We wanted to look at pricing models for ski lift tickets for the Big Mountain Ski resort. Currently the strategy for pricing is to base it on a simple premium over average costs for ski resorts. That led to a current price of $81 per ticket. We wanted to see if we could find a model for ticket prices across all or a segment of ski resorts and get a better pricing model, as well as see if such a model could predict the effects of some possible changes being made.

We started with data for a group of ski resorts, but had to restrict to a smaller group based on useful meaningful data. Some of these were missing the prices for tickets entirely. Some only had weekend prices and some only had weekday prices. At Big Mountain, these prices are the same so we simply went with the number we had the most data for, namely the adult weekend price.

One of the first things we wanted to do was see if we should be treating states differently. If we looked as a whole Big Mountain has a price that is higher than most but there are several higher priced resorts there. For Montana alone it was at the top.

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This definitely creates concern, however when we did a PCA analysis of the variation, and plotted the various states, it seemed like it was reasonable to treat all states equally as there was no pattern of where the various states fell compared to pricing. This simplified things since we didn’t have to take state into account, and limiting to Montana resorts alone would be a very small sample size. We then wanted to start looking to see what features might correlate well to ticket price. When we looked at each feature separately we could see some features appeared to have a strong correlation, like vertical drop, number of runs, total number of chairs, while others had no strong visible correlation.

We looked at two types of models to predict price, a linear regression model, and a Random Forest regression model. After cross fold validation, we came up with the best version of each, and Random Forest Regression was the best model that we could construct.

Based on our analysis of the data for all the resorts, the model we constructed had a price prediction of $95.87 for the ticket price. The mean absolute error of this model was about $10.39 , but that still would allow for an increase in price. Even a modest increase to $85 a ticket which would still be below the mean absolute error below the price suggested by the model would increase revenue by $7,000,000 a year which would more than cover the operating costs added by the new lift.

We also considered a few options to make changes that might affect revenue. We considered closing some runs, adding a new longer run with a new lift that would increase the vertical drop, adding that new run along with some additional snow making capability, and increasing the length of the longest run and adding some snow making capability.

We found that we could close a few of the lowest use runs with minimal revenue changes, but those would have to be measured against any cost savings obtained by closing those runs. Adding a new longer run with a new lift justified a $1.99 per ticket price increase that could easily pay for itself. Adding small amounts of snow making did not increase the revenue, nor did adding length to the longest run along with increased snow making, so it doesn’t appear that the cost of additional snow making can be justified.

In conclusion, it appears that the features Big Mountain has now certainly justify an increase in ticket prices and there are a couple of potential things that could be done to increase profit by cutting costs more than the offsetting lost revenue by closing low use runs, or adding a longer run, new lift and increasing the vertical drop to increase revenue.