Estimating the Economic Impact of Tourism Events:

Creating an Input-Output Model for Texas

by

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Estimates of the economic impact generated by tourism events can vary greatly depending on the methodologies used to conduct an analysis. This professional report will attempt to establish a standardized methodology for estimating the economic impact created by demand shocks to the economy resulting from event generated tourism visitation and spending with the final deliverable being a state-level input-output model for Texas. A review of state-level input-output models created for Michigan and Georgia in addition to a hypothetical scenario based on the 1996 Atlanta Olympics will illustrate the importance of assumptions in input-output analysis and lead to a discussion regarding some elements of hosting an event and increasing tourism that cannot be captured through this method. The report concludes by briefly examining considerations that should be made before applying the Texas model, the potential for future improvements, and finally the viability of recruiting events as an economic development strategy.

Table of Contents

List of Tables

List of Figures

List of Figures (continued)

Chapter One - Introduction

Events have long been recognized as a tourism generator and an economic driver for Texas. More than ten years ago, around the time Atlanta secured the bid for the 1996 summer Olympics, the State of Texas commissioned a study evaluating sports facilities and sporting event impacts in major metropolitan areas that included numerous recommendations for encouraging sports related tourism while highlighting the role that sporting events can play in economic development (Event Partners September 1996). Many of the recommendations found in the report are still applicable today including a call for standardization in sporting event economic impact research,

> …develop a standardized method for measuring economic impact through sports. There are a number of separate measures and a number of clear differences and discrepancies in the methods of calculation. A standardized process and methods of data gathering, analysis and reporting would provide great value to not only the planning process but contribute to the public debate on these issues.
>
> -Event Partners, 1996 (p. 77)

This report will attempt to address this recommendation although with a somewhat expanded scope considering that events, regardless of sporting or otherwise, all have similar "demand-shock" effects on the economy. A more general approach based on tourism visitation generated and typical spending patterns will be used to hopefully provide a uniform starting point for economic impact analysis and understanding of tourism impacts generated regardless of the type of event under consideration.

The final deliverable of this effort will be an input-output (I-O) model designed to estimate the economic impact of events incorporating standard data inputs collected by the end user and assumptions built into the model as a way for communities to evaluate the potential of hosting events and their tourism impacts on Texas. The I-O model will be designed to provide a rough estimate of the economic impacts of the visitation generated by a given event at the state-level to serve as a consistent starting point for shareholders to consider before conducting a more thorough destination/event specific analysis when desired.

It is hoped that this tool, along with a detailed discussion regarding the theory and assumptions behind the end product, will provide insight and inform policies regarding public investment decisions and the viability of recruiting various types of events as an economic development strategy. Some concepts that that will be addressed include: defining the major components of an economic impact study in tourism, identifying sources of data to inform an impact analysis, understanding how tourism expenditures cycle through the economy, and the costs and benefits of hosting events and increasing tourism visitation. By incorporating these concepts with assumptions informed by Texas tourism industry research, the Texas I-O model should provide destinations with a standard methodology for examining the economic impact of events at the state-level.

The professional report begins with a literature review focusing on the major components of economic impact analysis within the tourism industry including

capturing visitation and spending information, defining the tourism industry to allow for the allocation of spending across different industry sectors, and input-output (I-O) analysis as a way to estimate the secondary impacts related to tourism spending in a destination. Following the general review, a section focusing on economic impact studies and special events will include a survey of different academic studies in an attempt to inform the modeling of the demand shock effects of tourism spending generated by a specific event on the greater economy.

Next, an overview of the tourism industry in Texas relying primarily on research conducted by the Office of the Governor, Economic Development & Tourism (EDT) division will provide context by communicating the size and composition of the tourism industry in Texas. This section will focus on providing information relevant to economic impact analysis, which will be used to inform many of the assumptions built in to the Texas I-O model. Specifically, constants like identifying the NAICS industry codes that comprise the tourism industry or distributing average tourism expenditures by commodities purchased will incorporate EDT research as a way to make the I-O model easier to generalize and compare with statistics published annually that are already familiar to many communities across the state when examining their local tourism industry.

Looking outside of Texas, a survey of state tourism websites revealed two existing state-level tourism economic impact models based on input-output analysis created for the tourism departments in Michigan and Georgia by state universities.

These models will be dissected to reflect on how the authors addressed different modeling issues, chose key assumptions, and created a user interface. Following this analysis, a detailed discussion regarding the construction of an I-O model for Texas will explain the process behind the deliverable for this research effort. To further illustrate the Michigan, Georgia, and Texas input-output models, a hypothetical example based on the 1996 Atlanta Olympic Games will display the economic impact estimates for each state if they were to host this event.

The Olympic example was chosen for multiple reasons, despite the fact that events of this magnitude are rare. First, the centennial games were an inspiration for the State of Texas to examine the role of events as an economic development generator in 1996 and this report is in many ways really just a continuation of that discussion. Second, the hypothetical example will allow for a comparison of the assumptions in each model, highlighting the effect that these choices have on economic impact estimates. Finally, the Olympics, and Atlanta's case in particular, provide an excellent context for discussing some of the positive factors (worldwide media attention, physical infrastructure improvements, etc.) and negative factors (overcrowding, safety concerns, etc.) that often escape economic impact analysis based on I-O modeling. The report will conclude with a discussion that examines the viability of applying public investment to recruit events as part of a broader economic development strategy.

Chapter Two - Literature Review

Economic impact studies play an important role in public policy-making and investment decisions by providing a method for assessing the impact of a proposed development or event on the local economy. Tourism is a unique industry which can make measuring economic impact difficult in some situations. The following overview of economic impact studies and tourism will illustrate considerations that must be made when completing an economic impact study within the tourism industry or regarding the tourism impacts of an event. The topics introduced below provide a snapshot of techniques and current issues within economic impact studies in the tourism industry including capturing visitor spending information, defining the tourism industry and input-output analysis. After introducing these concepts, the chapter will conclude with a section that reviews examples of economic impact studies of events found within the academic literature. This conceptual review of economic impact analysis and tourism will provide the foundation for designing an input-output model to estimate the economic impact of events held in Texas at the state-level.

2.1 Capturing Visitation and Spending Information

Visitation and spending information must be acquired before conducting an economic impact analysis of travelers visiting a destination. This information provides the primary input for economic impact modeling and is often used to

communicate the direct effect of an event on a destination by providing the money spent due to event driven attendance. Determining who qualifies as a visitor to a given jurisdiction is a necessary step to ensure that local spending is not included in any economic impact estimates attributed to tourism. The standard definition in most tourism studies at the destination-level states that any non-routine trip of 50 miles or more or an overnight stay qualifies a visitor as having a tourism impact which could be included in an economic impact study. This definition works well if the economic impact study is focusing on visitors to a city or attraction but when attempting to estimate impacts at the state or national level, the 50 mile definition will most likely include residents. At larger geographic scales, visitors are often defined as either non-residents of the state being examined or foreign visitors at the national-level to ensure that the spending included in economic impact analysis is from outside of the jurisdiction being examined.

