2021 BAS Annual Case Competition

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Luvalle Life

Agenda

1. Sensitivity Analysis Objective
2. SPIA Sensitivity Testing
3. SPIA Asset Portfolio
4. Business Impact

1

Sensitivity Analysis Objective

What do we gain from this project?

Motivation

- Why is this needed?
  - To protect Luvalle
  - Analyze our risk profile
  - Set strategy in low rate environment

Risk vs. Reward

	Risk	Reward
Term Life	Lower	Lower
Indexed Universal	High, indirectly depends on stock market	Potentially high or low
Single Premium	Lower	Lower
Variable Annuity	Higher, directly depends on stock market	Potentially high or low

2

SPIA Sensitivity Testing

What are potential risks for our SPIA product?

Data Quality:
Inconsistencies Within Fields

Iss_Age
70
0
67
66
67

Pol_Sts
PD
PD
NA
NA
AC

Iss_Yr
2016
17
2015
2018
2020

Birth_Yr
1940
2055
2055
2055
1960

Mode
12
2
1
12
2

See Appendix for details

Data Quality: Relationships Between Fields

- Checked Iss_Age and Att_Age were accurate as of 12/31/2020
- Noticed unusually high and low benefits

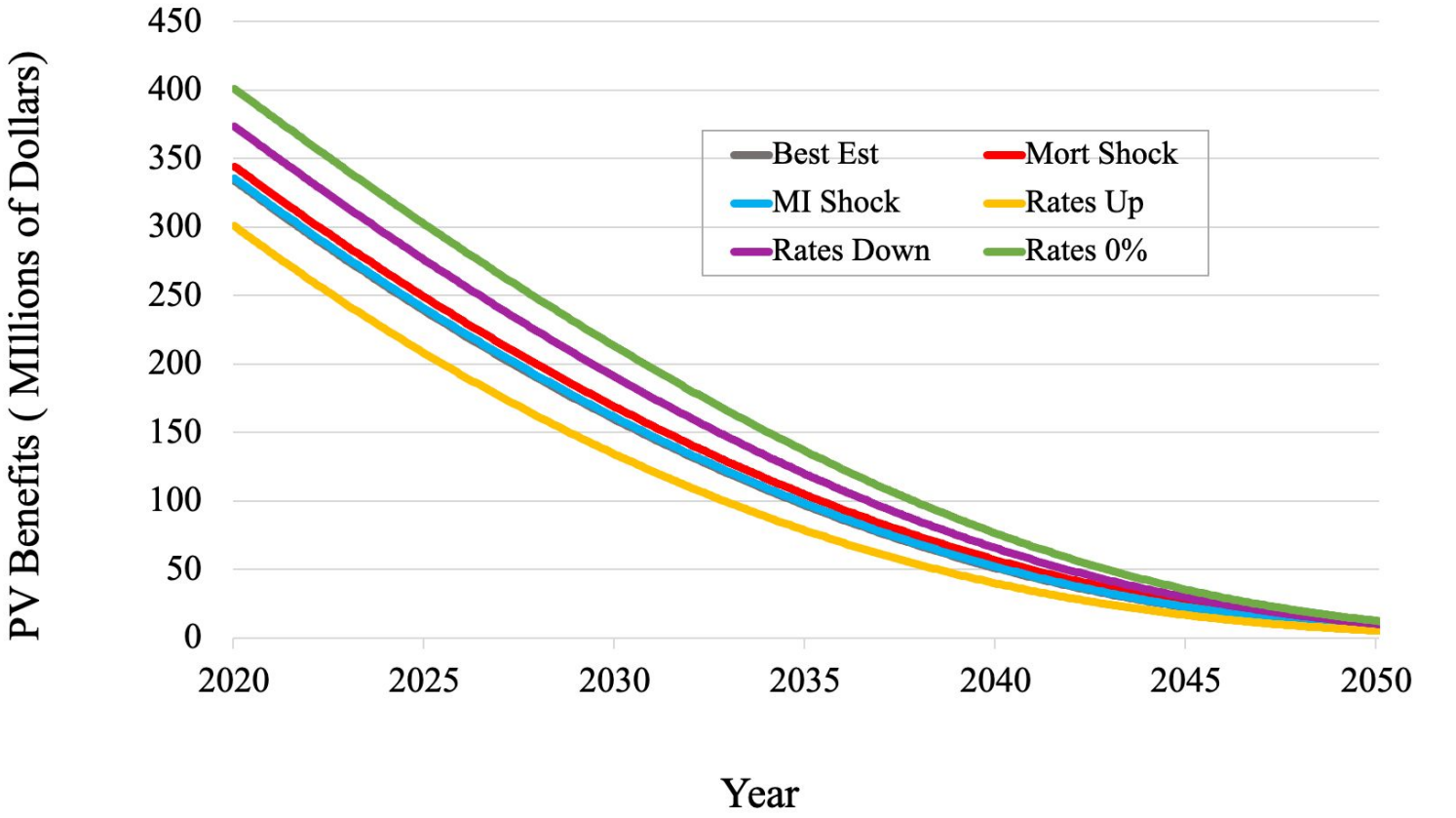
See Appendix for details

Sensitivity Expectations vs Results

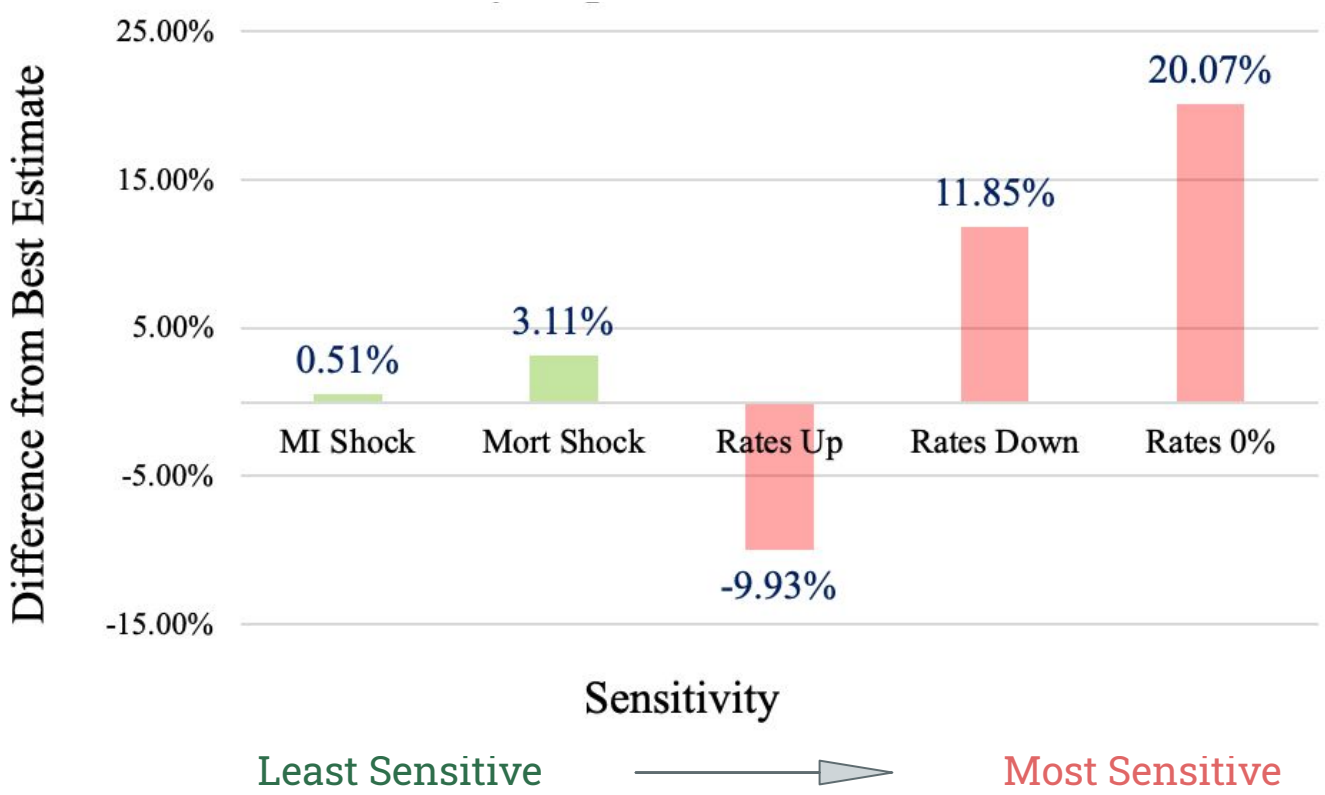
(Trends in Comparison to Best Estimate)

