

BALL STATE UNIVERSITY  
CENTER FOR BUSINESS AND ECONOMIC RESEARCH

# **TOURISM-RELATED COMMERCE IN INDIANA:**

THE INNKEEPER'S TAX, INDUSTRY STRUCTURE AND IMPACTS





## INTRODUCTION

Public investment in tourism-related economic development and promotion has a long pedigree, dating at least to the 18th Century trips to Bath, England. In recent years, a trend towards targeted expenditure of tourism-related taxes has taken place. In at least 47 U.S. states, this results in the direction of all or part of hotel and motel taxes towards promotion and advertising of regional tourism. Not surprisingly, evaluating the efficacy of these expenditures has become an important question for policymakers. The nexus of this question is the role tourism-related taxes and expenditures play in dissuading or promoting tourism-related commerce in a region. Informing this analysis is an understanding of the size of tourism-related commerce, and its forward and backward linkages in the state's economy.

This paper specifically addresses the role Indiana's hotel and motel taxes, and expenditures on tourism-related promotion and advertising play on tourism-related commercial economic activity in the region. We also attempt to explain the role trade linkages play in cementing tourism-related expenditure in the regions' economy. To accomplish these tasks we exploit a unique data series on tourism-related expenditures at the county level, and match this to the innkeeper's tax in each of Indiana's 92 counties. We employ an instrumental variable approach to correct for the endogenous nature of tourism taxation and expenditures. That, along with the presence of significant divergence of hotel motel tax revenue offers a robust analysis at very detailed industry levels.

We begin by explaining the backward and forward linkages of the tourism trade in Indiana, focusing on the hotel and motel sectors of the economy. We then review academic studies of the innkeeper's tax and follow this by a discussion of the data and our model. We then present results and extensions of our findings to a more detailed picture of tourism in Indiana. This is followed by conclusions and policy recommendations.

*“The [hotel] industry in Indiana produces over \$1.4 billion in revenue with a value-added of over \$830 million annually.”*

## FORWARD AND BACKWARD LINKAGES IN INDIANA'S HOTEL INDUSTRY

The hotel industry in Indiana consists of two disaggregated economic sectors. The first includes larger facilities such as traditional hotels and motels and includes casino hotels. The second includes other accommodations such as bed & breakfast inns, RV parks and recreational camps, rooming and boarding houses. The industry in Indiana produces over \$1.4 billion in revenue with a value added of over \$830 million annually. Figure 1 (and Appendix 1) displays data on the industry, for each county, including the amount of revenue, the share consumed by residents of the county, employment and value added as well as their own county share.

The size of the industry is an important gauge of its regional contribution. However, economists have long reported industry 'multipliers' as a measure an industry's overall contribution to a regions economy through the flow of revenues locally. Table 2 displays a comprehensive multiplier table for this industry in Indiana.

Understanding the multiplier effect is quite simple. An output multiplier of an industry is the sum of direct, indirect, and induced effects of that industry. A one dollar increase in demand on output (goods and services) of an industry is considered the “Direct Effects.” A portion of that one dollar increase in output is used by the industry to create a new round of demand for output from other industries. This new round of demand is



termed the “Indirect Effects.” Finally, the combined direct and indirect effects of that one dollar increase in the new demand also results in increases household incomes. As a result, spending by households on goods and services also increases due to increases in production. This household spending increase is known as the “Induced Effects.” The same definition applies to the employment and value-added multipliers. Multipliers are then used to describe the “total” effect of a dollar spent on an activity within a region. This is also a method of appreciating the size and scope of backward linkages of this industry within a region.

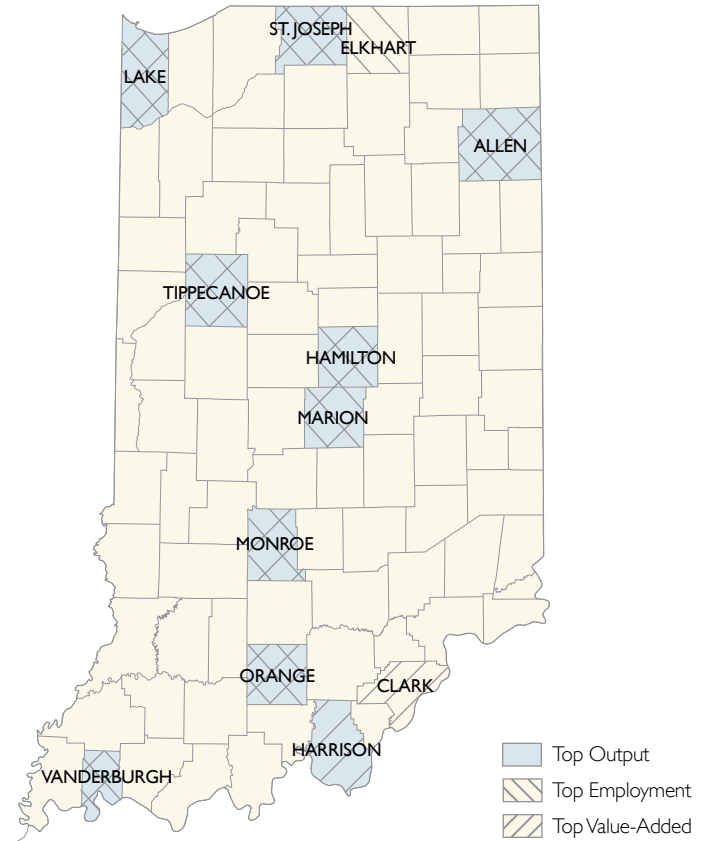
Another way of examining the structure of an industry within a region is to estimate the amount of local goods and services that are consumed by an industry in the normal course of production. Table 3 reports the amount of selected Hoosier commodities consumed by the hotel industry in the most recent year for which data is available (2006). In that year, roughly \$1.412 billion in total revenues were spent on the hotel industry in the state. This table reports selected industries and focuses on the dollar amount purchased by the hotel industry from Hoosier businesses, and their share of total expenses. We also compare the import share (and by imports we mean non-Indiana firms).

