Economic Impacts of Carlsbad Caverns National Park on the Local (Eddy County, NM) Economy, 2002

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Executive Summary

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Carlsbad Caverns National Park hosted 476,259 visits in 2002. This report estimates the economic impacts of the park on the Eddy County, NM economy based on park operations and visitor expenditures in the area in 2002.

Spending associated with the park directly supports over 800 jobs in the area, 104 jobs inside the park and 710 jobs in nearby communities. The direct contribution to personal income (wages and salaries) is $14 million. Sectors most directly impacted by visitor spending are lodging, food services, amusements and retail trade. Including secondary effects from the circulation of the park payroll and visitor spending through the economy, the total impact of the park is almost 1,000 jobs and $17 million in income in the county.

Park visitors spent $31 million in the area outside the park. On average visitor parties spent $108 per day ranging from $37 per party per day for local residents to $53 for visitors on day trips, to $86 per day for campers and $163 per day for visitors staying in motels. It is estimated that 15% of visitors are local residents, 32% are on day trips, 35% stay overnight in area motels and 18% are camping in the area. Park visitors account for an estimated 132,000 motel room nights and 52,000 campsite nights. Overnight visitors average a two night stay in the area. The average party size is 2.3 people.

The annual park operating budget is about $6 million, with $5.3 million going directly to wages and salaries and $712,000 to supplies and services. About 45% of the operating expenses accrue as sales to local firms. Impacts of park operations stem primarily from the NPS payroll and the induced effects from park employee spending of this income in the area. In addition to the 104 NPS jobs, another 43 jobs in the area are supported through secondary effects of park operations.

Based on the visitor spending estimate, park visitors account for about half of the overall travel spending in the area. Lodging sales to park visitors also represent about half of all lodging sales in the county. The 1,000 jobs supported by park and visitor spending represents about 4% of all jobs in the county.

The impact estimates are made using the Money Generation Model (MGM2), which estimates spending by each of four visitor segments using park visitation figures, estimates of the share of park visitors from each segment, and a per day average spending figure for each segment. Spending is itemized in eleven categories and applied to a set of multipliers and economic ratios representing the Eddy county economy. The MGM2 "medium" spending profiles and rural area multipliers are the basis for Carlsbad Caverns.

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Introduction

This report estimates the local economic impacts of Carlsbad Caverns National Park. The park contributes to economic activity in the area through visitor spending and park operations. Impacts are estimated using the MGM2 model along with park visitation and budget information for 2002 provided by the park.

The Region

Carlsbad Caverns National Park is located in the southeast corner of New Mexico. The park is the principal tourist attraction within Eddy county. The park hosted 476,259 visits in 2002[2]. For the purpose of estimating economic impacts, the local region is defined as Eddy County. This roughly covers a 30-50 mile radius around the park. The Eddy county population was 51,000 in 2001. Economic impacts are based on sales to firms and government units within the county.

We first provide a brief summary of the Eddy county economy. Employment data from the Bureau of Economic Analysis' (BEA) Regional Economic Information System (REIS) provide a profile of the county economy in 2001 (Table 1)[3]. There were 26 thousand jobs in the county in 2001. With the exception of mining which accounts for 12% of all jobs, the area economy is largely based on services. The largest employers are government (14%), retail trade (12%), and health services (10%). Accommodations and food services account for 9% of private employment in the county.

Four sectors are the principal beneficiaries of visitor spending in the area: retail trade, accommodations, food services (restaurants and bars), and amusements. The accommodations and food service sector accounted for 4% of all private sector earnings in the county in 2001. Accommodations paid out $7.3 million in wages and salaries in 2001 while food services paid $16.9 million, and arts, entertainment and recreation paid $2.0 million.

Economic impacts of tourism in general on the county were estimated by the Travel Industry Association (TIA) for 2000[4]. They report $71 million in travel expenditures in

[2] National Park Service Statistical Abstract 2002. 2003. Denver, CO: NPS Public Use Statistics Office.
[3] Figures downloaded from BEA website: http://www.bea.gov.
[4] Figures downloaded from the New Mexico tourism office website, February 10, 2004 :http://www.newmexico.org/Industry/economicimpact.html

the county, supporting 1,050 jobs. TIA includes spending on all trips of 50 miles or more within the county, covering pleasure trips, business travel, and visiting friends and relatives[5].