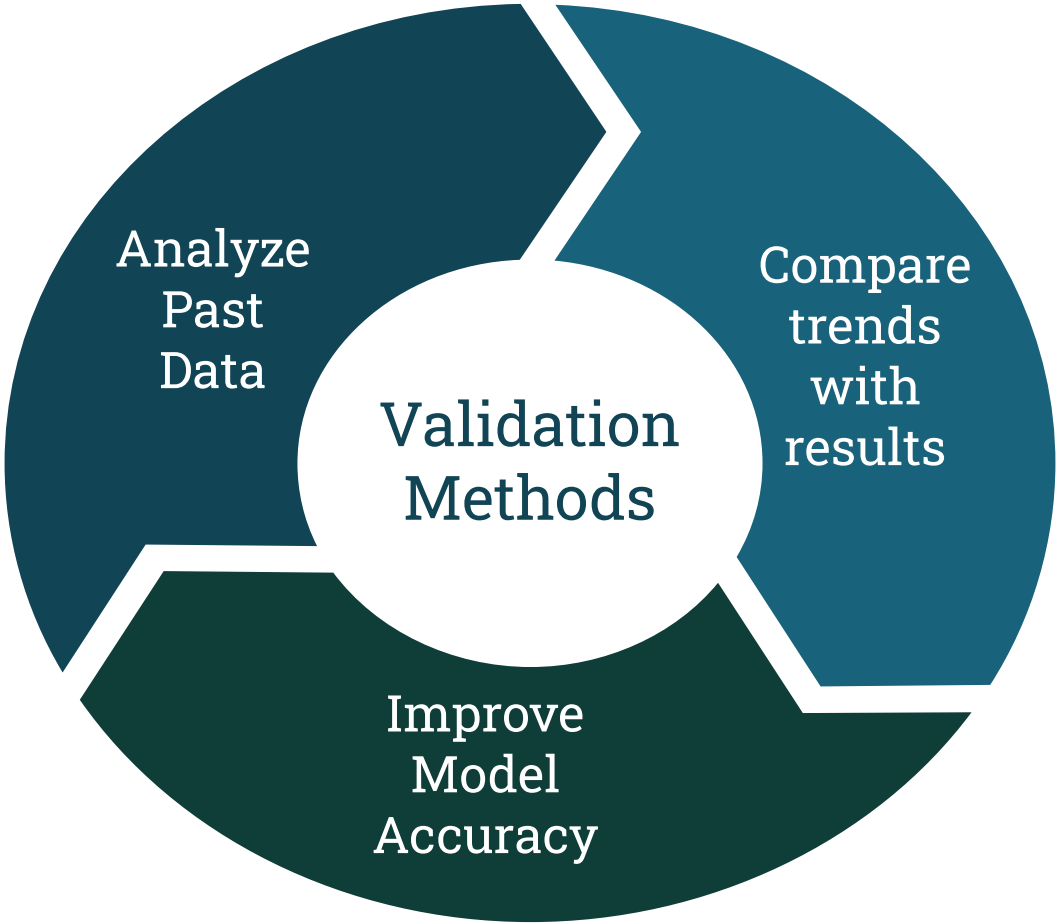
	Best Estimate	Base Mortality Shock	MI Shock	Rates Up	Rates Down	Rates 0%
Expectations (millions)	$333	↑	↑	↓	↑	↑
Results (millions)	$333	$344	$335	$300	$373	$400