Table 4 reports the total payment to, and share of revenues by major input class. For example, of the \$1.4 billion spent on hotels in Indiana, roughly \$431 million went to employee compensation, which totaled over 30.5 percent of the expenditures. Income to owners amounted to just 2.78 percent, while property income (rents, for example) totaled 17.3 percent and total taxes comprised 8.3 percent. Note that the total payment to these factors of production were just 59.05 percent of total revenues. The remaining 40.1 percent are essentially ‘pass through expenditures’ on such things as bedding, food, furniture, electricity and construction materials.

Table 5 accounts for the expenditures of the industry where hotels were consumed as an input to another industry and in final demand. This is a full accounting of expenditures on the industry to include some geographic data on the location of expenditures. Some elements of this table require additional explanation. While much is self explanatory, such as sales of hotel services to the Federal government, domestic export and foreign export of hotel services is badly measured in these data and does not reflect the origin of visitors, but rather the origin of some of the industries contracting for hotel services.

Finally, a flowchart of an industry’s inputs and outputs from an input-output table could help us understand more about the structure of that industry. The industry structure at the county level could be similar or different from that of the state and the nation. Information of inputs from the flowchart helps to review the range of opportunities to supplant imported inputs, which can provide a region with highly-targeted economic development opportunities. Flowchart 1 illustrates the inputs used for the services production of hotel industry in Indiana, and the services outputs that it made in 2006. The source of data is from IMPLAN’s sector 479: Hotels and motels, including casino hotels, and sector 480: Other accommodations such as bed &

**FIGURE 1: TOP TEN COUNTIES FOR HOTEL INDUSTRY OUTPUT, EMPLOYMENT AND VALUE-ADDED\***



\* Data for all 92 counties in Indiana and totals for Indiana and the US are listed in Appendix I.

**TABLE 2: INDIANA HOTEL SECTORS’ MULTIPLIERS**

Type SAM Multipliers*	Hotels and Motels, Including Casino Hotels		Other Accommodations	
		Ranked*		Ranked*
Output Multiplier	1.657	216	1.834	48
Employment Multiplier	1.351	425	1.570	385
Total Value-Added Multiplier	1.582	392	2.309	98
Labor Income Multiplier	1.570	351	2.264	81
Other Property Type Income Multiplier	1.717	296	2.300	199
Indirect Business Taxes Multiplier	1.364	428	2.652	380

\* The SAM matrix, or social accounting matrix, includes all types of expenditures within a region’s economy. It is the most frequently reported multiplier type.

breakfast inns, RV parks and recreational camps, rooming and boarding houses.

Flowchart 1 illustrates that the total industry output of the hotel industry in Indiana in 2006 was \$1.413 billion. The industry employed 22,406 people (full-time and part-time) in 2006. Out of \$1.413 billion in the hotel industry’s output, \$578.6 million was used to buy inputs for their operations, i.e. intermediate inputs or commodity demands. The remaining \$834.3 million

went to labor and capital costs and indirect business taxes, i.e. the industry's value added which breaks down into employee compensation, proprietary income, property income, and indirect business taxes. The detailed figures are presented in the left side of the flow chart. As much as \$229.5 million or 40 percent

of Indiana's hotel industry's gross inputs in 2006 were purchased out of the state (domestic and foreign imports). The industry spent \$349.1 million buying their inputs locally in 2006. This reflects the very high import dependency of the hotel industry in Indiana.