In many cases, visitation and spending data is not directly available and must be acquired either through direct observation or a survey designed to capture visitors to a destination. Frechtling (2006) identifies seven different sources for acquiring visitor expenditure data which in addition to direct observation include examining existing data, household surveys, visitor surveys, tourism establishment surveys, central bank data, and expenditure models. Some considerations that must be made before acquiring visitor expenditure information include identifying the occasion (referencing a specific event or time period), venue (site or region), and time frame

(past or future) of the visitation being targeted (Frechtling 2006). Each consideration has an impact on the available data sources for visitation and spending information.

At the national, state, or city-level, visitation estimates and visitor spending information is often available through tourism bureaus that could be used to inform an impact analysis. More unique situations involving remote destinations or shorter time periods, perhaps when attempting to determine attendance at a specific event in a rural area, often requires more targeted primary surveys or direct observation as this information will not be available from outside sources. Surveying tourism business or analyzing industry data along with capturing visitation can provide another avenue for estimating the scope of the tourism industry based on indicators like sales, employment and wages, and taxes generated.

2.2 Defining the Tourism Industry

When completing tourism economic impact studies, the lack of a universal industry definition is often one of the first hurdles to overcome before attempting to model the impact of visitor spending on a regional economy. At the national level, countries are increasingly adopting Tourism Satellite Accounts (TSA) according to definitions established by the United Nations World Tourism Organization (UNWTO) to facilitate direct comparisons between tourism and other economic sectors and allow for the communication of tourism's contribution to a country's GDP (Libreros, Massieu, and Meis 2006). TSA's are a valuable tool for

communicating the impact of tourism within the greater economy. In the United States, a national Travel and Tourism Satellite Account (TTSA) has been defined by the Department of Commerce, Bureau of Economic Analysis following as closely as possible the standards established by the UNWTO (Okubo and Planting 1998). The US TTSA is a demand-based model that relies on estimates of the total expenditures of all visitors which are then allocated across industries that produce commodities consumed by travelers.

Since 1998, the US TTSA has undergone numerous refinements to encourage more inclusive coverage as well as more frequent and timely data releases (Kern and Kocis 2007). The latest release defines the travel and tourism industry as consisting of five categorical groups producing tourism commodities: 1) traveler accommodations, 2) food and beverage services, 3) transportation, 4) recreation, entertainment and shopping and 5) nondurable personal consumption expenditures other than gasoline. The categorical groups are also broken down into more than twenty detailed industry groups to provide a robust data set for tracking tourism industry growth (Kern and Kocis 2007).

Despite the value achieved by a universal definition for tourism at the national level, defining the tourism industry at the regional level is much less standardized. Some of the more problematic issues are discussed in a recounting of the implementation of a regional TSA in Austria, including how to allocate transportation costs and account for potential omissions such as the intermediate purchases made by

corporations for business travel or mortgage payments on a vacation home that may not be considered by the individual when self-reporting their travel expenditures (Smeral 2006). Similar issues are present in the United States, which leaves the task of choosing a definition of the tourism industry for an economic impact study at the regional level to the researcher. The US TSA provides a valuable starting point, however, and any regional tourism industry definition should not stray far from what has been accepted as the national standard. Identifying the commodities purchased by travelers and then allocating these purchases across industry groups is necessary to estimate the direct and secondary impacts of visitor spending on the economy.

2.3 Input-Output

Visitor spending constitutes the direct impact of travelers on a destination and should be used as the primary input for input-output (I-O) analysis when modeling the secondary impacts. Before continuing, a brief review of I-O methodology will establish a foundation for this section. I-O analysis measures the secondary impacts resulting from direct investment in a community or what is often referred to as the "multiplier effect". Secondary impacts include indirect effects (local investment generated from inter-industry purchases) and induced effects (local investment generated by wages supported by direct investment). Commonly used multipliers include output multipliers, value-added multipliers, and employment multipliers.

Output multipliers are well suited for event economic impact studies due to the fact that it is often the spending being generated by the event that is analyzed.

When conducting economic impact analysis with output multipliers it is important to note that the total amount spent at a destination is not equal to the direct output used to calculate secondary effects. Trade margins and other costs must be accounted for to determine the amount of spending that remains in a destination and generates secondary effects. The spending that does not remain in the area being studied is often referred to as economic leakage. The ratio of spending that remains in the community and generates secondary impacts to total spending is referred to as the "capture rate" in many tourism economic impact studies.

Prepackaged models have made I-O analysis much more accessible to economic development planners when conducting economic impact studies. Some of the more commonly used regional I-O models include IMPLAN, REMI, and RIMS II. IMPLAN is maintained by the Minnesota IMPAN group and originally produced for the USDA/Forest Service; REMI is produced by Regional Economic Models, Inc.; and the RIMS II model is produced by the US Department of Commerce, Bureau of Economic Analysis. Comparisons of the three different models in a benchmarking study examining models created for Clark County, Nevada showed significant difference in out-of-box multipliers, which is to be expected knowing that the models are informed by different data sources and employ different regional interpretations of national estimates (Rickman and Schwer 1995). Both IMPLAN and

REMI models allow for user adjustments, however, and after changing some of the default settings the multipliers employed in each model did not exhibit any statistically significant differences among the Clark County models created. The study displayed how multipliers could easily become a source of misinformation in economic impact analysis, however, as conducting this modification required significant technical expertise.

Frechtling (1999) examined the use of RIMS II multipliers for estimating the secondary impacts generated from visitor-spending in a study examining tourism impacts in Washington, DC. The following quote summarizes a guideline for using RIMS II multipliers to estimate the total impact of tourism expenditures:

1) Obtain visitor expenditures in the economy under study by category of item purchased and/or earnings generated by such expenditures and/or employment generated by such expenditures.
2) Match the expenditures, earnings, and/or employment categories with the RIMS II industries.
3) For retail trade industries, transform visitor expenditures into visitor output through estimates of trade margins; for service industries, visitor expenditures equals visitor output.
4) Obtain the appropriate RIMS II output, earnings, and employment multipliers for these industries from the Bureau of Economic Analysis.
5) Multiply the visitor output for each industry by the appropriate final-demand multipliers to obtain total output, earnings, and employment produced in the economy by the tourism expenditures and evaluate.
6) If final-demand multipliers for earnings and/or employment seem unreasonable, multiply earnings and/or employment directly generated by these expenditures by the appropriate direct-effect multipliers to obtain total earnings and employment produced by tourism expenditures. Evaluate these multipliers.
7) Attempt to validate these estimates by comparing them with similar estimates obtained from other acceptable sources.

