BAS 2021 Ninth Annual Case Competition

TEAM 21

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Agenda

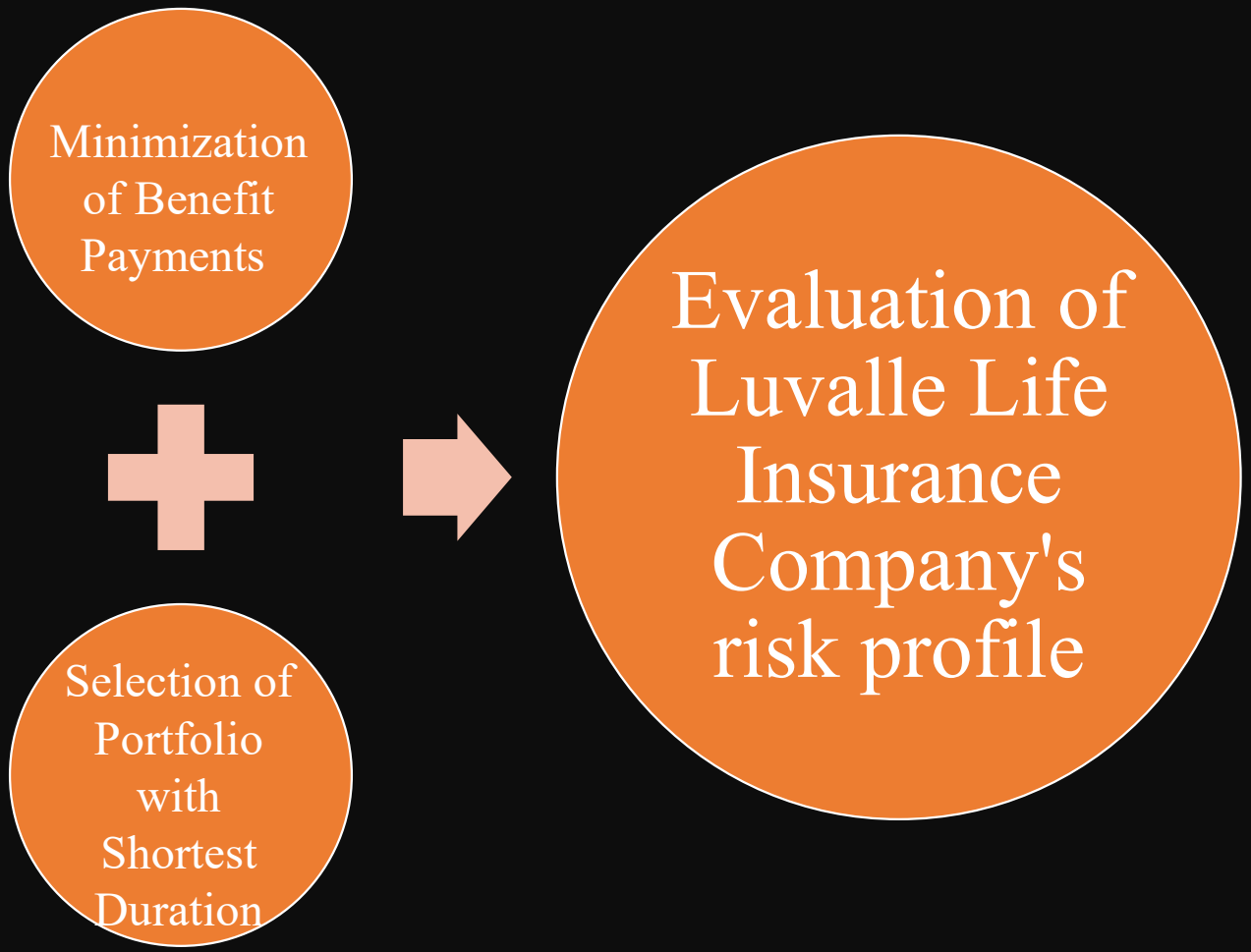
I Case Objective

II Enterprise View

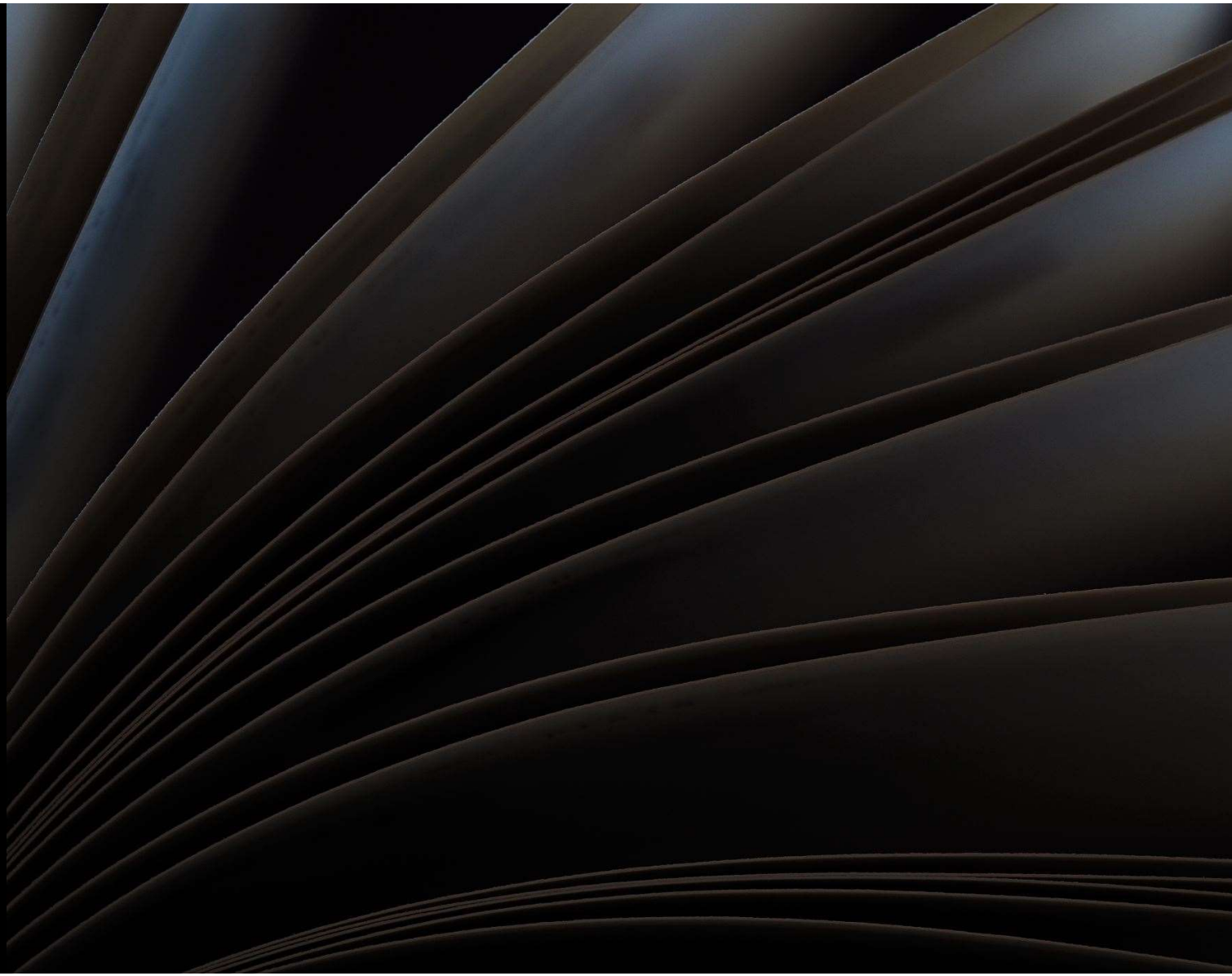
III Running Liability Sensitivities

IV SPIA Asset Portfolio Evaluations

Case Objective



Enterprise View



Luvalle Products

Term Life Insurance

- Protection over a set term