**TABLE 3: INPUT AND OUTPUT SHARES OF INDIANA HOTEL INDUSTRY, 2006**

Intermediate Inputs		Indiana Inputs (\$ Million)	Coefficient (Share) (%)	Imported Inputs (\$ Million)	Coefficient (Share) (%)
1-10	Crop Production	0.00	0.00	0.02	0.00
11-13	Animal Production	0.00	0.00	0.00	0.00
14-18	Forestry, Logging, Fishing, Hunting, Trapping, and Support Activities for Agriculture and Forestry	-	-	-	-
19-29	Mining	0.01	0.00	0.00	0.00
30-32	Utilities	28.59	2.02	6.74	0.48
33-45	Construction	22.67	1.60	-	-
46-91	Food, Beverage and Tobacco Product Manufacturing	1.20	0.09	0.94	0.07
92-111	Textile, Apparel, Leather and Allied Product Manufacturing	2.53	0.18	3.80	0.27
112-123	Wood Product Manufacturing	3.38	0.24	2.35	0.17
124-135	Paper Manufacturing	0.11	0.01	3.51	0.25
136-141	Printing and Related Support Activities	2.19	0.15	1.97	0.14
142-146	Petroleum and Coal Products Manufacturing	2.47	0.17	0.14	0.01
147-171	Chemical Manufacturing	4.24	0.30	2.68	0.19
172-181	Plastics and Rubber Products Manufacturing	8.86	0.63	1.89	0.13
182-202	Nonmetallic Mineral Product Manufacturing	1.54	0.11	3.98	0.28
203-223	Primary Metal Manufacturing	0.09	0.01	0.31	0.02
224-256	Fabricated Metal Product Manufacturing	0.94	0.07	5.86	0.41
257-301	Machinery Manufacturing	0.07	0.00	1.10	0.08
302-324	Computer and Electronic Product Manufacturing	0.41	0.03	0.85	0.06
325-343	Electrical Equipment, Appliance, and Component Manufacturing	0.25	0.02	1.87	0.13
344-361	Transportation Equipment Manufacturing	0.26	0.02	1.49	0.11
362-373	Furniture and Related Product Manufacturing	1.14	0.08	0.27	0.02
374-389	Miscellaneous Manufacturing	0.48	0.03	2.24	0.16
390	Wholesale Trade	6.53	0.46	3.09	0.22
391-400	Transportation and Warehousing	15.57	1.10	8.64	0.61
401-412	Retail Trade	8.49	0.60	1.05	0.07
413-424	Information	19.30	1.37	29.16	2.06
425-430	Finance and Insurance	19.66	1.39	17.33	1.23
431-436	Real Estate and Rental And Leasing	58.54	4.14	30.63	2.17
437-450	Professional, Scientific, and Technical Services	32.21	2.28	33.76	2.39
451	Management of Companies and Enterprises	17.52	1.24	16.51	1.17
452-460	Administrative and Support and Waste Management and Remediation Services	47.53	3.36	33.82	2.39
461-463	Educational Services	0.28	0.02	0.09	0.01
464-470	Health Care and Social Assistance	-	-	-	-
471-478	Arts, Entertainment, and Recreation	1.36	0.10	1.23	0.09
479-480	Accommodation	2.31	0.16	3.37	0.24
481	Food Services and Drinking Places	4.80	0.34	0.62	0.04
482-494	Other Services (Except Public Administration)	14.52	1.03	3.88	0.27
495-499, 503-506	Public Administration	16.43	1.16	4.26	0.30
500-502, 507-509	Others				
	<b>Total</b>	<b>346.49</b>	<b>24.52</b>	<b>229.46</b>	<b>16.24</b>

Where the output or services of the hotel industry from Indiana went in 2006 is shown on the right side of the flow chart. \$691.3 million of the output or services from the hotel industry went to other industries in Indiana as intermediate inputs, i.e. industries that buy a lot of accommodation services. The remaining \$721.6 million was consumed by what is called final demand, which is comprised of households, the governments, inventory and investment, domestic exports, and foreign exports. Out of \$721.6 million of the final demand on the hotel industry's output or services, households in Indiana's demand is estimated at \$598 million. \$80 million of Indiana hotel services was bought by the state and local governments. \$1.5 million went to the hotel industry's capital formation. \$41.3 million of hotel services was bought by households or businesses in other states in the United States. Only \$0.02 million of hotel services in Indiana was bought by foreigners. Note that the inputs on the left side must balance with the output on the right side.

Clearly the size and scope of the hotel industry in Indiana warrants additional consideration and study. We next turn our attention to the impact of taxes and tourism promotion on the industry in the state.

## STUDIES OF HOTEL/MOTEL TAXES AND TOURISM PROMOTION

This study is the first to combine tourism promotion (expenditures) to the tax revenue collections and rate as part of a joint analysis of tourism-related economic activity. However, a number of studies have examined parts of the issue. Before discussing, that, it is important to outline literature we will not review. There is an abundance of non-econometric studies of convention and visitor bureaus. Many of these studies employ visitation data as either an part of an input-output model (e.g. IMPLAN, or RIMS II) to assess economic impact, or calculate a rate of return on CVB expenditures. These studies are very useful in explaining the local consequences of tourism. They are also a far more extensive effort to evaluate the use of public investments (e.g. expenditures on CVBs) than is common in the public sector. Nevertheless, none of these studies that we have observed attempt to measure causation as we shall. For that reason we leave a number of studies of CVBs and tourism unreviewed.

Perhaps the most common issue in the scholarly literature are assessments of the responsiveness of tourism to hotel taxes. This literature has enjoyed near unanimity in finding a small influence of hotel taxes on tourism. Combs and Elledge [1979] employed a multi equation modeling approach to test consumer expenditures on tourism-related activities. They tested this model on data from 1972 and 1973 in the United States. Their study examined income groups, and found that demand for hotel occupancy was nearly inelastic, so taxes were fully passed on to the consumer. This study also noted the potential for border problem when tax rates on occupancy differed across jurisdictions.