(Frechtling and Horvath 1999)

After applying the methodology above, Frechtling concludes that employing RIMS II multipliers is an appropriate method for estimating the secondary effects of visitor spending on a local economy. The study calls for closer examination of the RIMS II multipliers themselves, however, to provide insight into how visitor expenditures flow through the economy and inform potential policy decisions that could strengthen local benefits from tourism spending. It should be noted that the steps outlined in this study apply generally to the use of any multiplier (RIMS II, IMPLAN, or REMI) in I-O analysis and as illustrated in the following section, RIMS II and IMPLAN are the more popular prepackaged multipliers to use when estimating the economic impact of events.

2.4 Economic Impact Studies and Special Events

This section will incorporate concepts from the previous discussion with a focus on events and their economic impact. More than ten different academic studies targeting the economic impact of a wide variety of events were reviewed to inform this analysis (Daniels, Norman, and Henry 2004; Dwyer, Forsyth, and Spurr 2006; Felsenstein and Fleischer 2003; Gazel and Schwer 1997; Gelan 2003; McHone and Rungeling 2000; Mondello and Rishe 2004; Randall and Warf 1996; Saayman and Saayman 2006; Jones and Munday 2004; Yu and Turco 2000). Insights will be drawn from each of these studies following the three major methodological

components to a tourism economic impact study: capturing visitation and spending data, defining the tourism industry, and input-output (I-O) analysis.

Visitor expenditure information was an essential part of each economic impact study reviewed and the primary input for I-O analysis. Ensuring that survey data provided accurate visitor spending information and accounting for sampling error was a concern in many studies. Some cautions that arose included avoiding the misappropriation of spending that may have occurred regardless of the event being held (casual visitors or time-switchers) and which did not meet the criteria of import substitution (incorporating residents) (Felsenstein and Fleischer 2003; McHone and Rungeling 2000). In one study, the data provided by survey respondents was considered questionable due to the type of event being examined, resulting in the researcher to present a range of outcomes based on conservative or optimistic spending numbers (Gazel and Schwer 1997). No matter how precise the economic impact model, if visitor expenditure data is inflated or understated any estimates created when modeling impacts will only increase the magnitude of inaccuracy.

Most studies reviewed did not explicitly define a tourism industry but did allocate visitor expenditures to the industry sectors most likely to be affected by the spending. Research for events occurring in the United States seemed to choose industry groups similar to those identified in the US Travel and Tourism Satellite Accounts when the information was provided. Interestingly, two international examples did make the effort to define the tourism industry, using survey data to

create a Tourism Satellite Account based on Welsh I-O tables (Jones and Munday 2004) and in the case of South Africa surveying both visitors and business establishments to measure spending leakages and industry relationships due to other data sources being unavailable (Saayman and Saayman 2006). In most cases, simply stating the industry sectors affected by visitor spending generated by an event was sufficient to estimate the economic impact, but by portraying these events as part of a defined travel and tourism industry there is potential for more meaningful results as the event impacts will be placed in the context of a larger industry presence.

Before conducting I-O analysis, the importance of using capture rates to estimate the amount of spending that reaches the local economy was mentioned in most studies, with a capture rate between "60-70%" indicated as a general rule of thumb for tourism retail industries depending on the size of the regional economy (Gelan 2003). Most studies reviewed performed some type of I-O analysis with multipliers provided by either IMPLAN or RIMS II. Some limitations to I-O analysis were discussed including the fact that the ratios of industry interdependence only represent a "snapshot" of the interactions at a certain period of time (Jones and Munday 2004), that there is no delineation between full and part-time employment (Yu and Turco 2000) as well as no way to identify inequalities in distribution of employment or earnings generated from visitor spending (Daniels, Norman, and Henry 2004). Finally, the fact that I-O analysis does not account for the costs of tourism events or development inspired one research effort to call for a computable

general equilibrium (CGE) approach to modeling impacts to provide a more complete picture of how destinations are affected by visitation (Dwyer, Forsyth, and Spurr 2006).

In summary, the major components to an economic impact study in tourism include: 1) capturing visitation and spending, 2) defining the tourism industry, and 3) conducting I-O analysis. Visitation and spending information is usually collected with a primary survey and should be used in conjunction with other data sources when possible to ensure reliability. The tourism industry is most often defined by visitor spending and the commodities purchased by travelers requiring the allocation of these purchases across industrial groups. At the national-level, Tourism Satellite Accounts (TSA) supply a universal definition that allows for comparison among industries and within the national GDP. There is no standard tourism definition at the regional level, leaving the definition employed in a regional I-O analysis to the researcher. Common multipliers in I-O analysis include output, value-added, and employment multipliers which are available through a range of prepackaged products. Special events are temporary occurrences and primarily involve accounting for the traveler spending generated and the dollars that will remain in the community and generate secondary impacts. The concepts summarized above will provide the foundation for the creation of a state-level Texas model while the following chapter will examine the tourism industry in Texas to inform the assumptions necessary to conduct I-O analysis.

Chapter Three - The Tourism Industry in Texas

This chapter will rely primarily on research made available by the Office of the Governor, Economic Development & Tourism (EDT) division to provide an overview of the tourism industry in Texas with an emphasis on the information necessary to conduct economic impact analysis as discussed in the literature review. The agency's mission, in regards to tourism, is to market Texas as a premier destination to domestic and international travelers, thereby increasing tourism revenues and creating jobs. The agency's research program informs marketing plans and tracks industry trends that can be used to monitor the status of the tourism industry in Texas. Studies targeting visitation, visitor profiles, and economic impact analysis will be especially helpful for informing the assumptions necessary to estimate the economic impact of events in Texas. The following sections will follow an outline similar to the literature review and introduce data sources while providing a contextual look at tourism in the state.

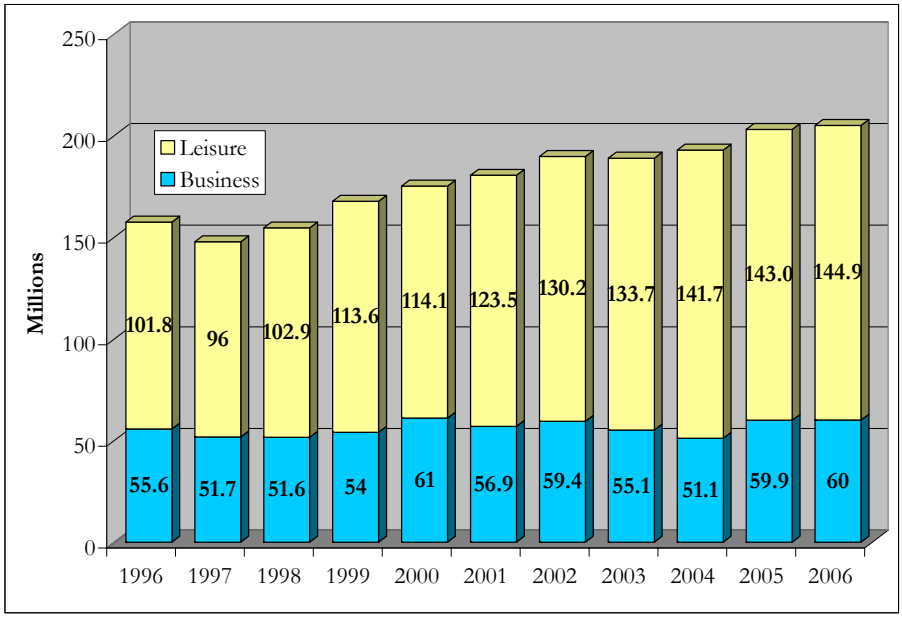
3.1 Visitation and Spending

The most important components to an economic impact study in tourism are visitation and spending in the destination under review. Examining visitation and spending at the state-level can provide insight into the composition of the tourism industry as well as spending profiles for a state-level tourism economic impact model. EDT provides visitation estimates based on the PERFORMANCE/Monitor travel