Indexed Universal Life Insurance (IUL)

- Investment growth with death protection

Single Premium Immediate Annuity (SPIA)

- Level benefits once the single premium is paid

Variable Annuity (VA)

- Annuity product that varies based on investments
- Guaranteed Minimum Withdrawal Benefit (GMWB)

Risks

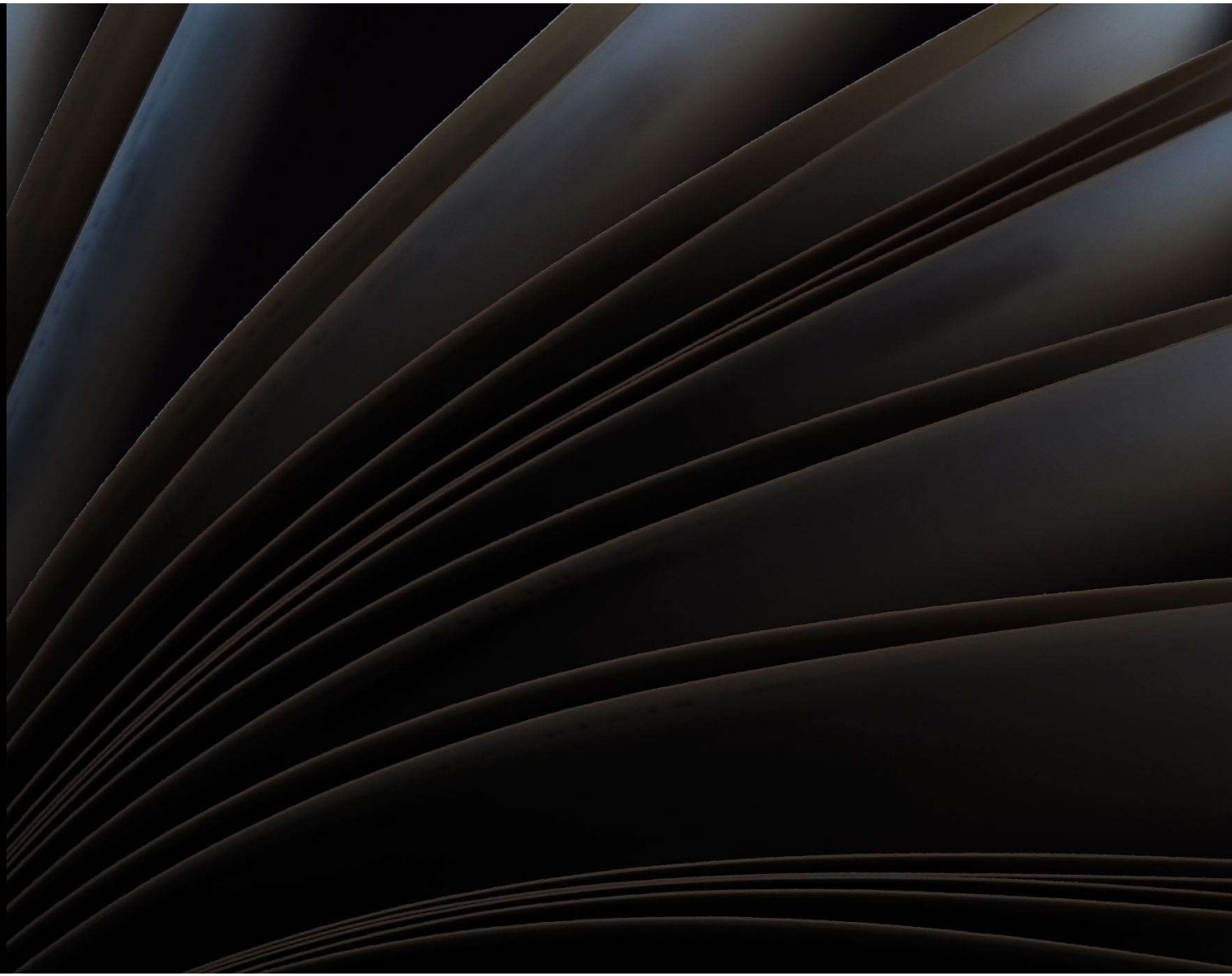
- Term Life Insurance
  - Limited liability reserves

