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The Ongoing Economic Impact of Laramie Jubilee Days

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The Center for Business and Economic Analysis (CBEA) at the University of Wyoming (UW) supports the economic growth and diversification of Wyoming's economy through applied economic and business analytics for communities, industries, and entrepreneurs. The center was established in 2019 as a unit within the College of Business. CBEA is a member of the Association for University Business and Economic Research (AUBER).

TEAM

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Dr. Morgan Holland graduated with a PhD in economics from Florida State University in 2022 with research interests in the economics of automation, corporate finance, human capital, and the economics of disability. In addition, Morgan worked as an economic consultant for the FSU Center for Economic Forecasting and Analysis, pursuing applied research projects in a wide variety of fields. Today, Morgan focuses on economic research in the tourism and hospitality sectors in Wyoming. He is especially interested in researching and promoting policies that will help Wyoming take full advantage of its outdoor recreation resources while preserving them for future generations. Morgan also provides support services to stakeholders in the tourism and hospitality sector through economic research and analysis.

Alexander Specht is the Associate Director of the University of Wyoming's Center for Business and Economic Analysis (CBEA). Alexander has several years of experience in fiscal policy analysis, education policy, public utility regulation, and regional economic development. His research has been cited in academic journal articles, in U.S. Congressional testimony and committee reports. He has been cited as an authority in a significant U.S. Supreme Court case, has served as an expert witness on high-profile regulatory cases, been a featured panelist and speaker at various events, and has had economic analyses featured on radio and television news shows and quoted by the press. Alexander holds a B.S. in Finance and a B.S.in Economics from George Mason University and a M.A. in Economics from Claremont Graduate University.

Bailey Kirkland is a Research Economist at the Center for Business and Economic Analysis (CBEA). He earned an M.S. in Economics from the University of Wyoming, where he is also pursuing a Ph.D. in Economics. His research primarily focuses on wildlife management, tourism, human responses to natural disasters, air pollution, and health economics. Bailey is especially interested in the sustainability of Wyoming's resource management and tourism in the face of challenging political and climatic conditions. Before joining the CBEA, he worked as an economist with the U.S. Geological Survey and the Haub School of the Environment.

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1. Executive Summary

INTRODUCTION

Laramie Jubilee Days (LJD) is an annual festival in Laramie, WY celebrating Wyoming's statehood and Laramie's western history. Dating back to 1940, this festival has been running continuously for 84 straight years. LJD is typically a nine-day-long festival that takes place in July, and in 2024, the festival was hosted from July 6 through July 14th. The festival itself is centered around Laramie's downtown area and the Albany County Fairgrounds at the south end of Laramie. Downtown Jubilee Days events include a parade, a beer festival, live music, swing dancing, eating contests, chili cookoffs, and several food trucks and other local stands, among others. Rodeo events are hosted every night at the Fairgrounds. As such, LJD draws many residents and nonlocal visitors to the area.

The Laramie Jubilee Days Committee contracted with the CBEA to produce a report quantifying the economic impact of Laramie Jubilee Days 2024. The CBEA conducted previous reports on the economic impact of Laramie Jubilee Days in 2018 and 2024, relying on business survey responses. This report improves upon and complements previous reports by utilizing mobile phone-derived visitation data coupled with data on visitor spending in Albany County for the years 2022-2024 to estimate increases in visitor spending attributable to LJD. These increases were used as inputs into IMPLAN, an economic impact modeling software. In quantifying the direct impact of LJD, this report also estimates indirect and induced impacts showing how the festival has ripple effects throughout the local economy.

KEY RESULTS

The results show that LJD has an average net positive effect on visitor spending within six broad tourism-dependent industries: Accommodations, Food Services, Food Stores, Arts, Entertainment & Recreation, Retail Sales, and Local Transportation & Gasoline. Food Services and Accommodations experience the largest percentage increase in revenue during the event.

These increases in visitor spending support an annual average of ten full-time-equivalent jobs within Albany County with a total annual average labor income of $311,928. Value added from LJD-associated visitor spending increases amounts to an annual average of $554,998 while total output associated with LJD events is $1,063,640. Economic impact estimates averaged across the years 2022-2024 are shown in Table 1 below.

