

# **Luvall Life Insurance Company**

## *Executive Summary*

Team 15

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The Luvall Life actuarial team assessed the key risks associated with their main product lines: Term Life Insurance (TL), Indexed Universal Life Insurance (IUL), Single Premium Immediate Annuity (SPIA), and Variable Annuity (VA). An in-depth look was taken at the SPIA line and the data behind its estimates. The data was found to have inconsistencies which were resolved through various formulas and corrections to readjust the estimates more accurately. Due to the data's discrepancies, the money collected from the premiums that were meant to be invested were incorrect figures and would have negatively impacted the decision as to where in the market the money should go. With the corrected data, the given model was run and the new estimates were used and applied to three alternate portfolio allocations to prevent any further profit loss.

### **Data Analysis**

Before running the model, we looked through the data to find any glaring issues and correct them. Using IF statements in Excel, we checked the data for more inconsistencies and confirmed that certain parts of the data were correct. All detected inconsistencies were then compared with similar correct data values in order to estimate what the new value should be. Furthermore, we set expectations for what the differences would be between the old and new data. It was also important to create expectations for the various sensitivities that we ran our model on based on the different factors for which each sensitivity was testing. With newly corrected data, we input it into our model and ran it. The results we found allowed us to reexamine our expectations, ultimately driving the data depicted in graph 1 and graph 2. As such, we were ultimately able to express additional ways to validate our results even more.

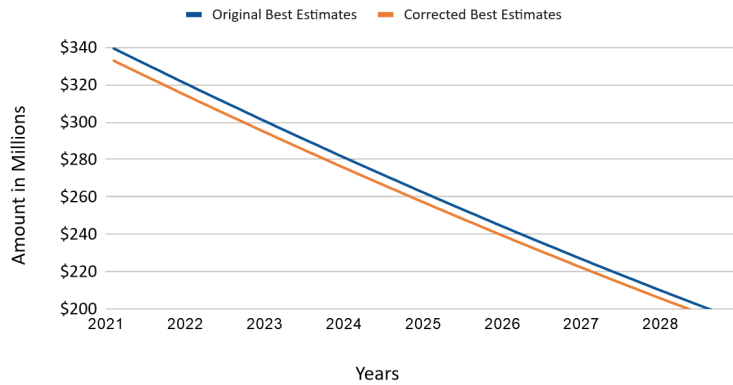
### **Portfolio Allocation Analysis**

We analyzed the three portfolio options, assessing the respective bonds of which each are comprised. Each portfolio has varying investment allocations based on the bond credit rating and time to maturity; running our sensitivity model to compile a new Interest Rate Sensitivity Table (table 1) helped clarify that Alternate 2 would be the most efficient option. Two main factors are important in considering the best choice: monetary return and stability. Our table indicates the value of each portfolio based on different interest rate shocks, particularly up 1%, down 1%, and changing 0%, and when the interest rate experiences 1% fluctuations in either direction, Alternate 2 maintains the greatest amounts. Further, each portfolio's duration is necessary to factor in, as this number quantifies the sensitivity to changes in interest rates. Correspondingly, Alternate 2 has the lowest duration out of the three portfolios, meaning that it is the least sensitive to possible fluctuations.

### **Implications**

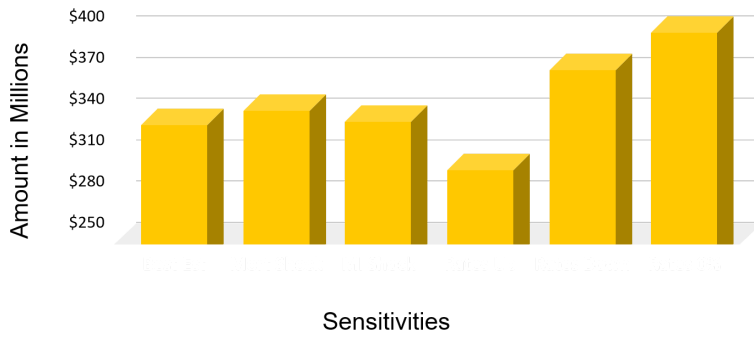
The inconsistencies in the SPIA data given to the team would have led to a large profit loss for Luvall. After correcting the data and running a projection model, our team believes that Alternate 2 would be the best portfolio choice to maximize profits for all interest rate changes and discounts. However, the current model does not take into account other factors in life expectancy such as medical history, occupation, and location, and it could be greatly improved by factoring each of these in. In addition, frequently checking data and introducing a more comprehensive data entry system should reduce and prevent errors in future data.

### Best Estimate Comparison



Graph 1

### Present Value Comparison of Sensitivities



Graph 2

Portfolio (baseline yield)	Up 1%	Down 1%	0% Change
<b>Current</b> (2.1%)	300.05	372.59	399.99
<b>Alternate 1</b> (2.25%)	295.56	366.21	399.99
<b>Alternate 2</b> (1.8%)	309.39	385.91	399.99

Table 1 (Note: Numbers are in Millions)