Projected PV Benefits Runoff



Sensitivity Impact on PV Benefits




Analyze Past Data
Compare trends with results
Validation Methods
Improve Model Accuracy

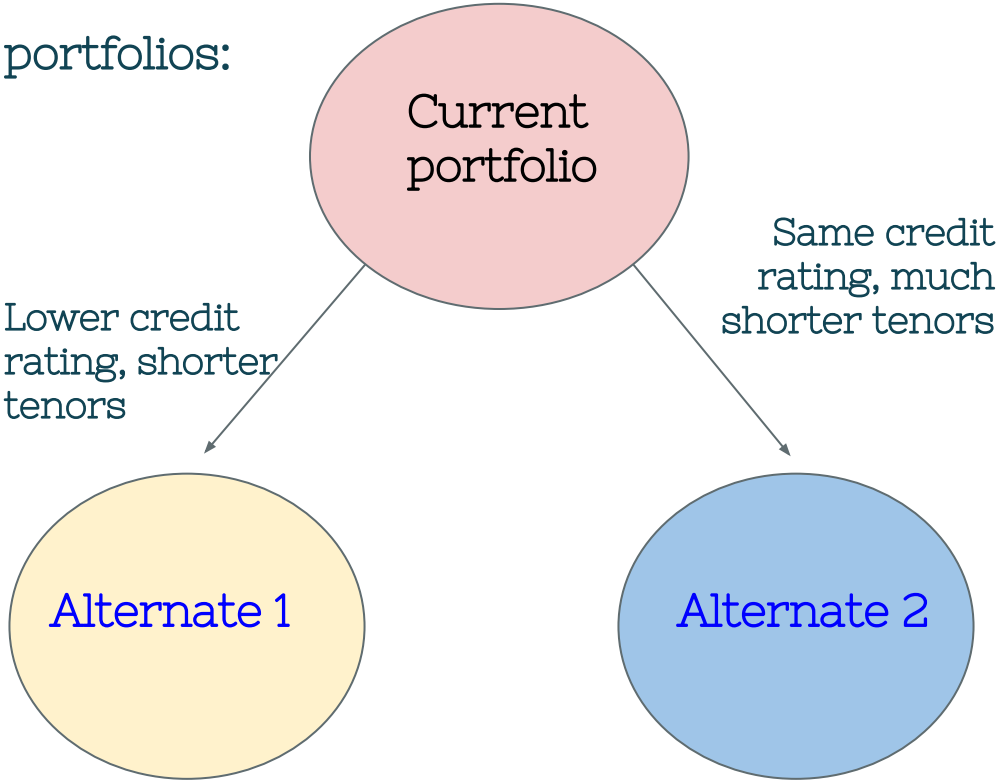
3

SPIA Asset Portfolio

How can we make investments to back up liabilities under the low interest rate environment?

Objectives:

3 portfolios:

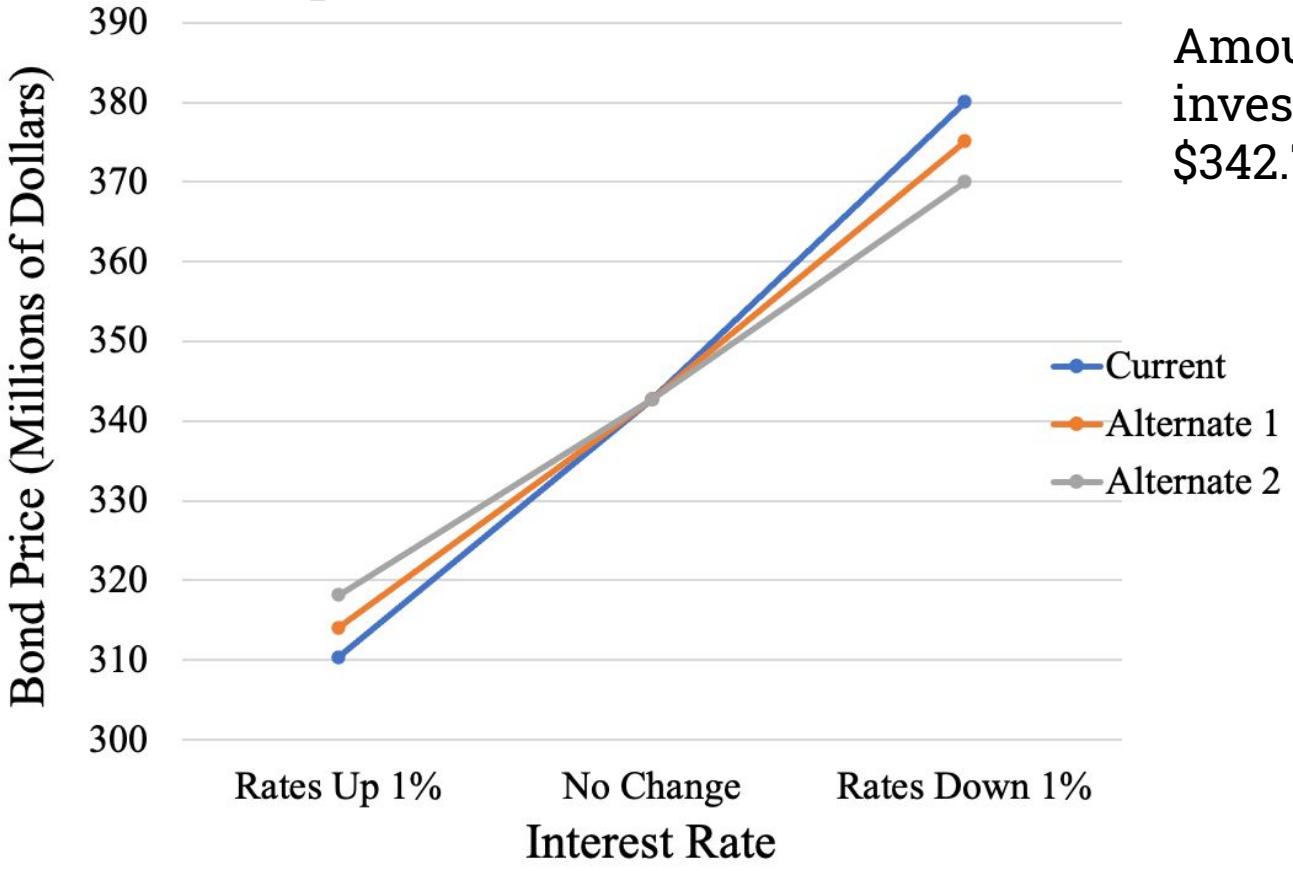


0% interest rate shock

Appropriateness for backing the SPIA Liability

Other sensitivities before making final decision

Implications from 1% rate shock



Amount invested: $342.7m

0% Rate Shock Estimate

Interest Rate ↓

↓

Bond Price ↑

Portfolio	Duration	Baseline Yields
Current	**10.1**	**2.1%**
Alternate 1	**8.9**	**2.25%**
Alternate 2	**7.5**	**1.8%**

Key Ideas:

If interest rates decrease by x%, then bond prices increase by (Duration * x) %

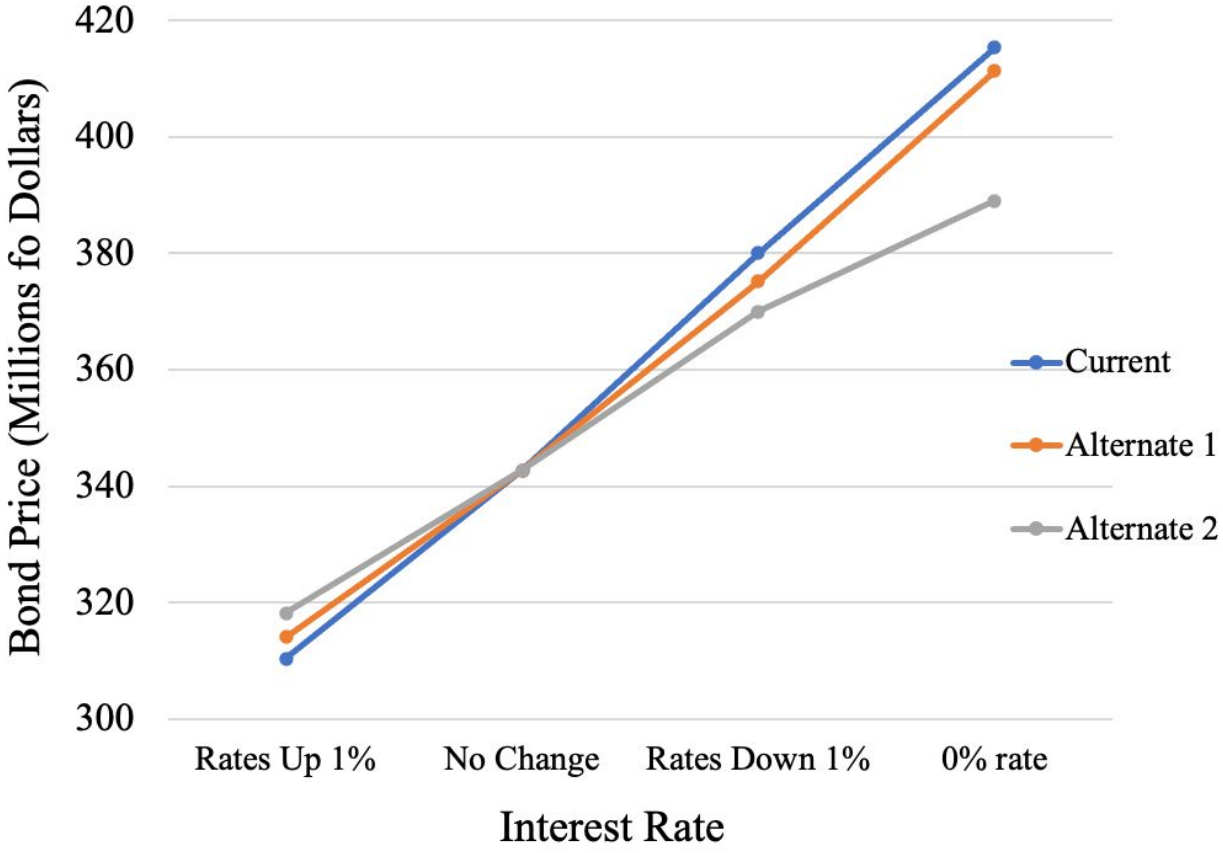
Baseline Yields ⇔ Interest Rate

Resulting Formula for 0% rate Shock:

New Bond Price =

Initial Bond Price * [1 + (Baseline Yields * Duration)]