Table 1: Average annual economic impacts of LJD on the Albany County Economy

Impact	Employment	Labor Income	Value Added	Output
Direct	8.0	$226,580	$400,237	$756,109
Indirect	1.2	$46,206	$74,101	$171,179
Induced	0.9	$39,142	$80,660	$136,352
Total	**10**	**$311,928**	**$554,998**	**$1,063,640**

2. METHODOLOGY

In this section, we present our methodology used to estimate visitor spending increases and their impact on the Albany County economy. First, we present a brief background on event impact studies. Second, we present all data used in the report including mobile phone-derived visitation data and estimates of county-level visitor spending. Second, we describe our empirical approach to estimate the impact of LJD on the number of visitors at business points of interest across a number of industries using panel regression methods. We then describe how regression results are used to estimate increases in visitor spending using visitor spending data. Lastly, we discuss how these estimates of visitor spending increases were input into IMPLAN, an economic input-output model, to calculate direct, indirect, and induced economic impacts resulting from Jubilee Days.

2.1 A BACKGROUND ON EVENT IMPACT STUDIES

Economic impact studies on events provide a dollar-value estimate of the impact of an event on the local economy. In the absence of direct data on participant spending or business sales, event impact studies typically rely on surveys of event attendees to estimate increases in local visitor spending across certain industries. These industries typically include restaurants, accommodation, gasoline, arts & entertainment, etc. These estimates of individual-level expenditures are paired with estimates of total non-local attendance to the event. Together, researchers can estimate the total increase in expenditures attributable to the event in a given area across different industries. These estimates are then used alongside industry-specific multipliers that translate how one person's spending becomes another person's income and induces further spending. A few examples of such studies are San Francisco's Office of Economic Analysis' (2014) impact estimate of regular outdoor events held within San Francisco, Tolle's (2014) study of the economic impact of the Sturgis Falls Celebration in Iowa, and Kim and Dombrosky's (2016) economic impact assessment of a local fair in Ohio.

Economic impacts from events are primarily driven by increases in visitor spending, where visitors are defined as individuals from outside the local economy. These visitors generate new economic activity that would not have occurred otherwise in the absence of the event. For example, someone from Fort Collins, CO attending LJD may spend money at a Laramie restaurant instead of one in their hometown. In contrast, local spending, such as that by Albany County residents, is generally not considered a net economic gain, as it likely would have happened regardless of the event, either at the same business, a different local business, or at a different time.[1] For this reason, event impact studies typically focus on visitor spending, which is more directly attributable to the event and less subject to intertemporal or inter-industry substitution effects.

In recent years, tourism and recreation managers and researchers have increasingly relied on other sources of visitation data due to the costly nature of surveying. One new source of visitation data is mobile phone-

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1   Positive event economic impacts can occur from local spending if 1) locals spend money within the region's economy that would have been spent elsewhere because of the event (e.g., a Laramie resident normally attends concerts in Denver but decides to substitute their spending to Laramie businesses because LJD has live music) or 2) Locals substitute spending from a lower multiplier industry (e.g., gasoline where most of the supply chain exists outside of the county) to higher multiplier industry (e.g., local restaurants where most of the spending stays within the local economy). These types of substitution effects in local spending are extremely difficult to estimate using existing data and survey methods rely on hypothetical questions that may be difficult for event participants to accurately answer. These impacts are also small relative to increases in nonlocal spending. For this reason, in accordance with most event impact studies, we focus solely on impacts driven by increases in visitor spending.

derived visitation counts which allow for temporally resolute tracking of visitors across different points of interest within Albany County. These data (described in more detail below) allow us to empirically estimate increases in visitation due to LJD events. We combine these estimated changes in visitor numbers across industries with Albany County-industry-specific visitor spending numbers to estimate changes in total spending due to LJD.

2.2 DATA

Mobile Phone-Derived Visitation Data

We gather daily visitation counts to different "points of interest" (POIs) from mobile phone-derived visitation counts provided by the tourism research platform Zartico.[2] Location-based services on mobile phone applications record the device's GPS coordinates and a time stamp when such services are enabled. In our study's context, a POI receives a visit if a device enters the POI's polygon (i.e., the geographic extent of the business) on a given day AND the device stayed within the municipal boundaries of Laramie for at least 2 hours on the same day. These devices are anonymized and aggregated up to the POI-day level from a panel of over 1.6 billion devices nationally. We utilize data from years 2022-2024.

Our sample of POIs include businesses such as restaurants and hotels as well as other locations such as museums and municipal parks. Not all businesses within Laramie are included in Zartico's sample of POIs, but a sufficient number exist within most tourism-dependent industries, particularly restaurants and accommodations. We drop any POIs not typically associated with visitor spending, specifically municipal parks without entry fees and the University of Wyoming campus. We also drop the Laramie Regional Airport as no reliable visitor airfare spending data exists and given the local-scale nature of LJD, it is unlikely that LJD draws significant visitor flights.

