Evaluating the Effect of Multi-Resort Passes on Ski Resort Lift Ticket Prices

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Defended on: April 5, 2024

Abstract

This senior thesis investigates the effect of ski resort inclusion in a mega-mountain ski resort pass on lift ticket prices for United States ski resorts during the 2023-2024 ski season. The effect of pass inclusion is estimated by conducting a cross-sectional analysis across United States ski resorts, using hedonic controls to account for varying ski resort characteristics. This analysis is extended to evaluate the effect of competition between resorts by incorporating controls for resort counts within a given radius. Furthermore, a time-series analysis was conducted to determine the effect of pass-switching over time with resort fixed effects. The results suggest that there is a positive correlation between being included in a mega-mountain pass and lift ticket prices, finding a price increase of $23.53 for the Epic Pass and $18.14 for the Ikon Pass when including hedonic controls. Additionally, this thesis found that having more resorts of similar affiliation within a radius of 40 miles increases daily lift ticket prices by $2.87 per resort.

1 Introduction

The concentration of firms in a market is a hotly contested topic of great importance to producers and consumers alike. Market concentration can greatly influence both the price and quantity of a good supplied to a market, which can have significant effects on the total welfare of that market. For this reason, it is important to have an adequate understanding of the effects of changes in market power on the welfare of a market. Skiing is a staple recreational activity in the mountains of North America and attracts many tourists from both non-mountainous states and international countries alike. For most of the existence of the ski industry, resorts have operated as standalone enterprises, offering season passes to their own individual resort, with the occasional partnership with another resort. However, over the past decade, the ski resort industry has seen major consolidation into two main competing firms, Vail Mountain Resorts and Alterra Mountain Company. Both companies have consolidated access to many ski resorts into two separate passes, which are Vail Mountain's "Epic Pass" and Alterra Mountain's "Ikon Pass." This paper estimates the effect of ski resort consolidation on lift ticket prices.

For skiers and snowboarders in the United States, the qualitative increase in prices has been noticeable. This paper will seek to answer how much of this can be attributed to pass affiliation conglomeration. Traditional economic theory of competition strongly indicates that at least some of the price increase comes from the concentration of market power into rival passes. Slowly, the market has approached a semi-duopolistic equilibrium, with many resorts being included in either of the two passes. While single-day lift tickets can still be bought at any individual resort, competitive economic theory indicates that these prices would also have experienced a significant increase. Additionally, while not all of the resorts have joined a pass, a neighboring resort joining a pass may affect the demand at a specific resort, altering the prices the resort can charge. To answer the question of how consolidation affects pricing, this thesis will examine the increase in prices for resorts that participate in passes and their neighbors, controlling for the characteristics of the resort and the level of local competition that a resort faces.

The ski industry serves as an excellent model to observe changes in firm concentration, as the consolidation of resorts into two passes has been recent and rapid. Both the Epic and the Ikon Pass can only trace their origins back to 2008 (Vail Resorts, 2023) and 2018 (Alterra Mountain Company, 2023), respectively. Additionally, the aggregation of resorts has been gradual, with a few resorts being added to each pass each year (See Figure 2).

This paper relies on hedonic price evaluation to determine the intrinsic value of a resort and uses both cross-sectional and time-series data to evaluate the effect of resort conglomeration on lift ticket prices. Hedonic pricing is the process of accounting for and controlling an object's characteristics to accurately measure economic effects (Rosen, 1974). Specifically, hedonic pricing is necessary when the goods under scrutiny are imperfect substitutes, or they have differing intrinsic values to consumers. This is strongly represented by the ski

resort industry, as some ski resorts may be limited to a single mountain with a few runs, while others are sprawling complexes of multiple mountains with hundreds of runs. For this reason, it is necessary to implement hedonic controls for each resort, with the specific controls listed in the methods section.

This paper uses pricing and hedonic control data from the website OnTheSnow.com, a subsidiary of Mountain News LLC. In all analyses, the y-variable is the daily weekday adult lift ticket price, as purchased at the window at a ski resort, and the x-variable of interest is pass affiliation.

