ASSESSING THE SOCIOECONOMIC IMPACT OF CONGLOMERATE SKI PASSES: A HETEROGENEOUS DIFFERENCE-IN-DIFFERENCES ANALYSIS OF U.S. SKI AREAS

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Chris Hampson

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Abstract

This study analyzes the socioeconomic impact of ski resorts joining a conglomerate ski pass, specifically the Ikon Pass or Epic Pass. Using a heterogenous difference-in-differences model, 23 resorts treated between 2014 and 2021 were grouped in cohorts and compared against 14 untreated resorts. Park City and Schweitzer Ski Resort produced significant results, revealing nuanced impacts on factors such as income, housing utilization, and commuting patterns. Findings highlight the complexity of conglomerate inclusion, suggesting future research should use a case study or narrowed approach to better address complexities in the ski industry and available data.

KEYWORDS: (Ski, Ikon Pass, Epic Pass, Conglomerate, Socioeconomic, Heterogenous Difference-in-Differences)
JEL CODES: (Z21, Z31, L25, L21, C21)

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Introduction

In 1970, there were over 1,000 ski resorts in the United States. Today, there are around 500. In 2008, the first major ski pass was introduced, giving skiers unlimited access to six different resorts (Snowsports Industries America, 2018). The conglomerate model gave consumers flexibility and options – untying the knot to single ski resorts and their subsequent snowfall. Consumers could now travel from mountain to mountain, chasing storms or taking vacations, united by one pass. The model was so successful that today, almost all of the roughly 500 U.S. ski resorts are involved in a partnership, reciprocity agreement, or conglomerate pass (Winchester, 2022). The access and options for skiers are limitless, from North America to the Alps to Japan.

In the U.S., eleven corporations own roughly 20% of U.S. ski areas, most of which were purchased in the last 15 years. The founder of the Indy Pass, a conglomerate ski pass with 180+ associated ski resorts across the world, calls resort partnership "business sense." The CEO of Boyne Resorts, the third largest ski corporation in the U.S., tied conglomeration to higher costs and financial tightening in the ski industry. Rising ski lift and infrastructure costs, with the increasing effects of climate change, highlight the need for financial security (Steiger et al., 2020). Beaudin and Huang (2014) found that weather conditions have significant direct and indirect effects on the closure of ski areas. More specifically, climate change played a significant role in altering the structure of the ski industry in New England. Results indicate that larger ski areas are more likely to invest in operations that offset adverse weather effects, highlighting diversification as a safety strategy through conglomerates.

Partnerships can provide a secure path in uncertainty; however, the necessity and impact of industry concentration warrant further examination. As more ski resorts traded hands, concerns regarding management, local impacts, and culture shifts grew substantially. One of the largest consortiums, Vail Resorts, bought Stevens Pass Ski Resort in 2018. By December 2021, an online petition received 46,000 signatures calling out mismanagement and the failure to pay employees a livable wage. Park City Mountain Resort had been under Vail Resorts control since 2004, but it wasn't until late 2021 when a union-action fundraiser raised over $100,000, once again fighting for a livable wage, this time for the Ski Patrol Association. At the time, I had spoken with Patrick Murphy, the Business Manager for the Park City Ski Patrol Association. In our conversation, he echoed the persistent concerns heard across the U.S., "We were kind of just representative of a greater battle amongst the industry and amongst the company for getting these higher wages. And I think that both of us saw that we represented more than just ourselves." The list of these instances goes on, and at the time of writing, Solitude Ski Patrollers petitioned for union representation. Since 2021, union membership has doubled for ski patrollers and lift maintenance workers at ski resorts in the U.S., now totaled over 700 members (Hawks, 2023).

In 2011, Alterra Mountain Company proposed development at Palisades Tahoe ski resort, including multiple high-rise condominiums and the construction of over 100,000 square feet of commercial property. An activist group, The Sierra Watch, filed a lawsuit against Alterra, creating petitions, and in May of 2023, performed a study finding 99% of the 2,686 comment letters oppose the Alterra Proposal. The Sierra Watch called

on local citizens to “secure our shared Sierra values” against Alterra’s capitalization on the “great growth potential” of Palisades Tahoe.

Workers are unionizing and social media is flooded with complaints of a changing ski culture. Concentrating ownership and multi-mountain passes are altering industry dynamics by targeting a new type of consumer. The prospective consequences and implications of the industry shift are unknown, but skiers across the U.S., on chairlifts, social media, ski bars, and from the armchair, believe the “big guys” are, or will, ruin skiing. The validity of assertions is backed by ski culture and unionization movements, but to what degree are they reputable? The move towards conglomeration, epitomized by the Ikon Pass and Epic Pass, prompts an examination beyond effects on ski culture to economic ramifications for residents. Ski towns’ unique economic and geographical positioning prompts a critical question: Do conglomerate ski passes impact the socioeconomic environment of local communities?

This study tracks ski resorts’ involvement in the two largest conglomerate passes, The Ikon Pass and Epic Pass, analyzing the impact of inclusion on local socioeconomic characteristics. Using a heterogenous difference-in-differences model (Falk and Scaglione, 2018), each ski resort’s conglomerate involvement is tracked adjacent to income, housing utilization, and commuting statistics. Data from ski resort and ski pass websites are paired with zip code characteristics from the Census Bureau. This study aims to understand the impact conglomerate passes have on ski area communities.