Visitors are distinguished from Albany County residents using the predominant device location. If a device spends the majority of the preceding weeks at a location greater than 50 miles away from the Laramie municipal boundaries, they are considered a visitor. For example, a person from Fort Collins, CO traveling to Laramie would be considered a visitor, whereas a person from Centennial, WY would be considered a resident.

Visitor Spending Data

We gather visitor spending data from Dean Runyan Associates' *The Economic Impact of Travel in Wyoming* report (2024).[3] This report quantifies annual visitor spending in the years 2014-2024 across seven broad industries: Accommodations, Food Services, Food Stores, Arts, Entertainment & Recreation, Retail Sales, Visitor Air, and Local Transportation & Gasoline. We categorize mobile phone POIs from Zartico to match six of the seven industry categories and use spending data from 2022-2024. We do not use Visitor Air spending data as Dean Runyan estimates $0 in visitor spending on air travel.

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2   See https://www.zartico.com/zdos.

3   See https://industry.travelwyoming.com/research/travel-economic-impacts/.

2.3 ESTIMATING VISITOR AND VISITOR SPENDING INCREASES

Estimating Visitor Increases

To isolate the impact of LJD on visitor numbers at POIs throughout Laramie, we use panel regression methods. First, we group existing Zartico POIs into respective industries coinciding with Dean Runyan spending categories. The categories Food Stores and Retail Sales do not have any relevant POIs in Zartico's dataset. We sum all visitor counts within a given industry on a given day. For each industry separately and for total visitors to Laramie (i.e., the sum of all visits to all POIs in a given day), we then estimate:

$$V_t = \alpha + \beta_1 LJD_t + \beta_2 CFD_t + \beta_3 PRCP_t + \beta_4 TEMP_t + \mu_m + \mu_y + \mu_m * \mu_y + \epsilon_t$$

where V_t is visits at day t, LJD_t is a binary variable = 1 if day t is during Jubilee Days, CFD_t is a binary variable = 1 if day t is during Cheyenne Frontier Days, $PRCP_t$ is precipitation, $TEMP_t$ is temperature, and μ are fixed effects for their relevant subscripts month m and year y. Through this specification, we control directly for the effect of concurrent or interacting events within July in Wyoming (CFD_t), weather effects ($PRCP_t$, $TEMP_t$), and for seasonal effects on visitation through the month, year, and month-year fixed effects. Specifically, our use of fixed effects allows us to compare visitation on days in July of a given year with and without LJD_t. We estimate a Poisson model as visitors are count data.

Estimating increases in spending.

Our coefficient estimates (β_1) from the above regressions represent the effect of LJD on visitors within a given industry. These Poisson coefficients are assessed for statistical significance, and if significant, are converted to percentage changes in visitors. For the two industries (Food Stores, Retail Sales) that lack relevant Zartico POIs, we use predicted percent changes from the total visitor regression. For example, if LJD increases total visitors across all Laramie POIs by 9%, we assume that visitors to food stores and retail establishments also increased by 9%.

The annual spending numbers from Dean Runyan are adjusted to estimates of mean daily spending in July. First, we utilize Albany County-specific visitor credit card spending data from Zartico to calculate the proportion of visitor spending that occurs in each month of the year using monthly means for the years 2022-2024. This adjustment allows us to capture seasonal trends in visitor spending (e.g., less visitor spending occurs in January in Laramie than in August). We find that 10.8% of visitor spending occurs in July. We multiply the proportion of visitor spending that occurs in July by the total annual spending and divide by 31 to get daily mean visitor spending in July. We then multiply this value by our predicted change in visitor spending and multiply this number by 9, representing the average number of days of LJD. The result is an industry-year-specific predicted visitor spending increase attributable to LJD.

2.4 ECONOMIC IMPACTS METHODOLOGY

Economic impacts can be broken down by direct, indirect, and induced impacts. The direct impact measures the actual increase in margin-adjusted output generated by the event. For example, if a restaurant increases gross sales by $20,000 during LJD and it costs $8,000 to produce the additional meals (e.g., buying beef for a hamburger), then the direct impact on Albany County's economy is $12,000 in output.

Indirect impacts represent the additional purchases by businesses on inputs (e.g., employment, supplies, etc.) as a result of the direct impact. For example, if the same restaurant increases gross sales by $20,000 as a result of LJD, the restaurant must purchase additional supplies (e.g., beef) or hire additional workers. Certain inputs will be sourced from other local businesses, while other supplies will be sourced from out of the region (in our case, Albany County). The local businesses (e.g., the local beef producer) will in turn increase input purchases from local and nonlocal businesses. This process continues until the original amount diminishes as a result of expenditures leaving the local regional economy. The net increase in expenditure to other local businesses (all the way down the supply chain) as a result of the direct impact are considered the indirect impact.