- Indexed Universal Life Insurance (IUL)
  - Limited profits

- Single Premium Immediate Annuity (SPIA)
  - Large payouts

- Variable Annuity (VA)
  - Account value being below 0

Running Liability Sensitivities



Present Value of Benefits ($m)

Initial Run Version

Best Estimate	Mortality Shock	Mortality Improvement Shock	Rates Up	Rates Down	Rates 0%
339.71	350.27	341.45	305.94	380.00	407.98

Data Inconsistencies, Issues

Redundancy

- SPIA00272, SPIA00298, SPIA00725, SPIA00928

"NA"

- SPIA00086, SPIA00740

Issue Year 17

- SPIA00421:SPIA00560 (140 SPIA cases in total)

Birth Year: 2055

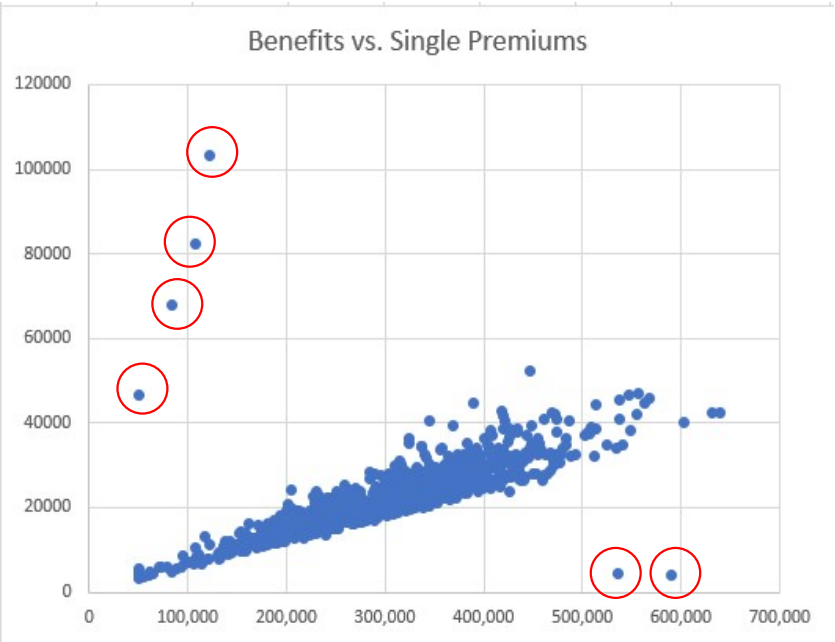
- SPIA00164, SPIA00295, SPIA00346

Issued Age of 0

- SPIA00952:SPIA00957 (6 SPIA cases in total)

