November 2001

ARPR 01-04

Agricultural and Resource Policy Report

Colorado State University Extension

Department of Agricultural and Resource Economics, Fort Collins, CO 80523-1172
http://dare.colostate.edu/pubs

SKI-TOURISM AND THE ECONOMY OF SUMMIT COUNTY, COLORADO

Rebecca Goldsmith, [*] Andrew Seidl [**] and Stephan Weiler [***] [1]

- *31.5% of total Colorado skier visits are to Summit County.*
- *Tourism accounted for 38% of total Summit county income & ski tourism accounted for 25% of the total.*
- *37.4% of the 20,481 total jobs are related to ski tourism.*
- *Each additional inch of snow contributes an estimated at $150,800 to the Summit County economy, or $60.12 per skier.*

This report provides an overview of a study that uses a unique combination of primary data collection, export base methods, and econometric analyses to estimate the role of ski tourism in the Summit County economy. The methodology is used to determine the amount of money brought into the county's various economic sectors in total, per skier and per inch of snow. In addition to providing original research insight on Summit County, a classic ski tourist economy, the method should also aid other scholars and development practitioners in their attempts to understand tourism and its impacts on local economies.

Summit County

Mining drove Summit County's economy for the first century from its original settlement. Like much of the mountainous region of Colorado, Summit County's population fluctuated with the mining industry's substantial booms and busts. However, over the past half century, the local economy has responded to another boom -- recreation. While the county has thrived on this new base, the potential negative aspects of a recreation-led economy in Summit County were noted almost three decades ago (Ulman 1974), underlining the importance of understanding this, potentially unique, economic growth process in informing local decision-making.

The theme of development, totally recreation-oriented, with the accent on ski resorts and second homes, is creating problems associated with densely populated cities: sewage and garbage disposal problems, traffic congestion, air and water pollution, and overall environmental decay. Only through a reversal of present trends can stress be reduced, thereby preserving some measure of environmental quality. (Ulman, 1974, 55)

Four popular ski resorts are located in Summit County, Colorado: Keystone, Arapaho Basin, Copper

[1] Assistant Senior authorship is not ascribed. *Delaware Department of Finance; **Assistant Professor and Extension Economist—Public Policy, Department of Agricultural and Resource Economics; ***Associate Professor, Department of Economics and Co-Director of the Center for Research on the Colorado Economy. Contact Seidl at T: 970-491-7071or E: Andrew.Seidl@colostate.edu.

Mountain, and Breckenridge. These 4 resorts, italicized in Table 1 below, represent the destination for 31.5% of total Colorado skier visits.

The same natural amenities that attract ski tourists are fueling a high rate of population growth only tangentially related to skiing. As technological innovation allows people to become less tied to the physical location of their workplaces and as these same people are acquiring substantial wealth, second home purchasers and younger, more active retirees are flocking to the Rocky Mountains. Colorado's population is growing at

Table 1: Colorado Ski Country USA Skier Visits 1996-97

Resort	Skier visits	Percent of total
Non-Front Range Resorts		
Aspen Highlands	157,053	1.33
Aspen Mountain	334,512	2.82
Buttermilk	154,028	1.30
Crested Butte	519,250	4.38
Cuchara Mountain	DNO	0.00
Howelsen Hill	18,736	0.16
Monarch	145,733	1.23
Powderhorn	71,689	0.61
Purgatory	341,643	2.88
Snowmass	788,620	6.66
Steamboat	1,102,751	9.31
Sunlight	102,096	0.86
Telluride	306,507	2.59
Wolf Creek	152,971	1.29
Sub-total	**4,195,589**	**35.42**
Front Ranch Destination Resorts		
Arapahoe Basin	*234,257*	*1.98*
Arrowhead	DNO	0.00
Beaver Creek	644,451	5.44
Breckenridge	*1,341,179*	*11.32*
Copper Mountain	*943,713*	*7.97*
Keystone	*1,217,359*	*10.28*
Silver Creek	95,401	0.81
Vail	1,686,790	14.24
Winter Park	991,393	8.37
Sub-total	**7,154,543**	**60.40**
Other Front Range Resorts		
Berthoud Pass	DNO	0.00
Eldora Mountain	174,237	1.47
Loveland	251,855	2.13
Ski Cooper	68,299	0.58
Sub-total	**494,391**	**4.17**
Colorado--Total	**11,844,523**	**100.00**
Summit County--Total	**3,736,508**	**31.55**

