up having 15 years of data for each insurance plan.

Based on this, we analyze the

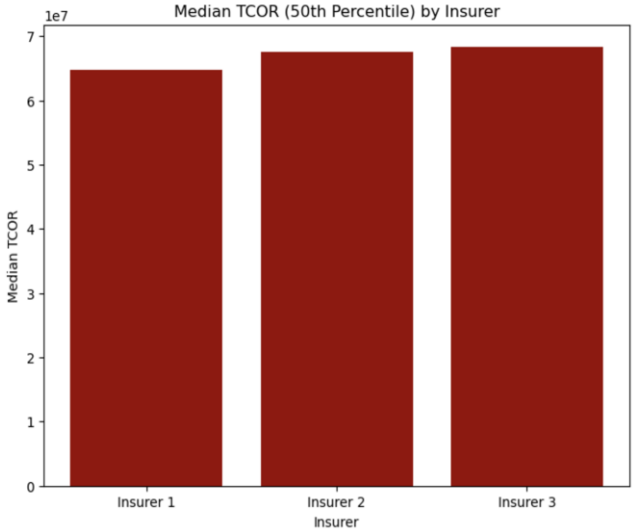
- Average TCOR
- Median TCOR
- 95th Percentile TCOR
- Worst Year TCOR
- Mean Loss Ratio



INSURANCE PERFORMANCE

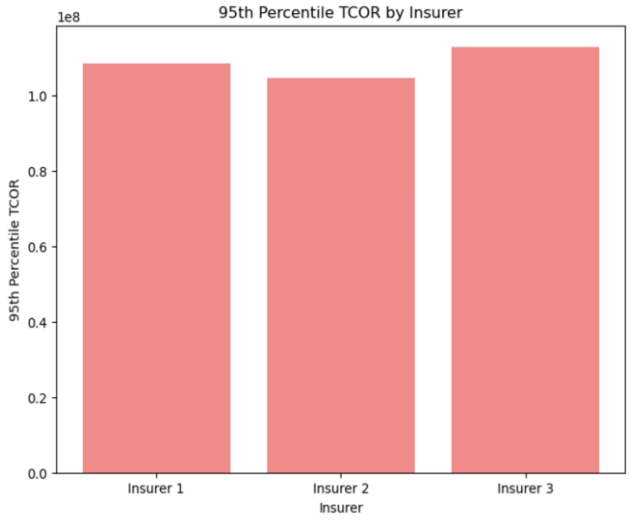


Average TCOR accounts for all 15 years, including both typical and extreme years (outliers)