The contribution of this paper to the current body of literature is mainly concerned with the incorporation of a pass affiliation parameter, which will control for the ski pass a resort is included in. Most recently, a paper investigated the effect of the advent of large mountain passes on lift ticket prices (Bergeron, 2023). Still, this paper seeks to investigate further by extending the analysis into the 2023-2024 ski season. Additionally, while Bergeron investigated the competitive nature of the market for ski resorts, this thesis examines the effect of consolidation on competition between nearby resorts. Also, the analysis by Bergeron only had two seasons of analysis within the multi-resort-pass era, whereas this paper extends previous analyses by including data from eight seasons between 2013 and 2024, observing many resorts joining or switching passes. In keeping with previous literature (Lai, 2019; Bergeron, 2023), this paper will continue to use hedonic controls to account for resort characteristics.

2 Literature Review

The literature concerning ski resort pricing is limited in scope and becomes much smaller when examining papers that investigate resorts using hedonic pricing. Falk (2011) applied a hedonic pricing model to investigate the effect of cross-county differences in daily lift ticket pricing. Through the cross-sectional analysis of 214 ski resorts in Austria, France, and Switzerland during the 2010/2011 ski season, it was determined that lift tickets in Austria and France were 9% and 14% lower than their counterparts in Switzerland, respectively. This paper used an extensive set of hedonic controls, including controls for trail length, mountain height, mountain area, ski-making capabilities, and whether or not the venue was a FIS racecourse venue, among others. In addition to finding statistically significant differences in price differences between countries, the paper also found the ability of resorts to make snow at varying altitudes to significantly affect lift ticket prices.

Similarly, the literature has applied hedonic pricing models to evaluate the effect of other variables on lift ticket pricing. Fonner (2014) investigates the effect of ski resort crowding on lift ticket prices within a hedonic pricing model. Investigating 181 US-based alpine ski resorts during the 2011/2012 ski season, it was determined that skiers have an optimal level of crowding, balancing the social aspect of more people on the mountain with the drawbacks due to congestion. This paper evaluated the effect of crowding by generating a crowding variable, which was determined by the maximum number of skiers who could

ride lifts in one hour divided by the total number of acres in the resort. Specifically, the paper found that below 64 skiers/acre/hour, there is no benefit to having additional acreage. Additionally, this paper used a rich set of hedonic controls, including the vertical drop, the number of trails, the base altitude, the annual snowfall, the lift capacity, the percentage of high-speed ski lifts, the population within a 125-mile radius, and categorical variables for the presence of lodging, a gondola, snow making capabilities, or if the resort was located on US forest service land.

Recent economic literature has sought to investigate the effect of ski resort consolidation on prices. Caplan (2019) attempts to answer this question by conducting a cross-sectional analysis of 120 resorts during the 2018/2019 season. Similar to previous economic literature, the authors chose to investigate price differences while applying hedonic controls, including many controls for both resort characteristics and pass affiliation characteristics. Additionally, the authors sought to control for variances in location, adding a parameter to control for the location of resorts in either the eastern or western United States. The authors found that ski resorts within conglomerates charge a premium of \$15.50-17.73, representing 15-17%, with the higher number accounting for controls in individualized snowfall amounts for each resort in a separate regression. Additionally, the authors extended their analysis of the data beyond single-day prices to season pass prices, where they found resorts included on multi-resort season passes charge a higher overall amount for a season pass, but that high-volume skiers can get an overall discount by purchasing a multi-resort pass from the parent corporation that includes a resort.

In a similar analysis to Caplan, Lai (2019) performed a cross-sectional analysis of the 2018-2019 season using 302 United States ski resorts. Lai conducted this analysis within a hedonic pricing framework, utilizing controls for pass characteristics, resort characteristics, and geographical controls. Like Caplan, Lai found that resorts included in both the Ikon and Epic Passes had significant premiums compared to independent resorts. However, after controlling for resort and geographical characteristics, Lai found that premiums decreased significantly, from \$59.05 to \$13.11 for weekend tickets at Ikon-affiliated resorts and \$67.37 to \$17.53 for weekend tickets at Epic-affiliated resorts.

Most recently, Bergeron (2023) was the first to investigate the effect of resort conglomeration on lift ticket prices using a time-series analysis. Using a set of extensive pricing data, from the years 1988, 2000, 2020, and 2022, including 213 North American resorts, Bergeron conducts his analysis within the framework of a hedonic pricing model, using controls similar to previous literature, including resort characteristics and distances. Similar to Caplan, Bergeron found that resorts included in mega-mountain passes charge a significant premium over independent ski resorts. Additionally, due to the nature of the panel data that Bergeron was using, it was determined that between the 2020 and 2022 seasons, the pricing premium for being included in a mega-mountain resort had increased 21.87% for weekend tickets.