Induced impacts represent the additional economic impact created by business owners, suppliers, and employees spending their additional income that they accrued because of the direct and indirect impacts. For example, the restaurant owner may spend additional income from the $20,000 sales increase on clothes purchases at other local stores. Similarly, a waiter may use additional income from LJD-based tips to pay for a haircut.

The total economic impact of an event is the sum of direct, indirect and induced impacts. In practice, multipliers are used to estimate indirect and induced impacts from direct impacts. These multipliers are deduced from industry compositions, interactions, and data on local economies. In this study, we utilize a popular impact modeling software IMPLAN that captures the composition and average industry interactions across 528 industries at the county-level. We focus on impacts within Albany County. Importantly, a proportion of gross sales changes exits the local Albany County economy due to factors such as nonlocal supply chains (e.g., gasoline purchased from out-of-county producers) or nonlocal business owners. These dissipations are referred to as "leakages" and are heavily industry dependent. Therefore, the total economic impact refers to impacts that stay and recirculate within the Albany County economy. Additional information on IMPLAN definitions, modeling, terminology, and assumptions are presented in Appendix 6.1.

Visitor spending is classified into 7 broad categories in the Dean Runyan report that are assigned to categories in IMPLAN's industry classification scheme. Because IMPLAN's scheme is more detailed than that of the Dean Runyan report, a single Dean Runyan spending category may be associated with several IMPLAN industry categories. To allocate visitor spending to IMPLAN categories, we use IMPLAN's estimated total output figures for each industry. IMPLAN industries are grouped by their associated Dean Runyan spending category and the proportion of total group output is calculated for each industry. These proportions are then applied to visitor spending in each Dean Runyan category to calculate estimated spending in each IMPLAN industry. The proportions of Dean Runyan spending mapped to IMPLAN categories are shown in Appendix 6.2. Table 2 shows the resulting IMPLAN input amounts for each IMPLAN industry category for 2022, 2023, and 2024, where all values are given in 2024 dollars. All values are input into IMPLAN as increases in industry output.

Table 2: Total visitor spending increases used as IMPLAN inputs by year and by industry

Dean Runyan category	IMPLAN spending code	IMPLAN description	IMPLAN input amount, 2022	IMPLAN input amount, 2023	IMPLAN input amount, 2024
Accommodations	489	Hotels and motels, including casino hotels	$161,574	$165,371	$174,670
Arts, Ent. & Rec.	478	Performing arts companies	$11,786	$12,123	$12,215
	479	Commercial Sports Except Racing	$12	$13	$13
	480	Racing and Track Operation	$0	$0	$0
	481	Independent artists, writers, and performers	$7,352	$7,563	$7,621
	482	Promoters of performing arts and sports and agents for public figures	$13,057	$13,431	$13,533
	483	Museums, historical sites, zoos, and parks	$2,464	$2,534	$2,553
	484	Amusement parks and arcades	$292	$300	$303
	485	Gambling industries (except casino hotels)	$10,535	$10,837	$10,919
	486	Other amusement and recreation industries	$10,068	$10,357	$10,436
	487	Fitness and recreational sports centers	$5,117	$5,264	$5,304
	488	Bowling centers	$1,489	$1,532	$1,543
Food Service	491	Full-service restaurants	$159,988	$167,172	$164,401
	492	Limited-service restaurants	$189,277	$197,776	$194,497
	493	All other food and drinking places	$114,909	$120,069	$118,078
Food Stores	389	Retail - Food and beverage stores	$43,897	$44,693	$44,643
Local Tran. & Gas	391	Retail - Gasoline stores	$68,966	$62,093	$59,678

Retail Sales	385	Retail - Motor vehicle and parts dealers	$29,319	$28,744	$28,033
	386	Retail - Furniture and home furnishings stores	$3,059	$2,999	$2,925
	387	Retail - Electronics and appliance stores	$1,096	$1,075	$1,048
	388	Retail - Building material and garden equipment and supplies stores	$9,003	$8,827	$8,609
	390	Retail - Health and personal care stores	$6,477	$6,350	$6,193
	392	Retail - Clothing and clothing accessories stores	$5,079	$4,979	$4,856
	393	Retail - Sporting goods, hobby, musical instrument and book stores	$2,347	$2,300	$2,244
	394	Retail - General merchandise stores	$16,524	$16,199	$15,799
	395	Retail - Miscellaneous store retailers	$6,308	$6,184	$6,031

The key assumption being made in this methodology is that visitor spending in the Dean Runyan categories is allocated in the same proportion to IMPLAN categories as total spending (i.e., spending by both residents and nonresidents) in Albany County. If this assumption does not hold, then impacts may differ from those estimated here.