tracking study which generates more than 75,000 respondents annually regarding travel patterns at the household level within the United States (Shifflet 2007). This study has been adopted by many other states and the larger travel industry as a reliable provider of visitation estimates and other market research data.

The most recent estimates reveal that more than 200 million travelers visited destinations across Texas in 2006. As seen in the following chart, Texas is primarily a leisure destination with approximately 70% of all domestic visitors to and within the state stating that the primary purpose of their trip was leisure related.

Figure 3.1.1: Leisure and Business Visitation in Texas (1996-2006)



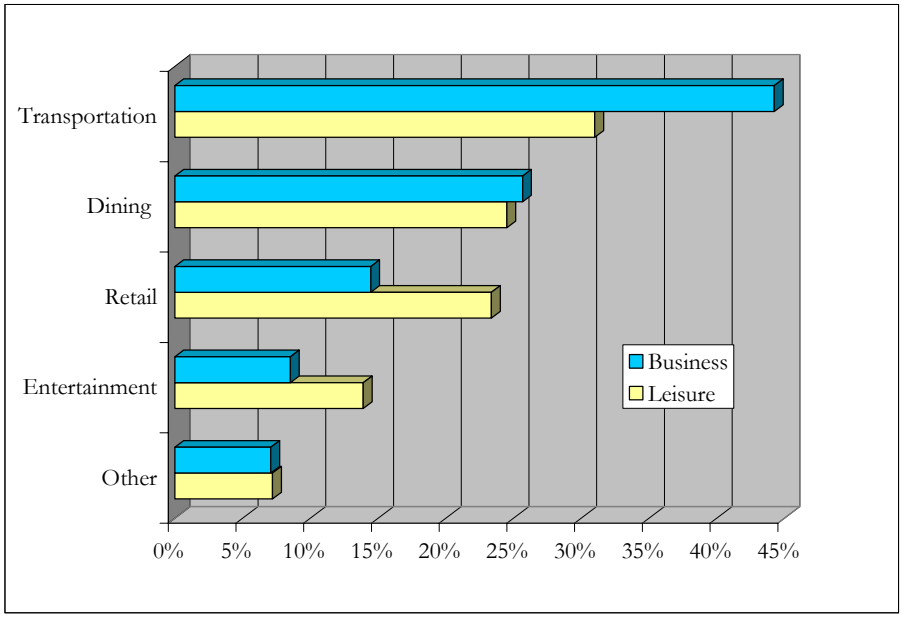
Source: D.K. Shifflet (2007)

The most significant distinction between leisure and business travelers in respect to economic impact analysis is the fact that business travelers tend to spend more per person per day than leisure travelers. Length of stay among leisure and business

travelers is similar on average so the ratio displayed above holds when estimating either the number of travelers or travel days generated in Texas by purpose of trip.

Examining aggregated data from survey respondents reveals that in 2006 the average leisure traveler spent $96.36 per day excluding accommodations when visiting a destination in Texas. Business travelers spent almost fifty percent more, $131.39 per day on non-room expenses. The following charts illustrate the average spending patterns for leisure and business travelers to Texas by commodity purchased as a share of total spending as stated by survey respondents.

Figure 3.1.2: Business and Leisure Spending by Commodity Purchased (2006)



Source: D.K. Shifflet (2007)

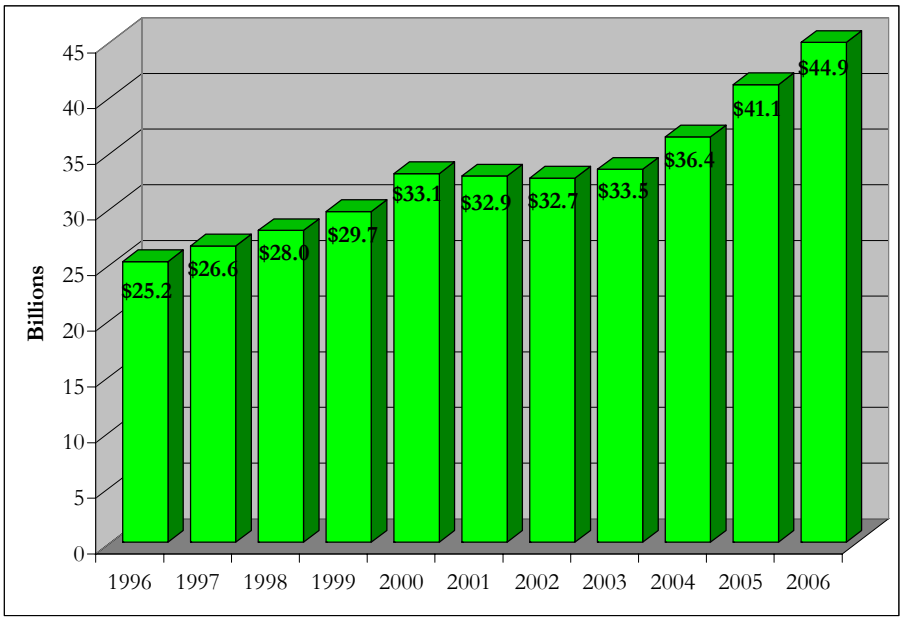
Business travelers to Texas spent a significantly larger share of their average daily spending on transportation expenses, possibly because these trips tend to be more likely to involve air travel and longer distances. As expected, leisure travelers spend

a larger share of their average daily spending on retail or entertainment offerings at the destination visited.

EDT relies on a Regional Travel Impact Model (RTIM) created by Dean Runyan & Associates to provide detailed estimates regarding the total economic impact of tourism spending across the state as well as jobs supported, earnings, and taxes generated from these visitors (Runyan 2007). This model is similar to the national-level Tourism Satellite Accounts discussed in the literature review with relatively minor adjustments to the Bureau of Economic Analysis definition, such as not including the purchase of certain consumer durables, by limiting the scope of included purchases to those directly related to a single trip. Other differences include additional procedures for allocating air travel and travel arrangement purchases, as all are included in the US Tourism Satellite Account but must be divided among different regions at the state or city level. A detailed methodology will not be reiterated here, however many of the concepts and assumptions behind the RTIM model will be adopted to inform assumptions in a Texas I-O model targeting the tourism impact of events.