Literature Review

Analyzing the past and present state of the ski industry sets the stage for in-depth analysis. This section discusses consumer behavior regarding visitation numbers and habits, the evolution of the ski industry and subsequent shift towards conglomeration, and tourism's impact on ski towns. The final section draws a parallel between the growth of conglomerate ski corporations and the rise of Airbnb as a large corporate entity in European cities.

2.1 Ski Industry Growth and Visitation

The 2021/22 and 2022/23 winter seasons saw the highest national totals for skier visits, totaling approximately 60 million visits in the 2021/22 season and 65 million visits in the 2022/23 season (NSAA, 2023). According to the National Ski Areas Association Economic Report (2022), over the last decade, the CAGR for total gross revenue was 7.3%, with 12.3% growth in operating profit and an increase of 23.1% in pre-tax profit. Total downhill snow sports visits are up 19.3% from the 2012/13 season. Extra-large ski areas, as classified by the NSAA, were largely responsible for such growth, with increases in gross revenue by 30%, per skier visit by 21%, and pre-tax profit by 96% (NSAA, 2022).

Tickets and passes accounted for 53.8% of gross revenue, up 28.8% year-over-year. Season pass sales records continue to be broken, yet revenue is largely gathered from tickets, which account for 49.6% of the total ticket/pass revenue. Financial and business measurements prove industry growth is led by larger ski areas and increases in annual ski visits.

The increase in skier visits and profitability showcases industry attractiveness from an investment standpoint. Skier visits are critical to industry growth and are the result of a few factors. An early study by Echelberger and Shafer (1970) found that snow accumulation directly affects the average annual number of visitor days. More recently, a study found that the most critical factors were ski resort conditions, including the quality of ski runs and snowfall totals (Sun, Xie, et al., 2022). Resort conditions had the largest effect on the overall experience and were the most valued attribute. Other factors included cost, leisure, services, and scenery.

Skiers are segmented into two groups: the vacationing skier, accessing a few days a year, and the local or semi-local skier, typically visiting weekly throughout the season (Perdue, 2012). The season pass skier believes a season pass is a better financial investment than a day or multi-day ticket (Malasevska & Haugom, 2018). Season pass holders have greater flexibility in the face of poor conditions. Malasevska & Haugom (2018) suggest ticket holders are likely not living locally and are visiting for a weekend or vacation. The conglomerate model, with cheaper multi-resort options, offers the occasional skier the same opportunity as season pass holders. Conglomerate passes alter consumer visitation, allowing greater flexibility for planning in the face of resort conditions.

2.2 Evolution of Ski Resort Conglomeration

Pass conglomeration was created on a whim in 1998 as a family deal offered by Keystone Ski Resort fueled a price war between Colorado ski resorts. Passes were discounted by 75%, driving intense competition and the creation of a pass partnership between three Colorado ski resorts: Keystone, Breckenridge, and Arapahoe Basin. Total

season passes between competing resorts hit 66,000, up from less than 10,000 the year before. The frequency of skier days saw a decline that year due to poor snow conditions, further highlighting the impact of uncontrollable weather events (Perdue, 2012).

A 2007 study by the Organization for Economic Co-operation and Development (OECD) analyzed mergers and partnerships in the European Alps. Benefits included synergies, reduced competition, market share, and diversification. The OECD discussed the North American ski industry's move to conglomeration, citing greater access to capital and marketing resources as an adaptive strategy to reduce the financial strain from climate change. Regional diversification aided losses due to poor conditions, further reinforced by Beaudin and Huang (2014), highlighting increased capital and diversification as safeguards in the face of increasing seasons with poor snowfall (Steiger et al., 2020). Falk (2009) analyzed conglomerate and independent ski resorts for differences in operating efficiency. In contrast to speculated synergies, results largely showed that independent ski resorts are no more or less operationally efficient. However, conglomerates are likely more financially efficient due to geographical diversification.

2.3 The Impact of Ski Tourism

Tang et al. (2023) found a strong tie between economic development and tourism. However, issues arose in British Columbia, CA, regarding development and tourism (Chipeniuk, 2005). Externalities persist if planning capacities are inadequate for large developments. Properly prepared towns in British Columbia cited the economic effect of such a situation as positive (Chipeniuk, 2005). Issues regarding changes in quality of life due to provincial economic growth cited the necessity for proper planning and accountability.

There was a significant impact on local communities when China hosted the 2022 Winter Olympics. Increased ski tourism revenue positively affected both urban and rural residents, highlighting the potential for poverty alleviation (Wang et al., 2022). Economic development was sustained following the Olympics, further citing the benefits gleaned from short-term visitation.

The economic effects of development and tourism are variable and highly dependent on the current economic state and population. *The Downhill Slide* by Hal Clifford (2002) discussed the "Aspen Effect." The effect? Nobody who works in Aspen lives in Aspen. Clifford cites income disparity in the ski industry as the sole reason why affordable housing and transportation have become the most contentious industry concerns. Over 24,000 people commuted into Colorado ski towns for work in 1997, projected to be closer to 59,000 by 2020 (Clifford, 2002). This study uses Clifford's findings as a basis for measuring commuting time and work-from-home statistics. However, variation in zip code tabulation complicates the estimates of these numbers and effects.