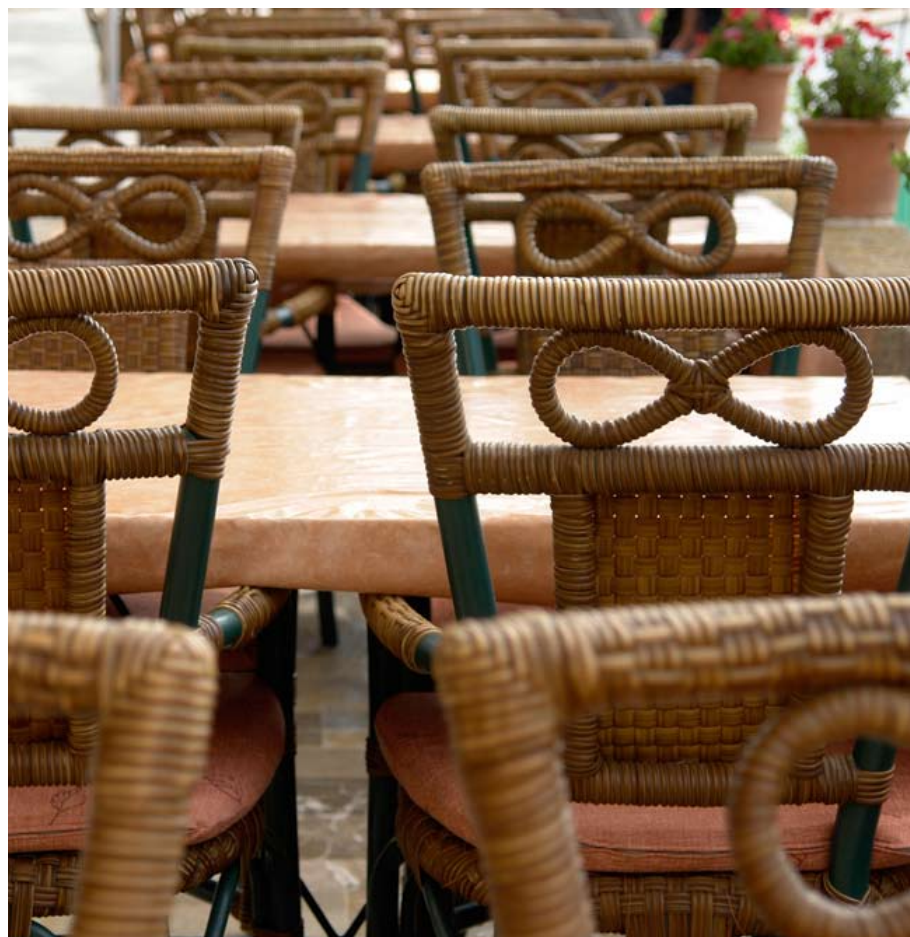
Fujii, Haled and Mak [1992] examined the tax exporting hypothesis of hotel taxes. Examining data on Hawaii in the 1980s

**TABLE 4: FACTOR BENEFITS AND REGIONAL SHARES**

Factor Inputs	Indiana Inputs	Coefficient (Share)
Employee Compensation	431.93	30.57
Proprietary Income	39.27	2.78
Other Property Income	244.84	17.33
Indirect Business Taxes	118.21	8.37
<b>Total</b>	<b>834.25</b>	<b>59.05</b>

**TABLE 5: AGGREGATE INTERMEDIATE INPUTS OF THE HOTEL INDUSTRY**

Outputs	Indiana Inputs	Coefficient (Share)
Sales to State Hotel Industry Itself	2.31	0.16
Intermediate Input Sales to Other Sectors in State	688.96	48.76
Sales to State Households	598.02	42.33
Sales to Federal Government	0.70	0.005
Sales to State and Local Governments	80.08	5.67
Capital	1.48	0.10
Inventory	–	–
Domestic Export (sales to customers from other states in the US)	41.27	2.92
Foreign Export (sales to customers from outside the US)	0.02	0.00
<b>Total</b>	<b>1,412.83</b>	<b>100.00</b>







**TABLE 6: SUMMARY STATISTICS**

	Mean	Median	Maximum	Minimum	Std. Dev.
CVB Budget (\$2006)	\$341,435	\$78,013	\$10,920,044	\$0	\$1,047,035
Hotel Tax Rate	2.6%	3.0%	8.0%	0.0%	2.5%
Mean Adjacent Hotel Tax Rate	2.8%	2.8%	7.5%	0.0%	1.3%
Share of Hotel Tax Rec'b by CVB	46.6%	15.0%	100.0%	0.0%	48.2%
Years Since CVB Opened	9.3	6.5	83.0	0.0	12.1

Earnings (thousands of 2006 dollars)					
Accommodations	11,760	1,621	169,719	0	34,751
Museum and Historical Attractions	1,994	0	37,346	0	7,093
Food Service	66,821	14,524	744,136	346	14,5165
Amusements and Gambling	7,567	1,731	73,666	0	15,605
Arts and Recreation	19,501	183	415,383	0	81,064
General Merchandise	22,308	9,879	248,570	100	36,053

they found that most of the taxes (more than 2/3) was exported, so that the incidence fell primarily on out of state visitors. They did find a modest negative impact on tourism expenditure due to taxes, and followed this with an explicit policy recommendation for 'ear-marking' a part of the proceeds for tourism promotion. Bonham, Fujii and Mak [1992] test the impact of a new hotel tax on hotel revenues using an empirical model which captures the incremental, effect of the imposition of a tax on hotel revenues when correcting for other tourism-related features. They found no meaningful reduction in hotel revenues attributable to hotel taxes in Hawaii during the 1980s. Bonham and Ganges [1996] perform a similar test in Hawaii using cointegration equation. They found no statistically meaningful impact of hotel taxes on hotel room revenues.<sup>1</sup> These studies represent all the recent analysis of hotel taxes, and enjoy a common finding,

that the elasticity of tourism revenues to hotel taxes is essentially inelastic within the observed range.

A number of marketing studies of tourism have been performed. The sole study that effectively measures CVB performance is (Wober and Fesenmiae, 2004) employed a data envelope analysis (DEA) of ten different market characteristics in Wisconsin. This study included CVB expenditures. The DEA approach allows for performance comparisons of different approaches, when controlling for variation that cannot be controlled by the CVB. It cannot however, determine optimality, only relative performance. Interestingly, this study examined Indiana, and found that as a state, its tourism promotion ranked with the very best (one of 15 to receive a 100% benchmark score). No remaining studies provide this type of analytical approach to CVB spending and tourism.

A number of studies have estimated advertising elasticity to evaluate the return on advertising (both domestic and international) on tourism-related activities. These studies include both public and private investing. Crouch, Schultz and Valerio [1992] reports returns of 9:1 in the United States, while Access Economics [2002] reported ranges of returns from 11:1 to 16:1 on publicly financed tourism advertising. Kulendran and Divisekera (2006) find the impact for international travel to New Zealand's of 8:1.