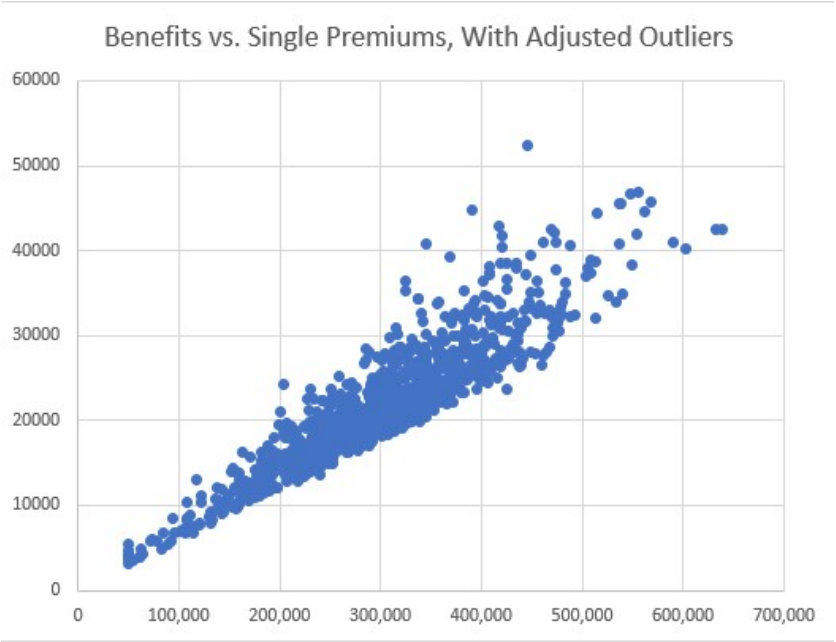
Outliers

Before Outlier Adjustment



Note: Benefits=Mode*Modal Benefits

After Outlier Adjustment

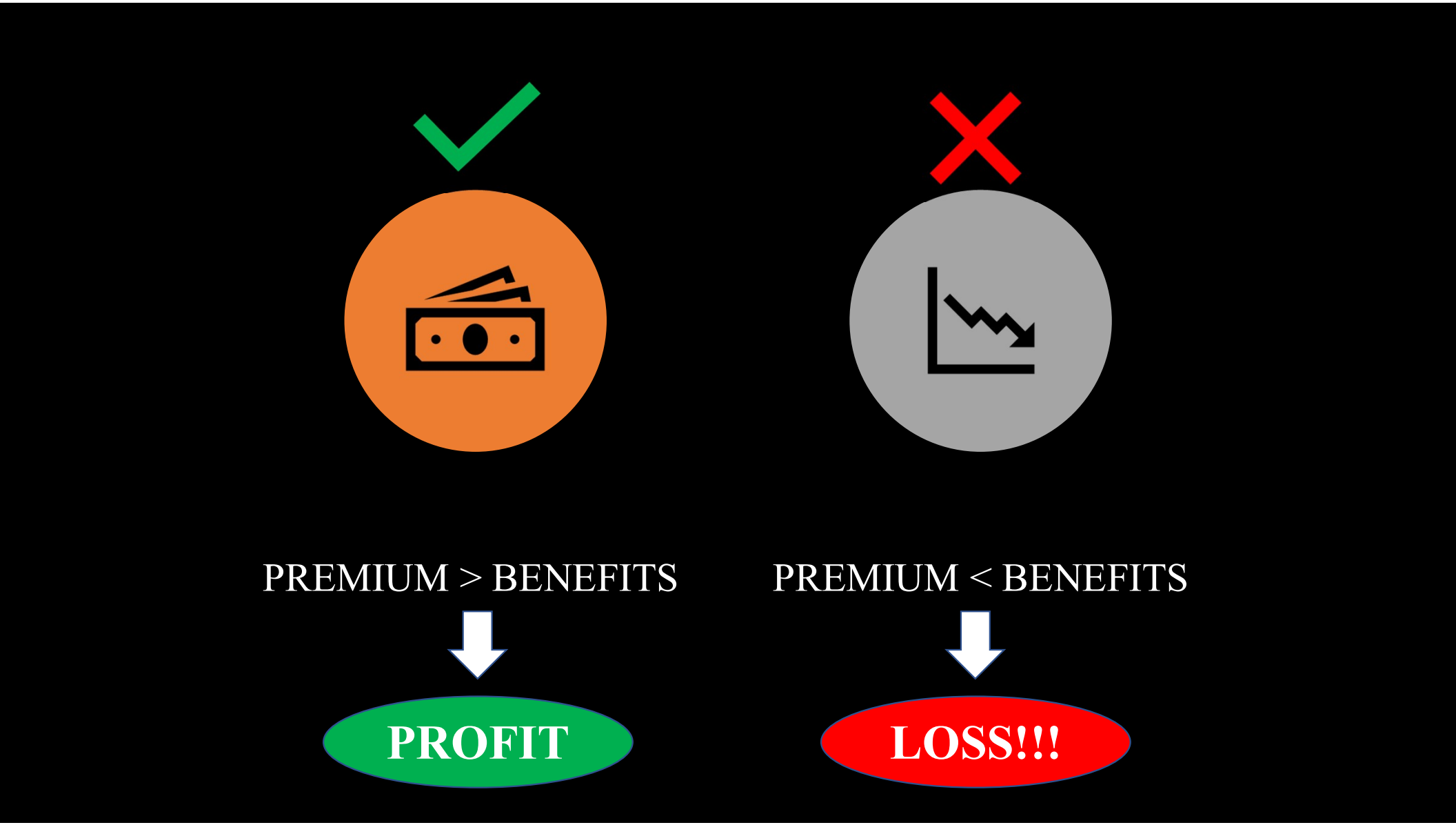


y = 0.0729x - 29.639

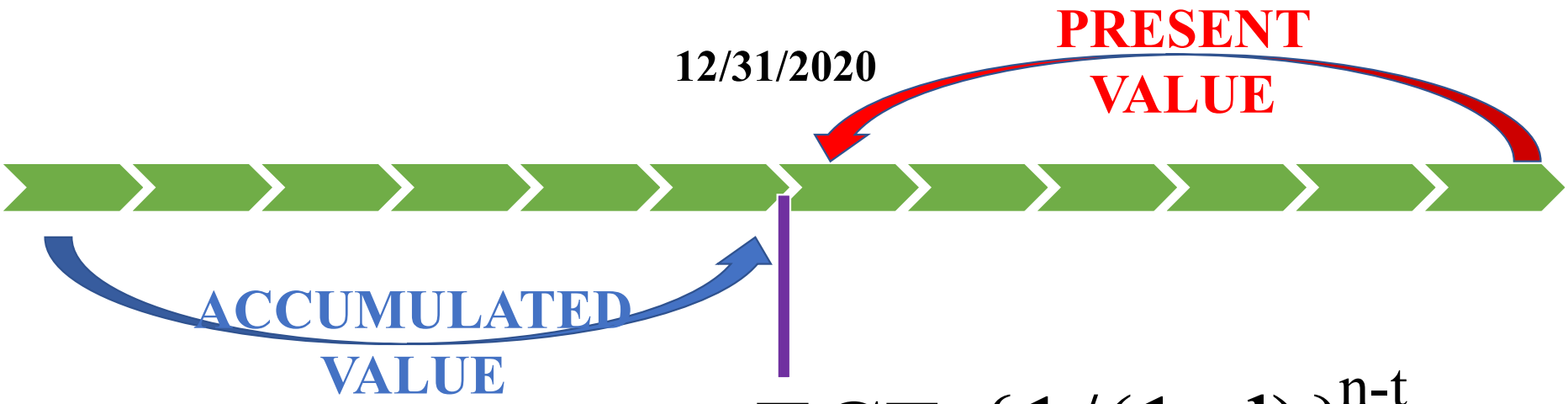
