Probability Models for Customer Lifetime Value Analysis

Computer Lab Exercise — Part 1

Required files: `Blue_Apron_case_data.xlsx`

The objective of this exercise is to give you hands-on experience with using simple probability models to forecast customer retention. You should complete Questions 1 and 2. Time permitting, Questions 3 and 4 can be completed in whichever order you find most interesting.

Question 1

- Plot the (empirical) survivor function, $S(t)$. Plot the (empirical) retention rate function, $r(t)$.
- Fit the BG model to the Blue Apron data using just the data from the first four renewal opportunities / five months. Create plots that compare predicted and actual survival and retention rates over all 12/13 months.
- Fit the BG model to the Blue Apron data using all the renewal data. Create plots that compare predicted and actual survival and retention rates over all 12/13 months. What are your conclusions regarding the robustness of the BG model?

Question 2

- Fit the two-segment model using just the data from the first four renewal opportunities. Create plots that compare predicted and actual survival and retention rates over all 12/13 months.
- Fit the two-segment model using all the renewal data. Create plots that compare predicted and actual survival and retention rates over all 12/13 months. What do you conclude about the robustness of the two-segment model compared to the BG model?

Question 3

This is a more challenging question.

- The data reported in the case are monthly, but the underlying subscription process is weekly. Fit a weekly model to these monthly data and assess the performance of the model. How do you interpret the change in the values of γ and δ?

Question 4

- Fit the BG model to the HelloFresh data, first using data from the first four renewal opportunities, then using all the data. Having now analysed two datasets, what do you conclude about the robustness of the BG model?
- Repeat using the two-segment model. What do you conclude about the robustness of the two-segment model compared to the BG model?