3 Methods

3.1 Data

The data used in this thesis is pulled from a compilation of 316 United States Ski Areas. The set of pricing data was collected from OntheSnow.com, from the "Lift Ticket Prices" section of their website. Lift ticket prices for the 2023-2024 ski season were collected in February of 2024, and consisted of four main categories: season pass price for an adult, season pass price for a child, weekday adult lift ticket price, and weekday child lift ticket price. The data set was filtered to only include resorts that had more than one operating ski lift, effectively removing Silverton Mountain Resort, a Heli-skiing resort, and a vertical drop of at least 1000 feet, removing smaller resorts from the sample. This resulted in 139 resorts used in the analysis.

Table 1: Summary Statistics of Lift Pass Prices

Price Category	**N**	**Mean**	**SD**	**Min**	**Max**
Adult Season Pass ($)	137	990.251	460.681	377	3314
Child Season Pass ($)	127	317.116	265.817	0	1050
Weekday Adult ($)	139	107.254	51.378	23	244
Weekday Child ($)	107	43.457	49.752	0	179

Table 1 depicts lift pass prices for multiple purchasable categories. Adult season pass and adult weekday ticket prices were available for 139 and 137 resorts, respectively, with data for children's passes being far more sparse. Since this thesis uses the adult weekday ticket as the primary dependent variable in its analysis, the remaining pricing variables will not be evaluated. As seen in Table 1, there is great variation in the prices for adult single-day tickets, with the cheapest costing a mere $23, and the most expensive costing $244. Furthermore, this trend continues with adult season pass prices, with the most expensive costing $3314, and the cheapest costing $377.

Additionally, resort characteristics were obtained using a web scraper, scraping OntheSnow.com's individual resort description sites. Since each website varied on the completeness of the resort characteristics it published, some resorts were missing data for specific control variables, demonstrated by the number of observations being below 139 for some variables.

As demonstrated by Table 2, wide variation in the characteristics of ski resorts exists, motivating an extensive set of hedonic controls for this analysis. This is evidenced by the vertical drop variable, with the smallest vertical drop pertaining to Wintergreen, at 1003 feet, and the largest to Telluride, at 4425 feet. Or, similarly, the Skiable Terrain variable also demonstrates the large variation in resort size, with the smallest resort, Massanutten, being 82 acres, and the largest resort, Powder Mountain, being 8464 acres (although this is not entirely all lift-accessible).

Table 2: Summary Statistics of Hedonic Control Variables

Variable	**N**	**Mean**	**SD**	**Min**	**Max**
Summit	139	7188.817	3343.635	1470	13150
Vertical Drop	139	2040.549	814.3953	1003	4425
Base	139	5170.296	3037.323	250	10800
Project Days Open	120	137.6	31.87881	65	305
Days Open Last Year	127	132.5433	37.14616	40	305
Years Open	139	67.02113	16.12912	14	100
Average Snowfall	139	269.3592	136.3388	0	669
Runs in Total	139	79.67183	60.78232	2	366
Longest Run	139	2.155634	1.194166	.4	6
Skiable Terrain	139	1342.092	1419.47	82	8464
Night Skiing	139	50.74014	111.8983	0	550
Snow Making	139	218.1704	352.6191	0	3379
Gondolas and Trams	139	.415493	.8357522	0	4
High Speed Sixes	139	.471831	1.00843	0	6
High Speed Quads	139	2.15493	2.971008	0	15
Triple Chairs	139	1.873239	1.882578	0	12
Double Chairs	139	1.915493	1.673714	0	6
Surface Lifts	139	2.598592	2.189789	0	12
Ikon	139	0.225	N/A	N/A	N/A
Epic	139	0.113	N/A	N/A	N/A
Unaffiliated	139	0.662	N/A	N/A	N/A

In addition to the data gathered from OntheSnow.com, the websites for both the Epic Pass and Ikon Pass were used to determine the affiliation of the relevant ski resorts for the 2023-2024 season. As depicted in Table 2, the variables Epic and Ikon's relative means depict the proportion of all United States ski resorts included on either pass, with 11.3% being on Epic and 22.5% of resorts being on Ikon, and the remainder are grouped into the category Unaffiliated. Additionally, it is important to note that the resort designations on this list were determined for the unlimited versions of both the Ikon and Epic Passes.