The following chart displays visitor spending estimates generated from the Regional Travel Impact Model, illustrating the billions of dollars spent in the state on travel each year.

Figure 3.1.3: Visitor Spending in Texas (1996-2006)



Source: Dean Runyan (2007)

The estimates above also display the cyclical nature of tourism and the impact certain events can have on the industry. After years of consistent growth, visitor spending in Texas did not reach pre-9/11 levels until 2003 and likely not until 2004 or 2005 after adjusting for inflation. Visitor spending certainly has made an impressive recovery in the past few years and the following section will explain how these demand-side spending patterns can be used to define a tourism industry.

3.2 Defining the Tourism Industry

The visitor spending displayed in the previous section must be distributed among the commodities purchased to create a demand driven definition for the tourism industry. The table on the following page displays the visitor spending in

Texas across seven commodities which is used to inform a tourism industry definition and estimate the direct impact of visitor expenditures.

Table 3.2.1: Travel Spending by Commodity Purchased

Commodity Purchased		Share	
Accommodations	$	7,287,000	16%
Food & Beverage Services	$	8,549,000	19%
Food Stores	$	1,844,000	4%
Groung Transportation & Motor Fuel	$	12,186,000	27%
Arts, Entertainment & Recreation	$	4,901,000	11%
Retail Sales	$	7,363,000	16%
Air Transportation (visitor only)	$	2,807,000	6%

Source: Dean Runyan (2007)

After determining the commodities purchased by travelers it is possible to designate this spending to specific industries and estimate the size of the industry. The following table shows the NAICS industry codes that were determined to be recipients of tourism spending which are then grouped into categories to create a demand driven definition for the Regional Travel Impact Model. Among the industry categories included below, air transportation and travel arrangement services represents only the portion of expenditures that impacted Texas and not the total expenditures some of which may have been made in other states. These expenditures are generally easier to aggregate at the national level since air travel and travel arrangement services are rarely made at the destination visited or easily attributable to a single region requiring these expenditures to be reallocated across regions based on the industry presence and penetration of each sector.

Table 3.2.2: Regional Travel Impact Model NAICS Industry Codes

Travel Impact Industry	NAICS Industry (Code)
Accommodations	Accommodation (721)
Food Services	Food Service and Drinking Places (722)
Arts, Entertainment, and Recreation	Performing Arts, Spectator Sports (711) Museums (712) Amusement, Gambling (713) Scenic and Sightseeing Transportation (487)
Retail	Food & Beverage Stores (445) Gasoline Stations (447) Clothing and Clothing Accessories Stores (448) Sporting Goods, Hobby, Book, and Music Stores (451) General Merchandise Stores (452) Miscellaneous Store Retailers (453)
Ground Transportation	Interurban and Rural Bus Transportation (4852) Taxi and Limousine Service (4853) Charter Bus Industry (4855) Passenger Car Rental (532111) Parking Lots and Garages (812930)
Air Transportation	Scheduled Air Passenger Transportation (481111) Support Activities for Air Transportation (4881)
Travel Arrangement Services	Travel Agencies (56151) Tour Operators (56152)

Source: Dean Runyan (2007)

Obviously, the industries included above do not rely solely on tourism expenditures to continue their operation, so it is necessary to allocate weights to estimate the share of each industry supported by traveler spending. The following chart displays the general weights used in the Regional Travel Impact Model.

Table 3.2.3: Travel Impact Industry Weights

Travel Impact Industry	General Weight
Accommodations	**85%**
Food Services	**20%**
Arts, Entertainment, and Recreation	**50%**
Retail	**5%**
Ground Transportation	**13%**

Source: Dean Runyan (2007)

For the purpose of creating an I-O model to measure the economic impact of events, the above weights will not be used, but they do provide insight into the role of tourism within the larger economy and begin to reveal the potential for hosting events as a way to encourage growth in the industries listed.

3.3 Input-Output

The visitor spending by commodity matched to NAICS industry code provides the direct input for I-O analysis which can be used to estimate the secondary impacts generated by investment in the Texas economy based on a detailed tourism industry definition. EDT research only reports the secondary impacts that tourism spending has on employment and earnings in industries across the state (Runyan 2007). Visitor spending directly supports employment in the industries included in the tourism industry definition, while secondary impacts created by intermediate purchases and the labor earnings from tourism industry employment impact many industries outside the tourism core as visitor spending spreads throughout the economy.

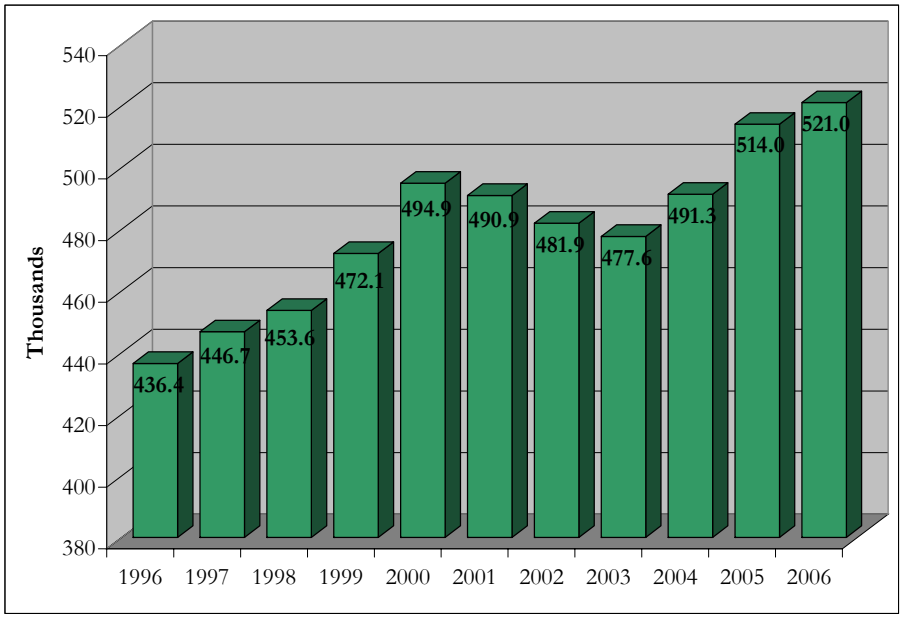
Secondary employment and earnings are generated within the travel impact industry sectors as well as professional services; other services; government; construction; finance, insurance, and real estate; mining and manufacturing; and finally agriculture and food processing. EDT estimates reveal that visitor spending supports nearly as many jobs through secondary impacts as direct impacts with the total earnings being comparable among both groups. It deserves mentioning here that

employment multipliers may not be the most applicable to the creation of an I-O model focusing on the temporary "demand-shock" effects of spending by travelers attending an event due to the part-time nature of the employment created. Incorporating multipliers more directly tied to spending and output will be discussed in the following chapter detailing the creation of the state-level Texas I-O model.