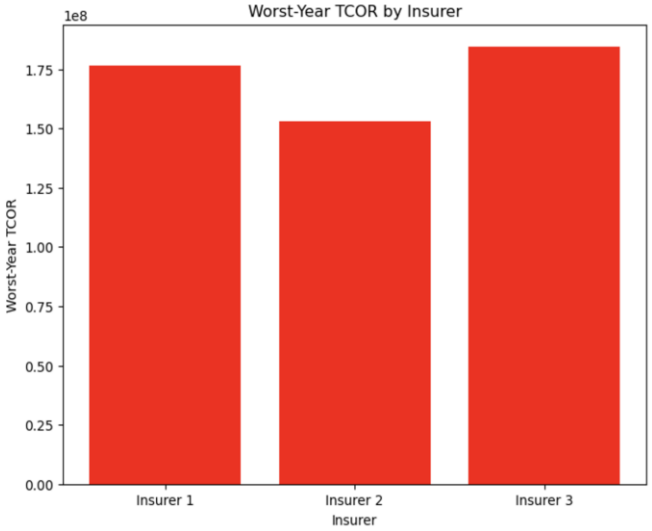


Median TCOR represents the most typical year

INSURANCE PERFORMANCE

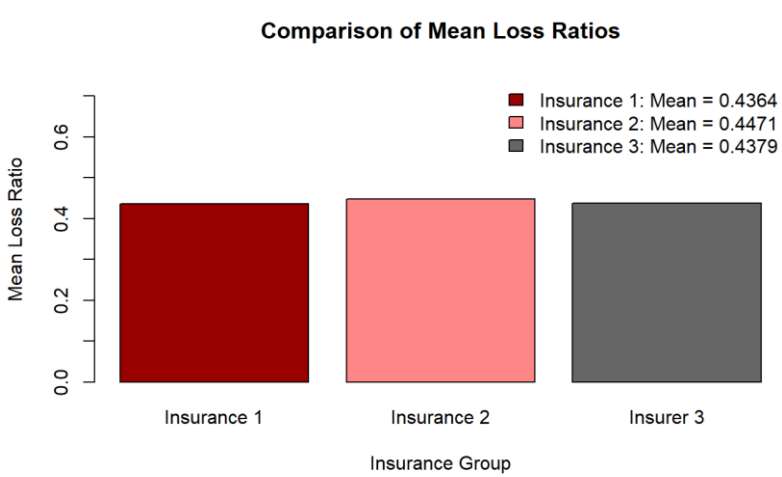


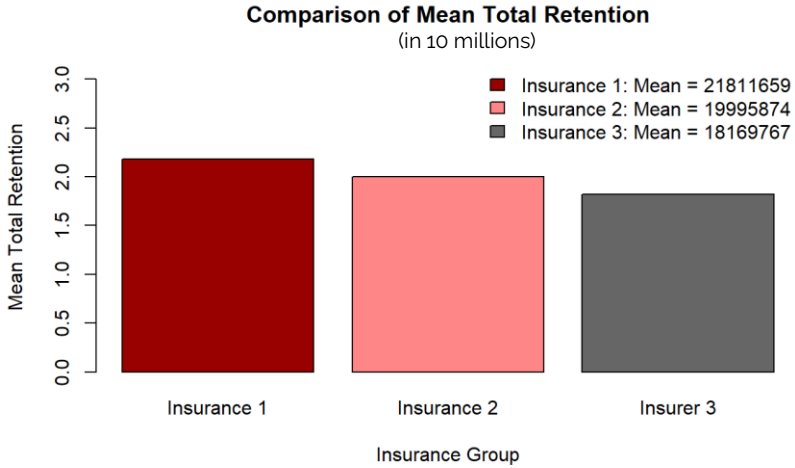
Represents a bad year where TCOR is worse than 95% of all other years



Worst-Year TCOR is where the largest, rarest claims occur.

