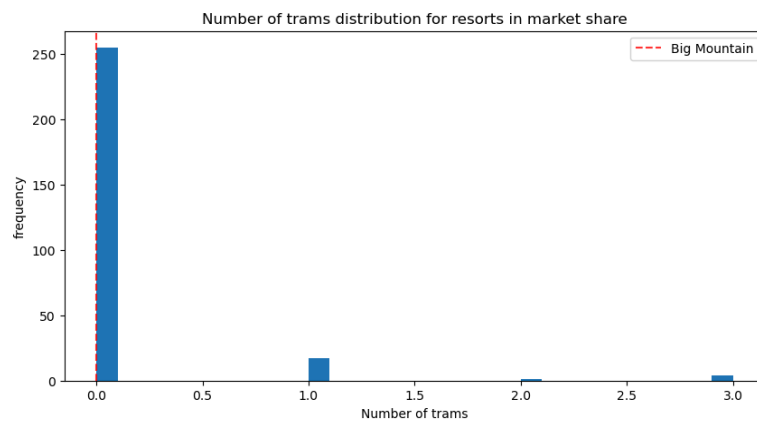


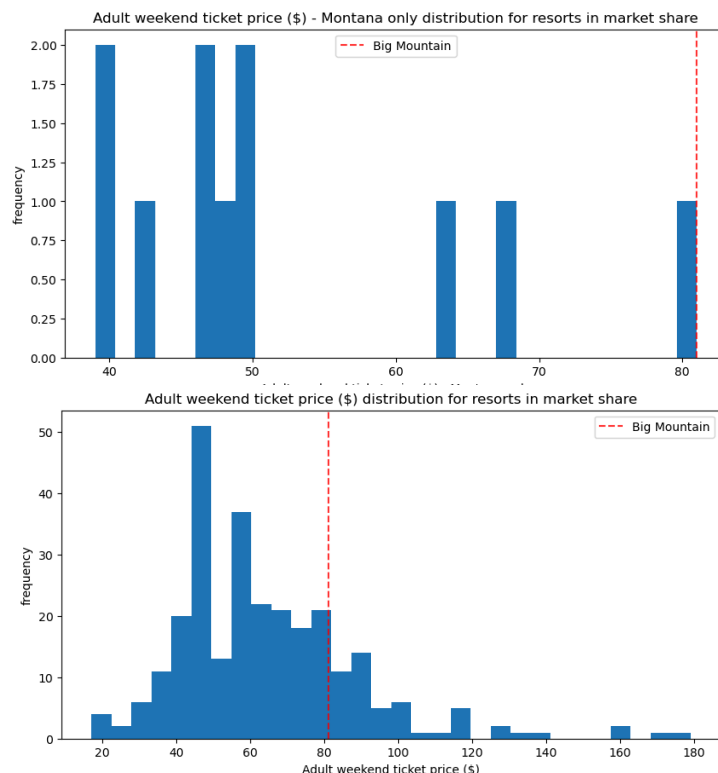
Big Mountain Resort currently charges eighty dollars for an adult weekend lift ticket. Our random forest model suggests that based on its terrain size chair and lift infrastructure and local demand Big Mountain could support a price of around eighty-five dollars without losing market share. To present this to leadership we would show predicted versus actual prices peer benchmarks and error margins alongside a willingness-to-pay survey.

We merged two data sources into one table of resorts and state summaries then imputed missing numeric values with the median. We replaced the raw state label with two PCA components derived from state aggregates to avoid an explosion of categorical columns.

Our exploratory analysis compared Big Mountain against its market share peers. The chart below shows that Big Mountain has zero trams while most peers have at least one



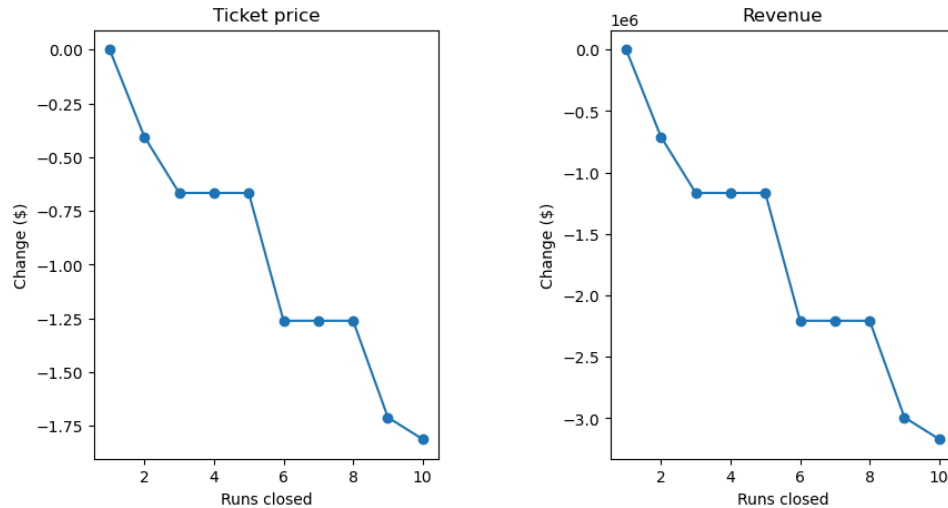
and the next charts show that its current ticket price of eighty dollars sits above most Montana resorts but below many large national competitors



For modeling we split data eighty percent to twenty percent then built two pipelines. The linear regression pipeline used median imputation scaling and optional feature selection and yielded a cross-validated root mean squared error around fifteen dollars and R squared near point six with almost identical test split performance. The random forest pipeline added one hot encoding of region and tuning of tree parameters and delivered RMSE near twelve dollars and R squared around point

seven on both cross validation and test data.

We then ran scenario simulations by closing between one and ten underused runs to see how it would affect the optimal ticket price and total revenue. Both figures below show that closing one run won't hurt the revenue, but closing more will implement a negative yield.



Our recommendation is to adopt the random forest model for pricing guidance set the new adult weekend ticket at around \$85 dollars and pilot the closure of one or two low-usage runs next season to lower maintenance costs at the same time. Communicate the change to guests collect feedback and then decide whether to adjust further.

In the future we would gather additional cost data such as lift maintenance, staffing, utilities, and revenues from food rentals and season passes to refine profit estimates.