3. Results

This section presents the results of the study including estimates of LJD's effect on visitation across industries, associated spending increases, and the total economic impact of LJD.

3.1 VISITOR AND VISITOR SPENDING INCREASES

We find that the Laramie Jubilee Days (LJD) celebration has a significant positive impact on visitor activity across six tourism-related industry categories: Accommodations, Food Services, Food Stores, Arts, Entertainment & Recreation, Retail Sales, and Local Transportation & Gasoline. Across all six categories, we estimate statistically significant increases in visitor numbers attributable to LJD. Full regression results are provided in Appendix 6.3.

These increases in visitation translate directly into increased spending within each industry. Between 2022 and 2024, LJD generated an average annual increase of $891,633 in visitor spending across the local economy. Table 3 summarizes the total estimated increase in visitor spending attributable to LJD by year where values are in 2024 dollars.

Table 3: Total spending increases attributable to LJD across all industries

Year	Total LJD Effect (Thousands $)
2022	880.0
2023	898.8
2024	896.1

The largest spending gains occurred within the Food Services industry, which includes full-service restaurants, limited-service venues, snack bars, and other special food services. Between 2022 and 2024, visitor spending in this category increased by an annual average of $475,389 during LJD celebrations. The second most positively impacted industry was Accommodations, which includes hotels and motels. This sector saw an average annual increase of $167,205 in visitor spending during LJD. The remaining industries, Food Stores, Arts, Entertainment & Recreation, Retail Sales, and Local Transportation & Gasoline, also experienced positive but more modest spending increases, reflecting smaller yet meaningful gains in visitor activity and spending during the event. Table 4 shows industry-year specific increases in visitor spending, where values are in 2024 dollars.

Table 4: The effect of LJD on visitor spending by industry by year

Industry	Year	Mean July Daily Spending (Thousands $)	Percent Change (%)	LJD Effect (Thousands $)
Accommodations	2022	136.3	13.2	161.6
	2023	139.6	13.2	165.4
	2024	147.4	13.2	174.7
Food Service	2022	165.5	31.2	464.2
	2023	172.9	31.2	485.0
	2024	170.0	31.2	477.0
Food Stores	2022	49.7	9.8	43.9
	2023	50.6	9.8	44.7
	2024	50.5	9.8	44.6
Arts, Ent. & Rec.	2022	84.0	8.2	62.2
	2023	86.5	8.2	64.0
	2024	87.1	8.2	64.4
Retail Sales	2022	89.7	9.8	79.2
	2023	87.9	9.8	77.7
	2024	85.7	9.8	75.7
Local Tran. & Gas	2022	113.6	6.7	69.0
	2023	102.2	6.7	62.1
	2024	98.3	6.7	59.7

Variations in year-to-year spending impacts are driven solely by fluctuations in annual-level visitor spending. These fluctuations could be driven by changing preferences around tourism spending (e.g., more visitors preferring to camp instead of staying in hotels) or general macroeconomic conditions. Importantly, our estimate of the effect of LJD on visitor spending within a given industry represents an average effect across the years 2022-2024. In reality, the effect of LJD on visitor spending may vary by year due to these unobserved demand-side factors or changes in the event structure of LJD. However, data availability limits our ability to precisely estimate these year-specific LJD effects.

3.2 ECONOMIC IMPACTS

Economic impacts as a result of increased visitor spending are presented in Table 5 and Table 6. Table 5 shows the impact on economic indicators separated by year and by direct, indirect, and induced impacts. Table 6 shows the estimated impact on tax receipts at the local, county, state, and federal levels. All values in both tables are given in 2024 dollars.

Table 5: Economic impacts of LJD on the Albany County economy by year

Year	Impact Type	Employment	Labor Income	Value Added	Output
2022	Direct	8	$221,721	$391,598	$739,316
	Indirect	1	$45,170	$72,436	$167,382
	Induced	1	$38,302	$78,930	$133,427
	Total	**10**	**$305,193**	**$542,963**	**$1,040,125**
2023	Direct	8	$228,939	$403,808	$764,179
	Indirect	1	$46,682	$74,877	$173,060
	Induced	1	$39,548	$81,497	$137,766
	Total	**10**	**$315,169**	**$560,181**	**$1,075,005**
2024	Direct	8	$229,081	$405,305	$764,831
	Indirect	1	$46,766	$74,991	$173,095
	Induced	1	$39,576	$81,555	$137,864
	Total	**10**	**$315,422**	**$561,850**	**$1,075,791**

Impacts to the Albany County economy are estimated to be substantial. LJD supports on average 10 full-time-equivalent jobs within Albany County with a total average annual labor income of $311,928. Value added from LJD-associated visitor spending increases amounts to an annual average of $554,998. Total output associated with LJD events is $1,063,640. These estimated impacts are relatively consistent over the 2022-2024 period due to relatively stable annual visitor spending across Albany County.