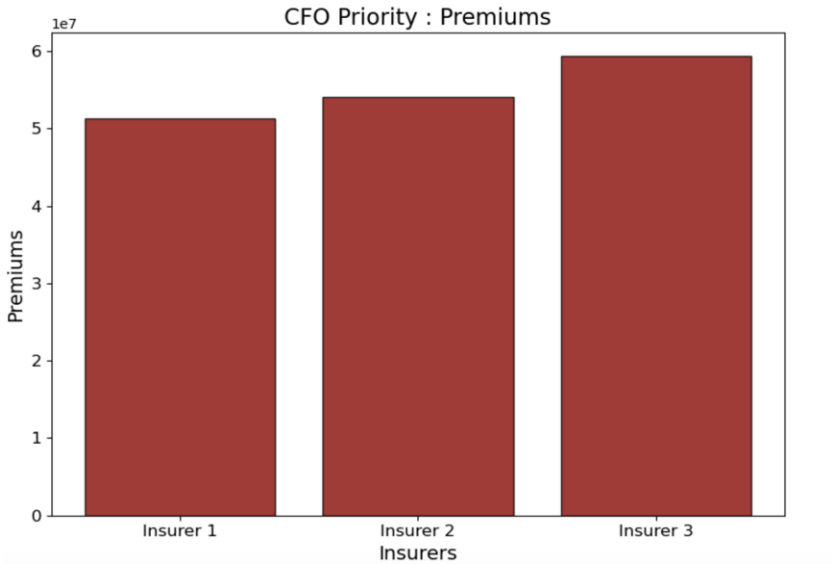
INSURANCE PERFORMANCE





PREDICTED PERFORMANCES OF INSURANCES

CFO’s GOAL



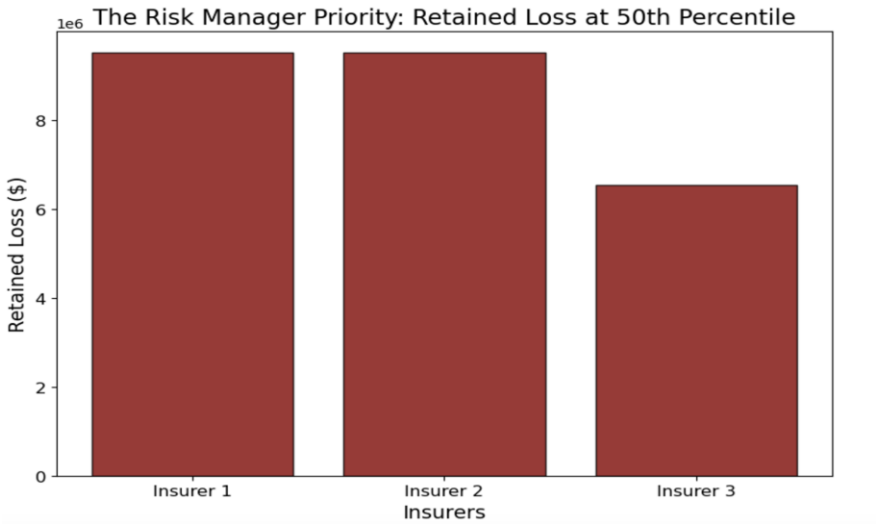
Best Option: Insurer 1

REASONING

- **Insurer 1 offers the lowest quoted premium at $51.27M.**
- **This aligns with the CFO's goal to free up as much cash as possible.**

PREDICTED PERFORMANCES OF INSURANCES

RISK MANAGER's GOAL



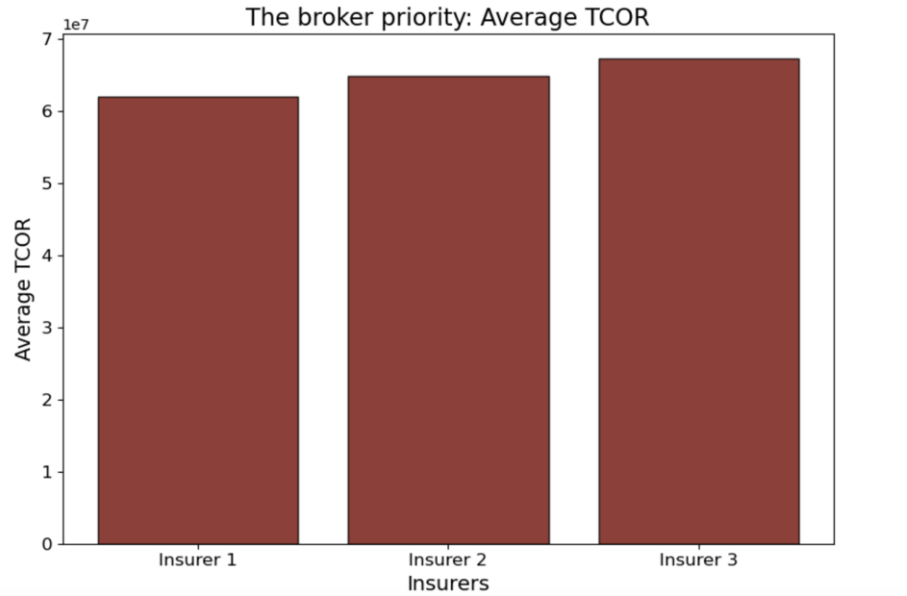
Best Option: Insurer 3

REASONING

- In a typical year, fire claims rarely exceed $10M.
- Insurer 3 with lower retention covers at least part of most claims.