Table 1 . Employment by Sector in Eddy County, NM, 2001 (NAICS basis)

Category/Sector	Jobs	Pct of Total	Pct of Pvt
Total employment	26,049	100%	
Wage and salary employment	20,879	80%	
Sole Proprietors	5,170	20%	
Private employment	21,621	83%	100%
Forestry, fishing, related activities	200	1%	1%
Mining	3,111	12%	14%
Utilities	136	1%	1%
Construction	1,580	6%	7%
Manufacturing	942	4%	4%
Wholesale trade	560	2%	3%
Retail trade	3,104	12%	14%
Transportation and warehousing	954	4%	4%
Information	357	1%	2%
Finance and insurance	787	3%	4%
Real estate and rental and leasing	757	3%	4%
Professional and technical services	723	3%	3%
Management of companies and enterprises	39	0%	0%
Administrative and waste services	1,654	6%	8%
Educational services	93	0%	0%
Health care and social assistance	2,512	10%	12%
Arts, entertainment, and recreation	257	1%	1%
Accommodation and food services	1,973	8%	9%
Other services, except public administration	1,882	7%	9%
Government and government enterprises	3,607	14%	
Federal, civilian	488	2%	
Military	166	1%	
State and local	2,953	11%	
State government	739	3%	
Local government	2,214	8%	

SOURCE: Bureau of Economic Analysis, REIS data, 2001.

[5] TIA also includes some imputed expenses not included for park visitors, e.g. imputed rents on seasonal homes and some imputed motor vehicle operating expenses. MGM2 only covers actual out-of-pocket expenses. Also note that TIA results may not be reliable at the county level.

Visitor Spending

Park visitors spent about $31 million in Eddy county in 2002. This represents about half of all travel spending in the area based on TIA reports[6]. Park visitor spending estimates are based on 476,259 visitors. To estimate spending, visitors are divided into four segments that help explain spending patterns:

- Local Visitors (15%) : residents of Eddy county
- Day Trips (32%): visitors from outside the county who do not stay overnight in the area in paid lodging. Park visitors staying with friends and relatives in the area are treated as non-local day trips.
- Overnight stays in Motel (35%): visitors staying overnight in area hotels, motels, cabins or bed and breakfasts
- Campers (18%) : visitors staying overnight in area campgrounds and RV parks.

The segment shares in parentheses are the percentage of park visits represented by each segment. We estimate that 15% of visitors live in the local area, 32% are on day trips from outside the county, 35% stay overnight in area motels and 18% stay in area campgrounds[7].

The MGM2 "medium" spending profiles are chosen as the basis for representing spending of Carlsbad Caverns NP visitors. The MGM2 park visitor spending averages were price adjusted to 2002 and also adjusted to match average room and campsite rates in the area. Park admission and cave tour fees are not included in the visitor spending analysis. These are treated as revenues in support of park operations and covered as part of the impacts of NPS spending.

Per party-day spending averages for Carlsbad Caverns NP visitors are $37 for locals, $53 for day trips, $163 for stays in motels and $86 for campers (Table 2). Overall, a typical park visitor party spends $108 per day in the area. Motel room rates were set at $70 per night , campsite rates at $20.

Table 2. Spending and Visits by Segment

Segment	Visits	Party-days	Avg Spending ($ per party day)	Total Spending $000's	Pct of Spending
Local	71,439	35,719	$37	$1,324	4%
Day Trip	152,403	66,262	$53	$3,523	11%
Motel	166,691	131,771	$163	$21,496	70%
Camp	85,727	51,956	$86	$4,494	15%
TOTAL	476,259	285,708	$108	$30,838	100%

[6] $31 million is 44% of $71 million, but adjusting for differences in the spending included in the two estimates puts the park visitor spending share near 50%.

[7] Reliable visitor survey information to estimate these shares is not available, so the estimates are based on some judgement and by adapting shares measured at similar parks to local population and lodging characteristics.