Note: Skier Visit = one skier-day, excluding spectator rides; DNO = Did Not Open

twice the national rate, and Summit County is growing half again as fast as Colorado (Census, 2001). Summit County continues to outstrip official projections for its growth, and depends on substantial inflows of commuters to maintain labor market balance (Table 2).

Part-time seasonal labor in the ski industry drives the local labor market. The combination of escalating living costs and relatively low wage employment opportunities within Summit pose challenges for county employers to find workers. The labor shortage is so problematic that the observed minimum wage in the county is approximately double the federal standard, the ski companies make ample high season use of foreign laborers, and affordable housing planning is becoming critical to the continued economic vitality of the ski economy.

The county's mountainous terrain and land tenure exacerbate local planning challenges brought on by population growth and the county's economic portfolio. Only about ¼ of Summit's 396 thousand acres is privately owned. More than 307 thousand acres are under federal management, mostly U.S. Forest Service. Thus, non-local land use decisions are likely to have important local economic implications, potentially translated most directly through the ski tourism sector, since Summit's ski areas use substantial amounts of federal forestland. For example, the Forest Service recently has proposed restricting ski areas located to their current boundaries and limiting access to off-road vehicles and snowmobiles in order to work toward federal biological diversity preservation objectives.

A lack of accurate and detailed data about the Summit economy creates difficulties for local, state and federal government officials in predicting and preparing for future economic activity. Consistent underestimation of Summit growth trends hinders the ability of local officials and principal employers to anticipate future labor, housing, and public service demands. This also places the county at a considerable disadvantage in attracting new and diversified resources to the area. Federal lands managers are unable to assess the impact of their policies on the local economy, despite their predominant role in local land management. Gaining a more thorough understanding of the relationship between labor, housing, and service demand generated as a result of tourist activities will help to clarify the link between economic growth and tourism needed to address these critical local issues.

Approach

A unique combination of surveys, export base methods, and econometric analyses are employed to determine the role of ski tourism in a local economy. The constructed tripartite methodology is used to estimate county income in total, per skier and per inch of snow. In most areas, income and employment statistics are known. However, their relationships to particular export sectors, such as tourism, are not well understood. Surveys can clarify the links between particular employment sectors and their relationship to ski tourism itself. Export base analyses can then assess the broader impact of these direct ski tourism effects through induced local household spending, which is fed by income from the ski industry, as well as indirect supplier activity sparked by those industries directly serving tourist needs. Finally, statistical techniques can connect these impacts with the importance of external factors, such as snowfall.

Export Base analysis will be used to trace the contribution of ski tourism to the various sectors of the Summit County economy. Export Base analysis bifurcates economies into "basic" and "non-basic" sectors. "Basic" sectors bring outside dollars (export sales) into the local economy. These outside revenues ultimately encourage further local job growth through supplier links and new household income and spending. Employment and income attributable to export sales are considered "basic." Industries that primarily service the local market and are sensitive to changes in basic employment are defined as "non-basic." The multiplied effects of these new export dollars drive the local economy and help it to attract new residents, new employers, and continued growth. Although there are a variety of measurements in which the economic base can be expressed, income and employment are the most commonly used in regional analyses (Tiebout, 1962).