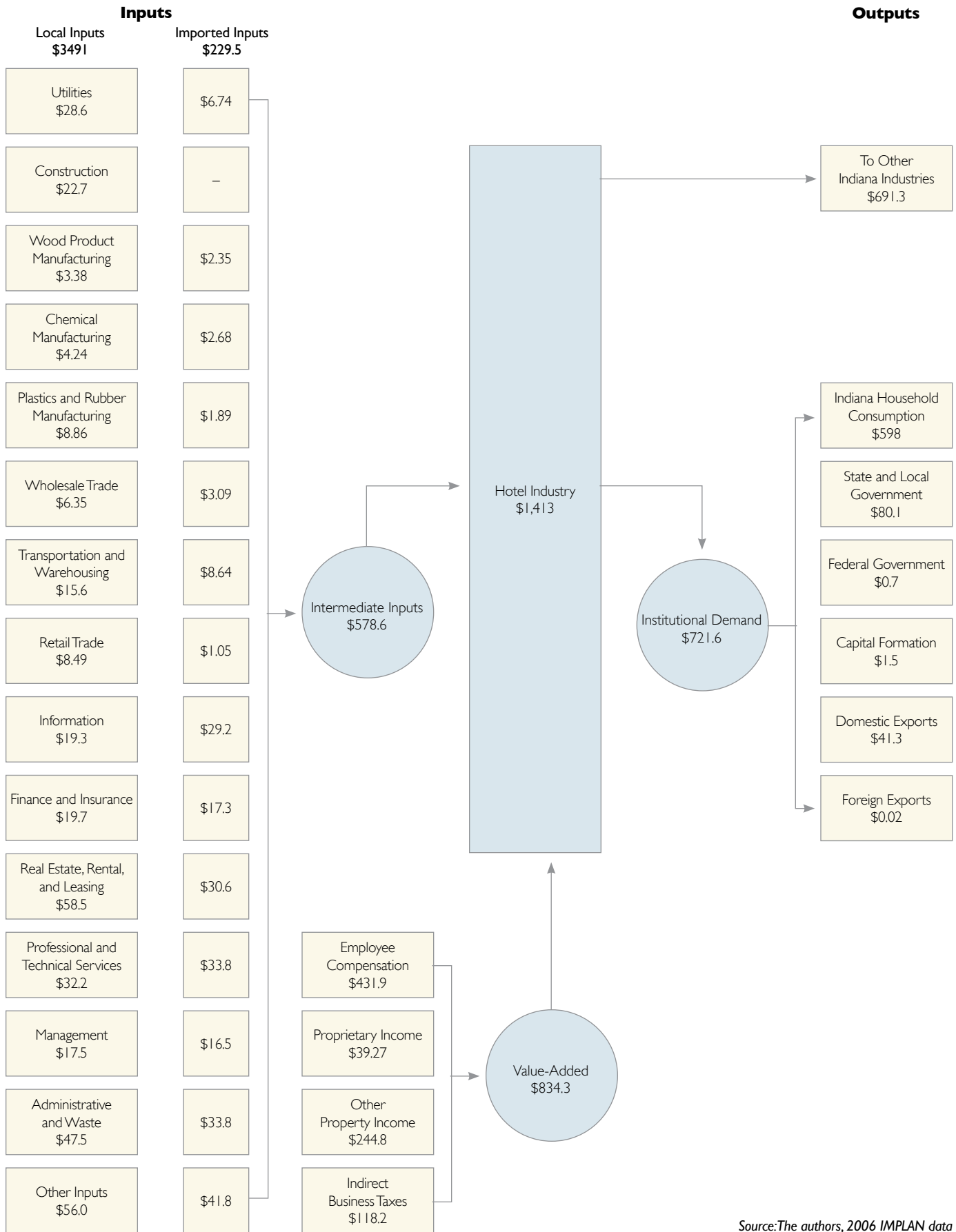
The literature does provide us with some Bayesian inference for our modeling effort. We would expect a very small negative influence (perhaps zero) of Indiana's Innkeeper's Tax on tourism-related economic activity. The effect on tourism from taxes in adjacent counties would be the opposite. We would also expect that promotional activities would be positively correlated with tourism expenditures, and that the magnitudes would be similar to other estimates. We now turn our attention to the empirics.

## OUR MODEL AND DATA

Our interest lies in testing the relationship between tourism taxes and expenditures and tourism-related economic activity at the county level. The data we use comes from three sources. Data on convention and visitor bureau expenditures was obtained from the Association of Indiana Convention and Visitor Bureaus (AICVB). This data was available from 2001 through 2006. Data on tax collections and rates for the Indiana Innkeeper's Tax was obtained for each of Indiana's 92 counties from the Department of Local Government Finance.<sup>2</sup> Data on industry earnings was obtained through the Bureau of Economic Analysis' Regional Economic Information System. The AICVB also provided data on the opening dates of each CVB in Indiana.<sup>3</sup> Summary statistics appear in Table 6.

An initial approach to modeling the incremental effect of taxes and expenditures is to construct a time series, cross sectional model of each industry using tax rates and expenditures as primary explanatory variables. However, the real concern in this approach is the presence of endogeneity bias. Simply, without a hotel tax there is no instance of tourism-related expenditures. Failure to account for this would immediately raise the specter of this bias, and render our results suspect.

**CHART 1: INPUT-OUTPUT OF HOTEL INDUSTRY IN INDIANA, 2006 (\$ MILLIONS)**



Source: The authors, 2006 IMPLAN data

Fortunately, we have three mechanisms to control this bias. First, for counties with a hotel tax, much is diverted to non-tourism-related uses. This provides some heterogeneous variation in the data, which is bias reducing. Second, we can test counterfactuals. This is an approach often used to examine the choice of instrumental variable approach (see Basker, 2007). And finally, we will employ the traditional instrumental variable approach.