2.4 Parallels from Airbnb's Growth in European Cities

The expected impact of entering a ski pass consortium is an increase in tourism presence and short-term visitation. Consequently, there is an expected increase in investment in local real estate and housing. Alterra and Vail Resorts have transitioned from resort partnership to ownership in multiple instances, signifying a further change in corporate structure and operation.

A 2023 study by the Cambridge Journal of Regions examined the effects of the accommodation platform industry, specifically analyzing Airbnb as a large corporate

entrant in the short-term rental market in Madrid, Spain. The study found a shift in local space to accommodate tourists, consequently masking negative effects in non-tourism sectors. Hidalgo et al. (2023) found a displacement of resident-oriented businesses directly related to Airbnb's presence. Three separate studies found decreases in long-term rental supply and subsequent increases in local rent due to Airbnb's increased presence in various European cities (Obrč, 2021; Shabrina et al., 2021; Franco et al., 2021). Building on these findings, housing utilization is a main measurement in this study. Xu et al. (2021) found an increase in Airbnb listings correlated with increases in residential renovations, retail renovation investment, and various business licenses. Effects were produced largely by commercial Airbnb hosts operating multiple listings. Airbnb's growth in presence and localized effects act as a parallel to corporate entry in U.S. ski towns, showcasing the impact industry expansion has on socioeconomic characteristics.

Methodology

3.1 Ski Resort Organization

This study analyzes 37 ski resorts in the U.S. Of these resorts, 23 are a part of the Ikon or Epic pass, offering access to five, seven, ten, or unlimited days. Analyzing the two largest ski passes tailors analysis and increases the likelihood of localized effects. While many ski resort partnerships occur on a lower scale including smaller resorts, smaller passes, and smaller pass access, this study focuses solely on larger groups. The Ikon Pass and Epic Pass, owned by Alterra Mountain Co. and Vail Resorts Inc., are expected to have increased effects due to factors such as size, visitation, financial strength, and overall prominence in the industry (NSAA, 2022). The following regions and states were analyzed:

1. Rocky Mountain – Colorado, Wyoming, Montana, Utah, New Mexico, Idaho
2. Pacific Northwest – Alaska, Washington, Oregon
3. Pacific Southwest – California

This study does not analyze Northeast, Midwest, or Southeast regions, due to limited scope and the smaller average size of resorts within these regions. The three regions average around 2,000 skiable acres, compared to an average of just a few hundred for the excluded regions. The 14 resorts in these regions, not involved with the Ikon or Epic pass, are the untreated group.

Almost all conglomerate inclusion occurred between 2011-2022, aligning with available census data. Some resorts were bought by Alterra or Vail Resorts, but this study categorizes treatment as the same, regardless of partnership or a buyout. Treatment effects for resorts that joined conglomerates in years closer to 2022 are limited. Eight ski resorts already in conglomerates before this time range were excluded. Ski resorts Brighton and Snowbird were excluded due to shared zip codes with ski resorts Solitude and Alta, which partnered in the same year as their counterparts. Deer Valley was excluded due to a shared zip code with Park City, which partnered in a prior year.

3.2 Data Collection

Ski resort and resort access were gathered from the Ikon Pass and Epic Pass websites. Skiable acreage was gathered from each ski resort's website. Average snowfall was gathered from Z Rankings (https://www.zrankings.com/ski-resorts/snow), providing consistent snowfall measurement. Z Rankings uses a custom "True Snowfall" calculus, nullifying measurement variation across ski resorts. Ski resorts were paired with the zip code they reside in, according to their website and in line with Census Bureau mapping.

Zip code tabulation varies by state, location, and relevancy to ski resorts. Certain ski resorts are immediately surrounded by five to six zip codes while others are just one. Ski resorts were paired with one zip code for consistency and reliability, given the broad scope of this study.

The 37 zip codes were used to pull socioeconomic data from the 5-year estimates of the American Community Survey (ACS). Data was gathered in the years 2011-2022, using the following codes corresponding with five characteristics, including Mean Household Income (DP03_0063E), Median Contract Rent (B25058_001E), Mean Travel Time to Work (S0801_C01_046E), Housing for Seasonal, Occasional, or Recreational Use (B25004_006E), and Worked from Home (DP03_0024E). The purpose of these factors is to represent relevant changes to livelihood during conglomerate inclusion.

Table 1 contains the descriptive statistics for variables used in **Equation (1).**

Table 1
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Skiable Acreage	444	2550.62	1782.80	240	8464
Average Snowfall (in.)	444	337	106.52	83	651
Total Population	444	10010.92	12642.36	35	50767
Mean Household Income	442	91925.24	31434.897	32167	273792
Median Contract Rent	373	997.42	321.50	348	2642
Housing for Seasonal, Occasional, or Recreational Use	444	1602.59	1719.22	0	7743
Worked at Home	444	520.11	707.40	0	4827
Mean Travel Time to Work	393	20.99	8.49	.9	55.5
Partnered	444	.24	.43	0	1

3.3 Analysis Technique

Data is analyzed using a heterogenous difference in differences model with two-way fixed effects. **Table 2** illustrates the 23 ski resorts that joined the Ikon or Epic pass between 2011-2022, and the 14 that did not. The five cohorts: 2014, 2018, 2019, 2020, and 2021, make the inclusion to a conglomerate pass, or hereby "treatment."