3.4 Communicating the Economic Impact

The end result of any economic impact research program involves how to communicate the results of the study. Direct impacts, like the visitor spending in a destination, are almost always included as part of any economic impact estimate. The impact of visitor spending on employment is another common deliverable for economic impact analysis. The following chart illustrates employment estimates for jobs directly supported by visitor spending in Texas to estimate the size of the tourism industry. The estimates provided do not represent a literal count of actual jobs and should be interpreted as full-time equivalent positions available based on employment to sales ratios for each industry group.

Figure 3.4.1: Tourism Employment in Texas (1996-2006)



Source: Dean Runyan (2007)

Traveler spending supports more than 500,000 jobs across Texas with the accommodations and food service sectors accounting for about half of all tourism employment. The remaining tourism industry jobs directly supported by visitor spending are distributed among the arts, entertainment and recreation sector, retail, transportation and other travel industries.

Tax impacts are another common deliverable for economic impact studies, especially when the report is being commissioned by a governmental agency. EDT reports that direct and local taxes generated by traveler spending amounted to $3.6 billion in 2006 not including property taxes. This impact represents approximately eight percent of all local and state tax revenues, again showing the importance of the tourism industry in the context of the greater economy (Runyan 2007). Tax impacts

are especially useful to include in an event economic impact study as they are likely to be an important consideration when targeting or justifying governmental investment, especially considering the difficulty in quantifying a full-time equivalency for the part-time positions typically associated with a single event.

Many of the statistics discussed in the preceding overview of tourism in Texas will be included as basic assumptions in the creation of a state-level I-O model. The number of visitors attributed to an event will have to be provided through either survey research or direct observation, however, which leaves the responsibility of ensuring accuracy among these estimates to the researcher. Spending patterns will be estimated using the average daily spending estimates and shares of commodities purchased as discussed in this chapter. Most of the Regional Travel Impact Model definition will be adopted in the Texas I-O model excluding air transportation and travel arrangement services categories due to the difficulty in allocating these purchases to a specific destination at the state-level, especially in the context of examining the demand-shock effects of event spending. The assumptions used in the state-level Texas I-O model will be detailed in the following section and compared to the modeling efforts from other select states.

Chapter Four - Creating an Input-Output Model for Texas

A survey of state tourism research websites uncovered existing I-O models for Michigan and Georgia which allow the user to estimate the overall economic impact of traveler spending in a manner similar to what is foreseen for the Texas model. In the following sections, both models will be reviewed to inform the creation of a state-level I-O model for Texas. Special attention will be given to how each model incorporates the major components of a tourism economic impact study as introduced in the literature review: visitor spending, defining the tourism industry and input-output analysis as well as reflections on the communication of economic impacts estimates provided by each model and the technical expertise necessary to correctly apply each model to an event. Finally, a hypothetical scenario built around visitor impact estimates generated for the 1996 Atlanta Olympics will be used to illustrate the importance of the assumptions made in each model and lead in to a discussion regarding some limitations of input-output based economic impact analysis when estimating the impact of events on a community.

4.1 Michigan Tourism Economic Impact Model

The Michigan Tourism Economic Impact Model (MITEIM) was created by Daniel Stynes from the Department of Community, Agriculture, and Recreation Resources at the Michigan State University with sponsorship from Travel Michigan, the state's tourism department (Stynes 2007). Styne's Economic Impact of

Recreation and Tourism website provides a comprehensive collection of resources for conducting economic impact studies including an overview of concepts, methodological discussions, and examples similar to what has been presented in this report. The MITEIM model represents the result of a continuous research effort spanning at least the past decade with an impressive amount of dedicated resources. The MITEIM model is unique in that its origin is shared with a concurrent effort to model the economic impact of visitation at national parks for the National Park Service. The end result is an I-O model that can be applied to events, but is truly designed to be more oriented towards destinations and estimating the impacts of tourism over time.

The MITEIM model defines visitors by lodging segment and provides different spending profiles for visits categorized as day-trips, motel, camping, seasonal home, or visiting friends and relatives. The average daily spending provided in the MITEIM model ranges from approximately $88/day for owners of seasonal homes and those visiting friends and relatives to more than $225/day for visitors staying in motels using the default spending data. In the case of seasonal home owners, spending is lower but it does not seem as if mortgage payments are included as an aspect of visitor spending. In addition to the default spending profiles, users of the model have the option to select a low, medium, or high spending profile or to import a custom spending profile as available. Average daily spending is allocated across twelve different commodities including accommodations, camping fees,

restaurants and bars, groceries, gasoline, other vehicle expenses, local transportation, admissions and fees, clothing, sporting goods, gambling, and souvenir and other expenses. The detail built into the model is impressive and goes further than what is possible with the average daily spending data available at the state-level for Texas. Hotel rates under the default scenario have been set at slightly more than $90/night which helps explain an average daily spending rate among those staying in motels that is twice the assumed spending across other lodging segments.

The MITEIM model is designed for the user to enter the number of visitor-nights completed at the destination being analyzed. An embedded tool for converting the number of visitors to visitor-nights is provided based on average party size and length of stay in the event that more detailed visitation information is unavailable. After the number of visitors in party-nights has been entered into the model, the user must allocate the visitor-nights across the different lodging segments to determine the average spending and estimate total spending generated at the destination. Macros built into the MITEIM model allow the user to balance shares of visitor-nights to lodging segments based on assumptions in the case that the totals provided do not equal 100%.

The MITEIM model identifies tourism-related sectors as shown in the following table to use as a working definition for the tourism industry.

Table 4.1.1: MITEIM Tourism Definition

Tourism-Related Sectors
Hotels and motels, including casino hotels
Other accommodations
Food services and drinking places
Other amusement, gambling, and recreation industries
Automotive repair and maintenance, except car wash
Transit and ground passenger transportation
All other food manufacturing
Cut and sew apparel manufacturing
Petroleum refineries
Sporting and athletic goods manufacturing
Buttons, pins, and all other miscellaneous manufac
Retail Trade
Wholesale trade

Source: Stynes (2007)

Related industry codes for each tourism sector displayed above are not included and retail trade is simply defined as an average or sum of the seven retail trade sectors. The model does not display how commodity purchases are allocated across industry groups and seems to only use the tourism-related sectors to acquire multiplier information as will be discussed below.