Table 6: Tax revenue generated by LJD-associated visitor spending

Year	Impact Type	Local	County	State	Federal	Total
2022	Direct	$7,726	$2,899	$42,722	$57,384	$110,731
	Indirect	$761	$289	$4,407	$11,282	$16,739
	Induced	$1,229	$462	$6,818	$10,392	$18,900
	Total	**$9,716**	**$3,649**	**$53,947**	**$79,058**	**$146,370**
2023	Direct	$7,924	$2,973	$43,835	$59,246	$113,979
	Indirect	$787	$299	$4,559	$11,660	$17,305
	Induced	$1,269	$477	$7,040	$10,730	$19,515
	Total	**$9,980**	**$3,748**	**$55,434**	**$81,636**	**$150,799**
2024	Direct	$7,939	$2,979	$43,913	$59,330	$114,161
	Indirect	$788	$299	$4,564	$11,682	$17,332
	Induced	$1,270	$477	$7,045	$10,737	$19,529
	Total	**$9,997**	**$3,755**	**$55,522**	**$81,749**	**$151,022**

LJD-induced visitor spending also supports a modest increase in local and county tax revenue. Local tax revenue generated by LJD averages $9,898 while county taxes increase by an average of $3,717 per LJD event.

4. Conclusion

Laramie Jubilee Days in the years 2022-2024 had a net positive economic impact on Albany County's local economy. Food Service and Accommodations saw the largest increases in visitor spending due to LJD, though we also predict modest spending increases across Retail, Food Stores, Arts, Entertainment & Recreation, and Local Transportation & Gasoline. The total impact of LJD on Albany County's economy averaged 10 full time-equivalent jobs and $554,998 value added for the years 2022-2024. These impacts do not directly include increases in recreation expenditures associated with rodeo events at the Albany County Fairground or Food Services expenditures associated with Beerfest hosted at Depot Park.[4] Given the significance of these events in drawing visitors, overall impacts are likely understated.

Our estimated impacts are accompanied by a few key assumptions driven by data availability. First, we assume that increases in visitor numbers to a POI result in proportional increases in visitor spending at the POI. If visitor counts increase, but each visitor spends more/less at the POI, we will be overestimating/ underestimating the impact of LJD on the local economy. Second, we must assume that visitor spending during a day of LJD is equal to visitor spending on non-LJD days throughout July. If visitors spend more/less during LJD than they do on other summer days, we may over/underestimate total impacts. Third, given the lack of visitor data on Retail or Food Stores within Laramie, we assume that these industries are impacted in

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4   Our estimates include the impact of the rodeo events and Beerfest on surrounding businesses but do not directly account for the impact of ticket sales, employment related to hosting the events, or food and beverage sales at the events themselves.

a magnitude equal to the average effect across all POIs in the Zartico sample. Once again, if LJD impacts to these industries vary significantly from the average effect, economic impacts may differ. Finally, because we are using multiple data sources that categorize industry spending differently, we must make assumptions about how visitor spending as estimated in one source (e. g. the Dean Runyan report) is allocated across industries in another source (e. g. IMPLAN industries). If our assumption that visitor spending is allocated to IMPLAN industries in the same proportion as total output is incorrect, then visitor spending in IMPLAN industries may be over/underestimated.

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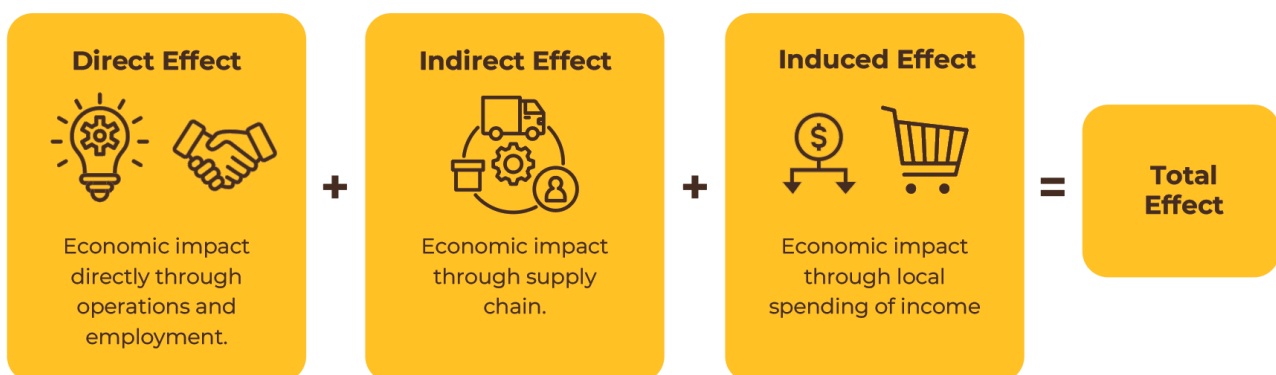
6. Appendix