Table 2

Resort	Treatment-time Resort Cohorts						
	Never treated	2014	2018	2019	2020	2021	Total
Alta Ski Area	0	0	1	0	0	0	1
Alyeska Resort	1	0	0	0	0	0	1
Aspen Snowmass	0	0	1	0	0	0	1
Big Bear Mountain Resort	0	0	1	0	0	0	1
Big Sky Resort	0	0	1	0	0	0	1
Bogus Basin	1	0	0	0	0	0	1
Brian Head	1	0	0	0	0	0	1
Bridger Bowl	1	0	0	0	0	0	1
Copper Mountain Resort	0	0	1	0	0	0	1
Crystal Mountain	0	0	0	1	0	0	1
Crested Butte	0	0	1	0	0	0	1
Eldora Mountain Resort	0	0	1	0	0	0	1
Grand Targhee	1	0	0	0	0	0	1
Jackson Hole Mountain Resort	0	0	1	0	0	0	1
June Mountain	0	0	1	0	0	0	1
Mammoth Mountain	0	0	1	0	0	0	1
Mt. Bachelor	0	0	0	0	1	0	1
Monarch	1	0	0	0	0	0	1
Mt. Baker	1	0	0	0	0	0	1
Mt. Hood Meadows	1	0	0	0	0	0	1
Palisades Tahoe	0	0	1	0	0	0	1
Park City	0	1	0	0	0	0	1
Powder Mountain	1	0	0	0	0	0	1
Purgatory	1	0	0	0	0	0	1
Schweitzer	0	0	0	0	0	1	1
Snow Valley	1	0	0	0	0	0	1
Solitude Mountain Resort	0	0	0	1	0	0	1
Steamboat	0	0	1	0	0	0	1
Sun Valley	0	0	0	1	0	0	1
Sierra at Tahoe	1	0	0	0	0	0	1
Stevens Pass	0	0	1	0	0	0	1
Taos Ski Valley	0	0	0	1	0	0	1

The Summit at Snoqualmie	0	0	0	1	0	0	1
Telluride	0	0	1	0	0	0	1
Winter Park	0	0	1	0	0	0	1
Whitefish	1	0	0	0	0	0	1
Wolf Creek	1	0	0	0	0	0	1
Total	14	1	15	5	1	1	37

The heterogenous model accounts for the different treatment times by creating the cohorts in **Table 2**. This model analyzes the average treatment effects on the treated (ATETs) by comparing the average effects from untreated resorts to treated resorts, before and after a cohort is treated. The untreated resorts are in the same geographical regions and reflect similar ranges of snowfall and acreage to treated resorts. The extended two-way fixed effects (twfe) method accounts for unobserved heterogeneity across time and within individual characteristics.

Covariant factors include zip code population, average snowfall, and skiable acreage. These factors capture characteristics influencing ski resort dynamics and skier demographics (Sun, Xie, et al., 2022). The total population may influence skier demand characteristics, as well as capture variation in zip code tabulation. Average snowfall and skiable acreage act as key attractions, accounting for consumer resort visitation (Sun, Xie, et al., 2022). Data is paneled per resort, set yearly.

3.4 Econometric Model

Equation (1) (Woodridge, 2021) is the estimator for extended two-way fixed effects in a heterogenous difference-in-differences model:

$$Y_{it} = a_i + \gamma_t + x_{it}\beta + d_{it}\tau + \varepsilon_{it} \qquad (1)$$

Yit is the dependent variable (zip code characteristic, such as Mean Household Income), for resort *i*, in year, *t*. Each resort fixed effect is represented by αi, and the time-fixed

effect is represented by γt. $xit\beta$ represents the explanatory covariates: total population, skiable acreage, and average snowfall. $dit\tau$ represents the time-variant treatment of each resort through the period. The error term is expressed by εit, capturing unobserved factors affecting Yit. Equation (1) regresses the ATET on resorts joining the Ikon or Epic pass between 2011-2022, controlling for heterogeneity of treatment and two-way fixed effects for time and resort. The equations for each socioeconomic characteristic are as follows:

Mean Household Income = Individual resort FE + Time FE + Covariates (Total Population, Skiable Acreage, and Average Snowfall) + Temporal Treatment Variation + Error Term. (2)

Median Contract Rent = Individual resort FE + Time FE + Covariates (Total Population, Skiable Acreage, and Average Snowfall) + Temporal Treatment Variation + Error Term. (3)

Mean Travel Time to Work = Individual resort FE + Time FE + Covariates (Total Population, Skiable Acreage, and Average Snowfall) + Temporal Treatment Variation + Error Term. (4)

Housing for Seasonal, Occasional, or Recreational Use = Individual resort FE + Time FE + Covariates (Total Population, Skiable Acreage, and Average Snowfall) + Temporal Treatment Variation + Error Term. (5)

Worked from Home = Individual resort FE + Time FE + Covariates (Total Population, Skiable Acreage, and Average Snowfall) + Temporal Treatment Variation + Error Term. (6)

Results

4.1 Mean Household Income

Results from **Equation (2)**, using Mean Household Income, filed as DP03_0063E from the 5-year estimates American Census Survey, analyze the average household income. Results from **Equation (2)** in **Table 3** show that the treatment of resorts joining the Ikon or Epic pass had no statistical significance on mean household income for cohorts 2018, 2019, or 2020.

