Guide Capstone Report: Big Mountain Resort

Big Mountain Resort expressed a need to reevaluate its current pricing model to increase revenue and traffic to offset this season's anticipated increase in operating costs of $1,540,000 from installing a new chair lift.

Background:
Big Mountain Resort (BMR) is a ski resort in Montana in the continental US. Located between two of the country's most beautiful natural landscapes, Glacier National Park and Flathead National Forest, BMR offers breathtaking views year-round and access to 105 trails. During the peak season, BMR attracts roughly 350,000 annual visitors for skiing and snowboarding. BMR's current pricing strategy is to charge a premium above the market average of similar resorts, yet can set the ticket price freely. There is also concern that BMR is not capitalizing on all of its facilities. The BMR leadership would like guidance and insights into improving revenue through their ticket pricing model without raising operating costs.

BMR has considered taking the following actions in order to increase revenue or reduce operating costs:

1. Closing up to 10 lesser-used runs;
2. Increasing the longest run by .2 miles to a total of 3.5 miles. However, this requires increasing snowmaking to cover 4 acres;
3. Increasing the vertical drop by 150', without adding additional snowmaking capabilities. This would, however, require installing an additional chair lift.
4. Increasing the vertical drop and also adding snow-making capabilities. Also, requires the addition of a chairlift.

Predictive Models:
Assuming the data provided includes the additional ski lift that was recently installed the following models were created and analyzed prior to making the below recommendations.

The following heat map(Figure 1) shows a) a significant correlation between the summit elevation and base elevation; b) a strong correlation between Adult Weekend ticket price and the vertical drop, the average snowmaking, the fastQuads, the number of runs, and the total number of chairs; c) a strong correlation between the skiable terrain and the number of runs; and, lastly, d)a very strong correlation between predicted days open and the number of days open last year.

Further analysis of the data through correlation scatter plots (Figure 2) confirms a strong positive correlation between the Adult Weekend ticket price and the vertical drop. The information gained from the fastQuads, as well as the number of runs and total chairs, is also quite useful in indicating how quickly and easily a resort can move its skiers and snowboarders around. Having no fastQuads would be detrimental to a resort when determining ticket prices, yet BMR currently has eight fastQuads and therefore has an advantage over others.

Looking through our clean data we were able to complete the following models: linear and random forest models. While developing the linear model, missing values were imputed with the mean and median values. If the linear model alone dictated ticket prices, the value would be off by roughly 9USD. However, the linear model provided insight on the most important factors to focus on when determining price: vertical drop, skiable terrain, fastQuads, longest run, total chairs, total runs, snow making and number of trams. The random forest model, where missing values were also imputed with the median and mean values, narrowed our focus to the following four factors to consider while pricing tickets: number of runs, fastQuads, snow making and vertical drop. Therefore, the final recommendations for BMRs ticket prices are based on the findings of the random forest regression model.

Findings:
Closing Runs: Big Mountain Resort has a competitive advantage regarding the number of used runs over 90% of the local resorts(Montana only) and 93% of the national resorts. Therefore, closing one run will not impact ticket price or revenue but will reduce operating costs. Closing two or three runs will directly impact revenue without reducing operating costs enough to offset the loss. If closing more than one run is considered by leadership, BMR may as well close four or five runs to decrease operating costs without severely affecting ticket prices. Closing more than six runs would be detrimental to BMRs revenue.

Increasing the Vertical Drop: According to our model, if BMR increases the vertical drop by 150', the Ticket Price will subsequently increase by roughly 10%, from 81.00USD to 89.61USD. This increase will lead to a jump in annual revenue by 15,065,471USD. Increasing the vertical drop will require an additional chair lift, with an estimated operating cost of 1,540,000USD based on this season. Additionally, a new run would be needed and said run would require additional snow making abilities (the cost of installing a run is unavailable).

Recommendations:

It is recommended for BMR to increase the vertical drop, add an additional chair lift, add an additional run and increase the snow making coverage for roughly 2 acres (Figures 3-6). At this time, it is not recommended BMR close runs due to lack of sufficient data (Figure 7).