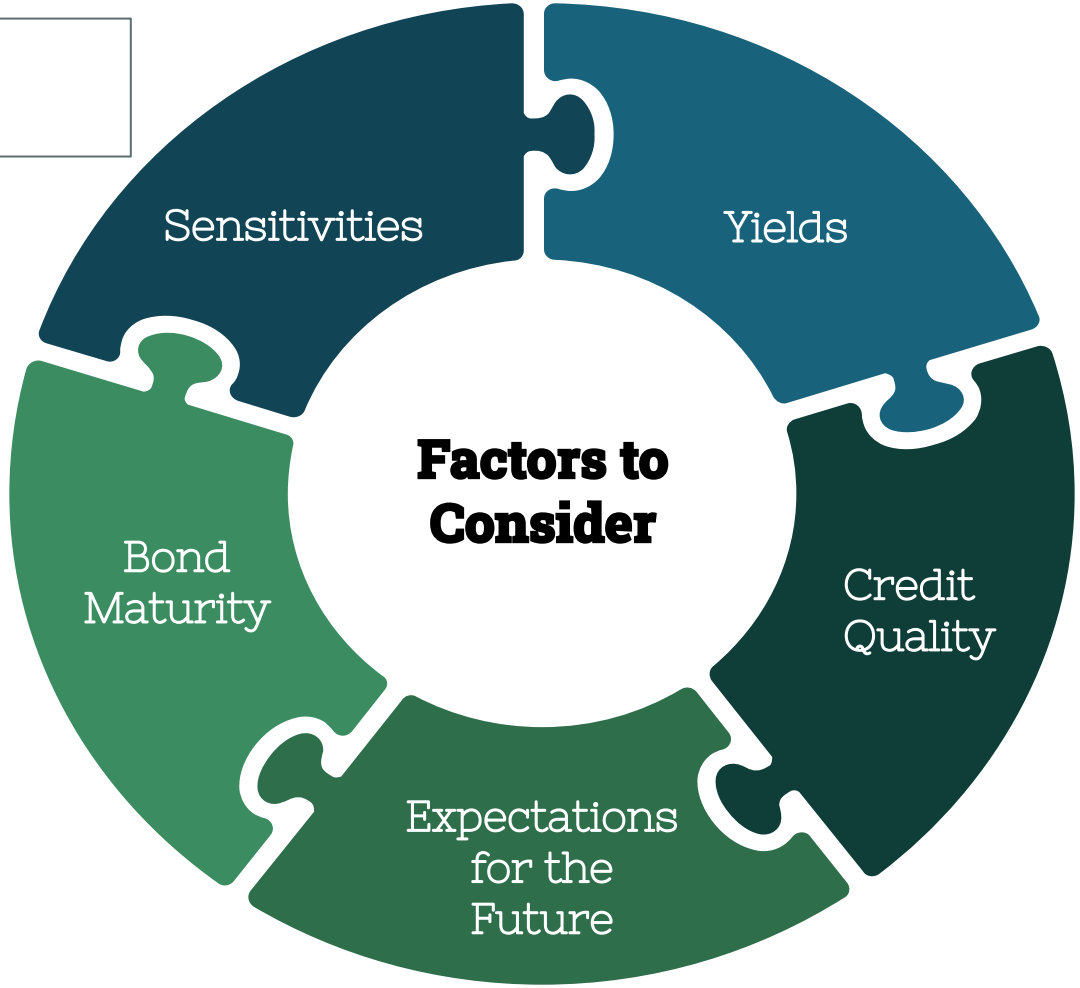
Interest Rate Sensitivities with 0% Rate Shock



Possible Inaccuracies

- 0% interest rate may not mean that the interest rate is literally 0
- Change in bond price given a 1% change in interest rate does not exactly match the duration

Which portfolio?



Current Portfolio

- Majority 20y bonds
- High credit quality

Drawbacks:

- If interest rates decrease -> lose more money
- Majority of returns in far future
- Most sensitive to interest rate changes

Alternate 1

- Most yields
- Majority 10y bonds
- Medium credit quality

Drawback:

- Highest default risk (5%)