The 2014 Cohort produced statistical significance in the years 2015, 2020, 2021, and 2022, at the 1% level. In the first year after treatment, 2015, there was a positive ATET of $35,339 on mean household income. 2020 showed an ATET increase of $33,017.60, followed by $38,821.38 in 2021, and $46,848.57 in 2022. The 2014 Cohort exclusively included Park City Ski Resort, since it was the only resort treated in this year **(Table 2)**.

In **Table 3**, The 2021 Cohort had statistical significance at the 1% level for the only available year of study following treatment, 2022. The ATET was a reduction of $13,330.90 in mean household income. Similarly to Park City Ski Resort, Schweitzer Ski Resort was the only resort in the 2021 Cohort **(Table 2)**.

It is important to note that consumer behavior is likely much different between these areas. The short time frame following Schweitzer's treatment may have affected the results.

Table 3

VARIABLES	Cohort*: 2014	Cohort: 2018	Cohort: 2019	Cohort*: 2020	Cohort*: 2021
Year = 2015	35,339.21***				
	(5,714.42)				

Year = 2016	18,031.66				
	(14,203.28)				
Year = 2017	18,766.58				
	(11,701.24)				
Year = 2018	16,298.01				
	(8,130.37)				
Year = 2019	12,557.17	-4,878.31			
	(10,602.96)	(11,977.88)			
Year = 2020	33,017.60***	15,786.14	1,670.71		
	(7,122.96)	(12,660.79)	(8,574.07)		
Year = 2021	38,821.38***	11,793.38	1,724.57	-16,662.70	
	(9,153.97)	(9,443.51)	(8,120.93)	(14,017.64)	
Year = 2022	46,848.57***	12,137.00	3,144.98	-9,110.04	-13,330.90***
	(11,801.59)	(9,071.66)	(8,893.03)	(15,737.38)	(3,834.63)
Observations	442	442	442	442	442

Note: Robust standard errors in parentheses. Cohort* = Exclusively contains one treated ski resort. Cohort = Year of treatment.
*** p<0.01, ** p<0.05

4.2 Median Contract Rent

Results from **Equation (3)**, using Median Contract Rent, filed as B25058_001E from the 5-year estimates American Census Survey, analyze the change in the monthly median contract rent price. Results from **Equation (3)** in **Table 4** show that the treatment of resorts joining the Ikon or Epic pass had no statistical significance on median contract rent for cohorts 2018, 2019, or 2020.

The 2014 Cohort had statistical significance in the years 2019, 2020, 2021, and 2022, at the 1% level. In 2019, there was a negative ATET of $839.38 on median contract rent. In the following years, there was a negative ATET of $687.58, $698.89, and $604.70, for 2020, 2021, and 2022, respectively. In **Table 4**, The 2021 Cohort had statistical significance at the 1% level for the only available year of study following treatment, 2022. The ATET was a reduction of $319.58 in median contract rent.

In this case, both cohorts saw decreases in median contract rent, yet at varying years following treatment. The inclusion of conglomerate presence had a net negative effect on contract rent in these cohorts. In Park City, one explanation is that rental properties increased in supply following treatment. The market may have recognized effects a few years later, creating an oversupply and driving rental prices down. In the case of Schweitzer Ski Resort, the market may have readily reacted, causing an immediate decrease in rental prices.

Table 4

VARIABLES	Cohort*: 2014	Cohort: 2018	Cohort: 2019	Cohort*: 2020	Cohort*: 2021
Year = 2015	102.57				
	(110.58)				
Year = 2016	71.61				
	(130.26)				
Year = 2017	61.27				
	(185.10)				
Year = 2018	-215.11				
	(199.16)				
Year = 2019	-839.38***	-214.50			
	(164.84)	(121.53)			
Year = 2020	-687.58***	-190.44	106.39		
	(172.82)	(123.82)	(170.96)		
Year = 2021	-698.89***	-118.33	102.31	11.74	
	(163.10)	(134.10)	(178.88)	(142.85)	
Year = 2022	-604.70***	-86.35	60.61	52.69	-319.58**
	(134.57)	(139.85)	(171.46)	(137.80)	(155.17)
Observations	373	373	373	373	373

Note: Robust standard errors in parentheses. Cohort* = Exclusively contains one treated ski resort. Cohort = Year of treatment.
*** p<0.01, ** p<0.05

4.3 Mean Travel Time to Work

Results from **Equation (4)**, using Mean Travel Time to Work (S0801_C01_046E) from the 5-year estimates American Census Survey, analyze commuting time to work.

Results from **Equation (4)** in **Table 5** show that the treatment of resorts joining the Ikon or Epic pass had no statistical significance on mean travel time for cohorts 2018, 2019, or 2021.

The 2014 Cohort produced statistical significance at the 5% level in 2017 and 2019, and statistical significance at the 1% level in 2018. The ATET for 2017, 2018, and 2019, was an increase of 6.61 minutes, 5.41 minutes, and 3.05 minutes, respectively. This indicates that as Park City joined the Epic Pass in 2014, there was an increase in commuting time compared to untreated ski resort areas. The 2020 Cohort, exclusively Mt. Bachelor, showed statistical significance at the 5% level for the two years following treatment, 2021 and 2022. After Mt. Bachelor joined the Ikon pass in 2020, there was an average increasing travel time of 3.97 minutes and 9.67 minutes in the following years.