Figure 1

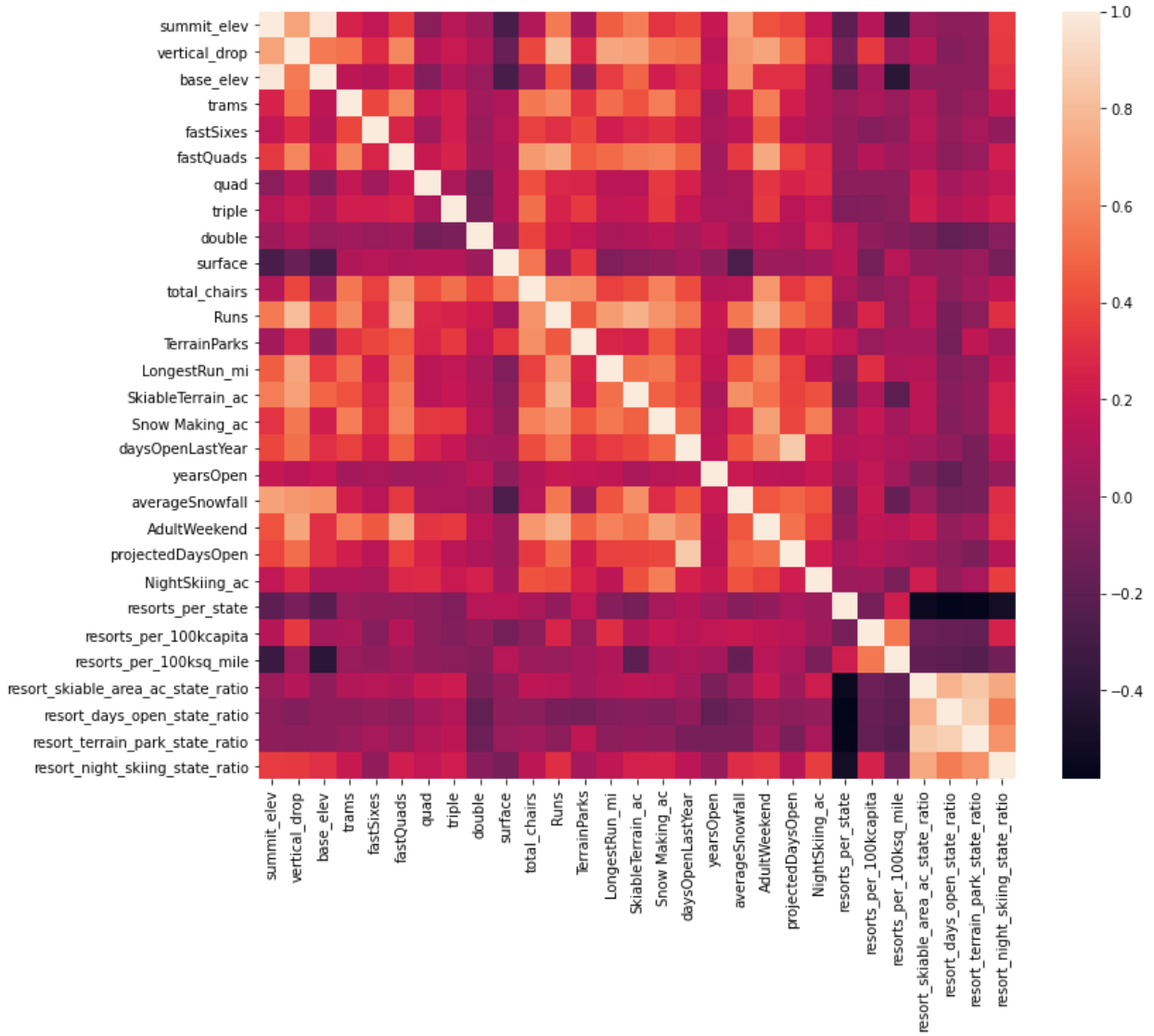


Figure 2

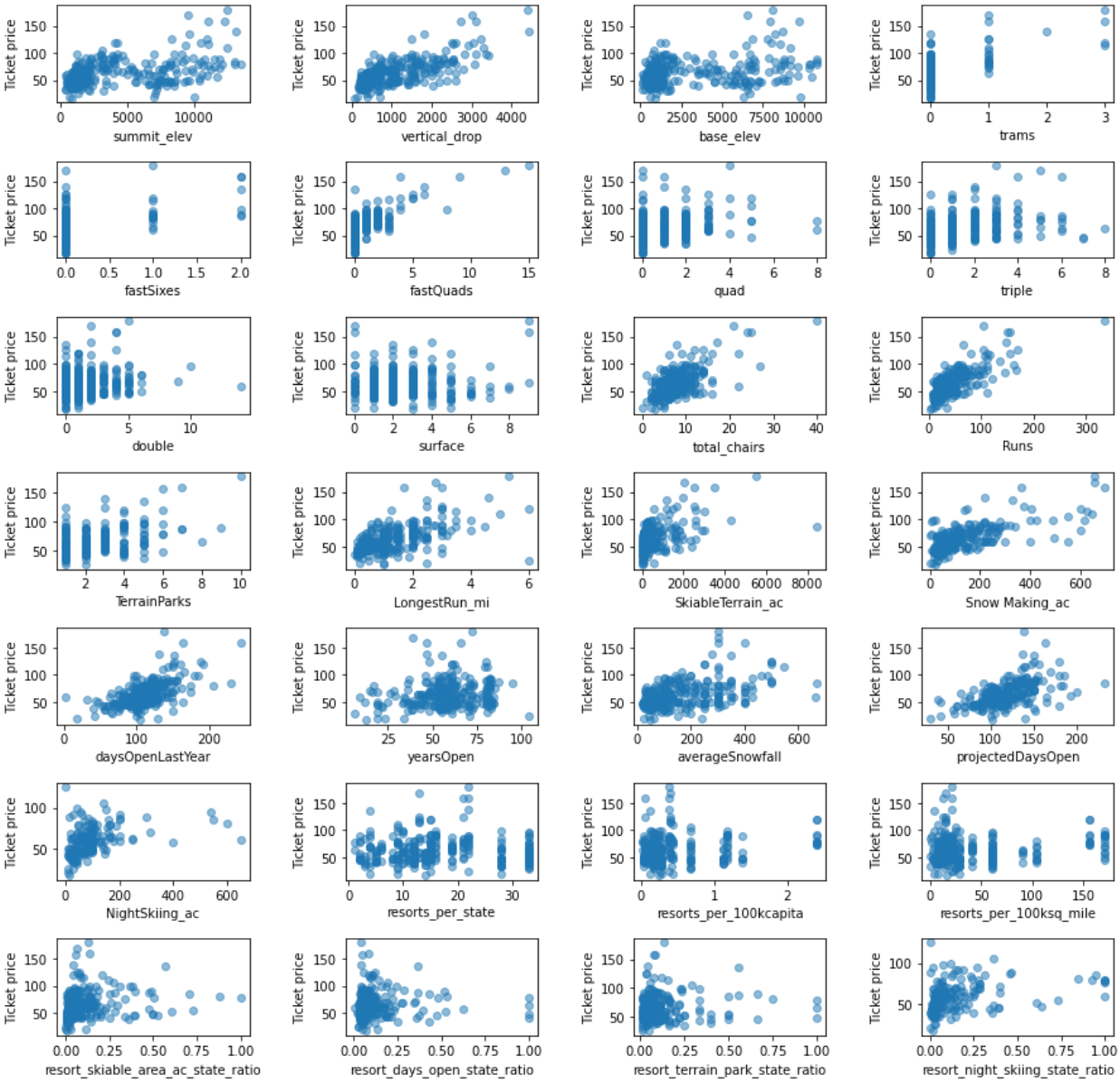

Ticket price
summit_elev
vertical_drop
base_elev
trams
fastSixes
fastQuads
quad
triple
double
surface
total_chairs
Runs
TerrainParks
LongestRun_mi
SkiableTerrain_ac
Snow Making_ac
daysOpenLastYear
yearsOpen
averageSnowfall
projectedDaysOpen
NightSkiing_ac
resorts_per_state
resorts_per_100kcapita
resorts_per_100ksq_mile
resort_skiable_area_ac_state_ratio
resort_days_open_state_ratio
resort_terrain_park_state_ratio
resort_night_skiing_state_ratio