The detailed visitor spending profiles used in the analysis are reported in the Appendix (Table A2). Note that the MGM2 spending profiles are on a party day basis for day trips and a party night basis for overnight stays[8] .

To be consistent with the spending units, park visit figures must be converted to a party day/night basis. Party days in the area are estimated using the following formula:

Party days = (Park visits * Length of stay in area)/ (Party size * Re-entry rate).

A length of stay of two nights is used for the overnight segments. This counts the equivalent of two nights of spending. Average party sizes are set at 2.3 people for day trips and visitors in motels, 2.0 for local visitors and 3.0 for campers. A modest re-entry factor of 1.1 is applied to the overnight segments to account for some possible double counting of these visitors. This assumes that one in ten overnight visitors are counted twice during their stay in the area.

The 476,259 visits equates to 285,708 party days in the area (Table 2). Park visitors account for about 132,000 room nights in area motels and 52,000 campsite nights in area campgrounds (Table 2). Total spending is estimated by multiplying the detailed spending profiles in Table A2 times the number of party days from each segment in Table 2. Total park visitor spending is itemized by spending category and segment in Table 3.

Total park visitor spending in the county is estimated at $31 million. Park visitors spent $10 million on lodging (motel + camping) and $7.5 million in restaurants and bars. Visitors staying in area motels, cabins or B&B's account for 70% of the spending.

Table 3. Total spending by Park Visitors in Eddy County ($ 000's)

	Segment				
	Local	Day Trip	Motel	Camp	Total
Motel, hotel cabin or B&B	$ 0	$ 0	$ 9,224	$ 0	$9,224
Camping fees	0	0	0	1,039	1,039
Restaurants & bars	452	1,118	5,283	658	7,511
Groceries, take-out food/drinks	225	417	1,383	491	2,516
Gas & oil	161	597	1,069	515	2,343
Other vehicle expenses	19	52	208	41	320
Local transportation	0	17	69	14	100
Admissions & fees	156	506	1,724	736	3,122
Clothing	34	127	757	298	1,216
Sporting goods	35	65	129	51	280
Souvenirs and other expenses	243	623	1,652	651	3,168
Total	1,324	3,523	21,496	4,494	30,838

Note: Estimated by multiplying park visits in party days (Table 2) by spending profiles in Table A2. Excludes park admissions and cave tour fees.

[8] The travel party consists of all people in the same vehicle. Spending is reported on a per day basis, with nights equated to days for overnight stays. The average spending on lodging for visitors staying overnight in the area therefore represents an average nightly room or campsite rate.

Economic Impacts of Visitor Spending

Economic impacts of this spending are obtained by applying the spending totals to a model of the local economy. The Eddy county economy is represented by the MGM2 rural area multipliers[9].

The $31 million in spending results in $25 million in direct sales.[10] These sales support 710 jobs in tourism-related businesses, contribute $8.5 million in personal income[11] to the area , and represent almost $13 million in value added[12]. The largest direct effects are in lodging, restaurants, amusements and retail trade (Table 4).

As a typical rural region, the sales multiplier for Eddy county is 1.33. This means there is an additional $ .33 in secondary sales for every dollar of direct sales. Secondary effects support an additional 125 jobs and $2.8 million in personal income (Table 4).

Table 4. Economic Impacts of Visitor Spending

	Direct Effects			
Sector/Spending category	**Direct Sales $000's**	**Jobs**	**Personal Income $000's**	**Value Added $000's**
Motel, hotel cabin or B&B	$ 9,224	232	$ 2,677	$ 4,068
Camping fees	1,039	26	302	458
Restaurants & bars	7,511	231	2,365	3,295
Amusements	3,122	91	1,073	1,756
Other vehicle expenses	320	4	89	140
Local transportation	100	3	53	62
Retail Trade	3,345	116	1,706	2,665
Wholesale Trade	519	6	208	355
Local Production of goods	168	0	10	19
Total Direct Effects	25,348	710	8,483	12,819
Secondary Effects	8,289	125	2,784	5,135
Total Effects	$ 33,636	835	$ 11,267	$ 17,954

[9] MGM2 generic multipliers for rural areas represent averages for rural regions around National Parks. These were estimated from input-output models using the IMPLAN system. See the MGM2 user manual for details.