PREDICTED PERFORMANCES OF INSURANCES

BROKER's GOAL



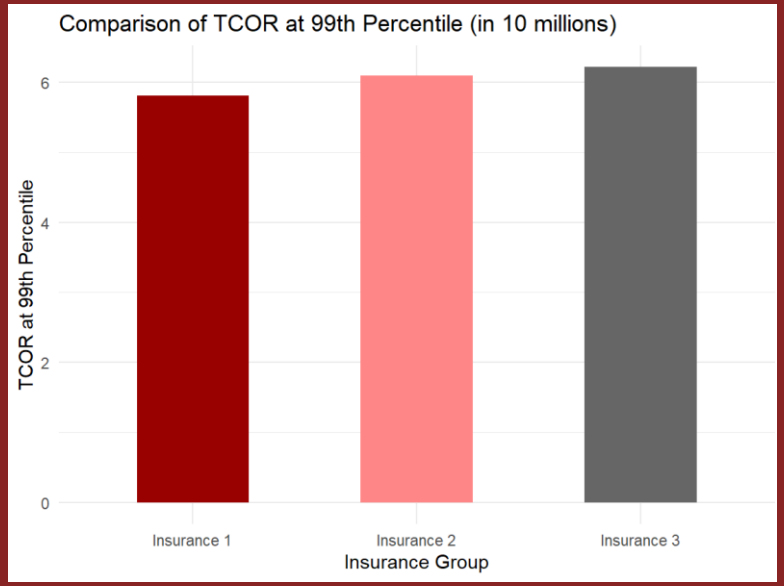
Best Option: Insurer 1

REASONING

- **Retained Loss does not perform the best but the low cost of premium is balanced out**

04
Recommendations

ADDITIONAL METRIC : TCOR AT THE 99TH PERCENTILE



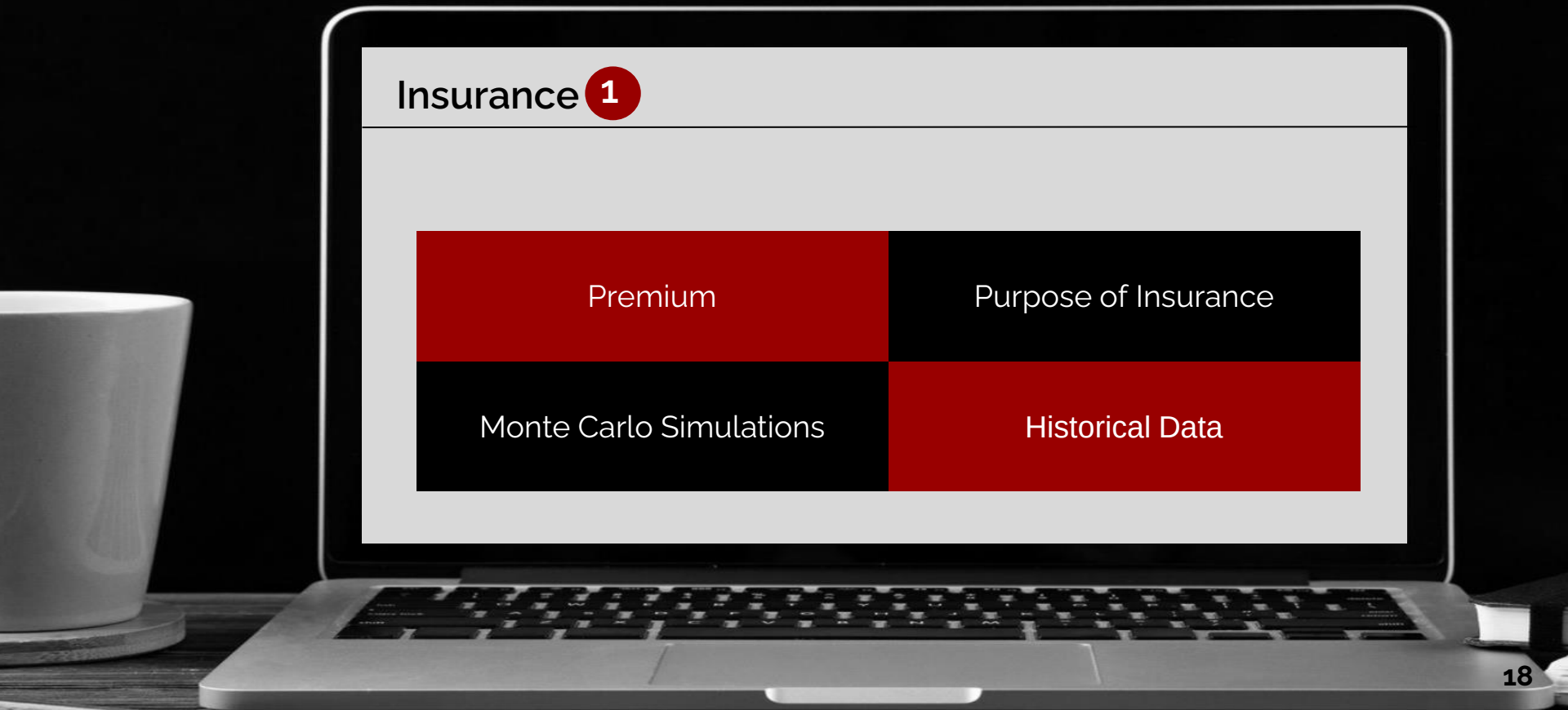
Insurance 1: 58107936
Insurance 2: 60933736
Insurance 3: 62162381