Figure 3

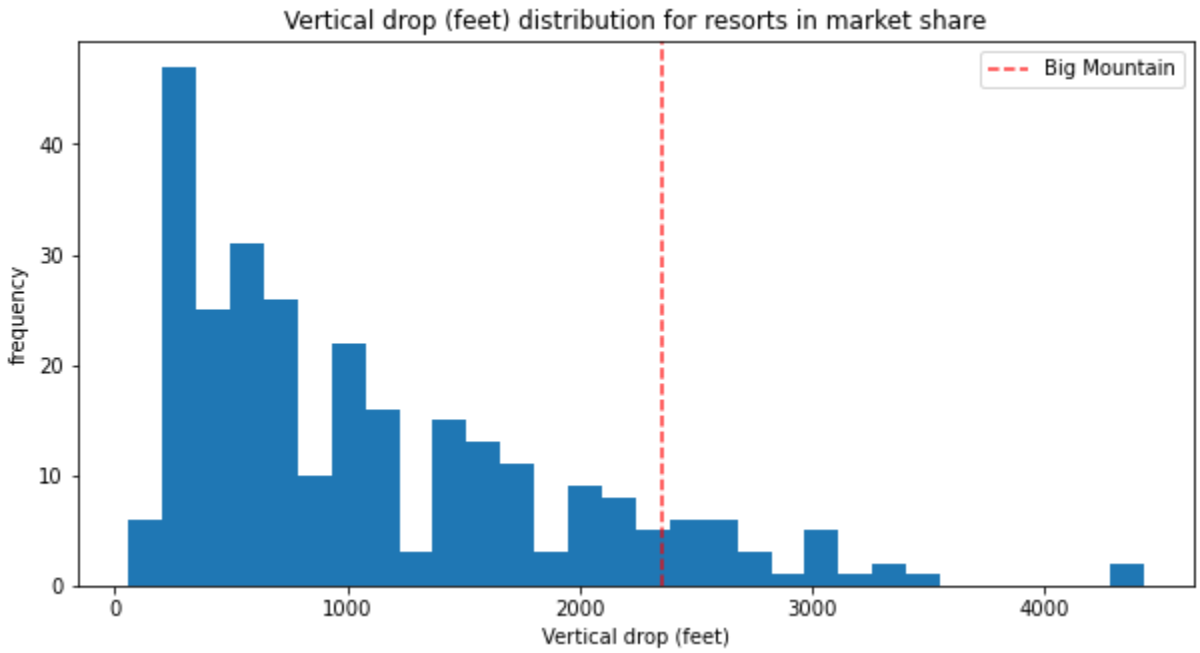


Figure 4

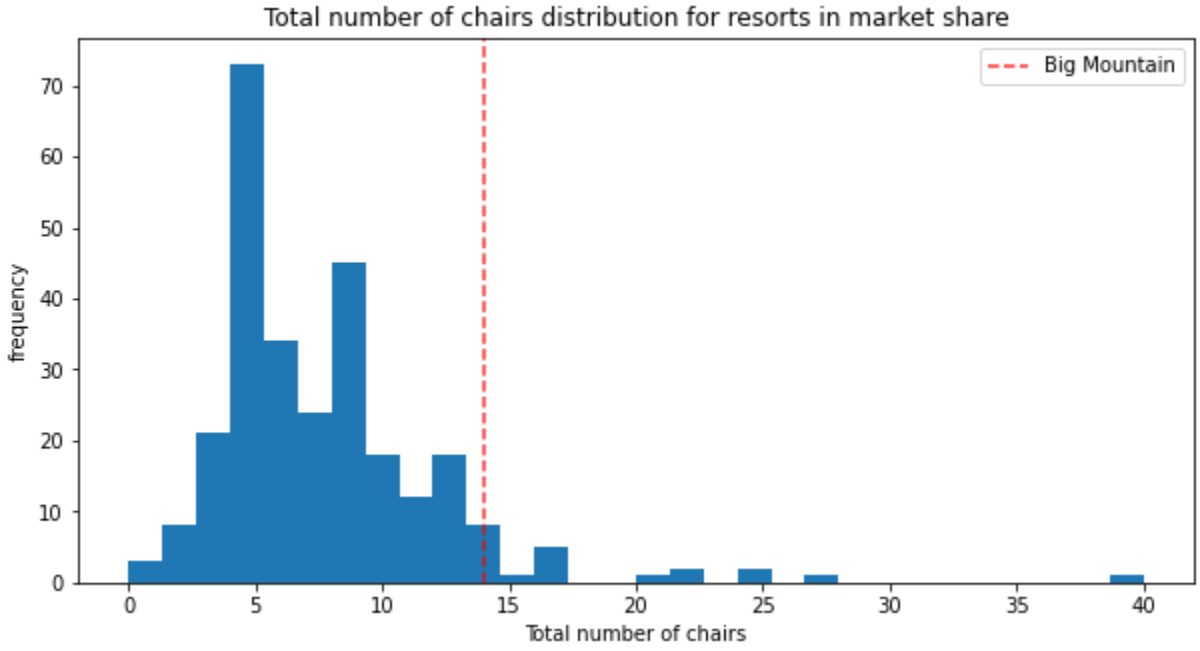


Figure 5

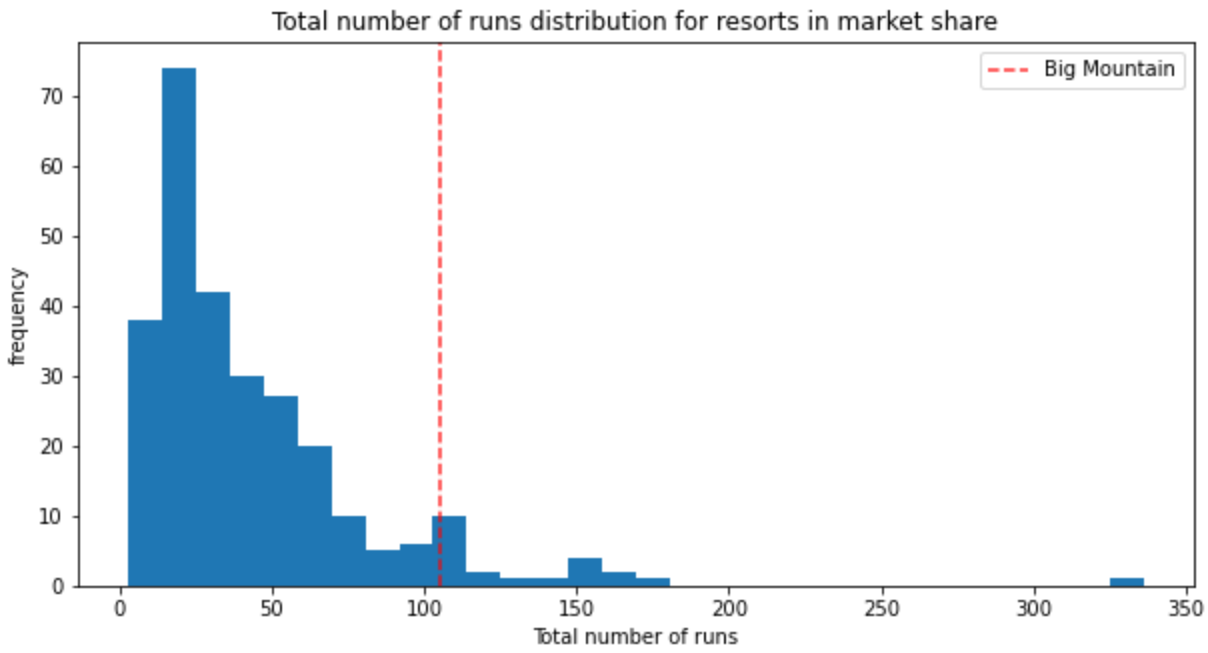

Total number of runs distribution for resorts in market share
Big Mountain
frequency
Total number of runs
0
10
20
30
40
50
60
70
0
50
100
150
200
250
300
350