Table 5

VARIABLES	Cohort*: 2014	Cohort: 2018	Cohort: 2019	Cohort*: 2020	Cohort*: 2021
Year = 2015	2.71				
	(2.30)				
Year = 2016	3.50				
	(2.07)				
Year = 2017	6.61**				
	(2.79)				
Year = 2018	5.41***				
	(1.39)				
Year = 2019	3.05**	1.70			
	(1.36)	(1.67)			
Year = 2020	-0.51	-0.71	-0.12		
	(4.70)	(3.88)	(2.46)		
Year = 2021	1.10	1.69	1.11	3.97**	
	(1.22)	(1.94)	(0.72)	(1.86)	
Year = 2022	-1.49	-0.23	-0.44	9.67**	0.70
	(2.22)	(2.87)	(2.06)	(4.52)	(0.96)
Observations	388	388	388	388	388

Note: Robust standard errors in parentheses. Cohort* = Exclusively contains one treated ski resort. Cohort = Year of treatment.
*** p<0.01, ** p<0.05

4.4 Housing for Seasonal, Occasional, or Recreational Use

Results from **Equation (5)**, using Housing for Seasonal, Occasional, or Recreational Use (B25004_006E) from the 5-year estimates American Census Survey, analyze the number of housing units that are not lived in year-round. Results from **Equation (5)** in **Table 6** reveal the treatment had no statistical significance for the 2018, 2019, and 2020 cohorts.

The 2014 Cohort showed statistical significance at the 1% level from 2015-2017 and 2020-2022. Housing units for seasonal, occasional, or recreational use decreased by 344.49, 760.06, and 361.58 for 2015, 2016, and 2017. Similarly, from 2020 to 2022, housing units decreased by 184.76, 840.62, and 1,031.05. The decrease in housing units is the average effect Cohort 2014 experienced due to treatment compared to resorts that were untreated. The conglomerate presence may have incentivized owners to utilize housing for permanent residences or short-term rentals like Airbnb's. The 2021 Cohort had an average treatment effect statistically significant at the 5% level of 152 more housing units in 2022. The 2014 and 2021 cohorts differed in the directionality of average treatment effects.

Table 6

VARIABLES	Cohort*: 2014	Cohort: 2018	Cohort: 2019	Cohort*: 2020	Cohort*: 2021
Year = 2015	-344.49***				
	(77.69)				
Year = 2016	-760.06***				
	(83.61)				

Year = 2017	-361.58***				
	(91.90)				
Year = 2018	-102.23				
	(112.11)				
Year = 2019	-141.35	87.23			
	(73.78)	(65.66)			
Year = 2020	-184.76***	125.96	80.17		
	(50.65)	(68.13)	(86.42)		
Year = 2021	-840.62***	177.23	146.61	-114.20	
	(76.03)	(94.87)	(109.46)	(164.07)	
Year = 2022	-1,031.05***	177.76	169.07	-185.65	152.38**
	(102.63)	(105.96)	(133.63)	(222.57)	(65.13)
Observations	444	444	444	444	444

Note: Robust standard errors in parentheses. Cohort* = Exclusively contains one treated ski resort. Cohort = Year of treatment.
*** p<0.01, ** p<0.05

4.5 Worked at Home

Results from **Equation (6)**, using Worked at Home (DP03_0024E) from the 5-year estimates American Census Survey, analyze the number of residents working from home. Results from **Equation (6)** in **Table 7** reveal the treatment had no statistical significance for the 2018 and 2019 cohorts.

The 2014 Cohort had statistical significance at the 1% level for 2015, and statistical significance at the 5% level for years 2016, 2019, and 2021. The number of residents working from home increased by 188.26 in 2015, followed by 144.55 in 2016. In 2019 there was an average decrease of 140.56 residents, and in 2021, a decrease of 119.14 residents working from home. The 2020 Cohort, represented by Mt. Bachelor, saw an increase in the two years immediately after treatment. Statistically significant at the 1% level, there was on average, a 307.92 and 480.73 increase in residents working

from home, compared to untreated ski resorts. The 2021 Cohort had an ATET decrease of 706.42 residents in 2022, statistically significant at the 1% level.

While Mt. Bachelor saw substantial relative increases, Schweitzer Ski Resort displayed a large decrease, and Park City's results varied across the years. **Table 7** is a case highlighting the individuality of resort characteristics and the consequences of broad measurement.

Table 7

VARIABLES	Cohort*: 2014	Cohort: 2018	Cohort: 2019	Cohort*: 2020	Cohort*: 2021
Year = 2015	188.26***				
	(56.75)				
Year = 2016	144.55**				
	(55.49)				
Year = 2017	124.09				
	(71.68)				
Year = 2018	75.91				
	(82.53)				
Year = 2019	-140.56**	42.67			
	(68.75)	(73.19)			
Year = 2020	11.22	112.97	11.06		
	(100.31)	(70.78)	(106.61)		
Year = 2021	-119.14**	44.23	130.27	307.92***	
	(50.06)	(80.79)	(204.03)	(104.70)	
Year = 2022	-89.74	46.59	93.55	480.73***	-706.42***
	(67.28)	(81.87)	(245.87)	(83.63)	(36.21)
Observations	444	444	444	444	444

Note: Robust standard errors in parentheses. Cohort* = Exclusively contains one treated ski resort. Cohort = Year of treatment.
*** p<0.01, ** p<0.05

Discussion

The 2014, 2020, and 2021 cohorts exclusively analyze single ski resorts. Statistically significant average treatment effects varied by years within cohorts, as well

as between cohorts. Due to the broad approach of this study, not all unique resort characteristics are accounted for.