Through careful parsing of the downloaded HTML file from OntheSnow.com, latitude and longitude data for each resort was obtained. Using this data, the resorts were displayed on a map of the United States.

Figure 1: United States Ski Resorts

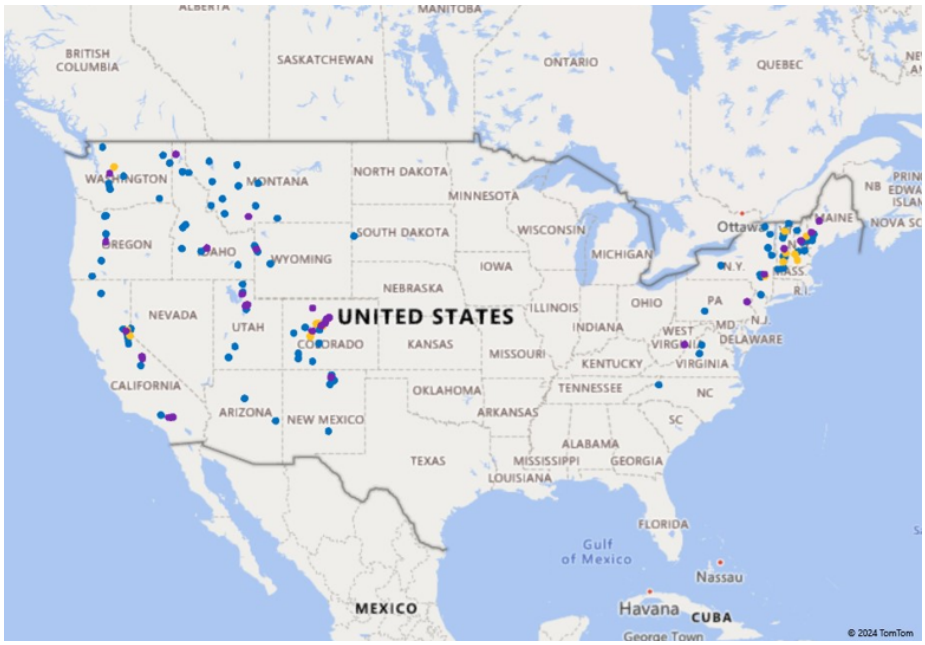

Figure 1 depicts a map of the 139 ski resorts in the United States. Two ski resorts located in Alaska (Alyeska Resort and Eaglecrest) are not pictured in Figure 1. Unaffiliated resorts are located with blue markers, Ikon-affiliated resorts with purple markers, and Epic-affiliated resorts with yellow markers.

In addition to the cross-sectional dataset that was collected for the most recent year, a time-series dataset was collected for eight seasons spanning from 2013 to 2024. The resort lift ticket pricing data was collected from OntheSnow.com's previous websites, accessed through the Internet Archive. Price data was then adjusted for inflation using the consumer price index. Pass affiliation for each year was collected through the archived websites for both the Epic Pass

and the Ikon Pass.