[10] Roughly $6 million of visitor spending directly leaks out of the region to cover the cost of imported goods purchased by visitors. Only the retail margins on these purchases accrue to the local economy. Impacts of retail purchases appear in the retail trade sector.

[11] Personal income includes wages and salaries, payroll benefits and income of sole proprietors.

[12] Value added is the preferred measure of the contribution of an activity or industry to gross national, state or local product. Value added includes all personal income (wages and salaries plus sole proprietor income), rents and profits, and sales and other indirect business taxes.

Impacts of Park Operations

Local impacts of park operations are estimated using the MGM2Operate model[13]. The park budget was almost $6 million in 2002, the majority of which ($5.25 million) went to wages and salaries, including payroll benefits (Table 5). The park directly employs 104 people, 73 on an annual basis and the equivalent of 31 additional jobs on a seasonal basis[14].

Table 5. Carlsbad Caverns NP Operating Budget, 2002

Expense Category	Dollars
Wages and Salaries	4,241,030
Payroll Benefits	1,008,745
Total payroll	5,249,776
Supplies and Services	711,467
Total	5,961,242

The park spends $712,000 on supplies and services of which about 45% accrues to local firms. Impacts of park operations stem primarily from the NPS jobs. The park payroll is a direct contribution to income and value added in the region. Secondary economic effects from park operations arise from park employee spending of their income in area businesses (induced effects) and the jobs and income supported in local businesses that provide goods and services to the park.

Park employee spending in the area supports 37 jobs while park purchases support about 6 jobs. The secondary impacts of park payroll and operations combined contribute another $737,000 to personal income and $1.4 million to value added.

Total Impacts of the Park on the Eddy County Economy

Combining the impacts of visitor spending and park operations yields a total impact of over almost 1,000 jobs, $17 million in personal income and $25 million in value added (Table 6). Visitor spending accounts for 93% of the sales effects of the park and 85% of job impacts. However, park employees and operations constitute 27% of the value added by the park to the Eddy county economy and 35% of the personal income contribution.

[13] MGM2Operate is a spreadsheet model similar to MGM2 that is applicable to park operations and construction expenditures. It is available at the MGM2 website: http://www.prr.msu.edu/mgm2/.
[14] Three seasonal jobs for four months each are counted as one annual equivalent. Note that all job estimates include both full and part time jobs.

Table 6. Summary of Economic Impacts of Carlsbad National Park on the Eddy County economy

Impact	Visitor Spending	Park Operations	Combined total
Direct effects			
Sales ($ 000's)	$25,348	NA	$25,348
Jobs	710	104	814
Personal Income ($ 000's)	$8,483	$5,250	$13,733
Value Added ($000's)	$12,819	$5,250	$18,069
Secondary effects			
Sales ($ 000's)	$8,289	$2,594	$10,883
Jobs	125	43	167
Personal Income ($ 000's)	$2,784	$737	$3,521
Value Added ($000's)	$5,135	$1,453	$6,588
Total effects			
Sales ($ 000's)	$33,636	$2,594	$36,230
Jobs	835	147	982
Personal Income ($ 000's)	$11,267	$5,987	$17,254
Value Added ($000's)	$17,954	$6,702	$24,657

Limitations and Suggestions for Further Research

Recent visitor surveys to reliably estimate Carlsbad Caverns NP visitor spending patterns and segment shares are not available. However, the MGM2 model allows us to make reasonable estimates of economic impacts of park visitors based on park visit counts and some additional secondary economic data for Eddy county. Park employment and operational expenses are easier to estimate than visitor spending.

Patterns of spending of national park visitors are reasonably stable across different parks and regions when visitors are divided into distinct segments and spending averages are put on a per day basis (Stynes and Sun, 2003). Variations from the spending averages within camping or day trip segments, for example, can usually be predicted based on spending opportunities and prices in the area.

Spending averages for Carlsbad Caverns NP visitors were adapted from the MGM2 spending averages estimated in visitor surveys at similar parks. Park visit data provides a fairly reliable estimate of the total number of visitors. The greatest potential source of error in the spending estimates is likely from the segment shares, especially the percentage of park visitors staying overnight in area motels and their length of stay in the area.