OUR APPROACH

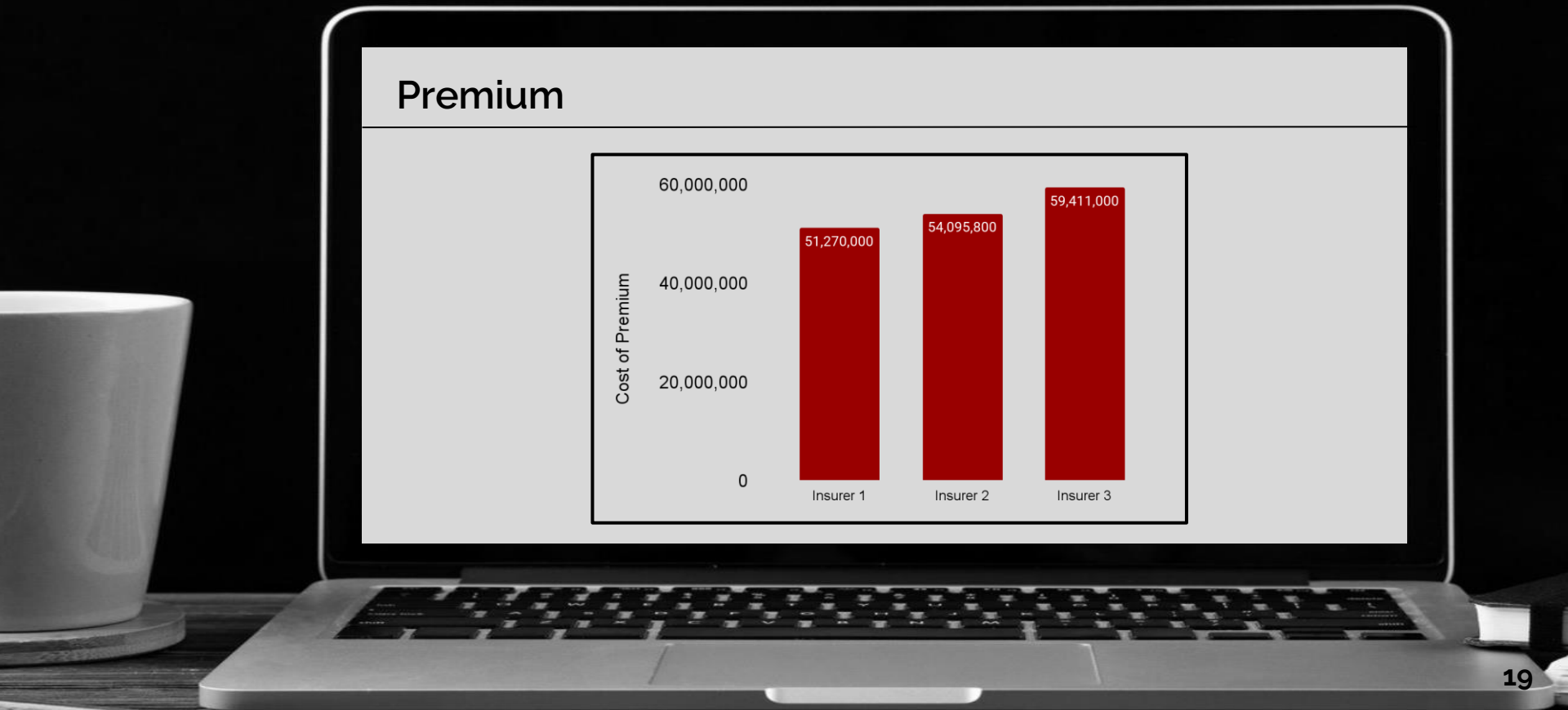
- Extracted data for fire, NWS, EQ at their 99th percentile occurrences.
- Create a hypothetical extreme year.
- Calculated TCOR for this “bad year”
- Good for stress testing