6.1 ADDITIONAL INFORMATION ABOUT INPUT-OUTPUT MODELING

What is Economic Impact and Economic Contribution Analysis?

Economic impact analyses are a widely accepted research approach used to better comprehend the effect of a new event or industry changes on local and state economies. Economic contribution analyses examine the total economic activity resulting from an existing industry or business. These analyses typically use input-output methodologies to re-create inter-industry linkages and calculate the impact on a regional economy.

We typically use the Impact Analysis for PLANning (IMPLAN) software package to conduct our analysis. This cloud-based software package allows us to estimate resulting economic activity in terms of employment, labor income, value added (i.e., increase in Wyoming's gross domestic product (GDP)), total output, and generated tax revenues. IMPLAN allows us to calculate economic impacts at the state, county, Metropolitan Statistical Area (MSA), and ZIP code levels. Although IMPLAN is our primary software package for calculating economic impacts, we also have license to other programs such as REMI, SiteStats, Moody's Analytics, and Lightcast.

Modeling the economic impacts requires the examination of three distinct types of effects. To illustrate, assume the project requires several construction jobs. These jobs, and their associated compensation and output, are what we refer to as the direct effect. Beyond this initial effect, there will also be an increase in the demand for intermediate goods needed in construction, e.g., steel. This is called the indirect effect. Further, the additional income of workers within the construction industry will lead to added economic activity in terms of buying goods and services, which, in turn, creates new economic activity in a region. In other words, individuals' spending will induce more spending, which we refer to as the induced effect. The total impact is the sum of direct, indirect, and induced effects, as illustrated in the figure below. In sum, an exogenous direct increase in economic activity, in a given geographic area, creates a ripple effect in the economy of that area. The totality of the ripple effect is what we refer to as the total impact.

Direct Effect		Indirect Effect		Induced Effect		Total Effect
Economic impact directly through operations and employment.	+	Economic impact through supply chain.	+	Economic impact through local spending of income	=	

How does Economic Impact Analysis relate to Cost-Benefit Analysis?

Economic impact analyses consider a new event or change in an industry. Economic contribution analyses consider the impact of an existing industry. It is common for both types of analyses to only report the economic benefits and not the costs. This makes sense for existing industries where investments may be partially or fully irreversible. However, it is less justifiable when considering a new event or a change in an existing industry. To determine the optimal use of limited resources, it is necessary to consider both the benefits AND costs of an investment. Therefore, the CBEA strives to calculate the full costs of any new investment whenever possible and do a full cost-benefit or return-on-investment (ROI) analysis

What Benefits and Costs are Included in an Economic Impact (or Contribution) Analysis?

Not all benefits and costs of an investment or existing industry are quantifiable. For example, consider the construction of a new community hospital. Our standard cost-benefit analysis would report costs such as capital expenditures (CAPEX) and operating expenditures (OPEX), in addition to the economic benefits such as new jobs, value added, tax revenues, and total output. However, the construction of the hospital may also lead to additional costs such as traffic congestion, noise and air pollution, and housing shortages. The construction of the hospital is also likely to have additional benefits that are not easy to quantify such as improving the quality of life of patients and encouraging further economic development in the region. The CBEA recognizes that these non-quantifiable costs and benefits exist and, to the extent possible, will list them in our final report.

Additional economic impact terminology is shown in Table 7. In addition, economic impact analyses make some key assumptions about the industry and firm, as well as how the "ripple effects" of these changes reverberate throughout the economy. In Table 8 a brief outline of these assumptions and the resulting implications are provided.

Table 7: Additional Economic Impact Terminology

Variable	Definition
Employment	Employment refers to an industry-specific mix of full-time, part-time, and seasonal jobs. Expressed as full-time equivalents (FTE).
Labor Income	Labor income refers to all forms of employment income, including employee compensation (i.e., wages, salaries, and benefits) and proprietor income.
Value Added	Value added is the difference between an industry's total output and the cost of its intermediate inputs; it is a measure of the contribution to GDP.
Output	Output is the value of production by industry in a calendar year. It can also be described as annual revenues plus net inventory change. It is often referred to as total economic impact.
Multipliers	Multipliers describe how, for a given change in a particular industry, a resulting change will occur in the overall economy. For instance, employment multipliers describe the total jobs generated as a result of one job in the target industry.