Basic and non-basic employment can be derived by direct methods (e.g., surveys, interviews) and indirect methods (e.g., location quotients) (Blair, 1995). For our purposes, the crucial triage consists of distinguishing local recreation from tourism and ski tourism from other tourist activities and in sorting ski tourist sectors into basic and non-basic categories. In idiosyncratic regions such as Summit County, direct measures are preferable due to their greater accuracy and reliability relative to indirect methods based upon national benchmarks. Employer surveys allow the direct estimation of where, when, and in what proportions export dollars

Table 2: Summit County population and labor, 1990-2020

Year	1990	1995	1997	2000	2005	2010	2015	2020
County population	12,941	17,247	18,918	21,621	26,054	30,416	34,288	37,810
Annualized percent change		5.9	4.7	4.6	3.8	3.1	2.4	2.0
County employment	13,643	19,131	20,481	22,584	26,441	30,104	33,384	36,864
In-commuters	3,750	6,050	6,100	6,100	6,475	6,800	7,300	8,700
Out-commuters	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unemployment rate (%)	3.6	3.0	2.2	2.1	2.0	2.0	2.0	2.0
Labor force participation rate	88.0	87.5	87.3	87.2	86.4	85.5	84.8	84.0

Source: Office of the State Demographer, Colorado Department of Local Affairs

are generated. Information collected directly from the employers provides insights into local economic activity that may otherwise be overlooked in secondary employment and income comparisons.

Results—Export Base Analysis

Deriving the impacts and spending activities of ski tourists on given sectors of the economy also requires that a series of economic sectors be known and well-defined. G-code groupings are therefore used to define relevant sectors of the economy. G-codes are categorical classifications that represent aggregate versions of Standard Industrial Classification (SIC) Code, which identify businesses by their primary activity. For instance, personal services such as laundry services, hair salons, massage services, and portrait studios typically receive individual 4-digit SIC assignments. Instead, the G-code divides the personal services category into much broader assignments such as: “G39a Personal Services - Laundry, Cleaning” and “G39b Personal Services—All Other”.

The lack of specificity in G-code assignments may mask the effects of tourism on specific sectors of given industries. However, G-codes allow the aggregation of like industries, roughly equating to the 2-digit SIC industries, simplifying both analysis and intuition. In this analysis, 30 G-code categories and 5 broad economic sectors are explored: Services, Retail Trade, Real Estate & Construction, Transportation, and Wholesale Trade. Comprehensive establishment total annual wage, employment, and income data for all county businesses were compiled from the Colorado State Division of Local Affairs (DOLA).

Table 3 illustrates the role of tourism and ski tourism in the Summit County economy. Total county income was more than $600 million in 1997. Tourism accounted for 38% of total county income and ski tourism accounted for 25% of the total. Tourism was responsible for 85% of the service sector of the Summit County economy with ski tourism accounting for 59% of the total. Ski tourism provided 40% of the county’s retail trade, 16% of real estate and construction expenditures, 20% of transportation expenditures and 7% of wholesale trade.

Results--Multiplier Analysis

The multiplier is calculated by dividing total employment by basic employment across the county. The broader county basic/non-basic aggregations come directly from the office of the Colorado State Demographer, which uses a combination of survey and secondary data to arrive at the taxonomy. The estimated total employment in Summit during 1997 was calculated as 20,481 and the direct base industry jobs were estimated at 13,654. As a result, the regional multiplier is 1.5. Income and employment are assumed to be proportional in this model. As a result, every dollar increase in basic income will result in a 50-cent increase in non-basic income, implying every extra base job will lead to another ½ job in the non-basic sector.

This multiplier can be applied to determine the total impact of ski tourism on local employment and income. Using the composite income from Table 3, total income derived directly from ski tourism is $149,471,000. The additional indirect effect would thus be an extra 50% of this base figure, or 74,736,000.