BEST OPTION: INSURER 1

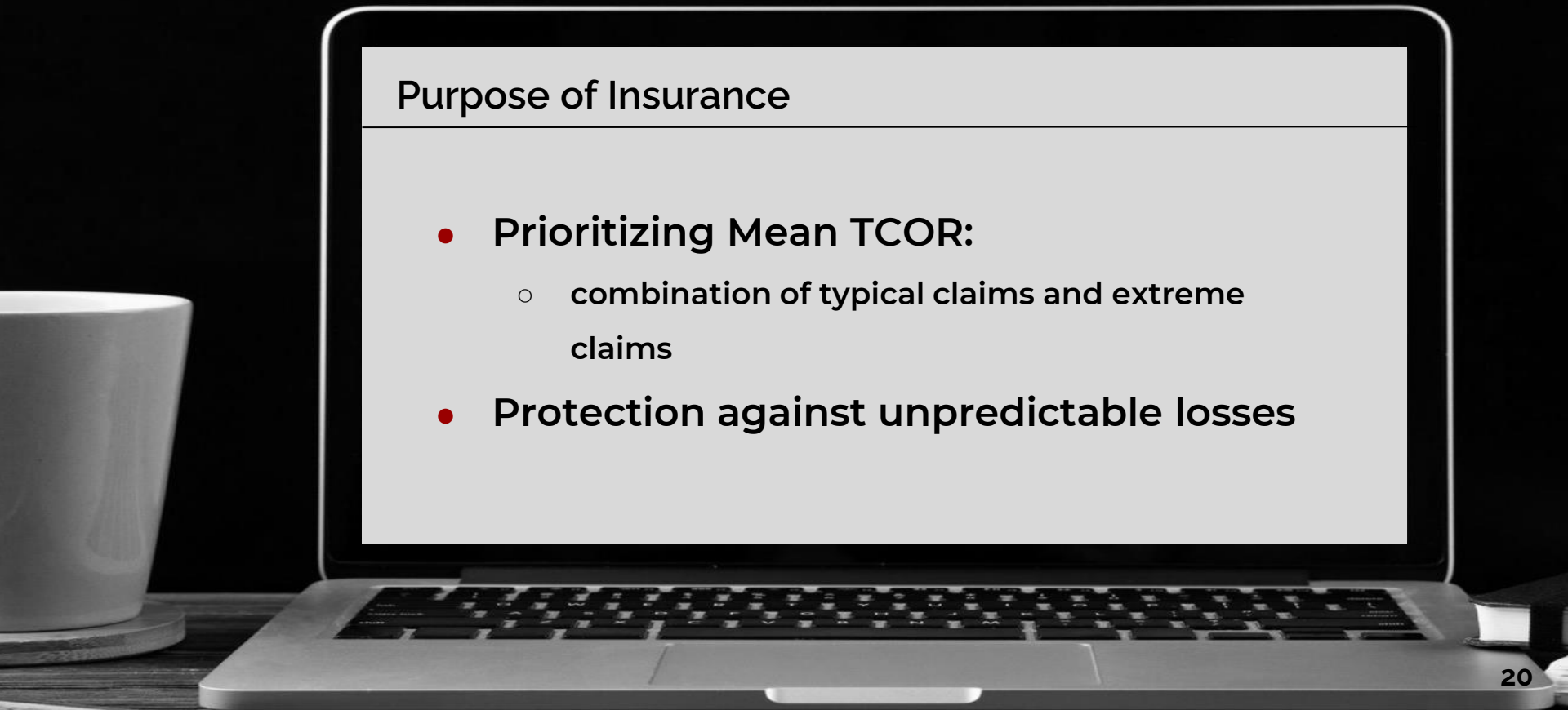
Best Insurance Plan?