Our visitor spending impact estimates are based on an assumption that 35% of park visitors are staying overnight in area motels and that they average a two night stay. Park visitors therefore account for 132,000 motel room nights and $9.2 million in motel room sales. Visitor spending totals will be sensitive to the assumed motel share as these visitors

spend considerably more than visitors not staying overnight in the area. Segment shares and/or spending patterns of park visitors could be estimated in a small visitor survey to verify the MGM2 estimates.

Application of the Results

Economic impact estimates are used to increase local support for the park and encourage partnerships and cooperation with local businesses and tourism interests. Carlsbad Caverns NP is one of the most significant tourist attractions in the region. Serving visitors to the area requires the efforts of the park, as well as local businesses and government units, not to mention the cooperation of local residents. Economic impact analysis helps to quantify some of the interrelationships between the park and surrounding communities.

Spending and impacts on the community are significantly increased by keeping visitors overnight in the region. Overnight stays require adequate lodging facilities in the area and are enhanced by other attractions. Morning and evening programs at the park encourage overnight stays. Visitor spending and local impacts rest considerably on the array of spending opportunities provided in the area, and cooperative information and marketing strategies between the park and the community.

The MGM2 model provides baseline estimates of spending and impacts and helps to identify the key data required to make these estimates. The estimates of income, sales, and jobs are readily updated as new or beter information becomes available. The impact estimates also can be compared with local economic statistics to assess the relative importance of the park in the regional tourism picture or economic development more generally.

The model can also be used to evaluate particular park or community marketing or development alternatives. The model is linear so that a 10% increase in visits or party nights in the area will also increase income and jobs by 10%. The segmented approach also permits the evaluation of strategies that may impact only some visitor subgroups, for example changes in camping or room capacities.

REFERENCES

National Park Service Statistical Abstract 2002. 2003. Denver, CO: NPS Public Use Statistics Office.

Stynes, D.J., Propst, D.B., Chang, W.H., and Sun, Y. 2000. Estimating regional economic impacts of park visitor spending: Money Generation Model Version 2 (MGM2). East Lansing, MI: Department of Park, Recreation and Tourism Resources, Michigan State University.

Stynes, D.J. 2002. MGM2 Operate User Manual. East Lansing, MI: Department of Park, Recreation and Tourism Resources, Michigan State University.

Stynes, Daniel J. and Sun, Ya-Yen. 2003. Economic Impacts of National Park Visitor Spending on the Local Economy; Systemwide estimates for 2001. East Lansing, MI: Department of Park, Recreation and Tourism Resources, Michigan State University.

Appendix Tables

Table A1. Visit Conversion Parameters

Segment	Party size	Length of Stay	Park Entries per Trip
Local	2.0	1.0	1.0
Day Trip	2.3	1.0	1.0
Motel	2.3	2.0	1.1
Camp	3.0	2.0	1.1

a. adapted from MGM2 model averages

Table A2. Carlsbad Caverns NP Visitor Spending in the Local Area by Segment, 2002 ($ per party per night)

	Segment			
Spending category	Local	Day Trip	Motel	Camp
Motel, hotel cabin or B&B	0.00	0.00	70.00	0.00
Camping fees	0.00	0.00	0.00	20.00
Restaurants & bars	12.66	16.88	40.09	12.66
Groceries, take-out food/drinks	6.30	6.30	10.50	9.45
Gas & oil	4.51	9.01	8.11	9.92
Other vehicle expenses	0.53	0.79	1.58	0.79
Local transportation	0.00	0.26	0.52	0.26
Admissions & fees	4.36	7.63	13.08	14.17
Clothing	0.96	1.91	5.74	5.74
Sporting goods	0.98	0.98	0.98	0.98
Souvenirs and other expenses	6.79	9.40	12.53	12.53
Total Spending	**37.08**	**53.17**	**163.13**	**86.50**

a. adapted from MGM2 model medium spending profiles.