Table 8: Economic Impact Analysis Assumptions

Assumption	Description
Constant Returns to Scale	The quantity of inputs needed per unit of output does not change.
No Supply Constraints	Input-output methodology assumes that there are no restrictions to inputs, raw materials, or labor needed to produce an unlimited quantity of output.
Fixed Input Structure	Changes in the economy may impact the industry's level of output, but do not impact the mix of commodities and services the industry requires to produce that output.
Fixed Technology	The same technology is used to produce each of the industry's products.
Constant Byproduct Coefficients	This is required by the fixed technology assumption. An industry will produce the same mix of goods or services regardless of the level of production.
Static Model	The model does not include price changes and general equilibrium effects are not accounted for.

6.2 ATTRIBUTING DEAN RUNYAN SPENDING CATEGORIES TO IMPLAN

Table 9 shows IMPLAN industries grouped by Dean Runyan spending categories and the proportion of total group output for each IMPLAN industry.

Table 9: Mapping Dean Runyan spending categories to their respective IMPLAN industry codes and spending proportions

Dean Runyan Category	IMPLAN Spending Code	IMPLAN description	Percentage of total grouping output for Albany County
Accommodations	489	Hotels and motels, including casino hotels	100.00%
Arts, Ent. & Rec.	478	Performing arts companies	18.96%
	479	Commercial Sports Except Racing	0.02%
	480	Racing and Track Operation	0.00%
	481	Independent artists, writers, and performers	11.83%
	482	Promoters of performing arts and sports and agents for public figures	21.00%
	483	Museums, historical sites, zoos, and parks	3.96%
	484	Amusement parks and arcades	0.47%
	485	Gambling industries (except casino hotels)	16.94%
	486	Other amusement and recreation industries	16.19%
	487	Fitness and recreational sports centers	8.23%
	488	Bowling centers	2.39%

Food Service	491	Full-service restaurants	34.47%
	492	Limited-service restaurants	40.78%
	493	All other food and drinking places	24.76%
Food Stores	389	Retail - Food and beverage stores	100.00%
Local Tran. & Gas	391	Retail - Gasoline stores	100.00%
Retail Sales	385	Retail - Motor vehicle and parts dealers	37.01%
	386	Retail - Furniture and home furnishings stores	3.86%
	387	Retail - Electronics and appliance stores	1.38%
	388	Retail - Building material and garden equipment and supplies stores	11.37%
	390	Retail - Health and personal care stores	8.18%
	392	Retail - Clothing and clothing accessories stores	6.41%
	393	Retail - Sporting goods, hobby, musical instrument and book stores	2.96%
	394	Retail - General merchandise stores	20.86%
	395	Retail - Miscellaneous store retailers	7.96%

6.3 REGRESSION RESULTS

Table 10 below presents the full results from Poisson regressions estimating the effect LJD on visitor counts across different industries. The dependent variable in all models is the number of visitors per day. Each column represents a separately estimated model for a specific industry, allowing for industry-specific responsiveness to LJD. All models control for weather (precipitation and maximum temperature), fixed effects for month and year, and their interaction. Statistical significance is indicated by asterisks such that $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Variable	Food Service	Accommodations	Arts, Ent. & R..	Local Tran. & ..	Total
Dependent Var.:	Visitors	Visitors	Visitors	Visitors	Visitors
LJD	0.271*** (0.009)	0.124*** (0.005)	0.079*** (0.007)	0.065*** (0.003)	0.094*** (0.003)
CFD	0.173*** (0.004)	0.210*** (0.002)	0.207*** (0.006)	0.138*** (0.002)	0.163*** (0.001)
Max temperature	0.0005 (0.002)	-0.001 (0.0009)	-0.002. (0.001)	-0.0005 (0.0006)	-0.0006 (0.0006)
Cumulative precipitation	-0.124 (0.081)	0.060 (0.050)	0.087 (0.108)	-0.008 (0.026)	0.004 (0.024)
Fixed-Effects:	----------------	----------------	----------------	----------------	----------------
Month	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Month-Year	Yes	Yes	Yes	Yes	Yes
Observations	1,093	1,093	1,088	1,093	1,093
Pseudo R2	0.35637	0.58823	0.51650	0.57069	0.60864
BIC	285,689.7	300,722.4	66,885.4	458,267.6	718,885.7

Table 10: Poisson estimates of the impact of LJD on visitor counts across different industries and on total visitation