Present Value of Benefits ($m)

Post-Adjustments Version

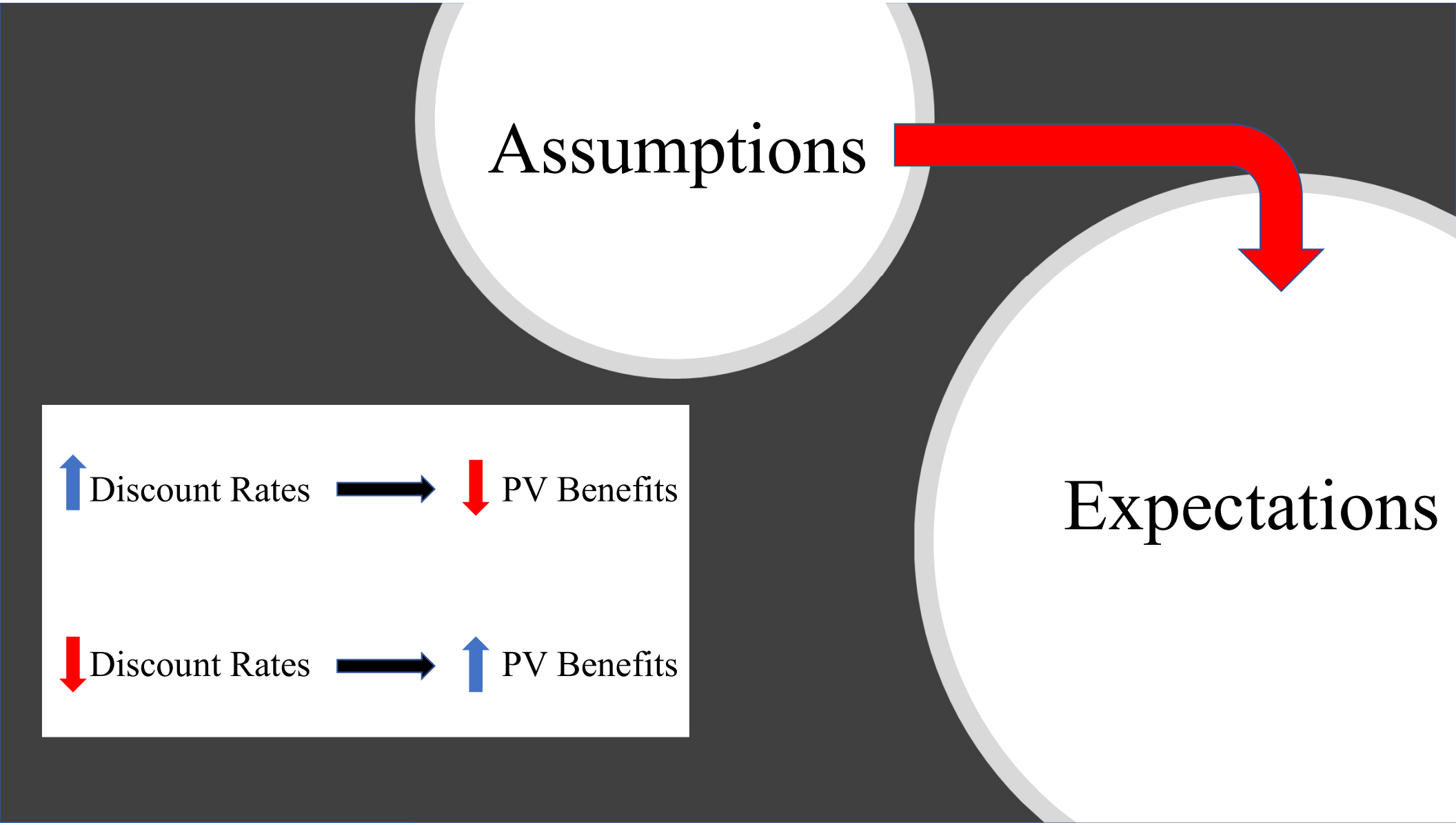
Best Estimate	Mortality Shock	Mortality Improvement Shock	Rates Up	Rates Down	Rates 0%
333.87	344.25	355.59	300.67	373.48	400.99