5.1 Park City: Cohort 2014

Park City Ski Resort's paired zip code accurately reflects the local ski community. It sits about an hour from Salt Lake City, which has a large urban population and a large airport. The ability to fly in and stay overnight in Park City attracts a more affluent, vacation-oriented skier demographic. In an aggregate model, Park City produced statistically significant ATETs for increased mean household income of $27,611.15 **(Appendix A)**, a decrease in contract rent by $305.85 **(Appendix B)**, and a reduction in seasonal, occasional, or recreational housing by 436.44 units **(Appendix D)**. Park City likely experienced economic growth from increased skier visitation and/ or investment by conglomerate corporations during this time, explaining the increase in income. The reduction in contract rent could be due to an increase in long-term housing, or affordable housing projects put forth by the town of Park City. Similarly, the relative effect of a reduction in occasional housing could be due to a shift towards long-term housing, or a shift to short-term rentals, such as Airbnb's. This would also be in line with the 2023 study by the Cambridge Journal of Regions, which revealed a shift in local spaces to accommodate tourists for Airbnb.

5.2 Mt. Bachelor: Cohort 2020

Mt. Bachelor produced an aggregate ATET, statistically significant at the 1% level, for an increase in residents working from home by 320.88 **(Appendix E)**. Although significant, these results are likely the result of zip code tabulation. The Mt. Bachelor zip

code extends into a larger urban population, including the town of Bend, OR. The broad inclusion of data by size and tabulation detaches the likelihood of accurate results.

5.3 Schweitzer Ski Resort: Cohort 2021

Schweitzer Ski Resort produced statistically significant aggregate ATET including a decreased mean household income of $13,788.48 **(Appendix A)**, decreased median contract rent of $329.57 **(Appendix B)**, increased seasonal, occasional, or recreational housing units by 166.26 **(Appendix D)**, and a decrease in residents working from home by 663.81 **(Appendix E).** Aggregate results provide a generalization of effects. However, treatment in 2021 leaves only one year of data for analysis. The short time frame combined with zip code variability makes concluding increasingly difficult. These results highlight the importance of comprehensive models that account for the bounds of a ski area community.

5.4 Challenges and Considerations

Snowfall and skiable acreage are consistent measurements of ski resort characteristics. Conversely, zip code data gathered from the Census Bureau varied in size and locality to resorts, negatively affecting the accuracy of models. As a result, socioeconomic characteristics can become detached from ski resorts. Smaller zip code areas can exclude local populations residing not immediately nearby, whereas larger zip code areas may include broader populations unassociated with the desired area of study. Notably, Taos Ski Valley represented an extremely small population (<100 residents) unrealistic to the total population affected by conglomerate inclusion. Inversely, areas like Alta and Solitude encapsulate regions of Salt Lake City. These resorts are located in very small towns in canyons that run west out of Salt Lake City. Unless these regions can

be measured, it would be expected that most residents are in Salt Lake City, where effects would be unlikely. The same applies to Mt. Bachelor and its proximity to Bend, OR. These reasons result in zip code tabulation not accurately representing rental markets, income distributions, or commuting patterns.

The accuracy of data pertaining to resort locality is difficult to analyze on a broad level. Cohorts 2018 and 2019 contained the most resorts, with 15 and 5 ski resorts respectively. These cohorts had no statistical significance across any of the five socioeconomic measurements, whereas cohorts 2014, 2020, and 2021, only contained individual resorts and contained statistical significance in various areas.

Due to the variance in measurement, an optimal approach would be case-study or smaller-scale studies. Defining the bounds of ski resort communities, the concentration of potential effects, and the interaction between resorts and local populations should be examined further. The 2014 Cohort in **Tables 3, 4, 5, 6, and 7**, had varying statistically significant results. Potential reasons for significance could include the accuracy of zip code representation, proximity to broader urban populations/ large airports, and/ or skiing acting as the main economic force.

Conclusion

This study aims to understand the potential socioeconomic effects of ski resorts' inclusion into conglomerate ski passes, specifically, the Ikon and Epic pass. Ski resorts were paired with relevant zip codes, which included data for mean household income, median contract rent, mean travel time to work, housing for seasonal, occasional, or recreational use, and working from home. A heterogenous difference-in-differences model with two-way fixed effects was used to measure treatment across years. The

treatment cohorts 2014, 2018, 2019, 2020, and 2021 represent when resorts joined a conglomerate ski pass. The heterogenous difference-in-differences model measured the ATET, average treatment effect on the treated, for each year following treatment. 23 ski resorts were treated across cohorts with 14 untreated resorts as the control. Untreated resorts reflected broad geographical location and resort characteristics. While there was no statistical significance for the 2018 Cohort (15 ski resorts) or the 2019 Cohort (5 ski resorts), cohorts representing one ski resort produced statistically significant results.