Table 3: 1997 Summit County Tourism Matrix, income in $1000

G-Code	Industry Description	Total Income	Tourism Income	Tourism % Of Total	Ski Tourism Income	Ski Tourism % Of Total
Total		600,534	229,528	38	149,471	25
Services		*146,377*	*124,045*	*85*	*87,065*	*59*
G38	Hotels & Other Lodging Places	90,686	90,686	100	58,946	65
G42a	Amusement & Rec.-Ski Resorts	15,879	15,879	100	11,909	75
G42b	Amusement & Rec.-Motion Pictures	106	106	100	82	77
G42c	Amusement & Rec.-All Other	10,969	10,530	96	10,311	94
G39a	Personal Service-Laundry, Cleaning	2,533	2,026	80	1,722	68
G39b	Personal Services-All Other	5,669	4,818	85	4,095	72
G40a	Business Services-Film development, etc.	19,774	0	0	0	0
G45	Private Education Services	763	0	0	0	0
G02	Agricultural Livestock, outfitters	0	0	0	0	0
Retail Trade		*105,475*	*64,484*	*61*	*41,885*	*40*
G33	Eating & Drinking Places	45,904	32,133	70	18,362	40
G29	Building Material, Hardware, Garden	3,963	0	0	0	0
G30	General Merchandise, Apparel, & Furniture	20,712	14,084	68	9,942	48
G31	Food Stores	11,180	3,354	30	1,453	13
G32pt.	Service Stations	9,551	4,775	50	3,534	37
G34a	Drugs, Liquor, Used	2,220	1,776	80	710	32
G34b	Goods	11,945	8,362	70	7,884	66
Real Estate & Construction		*110,680*	*37,356*	*34*	*18,191*	*16*
G37	Real Estate	42,500	21,250	50	10,625	25
G09	Building Construction	23,220	11,610	50	5,805	25
G10	Maintenance - Special Trades	34,640	3,464	10	1,039	3
G11	Heavy Const. other than building	10,320	1,032	10	722	7
Transportation		*11,010*	*3,532*	*32*	*2,240*	*20*
G22	Local & Suburban Transit	2,752	1,926	70	1,651	60
G24	Air Transportation	3,984	0	0	0	0
G25a	Arrangements	1,000	950	95	200	20
G41a	Auto Rental	173	35	20	17	10
G41b	Parking	0	0	0	0	0
G41c	Repair Services	3,101	620	20	372	12
Wholesale Trade		*1,314*	*112*	*9*	*90*	*7*
G28l	Apparel	373	112	30	90	24
G28m	Groceries	634	0	0	0	0
G28q	Beverages	307	0	0	0	0

The total impact of ski tourism is thus $224,207,000 in an economy with total income of $600,534,000. Therefore, roughly 37.4% of the local economy is based directly or indirectly on ski tourism. Translating these findings into employment (Table 4), an estimated 37.4% of the 20,481 total jobs are related to ski tourism, or 7,660 positions.

We can further use these results to relate jobs to ski visits. Summit County ski areas reported 3,736,508 skier visits in 1997. Consequently, every 1,000 skiers leads to 1.4 direct jobs. Multiplied effects of these same 1,000 skiers would result in 0.7 additional indirect jobs, yielding 2.1 total jobs per 1,000 skiers. Since some of these jobs could be seen as "fixed" costs of the industry, the true jobs per skier ratio is likely to be lower than these figures indicate. Nevertheless, this simple relationship allows useful insights into the relationship between ski visits and employment.

Results--Regression Analysis

Changes in snowfall are likely to affect the attractiveness of ski tourism to potential customers. Since many of Summit's ski tourists come from Colorado's Front Range, we analyze the relationship between snowfall and Front Range population on Summit County skier visits.

The statistical analysis covered 28 ski seasons/years from 1969 to 1997. Data on skier visits in Summit County were derived from Recreation Statistics published by the Summit County Government. Monthly snowfall data were provided by the National Climatic Data Center for three weather stations in Summit (Climax, Breckenridge, and Keystone), and were averaged for each year. Front Range Population estimates were calculated as the sum of the populations of Boulder, Gilpin, Clear Creek, Jefferson, Arapahoe, Adams, Douglas, El Paso, Larimer, and Denver counties.