PREMIUM > BENEFITS
PROFIT
PREMIUM < BENEFITS
LOSS!!!

Ideal Case

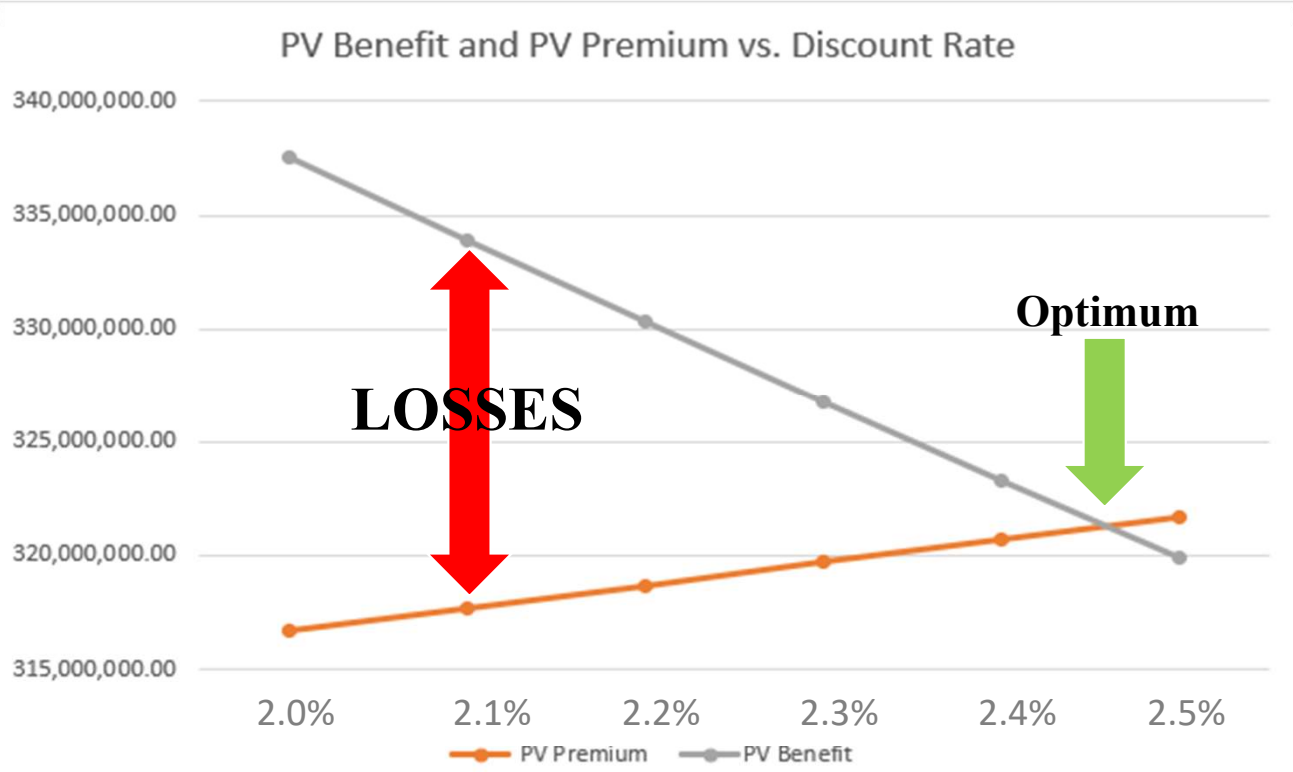


$$AV=\Sigma CFt\{1/(1-d)\}^{n-t}$$


Assumptions
Expectations
Discount Rates
PV Benefits
Discount Rates
PV Benefits

Discount Rates (%)	PV Benefits ($million)	PV Premiums ($million)	Projected Loss ($Benefits - $Premium)
2.0	337.5	316.7	20.8
2.1	333.8	317.7	16.2
2.2	330.3	318.7	11.6
2.3	326.8	319.7	7.1
2.4	323.3	320.7	2.6
2.5	319.90	321.7	-1.8