The source of the endogeneity bias, is that the presence of CVBs and the advertising and development of tourism they undertake is the result of a naturally occurring tourism-related amenity in a region. Thus, CVBs are 'caused' by existing tourism and funded by hotel taxes. In order to construct an instrument to identify the relationship, it is necessary to find a variable this is simultaneously correlated with the presence of the dependent variable, but not the economic variable in question.<sup>4</sup> This is one of the more difficult estimation problems, but there is unfortunately no simple way to perform an identification procedure common to all estimation problems. Fortunately for us, the age of the CVB is a factor that describes the importance of tourism (and hence the magnitude of the tourism-related economic activity),

but not correlated with the actual presence of a CVB (a dichotomous variable) or hotel taxes.

$$Y_{i,t} = \beta_1 CVB_{i,t} + \beta_2 HOTELTAX_{i,t} + \beta_2 \tilde{W} HOTELTAX_{j,t} + e_{i,t}$$

(1) Where  $Y$  in county  $i$ , year  $t$  are the inflation adjusted earnings in tourism-related commerce (e.g. food service, accommodations, etc.) The variable  $CVB$  are the annual budget for convention and visitor bureaus in each county.  $HOTELTAX$  is the rate of the hotel tax (set locally) in county  $t$ , in year  $t$ . The next variable is the weighted average of the hotel tax rate in the adjacent counties  $j$ , to county  $i$ , in year  $t$ . While  $\tilde{W}$  is the row normalized first order contiguity matrix which weights this variable. The parameter estimates are the estimated  $\beta$  values, and  $e$  is the error term which we assume enjoys the white noise characteristics. The identifying equation is specified as:

$$\hat{Y}_{i,t} = \beta_1 CVBYears_{i,t} + \beta_2 (CVBYears_{i,t})^2 + \beta_2 T + e_{i,t}$$

(2) where the estimated endogenous variable  $\hat{Y}$  is a function of the age and squared age of the CVB, and a time trend and white noise error term. We subjected this instrument to a weak instrument test suggest by Stock and Yogo [2002] finding that in each case, the instrument met the critical Wald values for a strong instrument. We then tested these models on the existing data. Results appear in Table 7.

These results require both specific interpretation and a broad explanation. First, CVB expenditures (which are primarily advertising and development) affect revenues in each of the categories of tourism-related economic activity we model. Perhaps more importantly, the magnitude of the impact is closely aligned with the relative anticipated impact between different activities. For example, \$1 in CVB expenditures, raises arts and recreation incomes by roughly \$38, \$16 for accommodations and only \$5 in amusement and gambling earnings. Food service experiences an increase of \$65 while general merchandise stores see earning increases of \$23. Museum and historical attractions see only a \$3 impact from each dollar of CVB advertising. These impacts can be aggregated which yields \$151 of additional revenue from each dollar of public advertising. These appear excessive, but it is important to understand that the advertising and development performed by the CVB is public expenditures, and our estimate does not include private expenditures. In order to better understand this, we apply some estimates of advertising, and tax rates. In Indiana, the total local and state tax burden in 2003 (the median year of

*“...the age of the CVB is a factor that describes the importance of tourism (and hence the magnitude of the tourism-related economic activity), but not correlated with the actual presence of a CVB or hotel taxes.”*

but not correlated with the actual presence of a CVB (a dichotomous variable) or hotel taxes.

Given the presence of a potential instrumental variable approach, we con-





**TABLE 7: ESTIMATION RESULTS\***

	Arts and Recreation	Accommodations	Amusements and Gambling	Food Service	General Merchandise Stores	Museums and Historical Attractions
CVB	0.038564*** (44.36)	0.016383*** (117.55)	0.005341*** (4.82)	0.065596*** (61.63)	0.023793*** (381.14)	0.003357*** (42.32)
HOTELTAX	-420871*** (-13.42)	-161719*** (-9.21)	407218 (1.60)	-218877*** (-6.78)	-2258 (-0.22)	-26293*** (-23.37)
HOTELTAX Adjacent	149883*** (5.15)	140651*** (21.40)	-128448 (-1.17)	582262.8*** (47.09)	442010*** (26.88)	6948*** (10.13)
Adjusted R-squared	0.98	0.93	0.18	0.83	0.71	0.96

\*These data do not share a common unit root and we found no evidence of non-stationarity in these data, but remind the reader of the weakness of the tests in the absence of a long time series. We white-washed these data employed White's Heteroscedasticity Invariant, Variance-Covariance Matrix.

\*\*\* Significant:  $p < 0.001$

our study) was 10.1 percent. Applying our results roughly to tax receipts suggests, the return on tourism marketing is about 15:1. A more detailed application of tax incidence will be preserved for later work. Our experience on the matter suggests that the rough estimates is very close to the results a more detailed analysis would find. This is somewhat higher than other estimates. Crouch, Schultz and Valerio [1992] report returns of 9:1 in the United States. Kulendran and Divisekera (2006) report returns to advertising of 8:1 for international travel to New Zealand. Access Economics [2002] reported ranges of returns from 11:1 to 16:1 on publicly financed tourism advertising.<sup>6</sup>

Our estimates also provide evidence of the impact of hotel taxes on tourism-related activity. Clearly, we expect the relationship between taxes and tourism to be negative. We find that to be the case, but our estimates suggest a very small negative impact. In terms of pure statistical significance, the hotel tax rate affects incomes in accommodations, arts and recreation, food service and museum and historical attractions. Interestingly, it does not affect incomes in amusement and gambling activities or general merchandise stores. However, the magnitudes of the impacts are not sufficiently large to be of consequence to policymakers. A ten percent increase in the hotel tax would cause only a \$1.05 million reduction in annual incomes in accommodations. All the remaining impacts are much smaller. All of these are below any reasonable policy threshold. This is a finding confirmed by all the existing research on hotel taxes (see Bonham and Ganges, 1996; Bonham, Fuji, Im and Mak, 1998; Fuji, Khaled, Mak, 1986; Combs and Elledge, 1981).

