

Health

Using the 2016 Claims Allowed Amount data provided, we trended the unprocessed claims amount for 2018, with a 10% trend. Based off the number of exposures and loss ratio provided, we determined aggregate values for pure premium. On the tabs labeled “Task 3 Plans and Task 3 Plans (Complete)” we first determined necessary PEPM rates, independent of insurance components such as deductible and out-of-pocket maximum. On Task 3 Plans (Complete) we factored in these amounts, modifying actuarial value, to calculate PEPM rates for each plan, in a standalone offering situation.

On the tab labeled ‘Task 5’, we calculated premiums for each plan, associating members into four groups based off of claims allowed amounts. While this did result in premiums that reflected the necessary health needs for each percentile, we realized that deductibles associated with each plan would raise premium prices further. On the ‘Task 5, cont.’ tab, instances where all employees chose the same health plan, with deductibles set to employee rather than to plan were taken into consideration. Logically, the premiums for bronze and silver plans increased, and those for gold and platinum decreased. In simulated enrollment, any situation where deductibles were set based off of claims allowed amounts and not plan choice, we found that premiums would increase if the risk pool associated with new members was higher than the target pool they switched toward.

Property and Casualty

In each of the in-force policy tabs, we determined the on-level earned premium and computed the incurred-to-earned loss ratios for both 2016 and 2017. We then determined the percentage of policyholders who resided in each segment of the categorical rating variables.

Following this, in the “Claim” tab we identified the policy and rating variable information associated with each reported loss. We then proceeded to use the Loss Ratio Relativity Method to determine appropriate class factors based on the historical data. In cases where there were more than two segments per rating variable, we used a weighted average of the loss ratios to determine an “average” loss ratio with which to “normalize” the relativities. These computed factors were averaged between the two years with annual earned premium acting as weights. These class factors were then scaled closer to 1 proportionately to each other for each of the rating variables in hopes of minimizing premium dislocation.

Finally, a 2019 written premium was computed in the “2019 Premium Projections” tab with the algorithm in the “Proposed Rating Program” tab. Goal Seek was then used to determine a base rate to achieve a 10% increase over the 2017 written premium. Summary statistics for 2019 premium dislocation were computed and compared to their 2017 counterparts.

Retirement

We used the information in the “Assumptions” tab as well as the annuity-due formula to compute Age 65 Lump Sum values and annual benefits for each of the three plans. In the “Value Adjustment” tab, we determined how the parameters of the Final Average Pay Plan and the Cash Balance Plan had to change in order for the lump sum value to equal 11 times final annual salary, as well as what percentage of annual salary would need to be contributed by the employee alone to achieve the same result. In each of the Sensitivity Analysis tabs, we measured the pension funds’ response to changes in different individual parameters (comparative statics) and how these changes affected the total lump sum and annual benefit. Graphs were produced for each sensitivity analysis.