Big Mountain Resort Pricing Model

Summary and Conclusion

Big Mountain Resort ranks among the best ski resorts in the nation, and there is concern that it's failing to fully capitalize on its many features by underpricing its tickets. The current ticket price is $81, a price based on a simple method of charging a premium over market average. With 350,000 visitors per season, and an average stay of 5 days, this represents $141.75 million in annual gross revenue. The resort would like to increase this for the sake of enhancing profits and to cover the $1.54 million increase in operating costs incurred by the most recent ski lift. It's important for them to develop a more sophisticated and accurate pricing model.

We started with data on 330 ski resorts, with respect to 27 variables. Unfortunately, there were many missing values, including many ticket prices - tracking down this information would be worthwhile. But in the process of cleaning the data we chose to work with the remaining 279 resorts. State level data were merged with the ski resort data, allowing us to create meaningful ratios with respect to state population and area. Finally, we entered model selection with 37 variables for the 279 remaining ski resorts. Simple linear regression was compared with a random forest model; the random forest model was chosen on the basis of its substantially lower mean absolute error of $9, as opposed to $12 in the linear model.

The first and maybe most essential finding of this model was that Big Mountain Resort is indeed underpricing its tickets. The predicted price produced for the resort was $91.41, with a mean absolute error of $10.32. It's likely that the market would support a ticket price increase of nine or ten dollars without any additional investment in facilities. We then evaluated the four scenarios presented by Big Mountain management. The first, which was to save operating costs by removing up to ten runs, showed that there's no penalty to price support for the first two, but removing more would reduce the projected ticket price by slightly over $2. The second scenario was to add 150 feet to the vertical drop by extending a run; the model predicts a price increase of $1.24 for this improvement. The third scenario was to not only add 150 feet to vertical drop, but to also add 2 acres of snow making capacity. This also yielded an increase of $1.24 - there was no additional benefit to increasing snow making. The fourth scenario called for increasing the longest run by 0.2 miles, and adding 4 acres of snow making area. This produced no increase in predicted price at all.

We proceeded to examine other possible changes Big Mountain could make to increase ticket price. Many had no result, but we found that the predicted price is strongly supported by adding fast quad lifts. Adding just one increased the price by $23.61; adding two produced a $27.07 increase. Returns diminished quickly after this number. We also found that not only was there no benefit in adding night skiing acreage, but that removing it entirely increased the predicted price by $0.33.

In light of these results, our recommendation is that Big Mountain implement scenarios 1 and 2; scenario 1 will surely result in some cost savings, and scenario 2 supports another $1.24 of

ticket price. We also suggest considering adding two high speed quad lifts, supporting a ticket price increase of $27.07, and eliminating night skiing, as discussed. The model predicts that a ticket price of at least $118 could be supported having made these changes. At current ticket sales levels, this represents an additional $64.75 million in annual revenue.

Considering the effects of various resort improvements on ticket price is only part of the story. We must also consider the startup and operational cost of these improvements. While our exploratory predictions found strong price support for adding fast quads, no information has been provided about the cost other than that the latest lift adds $1.54 million in annual operating expense. A quick internet search reveals a skiing blog that claims the cost is “at least $2 million” and gives an example of a recent lift for which a resort paid $8 million. New England Ski History (dot com) provides a list of lift installation costs, in which the quad detachable (apparently, the “fast” ski lifts have chairs that detach, because a rider couldn’t get on or off as quickly as the lift carries them) shows a price history that increases over time; the most recent lifts cost around $7 million. Even supposing that two new lifts at Big Mountain would cost substantially more - say, $15 million each - with similar operating costs to the most recent lift, the increase in ticket price would exceed the cost of this investment within a season. However, more data on the operating costs of the resort would allow for better informed predictions.

Our analysis was also limited by a lack of marketing data. We had little to no information on Big Mountain’s customer base and operating costs; our assumptions about the cost of the proposed changes are little more than blind guesses. Worse, we are operating under the assumption that price changes as supported by new facilities investments will result in no substantial decrease in ticket sales, and that Big Mountain won’t lose any customers when it eliminates night skiing. While this may in fact be true, and the model does in fact support the proposed market price under these changes to the resort’s features, it would be very helpful to have more comprehensive data about Big Mountain’s customer base.

Additionally, while we examined a handful of possible feature changes at Big Mountain, this examination was anything but systematic. We considered all four strategies that were shortlisted by executives, and supplemented this with a couple of informed guesses. The model made strong predictions for these, particularly adding two new fast quad lifts; but more exploration is certainly warranted. A good next step would be to obtain more data and develop a production model that can be used by executives to make more informed predictions. There may be many other combinations of potential feature changes that are worth exploring.