Figure 2: Number of Resorts on the Epic and Ikon Passes

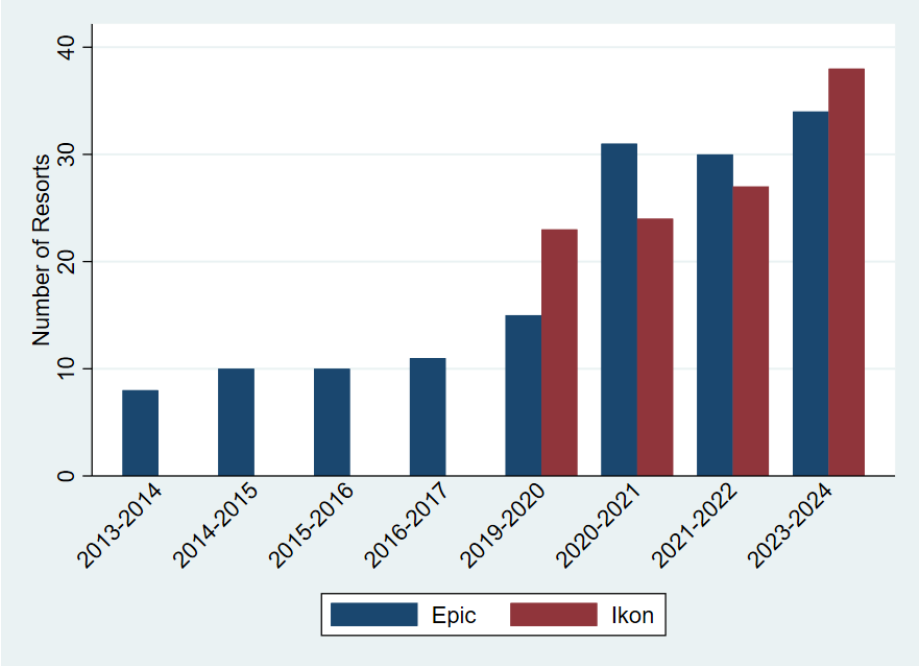

Figure 2 depicts the number of resorts contained in the Epic and Ikon Passes over the periods of analysis. Notably, the creation of the Ikon Pass during the 2018-2019 season can be seen, as well as the rapid growth of both passes over the ensuing years.

3.2 Model

To develop a baseline analysis of the impacts of inclusion in the Ikon or Epic Pass on lift ticket prices, an initial basic ordinary least-squares regression was performed:

$$price_i = \beta_1 ikon_i + \beta_2 epic_i + \gamma_s + \varepsilon_i \tag{1}$$

where the unit of observation, i, is each resort. This regression was performed on the entirety of the 2023-2024 cross-sectional dataset, and the results from this regression help to motivate the necessity of hedonic controls to account for variations in resort quality. This regression also includes state fixed effects, represented by γ_s, to control for state-to-state differences in ski quality.

Using the cross-sectional lift ticket price data from 2023-2024, the following ordinary least-squares regression was run:

$$price_i = \beta_1 ikon_i + \beta_2 epic_i + X_i\beta_3 + \gamma_s + \varepsilon_i \tag{2}$$

where the unit of observation, i, represents an individual resort. The dependent variable for this regression was the lift ticket price, and the independent variable was categorized by the pass-inclusion variables, ikon and epic. The variable X represents a vector of the control variables within the model, which includes the variables listed in table 2. Additionally, state fixed effects were included to control variations between states. The model (2) relies on the theory of hedonic pricing to control differences in resort characteristics and corresponding intrinsic value. Similarly, the principal independent variables controlling for pass affiliation can also be grouped under the classifier of hedonic controls.

This model suffers largely from two threats to identification. The first concern is whether being included in a ski pass is randomly assigned or is associated with intrinsic characteristics of the resort. That is, resorts must meet a certain threshold of quality to be included in the pass, and therefore the measured effect of being included in the pass will be overstated, assuming that a realistic imperfect selection of control variables has been utilized. The second major threat to identification is the violation of the stable unit treatment value assumption. That is, it is unlikely that the existence of the epic and ikon resorts does not affect the outcomes that other resorts receive.

If this conjecture is accurate, then the stable unit treatment value assumption is violated. Therefore, to measure the effect of pass affiliation on competition between resorts, the regression was modified to incorporate the distances between other resorts and their corresponding pass affiliation. The following regressions were performed, evaluating competition in varying manners:

$$price_i = \beta_1 ikon_i + \beta_2 epic_i + \beta_3 numResorts_i + X_i\beta_4 + \gamma_s + \varepsilon_i \tag{3}$$

Regression (3) adds an additional control variable for the number of resorts within a set distance, labeled as numResorts. To evaluate what the optimal distance to identify legitimate threats to competition for a ski resort, the regression was run multiple times for various distances. The effects determined from variable distances can then be evaluated to determine an appropriate distance parameter to use for subsequent regressions.

$$\begin{aligned} price_i = {} & \beta_1 ikon_i + \beta_2 epic_i + \beta_3 numSameResorts_i \\ & + \beta_4 numDiffResorts_i + X_i\beta_5 + \gamma_s + \varepsilon_i \end{aligned} \tag{4}$$

Regression (4) incorporates controls for the number of resorts and the affiliation of the resorts within a deemed "competitive distance." This is done

by breaking up the numResorts parameter into multiple variables counting either similarly affiliated resorts or differently affiliated resorts. For all Ikon and Epic resorts, similarly affiliated resorts were defined by being on the same pass, while differently affiliated resorts were either on the other pass, or no pass at all. For unaffiliated resorts, all other resorts were designated as differently affiliated. Both variables rely on the same optimal competitive distance determined for numResorts in regression (3). The regression was run on the set of cross-sectional data from the 2023-2024 season, while still maintaining hedonic controls and state fixed effects.

