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| C:\Users\gps329\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\5499F650.tmp | **Allocating Resources to Maximize Lifetime Value** |
| **Marketing Analytics:**  **Fall 2022** |

This exercise will give students the opportunity to calculate customer lifetime value and use the calculations to allocate marketing resources. We will use the file “Marketing Allocation Workbook Student 2021.xlsx” available on Canvas. The first tab (Static Model) contains the static model introduced at the beginning of class today. This is given to you only for your reference. The second tab (Baseline Effort Allocation) contains the baseline levels of marketing effort. Should you need to reset your model to the baseline you can use these data to do so. The third tab (Dynamic Model) contains the Dynamic Model partially solved. You will complete the model in this tab. Lastly, the fourth tab (Optimal Effort Allocation) will allow you to compare the Baseline and Optimal allocations.

**Part I: Using CLTV to Allocate Resources**

Step 1: In the tab “Dynamic Model” complete the spreadsheet model by computing the Contribution Multiplier, the CLTV, the Net CLTV (net of the acquisition costs), and the Scaled Net CLTV Less the Telesales Costs. The discount rate is given at 0.15. The Acquisition Costs per Booking is constant across segments at 25.27. The retention rate, the number of bookings, and the telesales costs are segment specific quantities.

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When you are done, your total profits in Cell D6 should update and be equal to the base case profits of $9,087,231.

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Step 2: Use Solver to find the marketing effort that maximizes the total profits in D6 by changing the activity levels in D11:G60 subject to the following constraints.

1. The activity variables in D11:G60 (email, email and 1 call, email and 2 calls, or email and 3 calls) can only be 0 or 1. Fractional amounts of an activity are not allowed. Constrain the values in D11:G60 to be binary.
2. Only one activity per segment is allowed. Column H sums across the four activity level columns. The values in H11:H60 must be equal to or less than 1.
3. The total costs in cell H5 may not exceed the $100,000 budget in D4.
4. The total number of calls in cell H4 may not exceed the limit of 50,000 calls in F4.

You may add constraints by clicking on the Add button in the dialog box. Each constraint you add will appear in the Subject to the Constraints box. Be sure you select Simplex LP as the Solving method and uncheck the “Make Unconstrained Variables Non-Negative” box. When you are satisfied that you have put all the constraints in the model, hit the “Solve” button.

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When solver is done running, click “Okay” to keep the solver solution. By what % did you improve Total Profits?

**PART II: Investigate the Allocation of Resources at the Optimal Solution**

Once you are satisfied that you have optimized the allocation of your marketing efforts, copy the optimal efforts reported in cells D11:G60 after Solver runs and paste them into the tab “Optimal Effort Allocation”. Use a pivot table to compute the sum of the Total # of Calls first by the Propensity to Respond segment (Column B) and then by the Risk Score (Column A). How does this compare to the Baseline Allocation in the notes?

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