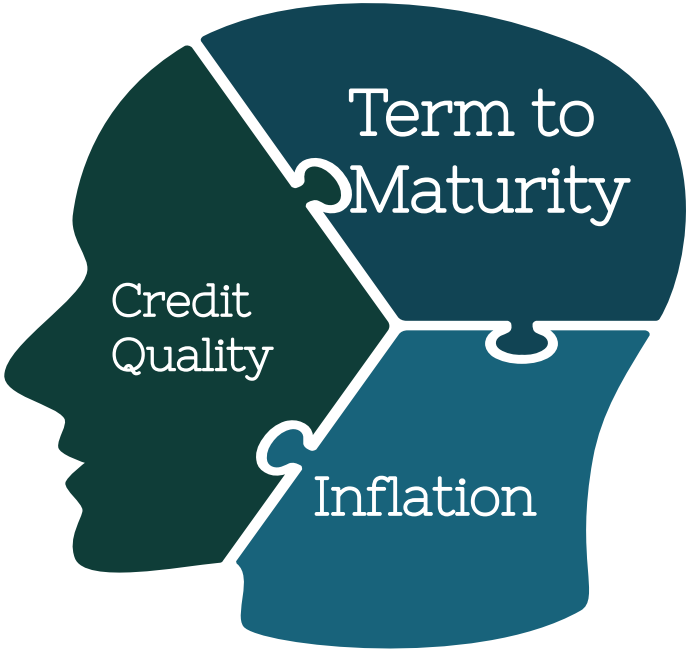
Alternate 2

- Least sensitive
- Majority 5y bonds
- High credit quality

Drawbacks:

- Least yields
- If interest rates increase -> higher opportunity cost for short-term bond

Other Possible Sensitivities for Bond Price

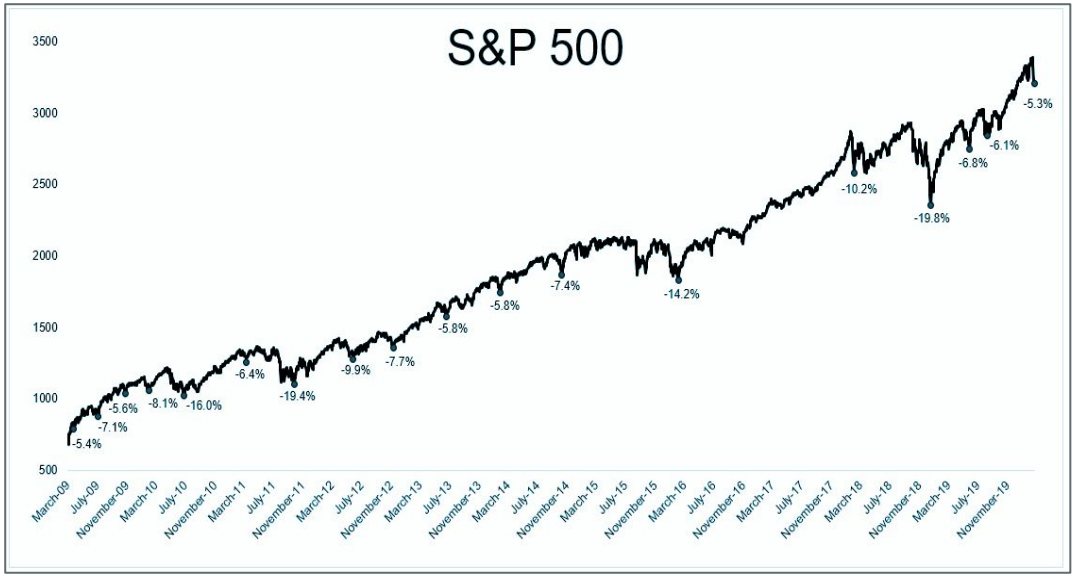


4

Business Impact

How can we best protect Luvalle against risk?

Enterprise-Wide Recommendations



Thank you!

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Appendix

Policy Deleted	Reason
SPIA00164, SPIA00346, SPIA00295	Birth Year was 2055
SPIA00740, SPIA00086	Policy Status was NA
SPIA00952, SPIA00953, SPIA00954, SPIA00955, SPIA00956, SPIA00957	Issue Age was 0
SPIA00272, SPIA00298, SPIA00725, SPIA00928	Duplicates

Additional Changes:

- Changed 104 policies to reflect annual payments instead of biannual payments
- Changed Att_Age so they all reflect age as of 12/31/2020
- Changed formatting in Iss_yr from 17 to 2017