PV Benefits VS PV Premium

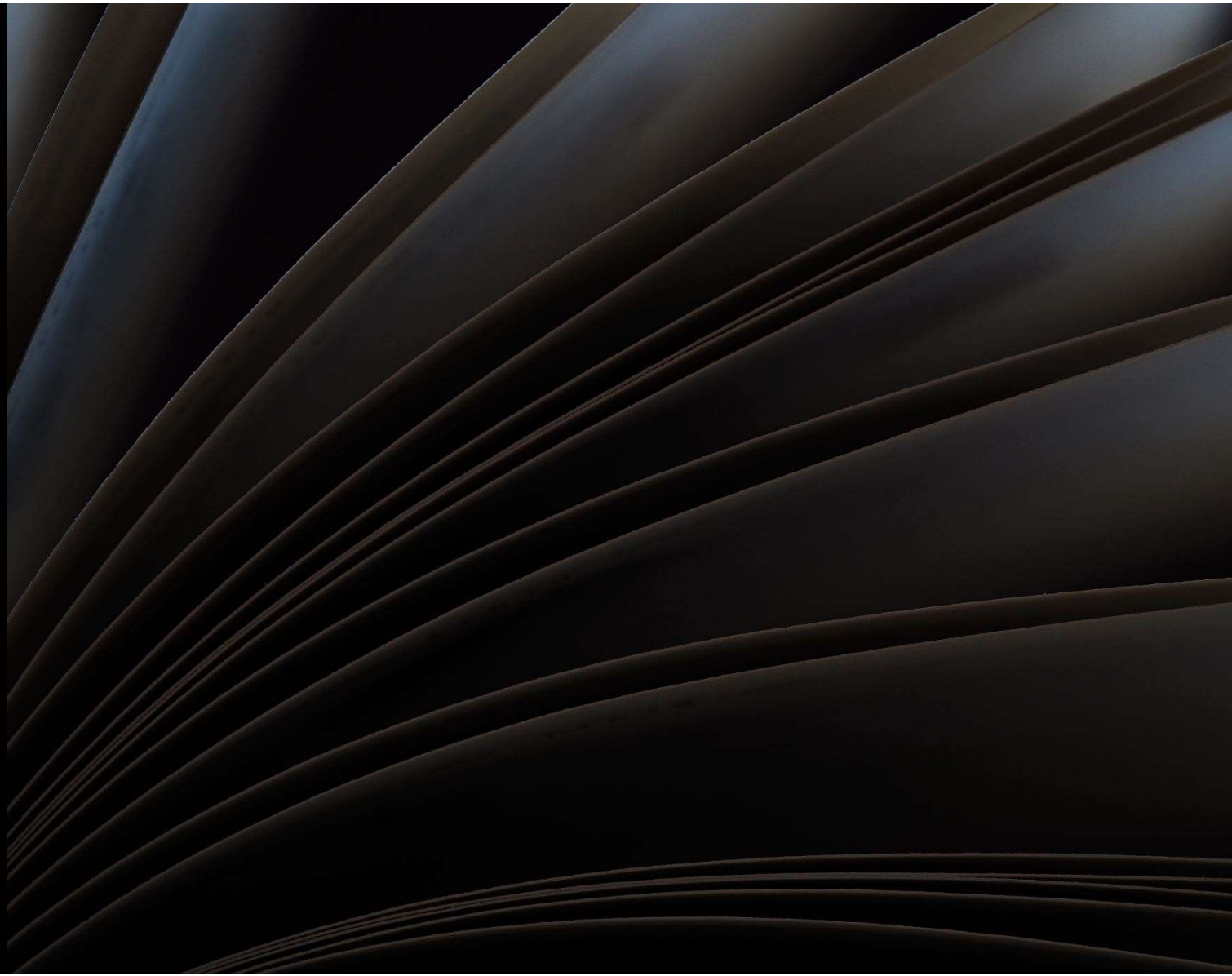


2.46% Discount Rate Model

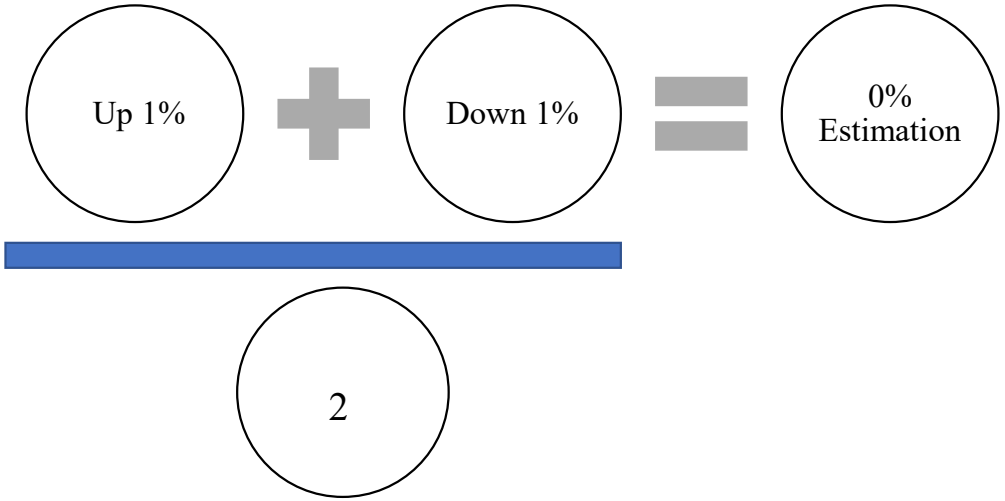
Best Estimate ($m)	Mortality Shock ($m)	Mortality Improvement Shock ($m)	Rates Up ($m)	Rates Down ($m)	Rates 0% ($m)
321.29	330.92	322.89	290.07	358.43	400.99