Users have the option to select rural, smaller metro, larger metro or state-level generic multipliers provided from IMPLAN to match the tourism-related sectors identified in the working tourism industry definition before proceeding with input-output (I-O) analysis. Multipliers are included for jobs, personal income, property income, and value-added all divided by sales as calculated according to the visitor-nights and lodging segments entered by the model's user. It seems that both indirect and induced multipliers are included in the I-O analysis but it is difficult to

completely ascertain as presented. Multipliers are provided for industrial groups although the results are reallocated by commodity purchased before impact estimates appear in the model. This step is somewhat confusing, but understandable as it will make it easier to determine tax impacts as the commodities included have the matching tax rates applicable to each purchase.

As stated in the opening description, the MITEIM model can be applied to events but seems to be better suited for modeling the effects of tourism at the destination level over a longer time period which is evident by some of the assumptions used in the analysis such as an average length of stay to calculate person-nights rather than a field allowing the user to enter the length of an event. Summary results are provided in five tables displaying the spending and visits by lodging segment, direct and secondary effects of this spending by commodity, marginal impacts per dollar of spending or 1,000 party-nights, aggregate economic ratios and finally the tax impacts of direct sales and income. Spending, direct effects, indirect effects and employment estimates are standard deliverables for an economic impact study but the ratios provided adds another level to the analysis allowing users of the model to estimate a range of impacts depending on distinct scenarios. The assumptions provided within the MITEIM model will be discussed further in an example provided at the end of this section that will compare results generated from a hypothetical scenario.

4.2 Georgia Economic Model of Developmental Events

The Georgia Economic Model of Developmental Events (GEMODE), unlike the MITEIM model, was designed explicitly to model the impact of events and goes into much greater detail in regard to the event being analyzed and the audience attending. GEMODE was designed by Bruce Seaman from the Andrew Young School of Policy Studies at Georgia State University in cooperation with the Fiscal Research Center under a contract provided by the Georgia Department of Economic Development (Seaman 2007). Seaman relies on years of experience estimating the impacts of many types of events including sports, arts, and others to inform the assumptions in the GEMODE model. Similar to the MITEIM model, the GEMODE model represents the final deliverable from a concerted research effort incorporating many different resources.

The GEMODE model relies on the user to provide event and audience data by following a set of questions that most likely will necessitate a detailed survey to provide data in all fields requested. The different categories where event specific data is requested include a description of the event, description of audience, visitor non-ticket spending/day, non-local artist or athlete spending/day and non-local media spending/day. The following table displays the amount of information requested from the user including tax rates, tickets and local spending in addition to the categories already described.

Table 4.2.1: GEMODE Data Requirements

Data Field	Input Required
Description of the Event	Main Event: Number of Days Supplemental Days Pre and Post Avg. NON-Hotel Visitor Length of Stay # Nights Stay of Avg. Hotel Visitor Population of Local Community
Description of the Audience	Total Attendance at Event all days % NonHotel Visitors Primarily for Event Visitors Due to Event BUT not Attending
Visitor Non-Ticket Spending/Day	Visitor Reported Hotel Room Rate
Non-Local Artist or Athlete Spending	# of Non-Local Artists or Athletes etc.
Non-Local Media Visitor Spending	Number of Non-Local Media Personnel
Tickets	Total # FREE Tickets yielding $0 Average Ticket Price Total Ticket Revenue from All Sources
Tax Rates	Total Sales Tax Rate Local Sales Tax Rate Only Local Hotel-Motel Tax Rate
Local Spending	Non-Local Coop and Other Funding Percent Organizer Revenue Spent Locally Known Number of People Hired

. Source: Seaman (2007)

The detailed data requirements within the GEMODE model as shown above may allow for more informed estimates of the economic impact of the event in question, but the data collection procedures necessary to acquire the information will likely be prohibitive to many users. A basic survey template is included with the GEMODE model but the questions provided do not address all of the data inputs available in the model.

Spending profiles are provided for each category of visitor ranging from attendees to media, who each spend considerably more than event participants in the

default settings. Visitor spending is allocated across five commodities including accommodations, food and beverage, non-souvenir shopping, souvenir shopping and local transportation with the average hotel room rate defaults at $95/night for all visitors regardless of purpose. It seems that the commodity purchased may inform taxes generated as the model does not include an industry definition or allocate visitor spending by commodity to specific industries.

Capture rates in the model estimate the amount of visitor spending that remains within the destination along with an additional reduction in spending aiming to account for taxes that may have been included in spending estimates before applying the applicable tax rates. Multipliers are provided for total output and employment effects scaled to population of the area hosting the event. The multipliers used in the GEMODE model seem reasonable when compared to other economic impact studies reviewed earlier in this report, however the lack of an industry definition makes it difficult to replicate the assumptions provided in the model. The total local economic impact estimates provided by the GEMODE model include the incremental local output, tax revenues and supported total short-term employment and personal income.

4.3 Texas Tourism Event Impact Calculator

In creating an input-output (I-O) model to estimate the economic impact of events at the state-level in Texas, the goal will be to fall somewhere between the

MITEIM and GEMODE models by delivering a model that only requires basic inputs from the user and is relatively straightforward in how estimates are calculated. Sacrificing detail may result in omitting some aspects of value generated by hosting an event, but will not prevent the goal of creating a model that provides a consistent starting point for economic impact analysis regardless of the event being considered. The following discussion will highlight assumptions made within the Texas I-O model, again focusing on the primary concepts behind economic impact analysis in tourism including visitation and spending, defining the tourism industry and I-O analysis.

The Texas Tourism Event Impact Calculator (TTEIC) requires users of the model to enter an event's daily attendance, the length of the event, and the percentage of the event's daily attendees traveling from outside the state and staying in paid accommodations. These inputs provide a count of the number of out-of-state person-days generated by event attendance as well as the share of those days that include paid accommodations. Again, it is the responsibility of the researcher applying the model to ensure that visitors included in the I-O analysis are non-residents and are not casual visitors or time switchers to create the most accurate estimates of the tourism impacts of the event being analyzed. The assumptions used to generate economic impact estimates from these user inputs will be highlighted below.

The average daily spending profile of $96.36 for leisure visitors to Texas on all non-accommodations purchases was adopted as the default setting for the TTEIC

model. The share of purchases allocated to each commodity is fixed, but the model allows for the user to adjust the average daily spending rate based on a local survey when available. The leisure spending profile was chosen to be most representative of the average traveler to Texas attending a special event and may not be appropriate for estimating the economic impacts of business travel and attendance at a conference or seminar. The following table displays the visitor spending allocated by commodity purchased, again relying on state averages for data regarding visitor spending patterns.

Table 4.3.1: TTEIC Commodity Purchased

Commodity Purchased		Share
Dining	$ 23.62	25%
Entertainment	$ 13.40	14%
Retail	$ 22.52	23%
Transportation	$ 29.87	31%
Other	$ 6.95	7%

Source: D.K. Shifflet (2007)

The default rate for paid accommodations was set at $95/day based on the values chosen for both the MITEIM and GEMODE models, which can also be adjusted to more accurately reflect local conditions. Purchases categorized as "other" above were reallocated evenly among dining, entertainment, retail and transportation purchases to allow these impacts to be included in I-O analysis.