The population variable implies that 2.63 new visits will occur with every increment of 1,000 new Front Range residents. For every inch of snowfall, skier visits increase by 2,480. Snowfall plays a large role in the success or failure of the ski industry. Since skiing requires snow, this result is largely intuitive. However, beyond the requirement that the amount of snow is sufficient to cover the rocks and grass, additional snowfall provides a rough indicator of the quality of the skiing experience. Skiers prefer natural snow to man made snow and large and early season storms to smaller and late season accumulations. Reports of "packed base" include man made snow and under report natural snowfall. Thus, these results permit an explicit quantification of this psychic relationship between natural snowfall, the perception of skiing quality and the decision to ski.

Combining the results of this regression analysis with the export base analysis, the relationship between snowfall and local employment and income can be explicitly described. The export base analysis resulted in an estimate of $149,741,000 in Summit County income was directly related to ski tourism in 1997.

Table 4: Summit County Labor Summary

	1997	2000	2005	2010	2015	2020
Basic jobs	*13,654*	*14,256*	*15,787*	*17,548*	*19,203*	*20,931*
?? Tourism	10,364	10,732	11,878	12,860	13,939	15,072
?? Wholesale & retail trade	609	639	667	767	856	950
?? Services	634	718	861	990	1,104	1,226
?? Government	766	817	831	855	953	1,058
?? Other	481	500	550	575	600	625
?? Retiree related local resident services	800	850	1,000	1,500	1,750	2,000
Non-Basic jobs	*6,827*	*7,128*	*7,894*	*8,774*	*9,601*	*10,466*
Multiplier-Total direct jobs	1.5	1.6	1.7	1.7	1.7	1.8
Estimated total jobs	20,481	22,584	26,441	30,104	33,384	36,864
Average annual percent change	3.5	3.3	3.2	2.6	2.1	2.0

During the related ski year there were 3,736,500 skier visits (Summit County, 1999), each of which generates approximately $40.08 of income. Intuitively, this number may appear to be an underestimate. However, due to the large number of in-state skiers who buy season ski passes, have their own equipment, and visit Summit many times each season, these individuals tend to drive down the average impact. For every inch of snowfall that brings 2,480 new skiers, it also directly creates $99,200 in direct income. The Summit County Multiplier was estimated at 1.5. Therefore, the multiplied effects of an additional inch of snow are approximately $49,600 and the total impact per additional inch of snow can be estimated at $150,800 or $60.12 per skier.

Conclusion

Ski tourism can be a crucial part of a mountain region economy; this situation is clearly the case in Summit County. This industry is responsible for over 37% of total income generated for the entire year in Summit County, despite the fact that ski season lasts at most six months. Sectoral impacts were isolated along with local economic effects of snowfall, highlighting the importance of properly evaluating external factors in understanding economic activity in a ski-tourist-dependent economy.

The methodological synthesis of this paper combined surveys, export base methods, and econometric analyses to construct a simple yet insightful structure with which to assess the crucial ski tourist component of the economy. By examining Summit County, a general picture of the importance of the ski tourism economy to both the broader local economy and specific local sectors can be clarified.

Bibliographical references

Blair, John. 1995. Local Economic Development: Analysis and Practice. Thousand Oaks, CA: Sage.

Goldsmith, Rebecca. 2001. Summit County: An Economic Base Analysis of Ski Tourism. MA Thesis. Colorado State University.

Summit County Government. 1999. "Summit County Colorado Recreation Statistics," www.co.summit.co.us/statistics/recreation.htm (5 Jan. 2000).

Tiebout, Charles M. 1962. *The Community Economic Base Study.* (New York:Committee for Economic Development, 1962) 13.

Ulman, Wilbert J. 1974. *Mountain Recreational Communities and Land Use "The Summit County Experience."* (Denver, CO: Colorado Land Use Commission, 1974) 55.