Table A3. MGM2 Rural Area Multipliers, 2002

	Direct effects			Total effects multipliers				
Sector	Jobs/ MM sales	Personal inc/sales	Value Added /sales	Sales I	Sales II	JobsII/ MMsales	IncII/ sales	VA II/sales
Hotels And Lodging Places	25.19	0.29	0.44	1.25	1.37	30.74	0.42	0.67
Eating & Drinking	30.75	0.31	0.44	1.19	1.30	35.25	0.42	0.62
Amusement And Recreation	29.00	0.34	0.56	1.19	1.32	33.89	0.45	0.76
Auto repair and service	12.75	0.28	0.44	1.16	1.26	16.78	0.37	0.60
Local transportation	32.78	0.53	0.62	1.11	1.28	37.46	0.63	0.79
Food processing	4.96	0.14	0.27	1.25	1.32	9.46	0.25	0.45
Apparel from purch mate	13.81	0.14	0.17	1.19	1.25	17.01	0.22	0.31
Petroleum refining	0.54	0.05	0.12	1.45	1.51	3.70	0.16	0.44
Sporting goods	7.26	0.27	0.51	1.16	1.25	10.90	0.36	0.66
Manufacturing	9.28	0.23	0.39	1.21	1.32	14.06	0.34	0.58
Retail Trade	34.79	0.51	0.80	1.10	1.26	38.97	0.60	0.96
Wholesale trade	12.31	0.40	0.68	1.12	1.26	16.43	0.49	0.84

Note: Job multipliers are adjusted to 2002 using price indices, all others are based on 1996 IMPLAN models, using IMPLAN Type SAM multipliers for Type II.

Brief explanation of table:

Direct effects are economic ratios to convert sales to jobs, income and value added.

Jobs/Million sales is the number of jobs per million dollars in sales in each sector.

Income/sales is the percentage of sales going to wages and salaries. Personal income includes sole proprietor's income and payroll benefits.

Value added (VA)/sales is the percentage of sales that is value added. VA includes all personal income, rents & profits and indirect business taxes.

Total effect multipliers capture the total effect (direct + indirect + induced) relative to direct sales.

Sales II multiplier = (direct + indirect + induced sales)/ direct sales

Sales I captures only direct and indirect sales = (direct + indirect sales)/ direct sales.

Job II/ Million sales = total jobs (direct + indirect + induced) per $ million in direct sales.

Income II /Sales = total income (direct + indirect + induced) per $ of direct sales

VA II/ Sales = total value added (direct + indirect + induced) per $ of direct sales.

Using the Hotel sector row to illustrate:

Direct Effects: Every million dollars in hotel sales creates 25 jobs in hotels. Twenty-nine percent of hotel sales goes to wages and salaries of hotel employees and 44% of hotel sales is value added. That means 56% of hotel sales goes to purchase inputs by hotels. The wage and salary income creates the induced effects and the 56% spent on purchases by the hotel starts the rounds of indirect effects.

Multiplier effects: There is an additional 25 cents of indirect sales in the region for every dollar of direct hotel sales (type I sales multiplier = 1.25). Total secondary sales ratio is 37 cents per dollar of direct sales, which means 25 cents in indirect effects and 12 cents in induced effects. An additional 6 jobs are created from secondary effects for each million dollars in hotel sales (31 total jobs – 25 direct jobs per million sales). These secondary jobs are scattered across other sectors of the local economy. Including secondary effects, every million dollars of hotel sales in the county yields $1.37 million in sales, $420,000 in income, and $670,000 in value added.

Note that the multipliers vary across sectors yielding distinct impacts for each sector.

Glossary of Economic Impact Terms

Terms are presented in groups within a logical rather than alphabetical order

Region – defines the geographic area for which impacts are estimated. The region is generally an aggregation of one or more counties.

Sector is a grouping of industries that produce similar products or services. Most economic reporting and models in the U.S. are based on the Standard Industrial Classification system (SIC code) or the North American Industrial Classification System (NAICS). Tourism is more an activity or type of customer than an industrial sector. While hotels (SIC 70) are a relatively pure tourism sector, restaurants, retail establishments and amusements sell to both tourists and local customers. There is therefore no simple way to identify tourism sales in the existing economic reporting systems, which is why visitor surveys are required to estimate tourist spending.

Impact analysis estimates the impact of dollars from outside the region ("new dollars") on the region's economy.