Further, we find that the weighted average of the hotel tax rate in the adjacent counties has the expected effect, in that it

leads to higher incomes in own county tourism-related activities. However, as with the own county tax, the effect is below the policy threshold, and in fact, is much smaller than the small own county effect. This is a new finding in the literature, as we have not seen empirical evidence on the influence of hotel tax rates on tourism spatially in this type of setting.

In terms of model performance, we are heartened by the quality of the results. We also note that within the models in which we could a priori anticipate smaller potential influence of hotel taxation and marketing (e.g. on gambling activities) the overall model explained far less of the variation than it did in the models where impact was clearly expected (e.g. accommodations). We fell this is strong support for our findings.

Our final step is to perform counterfactual testing. We use an approach employed by Basker [2007] to evaluate alternative identification strategies for endogeneity in Wal-Mart's entrance decision. Her approach involves estimating the impact of an unrelated economic activity on the specific equation. We use the same approach, and tested in the impact of this model of CVB spending and hotel taxes on manufacturing earnings in Indiana's counties. We were able to soundly reject any impacts. This, along with our heterogeneity in the sample and identification strategy makes us confident we have identified causality in these tourism-related impacts.

## SUMMARY OF TAX AND PROMOTIONS IMPACT ON TOURISM

In this study, we find that public expenditures in tourism result in higher levels of income in tourism-related activities at the county level. In our study of Indiana, we find that accom-





modations, arts and recreation, general merchandise sales, amusements and gambling, museums and historical attractions as well as general merchandise stores see higher levels of personal income attributable to spending on tourism advertising and promotion. Further, we see this impact concentrated in otherwise low advertising activities (e.g. in places other than amusement parks and gambling casinos, where extensive private sector advertising is the rule). Our estimates are reasonably close to other such studies. Further, we find that own county hotel tax rates reduce incomes in tourism-related activities, and all things being equal, the weighted average hotel tax in adjacent counties leads to higher incomes in tourism-related commerce in a county. However, like all previous studies, we find the size of the impact to be so small as to be effectively negligible.

## CONCLUSIONS

Tourism and related trade in Indiana is a significant industry with extensive forward and backward linkages into almost every sector in the state. Hotel expenditures alone are more than \$1.4 billion with almost 60 percent of that pure value added production by Indiana workers.

Indiana's communities support tourism through convention and visitor bureaus. These CVBs are financed primarily by the state's innkeeper's tax. In this report we examined the impact that innkeeper's tax, and the expenditures by the CVBs played in promoting tourism. Using a model that specifically accounts for the reverse causation problem of tourism taxes and tourism expenditures we found that a dollar spent on tourism promotion generates roughly 15 dollars in additional tax revenues for state and local governments.

## NOTES

1. We are at a loss to understand why Hawaii has been singled out for analysis. Perhaps it is due to the high reliance, and heavily measured tourism in the state. However, we suspect, but cannot prove, that some of the authors may have selected this state for analysis in hopes of performing an on-site visit.
2. Indiana's Uniform County Innkeeper's Tax is described in IC 6-9-18.
3. The AICVB typically has all but two or three CVBs in the state as part of their membership. Data on these were also obtained by the CVB and are included in these data.
4. Formally, we identify the equation by constructing another equation (or instrument) which is correlated with the endogenous variable, but not the error term.
5. These studies also provide estimates of advertising elasticity. Since we do not have pricing data, we cannot effectively measure this. However, if the Dorfman-Steiner conditions hold, our elasticities are roughly 0.009, which are quite low relative to other studies.

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**APPENDIX 1: HOTEL INDUSTRY OUTPUT, EMPLOYMENT AND VALUE-ADDED BY INDIANA COUNTIES**