Best Insurance Plan?



Best Insurance Plan?

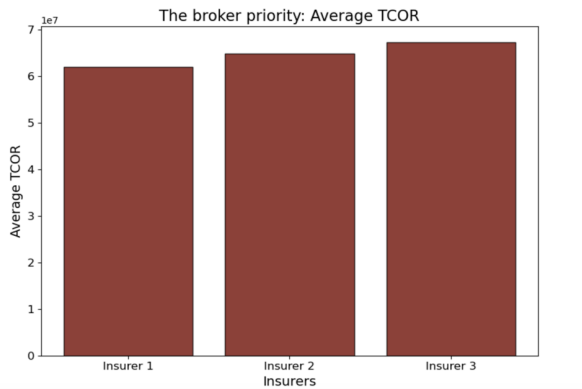


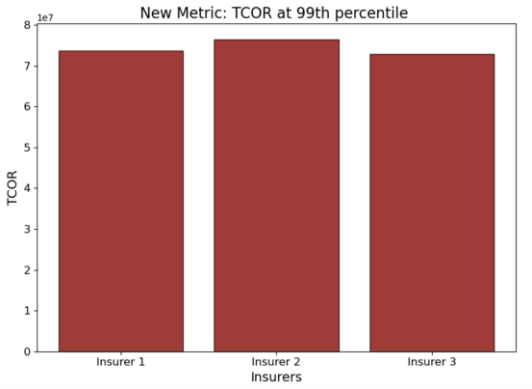
Purpose of Insurance

- **Prioritizing Mean TCOR:**
  - combination of typical claims and extreme claims
- **Protection against unpredictable losses**

Best Insurance Plan?

Monte Carlo Simulations





Best Insurance Plan?