Significance analysis estimates the importance or significance of an industry or activity to a region usually including spending by both local residents and visitors from outside the region.

Input-output model. An input-output model is a representation of the flows of economic activity between sectors within a region. The model captures what each business or sector must purchase from every other sector in order to produce a dollar's worth of goods or services. Using such a model, flows of economic activity associated with any change in spending may be traced either forwards (spending generating income which induces further spending) or backwards (visitor purchases of meals leads restaurants to purchase additional inputs -- groceries, utilities, etc.). Multipliers can be derived from input-output models.

IMPLAN is a micro-computer-based input output modeling system available from MIG Inc. With IMPLAN, one can estimate 528 sector I-O models for any region consisting of one or more counties. IMPLAN includes procedures for generating multipliers and estimating impacts by applying final demand changes to the model.

Final Demand is the term for sales to final consumers (households or government). Sales between industries are termed **intermediate sal**es. Economic impact analysis generally estimates the regional economic impacts of final demand changes. Tourist spending is one type of final demand.

Direct effects are the changes in economic activity during the first round of spending. For tourism this involves the impacts on the tourism industries (businesses selling directly to tourists) themselves.

Secondary effects are the changes in economic activity from subsequent rounds of re-spending of tourism dollars. There are two types of secondary effects:

Indirect effects are the changes in sales, income or employment within the region in backward-linked industries supplying goods and services to tourism businesses. The increased sales in linen supply firms resulting from more motel sales is an indirect effect of visitor spending.

Induced effects are the increased sales within the region from household spending of the income earned in tourism and supporting industries. Employees in tourism and supporting industries spend the income they earn from tourism on housing, utilities, groceries, and other consumer goods and services. This generates sales, income and employment throughout the region's economy.

Total effects are the sum of direct, indirect and induced effects.

Multipliers capture the size of the secondary effects in a given region, generally as a ratio of the total change in economic activity in the region relative to the direct change**.** Multipliers may be expressed as ratios of sales, income or employment, or as ratios of total income or employment changes relative to direct sales. Multipliers express the degree of interdependency between sectors in a region's economy and therefore vary considerably across regions and sectors.

Type I multipliers do not include induced effects while **Type II** multipliers do**. Type SAM** multipliers adjust the Type II multipliers for income that is not normally respent immediately within the region, e.g. commuting workers who live outside the region and retirement benefits.

A **sector-specific multiplier** gives total changes throughout the economy associated with a unit change in sales in a given sector**.**

Aggregate tourism multipliers are based on some assumed initial changes in final demand. An aggregate tourism spending multiplier is based on an assumed distribution of tourist spending across economic sectors. These are basically weighted averages of sector specific multipliers with the percentage of spending in each sector as the weights.

Capture rate is the percentage of spending that accrues to the region's economy as direct sales or final demand. All tourist spending on services within the region is captured, however, tourist purchases of goods is generally not all treated as final demand to the region. For imported goods bought at retail establishments, only the retail and possibly wholesale margins will accrue to the local economy.

Purchaser prices are the prices paid by the final consumer of a good or service. **Producer prices** are the prices of goods at the factory or production point. For manufactured goods the purchaser price = producer price + retail margin + wholesale margin + transportation margin. For services, the producer and purchaser prices are equivalent. The **retail, wholesale and transportation margins** are the portions of the purchaser price accruing to the retailer, wholesaler, and shipper, respectively. Only the retail margins of many goods purchased by tourists accrue to the local region, as the wholesaler, shipper, and manufacturer often lie outside the local area.

Measures of economic activity:

Sales or output is the dollar volume of a good or service produced or sold
Final Demand = sales to final consumers
Intermediate sales = sales to other industrial sectors

Income is the money earned within the region from production and sales. Total income includes:
Personal Income : wage and salary income, payroll benefits and income of sole proprietors
Profits and rents of businesses

Jobs or employment is a measure of the number of jobs required to produce a given volume of sales/production. Jobs are usually not expressed as full time equivalents, but include part time and seasonal positions.

Value Added is the sum of total income and indirect business taxes. Value added is the most commonly used measure of the contribution of a region or industry to the national economy, as it avoids double counting of intermediate sales and captures only the "value added" by the region to final products.