The final regression (5) consists of time series data with resorts switching statuses, and allows for the control of each resort, giving a cleaner identification of price increases from pass affiliation.

$$price_{it} = \beta_1 ikon_{it} + \beta_2 epic_{it} + \gamma_i + \gamma_t + \varepsilon_i \tag{5}$$

This allowed for the observation of the change in price due to the direct switch between passes, or from no pass affiliation to a pass for lift ticket prices. Additionally, this model included both time and resort fixed effects to control as much variation in yearly economic conditions and the quality of resorts as possible.

4 Results

Regressions 1-2, as described within the methods section, were run on the 2023-2024 cross-sectional dataset, and the resulting effects from inclusion in the Ikon and Epic Passes were evaluated.

As depicted in Table 3, with no controls over resort characteristics, there is a large effect on ticket prices to be included in either the Ikon Pass or the Epic Pass, with resorts included on the Ikon Pass being able to charge an additional \$51.78 per day, and resorts on the Epic Pass being able to charge an additional \$66.80 per day. Both of these effects were found to be significant to a less than 0.1% level.

However, this result helps to motivate the addition of hedonic controls. Since there were no controls in regression 1, there is significant positive omitted variable bias, as higher quality resorts were more likely to be on the Ikon or Epic Pass and were more expensive. Regression 2 added hedonic controls to the first regression. As demonstrated in Table 3, a significant decrease in the overall effect of being included on either the Ikon or Epic Pass was observed, with Ikon resorts charging an additional \$19.19 per day, and Epic resorts charging an additional \$24.80 per day. This strongly indicates that over half of the price increase found in regression 1 can be accounted for by resort characteristics difference between Ikon, Epic, and unaffiliated resorts.

Additionally, the regression found that of all the control variables in the regression, the number of gondolas and trams and the number of high-speed quad lifts were found to be significant to the 10% level. The model results

Table 3: Effect of Epic and Ikon Pass Inclusion on Lift Ticket Prices (Weekdayadult, $), with and without Hedonic Controls

	(1)	(2)
Ikon	51.78***	19.19*
	(6.18)	(2.19)
Epic	66.80***	24.80*
	(6.16)	(2.42)
Skiable Terrain (100 ac)		0.691
		(1.82)
Gondolas and Trams		9.305
		(1.74)
High Speed Quad Lifts		2.724
		(1.68)
Hedonic Controls		X
N	139	112

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

indicated that for each additional gondola the resort had, they were able to charge $9.31 more, and for each additional high-speed quad chair the resort had, they were able to charge an additional $3.67. Furthermore, the number of skiable acres was also found to be significant to the 10% level, with resorts being able to charge $0.69 for each additional 100 acres of skiable terrain they have.

Next, regressions 3 and 4 were modeled on the 2023-2024 cross-sectional dataset. Regression 3 was modeled to evaluate the effect of resorts within a "competitive distance," measuring from 10 to 100-mile radii, increasing at 10-mile increments. Additionally, regression 3 was run using all the hedonic controls previously used in regression 2.

Table 4: Effect of the Number of Resorts within a given Radius on Lift Ticket Prices (Weekdayadult ($))

Distance (miles)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Ikon	20.53*	18.09*	17.51	18.135*	18.82*	18.68*	19.22*	19.43	18.95*	18.71*
	(8.99)	(9.07)	(8.89)	(8.78)	(8.76)	(8.78)	(8.84)	(8.90)	(8.95)	(8.97)
Epic	25.77*	23.85*	23.35	23.53*	23.42*	23.26*	24.87*	25.11*	25.48*	24.18*
	(10.36)	(10.46)	(10.31)	(10.25)	(10.31)	(10.37)	(10.38)	(10.41)	(10.51)	(10.52)
NumResorts	-2.98	1.417	1.91	1.84	1.40	1.15	-0.06	-0.23	0.15	0.28
	(4.20)	(2.77)	(1.77)	(1.53)	(1.32)	(1.21)	(1.17)	(1.11)	(1.00)	(0.932)
t statistics in parentheses										
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$										