2.46% PV Benefits = $321,283,000
2.46% PV Premiums = $321,291,000
Projected *Profit* = $8,000

SPIA Asset Portfolio Evaluations



Estimation

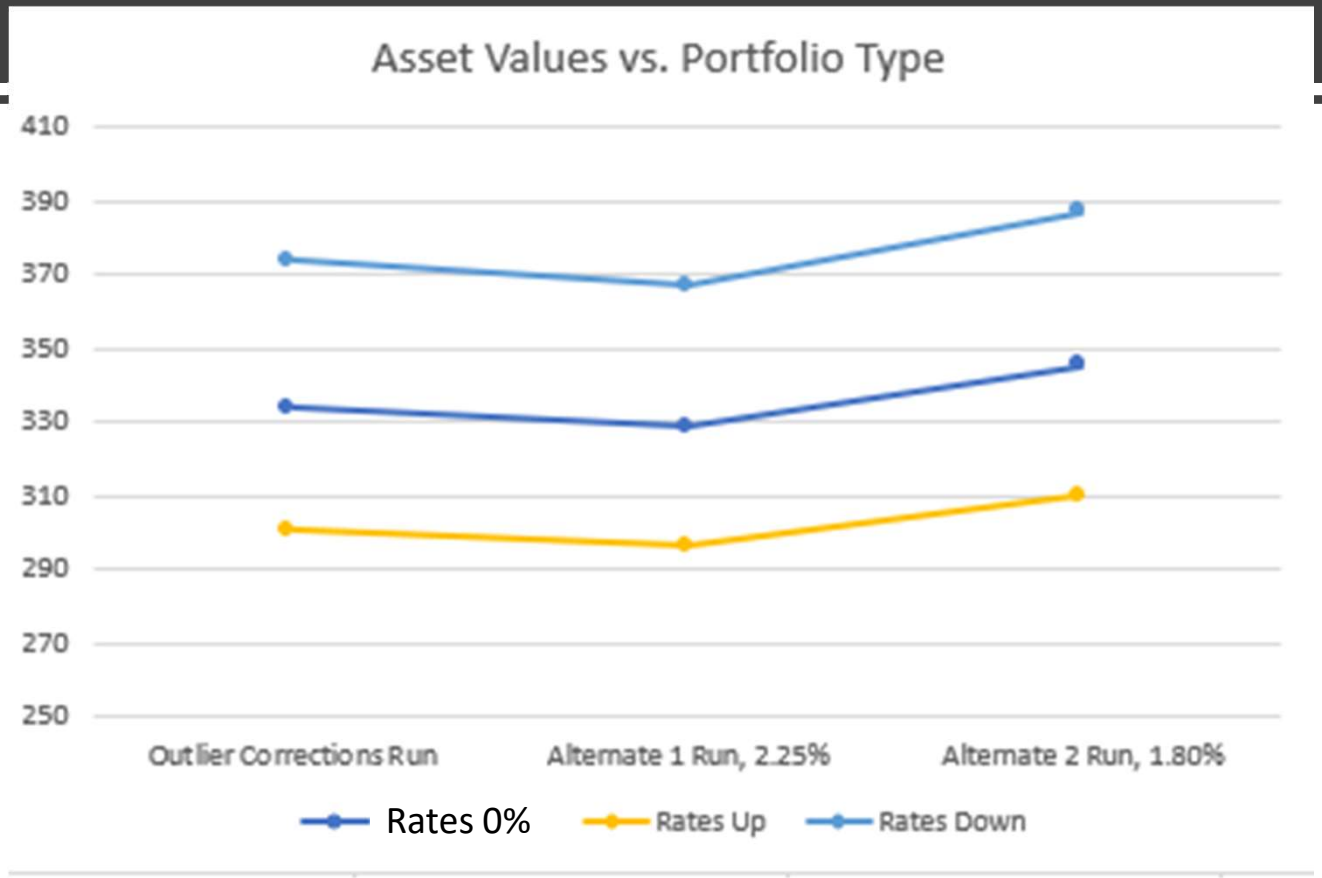


	Up 1%	Down 1%	Average
Current	310.37	380.07	345.22
Alternate 1	314.09	375.12	344.605
Alternate 2	318.18	370.01	344.095

0% Estimate, Each Portfolio ($m)

	Rates Up	Rates Down	Rates 0%
Current	300.67	373.48	333.86
Alternate 1	296.16	367.07	328.52
Alternate 2	310.04	386.85	345.02

Portfolio Comparison



Assumed Formula

$$\frac{D - U}{2S} * 100 = T$$

S : sum of bond prices

D : bond price when interest rate decreases by 1%

U : bond price when interest rate increases by 1%

T : duration of the portfolio

Bond Prices ($m)

	Bond 1	Bond 2	Bond 3	Sum
Current	73.1	129.5	140.1	342.7
Alternate 1	102.9	171.5	68.6	342.9
Alternate 2	172.8	138.2	34.6	**345.5**

Portfolio Appropriateness

Provision of higher quality credit rating bonds

Higher amount of assets through bond's investment

Thank You!

We are available for questions!