Figure 6

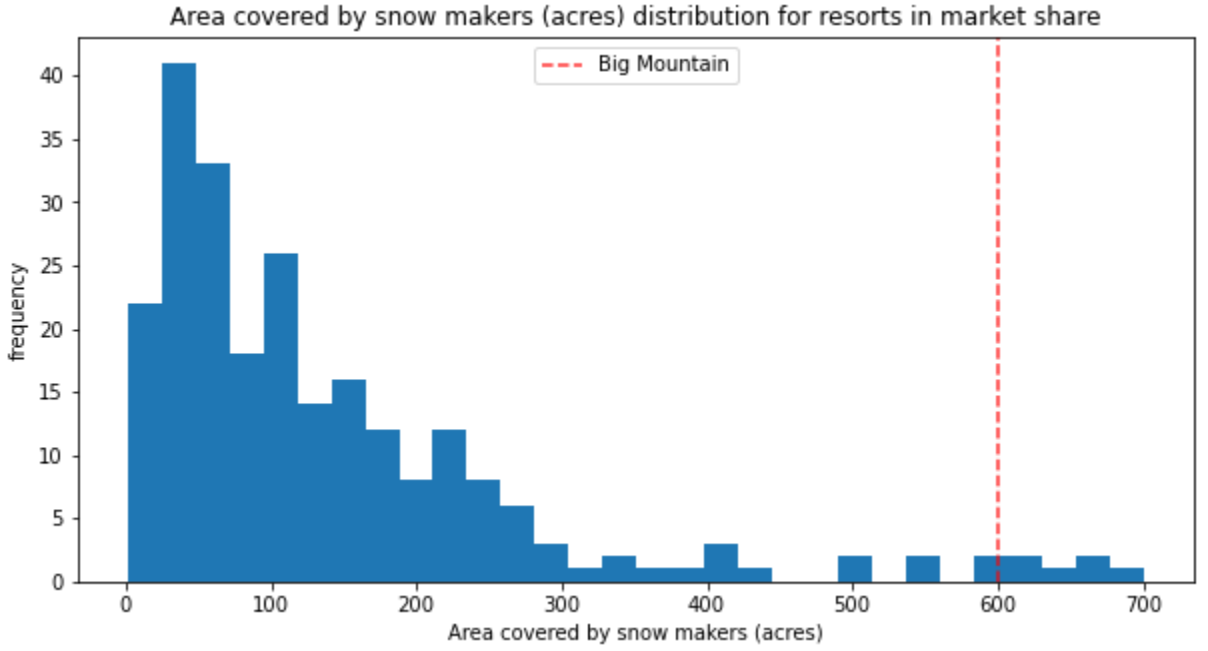
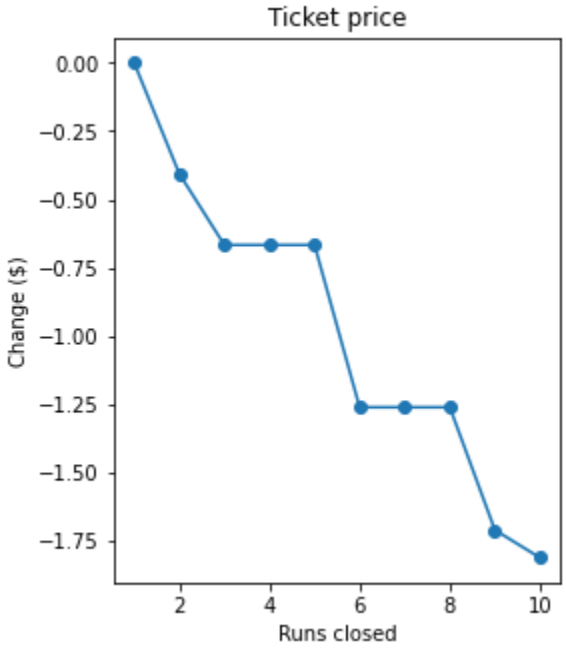
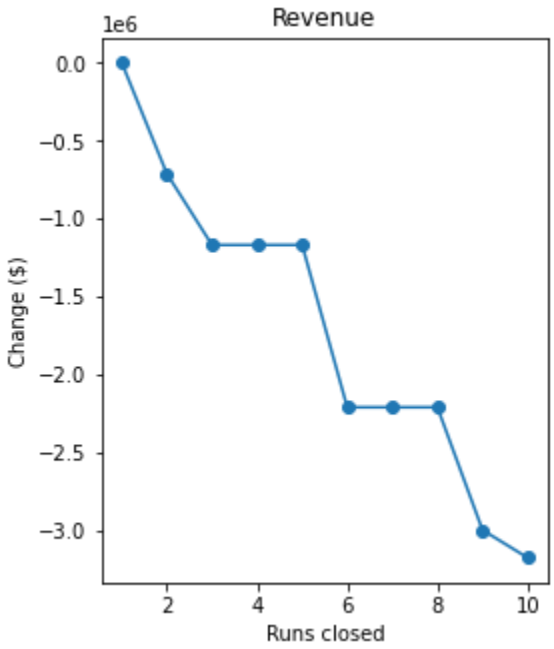

Area covered by snow makers (acres) distribution for resorts in market share
Big Mountain
frequency
Area covered by snow makers (acres)
0
5
10
15
20
25
30
35
40
0
100
200
300
400
500
600
700

Figure 7


Ticket price
0.00
−0.25
−0.50
−0.75
−1.00
−1.25
−1.50
−1.75
Change ($)
2
4
6
8
10
Runs closed


Revenue
1e6
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
Change ($)
2
4
6
8
10
Runs closed