As depicted in Table 4, a sensitivity analysis was conducted to evaluate the effect of resort pass inclusion over increasing radii. All models showed relatively equivalent effects for Ikon and Epic resorts, with estimates for Ikon ranging from 17.51 to 20.53 additional dollars per day, and between 23.35 and 25.77 additional dollars per day for Epic resorts. Most calculated effects were significant to the 5% level, with all being significant at the 10% level.

Additionally, the analysis of the number of resorts within a competitive distance found that for resorts within 10 miles of each other, each additional resort lowered the price by $2.98 per resort. However, from a distance of 20 to 60 miles, the additional price a resort can charge ranges from $1.45 to $1.92 per additional resort within the set radius. This is likely capturing the effect of local variations in ski resort quality, or the premia associated with having multiple choices to pick from that are grouped with the same ski pass or owned by the same ski company. For all resort count variables, the degree of statistical significance was found to be insignificant at the 10% level.

Regression 4 was run on the 2023-2024 cross-sectional data set, using the 40-mile radius for the number of resorts counter. However, regression 4 split the number of resorts counter into two new, separate variables, counting the number of same-affiliation resorts, and the number of opposite-affiliation resorts.

As depicted in Table 5, similar effects were found for Ikon and Epic inclusion, with Ikon-affiliated resorts being able to charge an additional $17.65 per day and Epic-affiliated resorts being able to charge an additional $26.28 dollars per

Table 5: Effect of Similarly and Differently Affiliated Resorts on Lift Ticket Prices

	(4)
	weekdayadult ($)
Ikon	17.65
	(1.94)
Epic	26.28*
	(2.54)
Same Affil. Resorts	2.873
	(0.93)
Different Affil. Resorts	-0.699
	(-0.74)
N	112

t statistics in parentheses, 40-mile resort radius

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

day. The effect for Epic was significant at the 5% level, and the effect for Ikon was significant at the 10% level. Furthermore, counting resorts of the same affiliation found that for each additional resort of similar affiliation within a 40-mile radius, a resort could charge an additional $2.87 per day. Similarly, for each resort within a 40-mile radius of a different affiliation, a resort charged $0.70 less per day. This likely represented a more realistic picture of the competitive nature of the market, as resorts grouped within similar passes control more market power, so they have more price-setting ability, as opposed to resorts of a different affiliation which created competition and lowered prices.

Finally, regression 5 was run using the 2013-2024 dataset. As described within the methods section, resort characteristics were assumed to be mostly constant over the time period, and therefore resort characteristics were controlled for by using both time and resort fixed effects.

Table 6: Effect of Inclusion in Ikon and Epic Passes on Lift Ticket Prices Over Time

	(5)
	weekdayadult (2024 $)
Ikon	6.94***
	(1.77)
Epic	-5.42**
	(-1.71)
N	1853
Year Fixed Effects	X

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As depicted in Table 6, the regression found that being included in the Ikon Pass resulted in a $6.94 per day increase in ticket prices, whereas being included in the Epic Pass resulted in a $5.42 per day decrease in prices. Additionally, there was a price increase each additional year, with 2023-2024 having a $24.98 increase as compared to the base year, 2013-2014.

5 Discussion

The results generated in this paper showed significant increases in ticket prices for resorts included in the Ikon or Epic Pass, across all levels. When strictly comparing resorts without any controls, increases in single-day lift ticket prices of $52 and $67 were found for Ikon and Epic Pass resorts, respectively. However, upon accounting for resort characteristic controls, this number fell to a much smaller $19 and $25 for Ikon and Epic Pass resorts, respectively. For the rest of the analysis, including resort counts of varying affiliations within a set distance, the magnitude of these effects was found to be relatively constant.