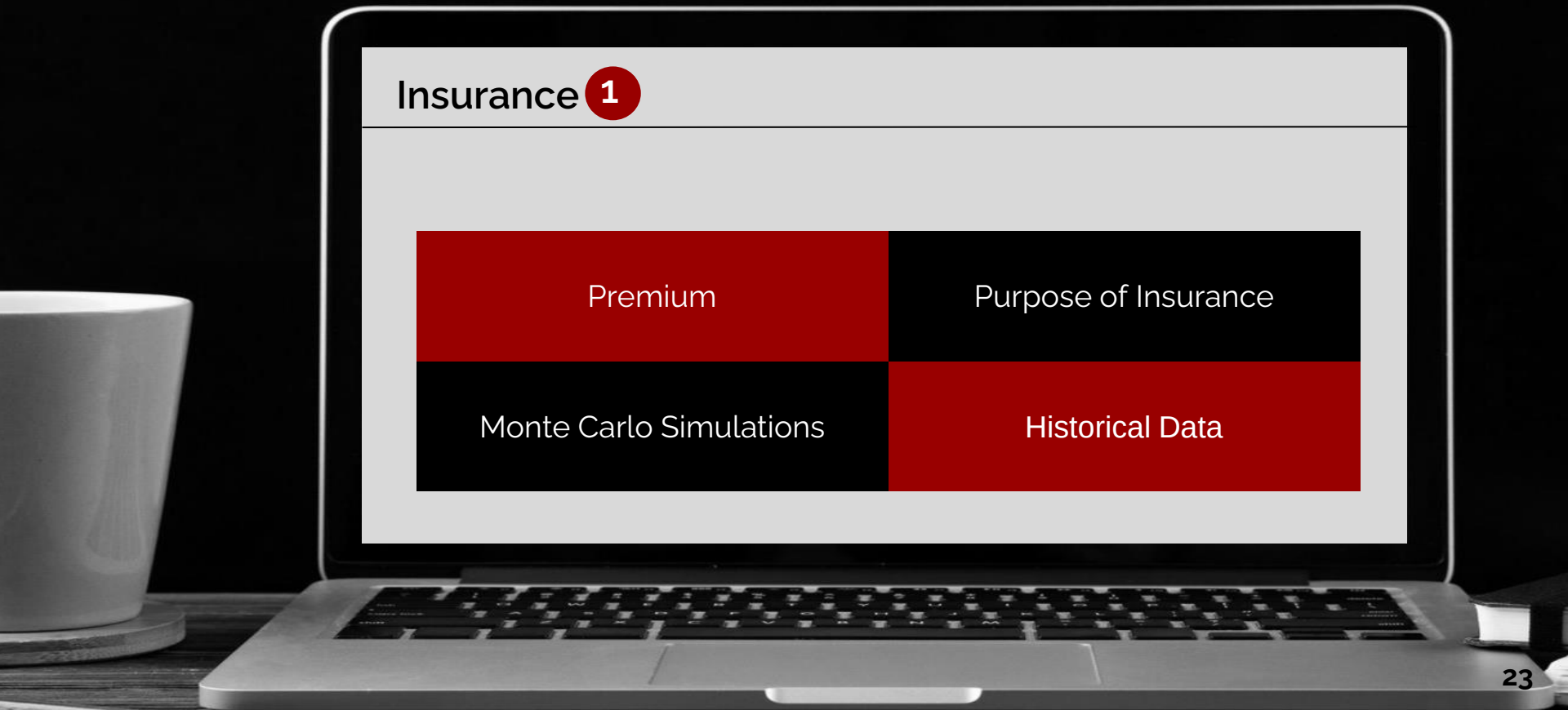
Historical Data

Year	Insurer Plan	Fire Retained Loss	NWS Retained Loss	EQ Retained Loss	TCOR
2023	Insurer 1	1.4M	123 M	0	176M
2023	Insurer 2	1.4M	97M	0	153M
2023	Insurer 3	1.4M	123M	0	184M

→ Lowest NWS loss and lowest TCOR

- Insurer 1 performs best in mean years
- Insurer 1 performs best in median years
- Insurer 2 performs best in extreme years

Best Insurance Plan?



Adjusted Insurance 1

new premium = original premium + expected loss + risk

$(1 + \theta) \times$ expected additional coverage

= 51,270,000 + 496,576.3 + 496,556.4

= 52,263,133

New Premium: 52.3M

Questions?