The 2014 Cohort, Park City, produced significant results for various years after treatment, for all tested variables. Using an aggregation of the ATET, treatment effects can be summarized for all years following treatment. Park City Ski Resort produced aggregate statistically significant results of an increased mean household income of $27,611.15 **(Appendix A)**, a decrease in contract rent by $305.85 **(Appendix B)**, and a reduction in seasonal, occasional, or recreational housing units by 436.44 **(Appendix D)**. Using the same method, Schweitzer Ski Resort (Cohort 2021) produced statistically significant results of decreased mean household income of $13,788.48 **(Appendix A)**, decreased contract rent by $329.57 **(Appendix B)**, increased seasonal, occasional, or recreational housing units by 166.26 **(Appendix D)**, and decreased residents working from home by 663.81 **(Appendix E)**. The 2020 Cohort, Mt. Bachelor, produced a statistically significant increase in residents working from home by 320.88 **(Appendix E)**. The average treatment effect varied across cohorts, including inversed directionality. The aggregate results do not reflect the intricacies of treatment, yet parallel total effects over the years after treatment. Diverse trends and outcomes are shown through variations in treatment effects, highlighting the complexity of conglomerate inclusion.

This study used total population, average snowfall, and ski resort size as covariates. Further research should consider two main strategies regarding measurement and local economic influence. Using the best available data from the zip code tabulation, resorts were paired with the zip code they resided in. A narrowed or case-study approach would mitigate discrepancies between socioeconomic zip code data and its relevancy to ski resorts. Ensuring zip codes accurately reflect the desired population is critical to produce meaningful results. Optimal measurement may best fit a model that considers bounds and urban population confoundment. Selecting areas where ski tourism is a dominant economic force will aid in the relevancy of data and potential effects. Furthermore, the proximity of urban populations and large airports can affect the consumer demographic, affecting local economic dynamics. The NSAA Economic Analysis Survey from 2021/22 asks resorts to self-identify metrics in the following categories: Resort type, Season Length, Employee Count, and Day/ Overnight Visits. A model encapsulating these factors can align resorts, or aid in the selection of resorts for analysis. Factoring for tourism demographics untangles local market dynamics affecting the variables of interest.

While significant effects were observed for Park City Ski Resort and Schweitzer Ski Resort, the findings reveal nuanced trends across treated ski resorts, underscoring the complexity of conglomerate involvement. As conglomerate passes grow, and more data becomes available, future studies should examine industry shifts and conglomerate involvement using intricate measurement strategies and comprehensive models.

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Appendix

Appendix A

Mean Household Income

Aggregate Cohort ATET

Cohort	ATET	Std.	Error	P> |t|	[95% CI]	
2014	27611.150	7544.492	3.660	0.001	12310.210	42912.090
2018	7042.751	8335.277	0.840	0.404	-9861.973	23947.480
2019	-564.435	7980.009	-0.070	0.944	-16748.64	15619.770
2020	-8369.113	12072.13	-0.690	0.493	-32852.53	16114.300
2021	-13788.48	3288.620	-4.190	0.000	-20458.12	-7118.854

Appendix B

Median Contract Rent

Aggregate Cohort ATET

Cohort	ATET	Std.	Error	P> |t|	[95% CI]	
2014	-305.853	119.302	-2.560	0.015	-548.050	-63.656
2018	-123.171	107.407	-1.150	0.259	-341.219	94.877
2019	78.806	181.377	0.430	0.667	-289.409	447.021
2020	11.131	120.322	0.090	0.927	-233.137	255.398
2021	-329.571	161.030	-2.050	0.048	-656.479	-2.664

Appendix C

Mean Travel Time to Work

Aggregate Cohort ATET

Cohort	ATET	Std.	Error	P> |t|	[95% CI]	
2014	2.424	1.741	1.390	0.173	-1.119	5.967
2018	0.544	1.973	0.280	0.785	-3.470	4.558
2019	0.101	1.269	0.080	0.937	-2.482	2.684
2020	6.819	4.056	1.680	0.102	-1.433	15.070
2021	1.169	0.643	1.820	0.078	-0.140	2.478

Appendix D

Housing for Seasonal, Occasional, or Recreational Use

Aggregate Cohort ATET

Cohort	ATET	Std.	Error	P> |t|	[95% CI]	
2014	-436.442	61.015	-7.150	0.000	-560.186	-312.698
2018	119.617	62.834	1.900	0.065	-7.817	247.050
2019	109.453	104.932	1.040	0.304	-103.359	322.264
2020	-151.470	154.553	-0.980	0.334	-464.917	161.977
2021	166.268	52.511	3.170	0.003	59.770	272.766

Appendix E

Worked at Home

Aggregate Cohort ATET

Cohort	ATET	Std.	Error	P> |t|	[95% CI]	

2014	37.513	47.949	0.780	0.439	-59.732	134.758
2018	56.876	56.973	1.000	0.325	-58.670	172.422
2019	45.661	135.853	0.340	0.739	-229.862	321.184
2020	320.886	109.691	2.930	0.006	98.423	543.349
2021	-663.817	34.332	-19.340	0.000	-733.446	-594.189