When a standard resort count was used in the model within fixed distances, the regression results found that resorts in immediate proximity, or less than 10 miles, led to an overall decrease in the price the resort could charge. As the counting radius was expanded, the results indicated that resorts could charge slightly more, although all effects were found to be statistically insignificant. This could be reflective of the state of competition within the ski industry. Two resorts that are within ten miles of each other are, in most cases, virtually indistinguishable for driving distances, and therefore can be considered as direct competitors to each other. In comparison, resorts that are forty miles apart, as was used in the analysis, have very different driving time costs for consumers and therefore may be less equivalent substitutes for each other.

When the analysis was extended to include the affiliation of the resorts being counted, the analysis yielded that additional resorts within a radius of the same affiliation raised the price a resort could charge, and resorts of other affiliations decreased the price a resort could charge. However, these effects were again found to be statistically insignificant. Similar to the previous simplified case, this may provide some information concerning the market structure of the ski industry. While the ownership structure of Alterra Mountain Company and Vail Mountain Resorts differs, both companies have resorts on their respective passes that are owned and operated by the company itself, and others that are simply affiliated with the pass. This means that in regions where multiple resorts are clustered with the same owner, there is more consolidated market power, and the ability for resorts to form a pseudo-cartel-like pricing structure could occur. Additionally, these results could reflect omitted variable bias in the model. Positive correlations between the number of resorts present in any area, and the price a resort can charge, likely indicate a missing quality aspect to the resorts within a localized area. More specifically, in areas that have better ski conditions, there are likely to be more resorts, and since the skiing at these resorts is "higher quality," more is charged for lift tickets.

This thesis also determined through the evaluation of time-series data that resorts joining the Ikon Pass experienced an increase in the price they could charge for a single-day lift ticket by around $7, while resorts joining the Epic Pass experienced a decrease in the price they could charge by around $6. This model helped to isolate the effect of a new resort joining a pass since it can be roughly assumed that all other characteristics for that resort were held constant for that year. Furthermore, by evaluating the change in prices following a resort

switching from one pass to the other, such as what was done by Arapahoe Basin, the pricing effects can be directly compared and evaluated by the model. Both effects were found to be statistically significant, despite the effect for the Epic Pass being negative, contrary to what was expected. A few potential explanations could provide insight into these results. First of all, the limitations in the data that was collected prevented a completely thorough analysis of the switching effect. An example of this is Park City, one of the country's largest resorts and likely the "highest quality" addition for the Epic Pass over the observed time period. Unfortunately, due to the incomplete nature of the data, Park City had to be removed from the analysis, so the effect of it joining the Epic Pass was not measured. Furthermore, many of the resorts added to the Ikon Pass were "high quality" resorts, or large resorts that can charge very high ticket prices, which may have boosted the effect of joining the Ikon Pass in comparison to the Epic Pass. In contrast, many of the resorts added to the Epic Pass during this time period were small resorts in the Northeast, which may not have as large of an effect on pricing as the large, Colorado and California-based resorts. This leads to a second possible explanation for the price decrease for resorts joining the Epic Pass, with Vail Mountain being able to provide pricing expertise. Since many of the resorts that joined the Epic Pass were smaller, they likely did not have as many resources as the larger resorts and therefore may have struggled to set the optimal profit-maximizing price. However, with the help of a well-endowed corporation such as Vail Mountain Resorts, these resorts may have determined a lower, but more efficient, lift ticket price.

Significant improvements could be made to the dataset, where some resorts are not included due to incomplete or missing price points for varying years. Additionally, as mentioned in Bergeron, OntheSnow.com infrequently updates their prices for resorts, so the prices found for some years may be skewed from what the actual price for that year was and may lag behind when a resort joins one of the passes. Also, with the time-series model, the Epic Pass was present for the entirety of the model, but the Ikon Pass was created in the middle of the time span. This may mean that the model was capturing some of the effects of going from a monopolistic state within the multi-resort pass industry to a duopolistic state, which would have significant effects on the prices resorts could charge.

6 Conclusion

This thesis found a significant, positive correlation between joining a multi-mountain resort pass and increasing lift ticket prices with the most recent cross-sectional data set. While somewhat conflicting results were found when the time-series model was run, multiple limitations to the scope of the model and the completeness of the dataset lend to further research needing to be done. Obtaining more reliable pricing sources directly from ski resorts themselves and the multi-resort pass companies could generate a more accurate dataset. Additionally, when conducting time-series models, having data from years prior

to the creation of the Epic Pass would significantly improve the accuracy and impact of the model.

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