County	Hotel Industry Output (\$ Million)	Share In Own County (%)	Hotel Industry Employment (Workers)	Share in Own County (%)	Hotel Industry Value-Added (\$ Million)	Share in Own County (%)	County	Hotel Industry Output (\$ million)	Share in Own County (%)	Hotel Industry Employment (Workers)	Share in Own County (%)	Hotel Industry Value-Added (\$ million)	Share in Own County (%)
Adams	1.24	0.04	35	0.18	0.59	0.06	Madison	9.53	0.16	198	0.37	5.65	0.18
Allen	53.68	0.16	998	0.43	32.81	0.22	Marion	483.79	0.45	6,567	0.90	302.78	0.53
Bartholomew	24.20	0.24	486	0.93	14.16	0.37	Marshall	5.52	0.16	122	0.51	3.18	0.24
Benton	–	–	–	–	–	–	Martin	0.04	0.01	1	0.02	0.02	0.01
Blackford	0.13	0.02	2	0.04	0.08	0.03	Miami	3.36	0.17	61	0.43	1.35	0.16
Boone	4.97	0.14	90	0.26	2.82	0.15	Monroe	64.23	0.80	928	1.22	31.36	0.71
Brown	21.28	5.42	342	6.96	10.06	4.60	Montgomery	7.47	0.21	156	0.73	4.23	0.26
Carroll	1.10	0.11	15	0.18	0.33	0.08	Morgan	1.81	0.06	39	0.20	1.08	0.09
Cass	4.05	0.17	73	0.41	2.28	0.24	Newton	2.09	0.29	32	0.41	1.07	0.32
Clark	23.53	0.34	409	0.73	14.28	0.42	Noble	2.53	0.07	59	0.25	1.48	0.10
Clay	2.96	0.24	54	0.47	1.37	0.28	Ohio	0.27	0.12	3	0.15	0.09	0.07
Clinton	0.27	0.01	6	0.04	0.16	0.01	Orange	42.97	4.45	571	6.59	27.31	5.54
Crawford	0.07	0.03	1	0.03	0.04	0.03	Owen	–	–	–	–	–	–
Daviess	6.58	0.36	155	0.98	3.86	0.47	Parke	1.07	0.23	18	0.37	0.56	0.23
Dearborn	3.67	0.16	69	0.31	2.24	0.16	Perry	3.59	0.38	68	0.87	1.75	0.38
Decatur	3.69	0.16	70	0.46	2.22	0.25	Pike	0.70	0.10	11	0.25	0.44	0.10
De Kalb	5.69	0.14	118	0.49	3.29	0.20	Porter	22.61	0.20	448	0.65	12.46	0.24
Delaware	12.13	0.20	214	0.35	7.37	0.22	Posey	2.22	0.04	30	0.26	1.41	0.13
Dubois	7.86	0.17	169	0.49	4.69	0.21	Pulaski	0.12	0.01	2	0.02	0.03	0.01
Elkhart	24.03	0.10	494	0.33	13.65	0.15	Putnam	16.48	1.05	253	1.55	7.35	0.92
Fayette	0.16	0.01	4	0.04	0.09	0.02	Randolph	0.16	0.01	1	0.01	0.11	0.02
Floyd	9.38	0.22	169	0.45	5.76	0.26	Ripley	5.09	0.29	80	0.50	2.17	0.22
Fountain	0.77	0.08	10	0.12	0.28	0.08	Rush	0.24	0.03	5	0.06	0.15	0.04
Franklin	0.43	0.08	8	0.12	0.26	0.09	St. Joseph	52.54	0.24	912	0.52	31.62	0.30
Fulton	0.64	0.06	9	0.10	0.41	0.08	Scott	1.58	0.13	25	0.27	0.85	0.18
Gibson	5.85	0.07	91	0.47	3.59	0.21	Shelby	3.04	0.11	59	0.27	1.76	0.14
Grant	5.11	0.12	117	0.35	3.02	0.14	Spencer	3.14	0.26	50	0.45	1.31	0.19
Greene	0.25	0.02	3	0.02	0.16	0.03	Starke	0.07	0.01	1	0.02	0.03	0.01
Hamilton	55.16	0.28	889	0.54	34.25	0.30	Steuben	11.53	0.54	194	1.02	5.26	0.56
Hancock	7.30	0.22	133	0.43	4.17	0.24	Sullivan	0.07	0.01	1	0.02	0.03	0.01
Harrison	24.68	1.69	314	2.38	14.28	2.01	Switzerland	17.11	8.75	189	8.54	11.06	8.74
Hendricks	13.69	0.22	251	0.41	8.38	0.23	Tippecanoe	45.82	0.28	822	0.86	24.12	0.37
Henry	3.51	0.17	81	0.45	2.05	0.21	Tipton	1.06	0.10	13	0.19	0.68	0.17
Howard	12.75	0.14	235	0.48	7.80	0.20	Union	0.18	0.06	2	0.07	0.08	0.05
Huntington	0.47	0.02	11	0.06	0.28	0.03	Vanderburgh	42.39	0.24	775	0.60	25.93	0.29
Jackson	11.48	0.29	216	0.74	5.25	0.33	Vermillion	0.79	0.07	11	0.17	0.36	0.07
Jasper	4.29	0.22	85	0.54	2.52	0.28	Vigo	19.81	0.26	385	0.63	11.86	0.31
Jay	2.70	0.17	52	0.47	1.54	0.27	Wabash	3.52	0.14	86	0.47	2.00	0.21
Jefferson	6.87	0.31	117	0.69	3.19	0.31	Warren	–	–	–	–	–	–
Jennings	5.81	0.51	63	0.61	3.71	0.66	Warrick	0.18	0.01	2	0.01	0.06	0.00
Johnson	7.25	0.12	150	0.26	4.33	0.13	Washington	0.96	0.11	8	0.10	0.63	0.14
Knox	4.16	0.17	92	0.44	2.47	0.21	Wayne	9.72	0.20	227	0.55	5.57	0.25
Kosciusko	15.32	0.23	227	0.52	7.52	0.25	Wells	0.12	0.01	6	0.05	0.05	0.01
Lagrange	9.17	0.42	140	0.83	4.37	0.48	White	4.35	0.34	72	0.65	2.32	0.38
Lake	85.88	0.18	1,125	0.47	52.71	0.30	Whitley	1.23	0.06	30	0.21	0.71	0.09
La Porte	16.03	0.25	300	0.57	9.13	0.28	<b>Indiana</b>	<b>1,412.83</b>	<b>0.27</b>	<b>22,406</b>	<b>0.61</b>	<b>834.25</b>	<b>0.35</b>
Lawrence	4.93	0.23	102	0.48	2.75	0.26	<b>USA</b>	<b>171,818.07</b>	<b>0.69</b>	<b>1,954,508</b>	<b>1.12</b>	<b>108,724.17</b>	<b>0.82</b>





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