The tourism industry definition adopted for the TTEIC model is similar to the Regional Travel Impact Model used to estimate the economic impact of tourism in Texas but does not include air travel or travel arrangement services for reasons discussed in the previous chapter. The following table displays the industries by

NAICS code that comprise the tourism industry definition for the TTEIC model organized by commodities purchased.

Table 4.3.2: TTEIC Tourism Industry Definition

Commodity Purchased	NAICS Code
Dining	Food Service and Drinking Places (722)
Entertainment	Performing Arts, Spectator Sports (711) Museums (712) Amusement, Gambling (713) Scenic and Sightseeing Transportation (487)
Retail	Food & Beverage Stores (445) Clothing and Clothing Accessories Stores (448) Sporting Goods, Hobby, Book, and Music Stores (451) General Merchandise Stores (452) Miscellaneous Store Retailers (453)
Transportation	Gasoline Stations (447) Taxi and Limousine Service (4853) Charter Bus Industry (4855) Parking Lots and Garages (812930) Interurban and Rural Bus Transportation (4852) Passenger Car Rental (532111)
Other	Allocated evenly among commodities listed above
Accommodations	Accommodation (721)

Source: Dean Runyan (2007); *Amended by Author*

Only dining and accommodation purchases could be directly allocated to a single industrial sector with the remaining spending distributed evenly across all industrial sectors within each commodity category before proceeding to I-O analysis. Admittedly, this is a somewhat crude approach to determining the impact of visitor spending across industries, which could cause problems if attempting to disaggregate the estimates generated, however it is impossible to achieve greater detail with the data available. Conducting primary surveys at events across Texas could allow for more detailed estimates of the industries impacted by the visitor spending generated by event attendance.

Multipliers for the I-O analysis were generated using a 2006 IMPLAN model for Texas at the state-level. Before applying multipliers the NAICS industry categories had to be matched to the IMPLAN categories as shown in the following table.

Table 4.3.3: TTEIC Tourism Industry Definition Matching NAICS and IMPLAN

NAICS Code	Implan Code
Food Service and Drinking Places (722)	481 Food service and drinking places
Performing Arts, Spectator Sports (711)	471 Performing arts companies
Museums (712)	475 Museums, historical sites, zoos, and parks
Amusement, Gambling (713)	478 Other amusement, gambling, and recreation industries
Scenic and Sightseeing Transportation (487)	397 Scenic and sightseeing transportation and support
Food & Beverage Stores (445)	405 Food and beverage stores
Clothing and Clothing Accessories Stores (448)	408 Clothing and clothing accessories stores
Sporting Goods, Hobby, Book, and Music Stores (451)	409 Sporting goods, hobby, book and music stores
General Merchandise Stores (452)	410 General merchandise stores
Miscellaneous Store Retailers (453)	411 Miscellaneous store retailers
Gasoline Stations (447)	407 Gasoline stations
Taxi and Limousine Service (4853)	395 Transit and ground passenger transportation
Charter Bus Industry (4855)	395 Transit and ground passenger transportation
Parking Lots and Garages (812930)	490 Other personal services
Interurban and Rural Bus Transportation (4852)	395 Transit and ground passenger transportation
Passenger Car Rental (532111)	432 Automotive equipment rental and leasing
Accommodation (721)	479 Hotels and motels, including casino hotels

In many cases, IMPLAN provides industry codes that directly matched the NAICS codes with the exception of the transportation sector where many more detailed NAICS codes were grouped as transit and ground passenger transportation.

Similar to other economic impact studies reviewed in this report, all visitor expenditures on services like accommodations, dining, and entertainment were considered as direct impacts for the purpose of I-O modeling. The share of retail and transportation purchases remaining in the regional economy was estimated using

gross margins derived from the Annual Retail Trade Survey conducted by the US Census Bureau supplemented with sales data from the 2002 Economic Census which estimates that roughly 29% of total retail sales can be considered a direct impact. For transportation purchases, gasoline stations were used as a proxy for all expenditures resulting in a more conservative assumption of roughly 16% of these expenditures being applicable as a direct input in I-O analysis within the TTEIC model.

After determining the amount of visitor spending captured within the state, output multipliers were used to estimate secondary impacts within the TTEIC model before applying employment multipliers to estimate the number of jobs per million dollars in total direct and secondary output realized as the result of the event being analyzed. For many commodities, more than one IMPLAN code applied to the NAICS codes receiving the direct output generated by visitor spending so the multipliers had to be averaged to provide a uniform estimate of the secondary impacts generated. Again, this is not an ideal scenario but the best available due to limitations within the spending data available.

Results provided by the TTEIC model include visitor spending, direct and secondary impacts, state taxes generated and an estimate of tourism industry jobs supported. Visitor spending is calculated based on attendance, event-length and spending profiles as discussed earlier with direct impacts calculated by estimating the amount of visitor spending that stays within the state, which is then applied as the input for I-O analysis to estimate the secondary impacts of this investment. The

Texas sales tax rate is applied to all purchases while hotel/motel tax rates are applied only to the purchase of paid accommodations. This assumption may result in a slightly higher estimate of taxes generated as some purchases across the identified commodity groups are likely tax exempt. Similar to other issues with the spending data discussed above, a dedicated primary survey of event attendees would also allow for more detailed tax estimates. The following scenario illustrates the function of each of the input-output (I-O) models and allows the assumptions that drive I-O analysis to be compared and evaluated.

4.4 An Olympic Hypothetical

The role of economic impact analysis in regards to the Summer Olympics has become especially important as the magnitude of the games continues to grow, attracting more tourism, media, and investment for the host community. A study examining the methods used to estimate or forecast the economic impact of Summer Olympic Games, reviewed studies of Los Angeles (1984), Seoul (1988), Barcelona (1992), Atlanta (1996), and Athens (2004) as well as bids for the 2012 games submitted by Washington-Baltimore and Houston revealing that most communities used input-output (I-O) analysis to communicate the benefits of hosting an Olympic Games to their constituents (Kasimati 2003). The primary objective of an Olympic hypothetical informed by forecasts for the 1996 Atlanta Olympics is to highlight the significant impact that different assumptions can have on economic impact estimates

by using similar inputs and examining the assumptions used in each model which are then applicable to any event regardless of size or duration.

Hosting the 1996 Summer Olympics was generally regarded as a coup for the City of Atlanta attracting international media attention, capital investment and tourism in a showcase of their city to the world. A University of Georgia study forecasting the economic impact of the Olympic Games on the State of Georgia (hereafter referred to as the UGA model) estimated that the short-term impacts of the games would result in a windfall of $5.3 billion for the state (Humphreys and Plummer 1995). This forecast included the total economic impact generated by spending from the Atlanta Committee for the Olympic Games to prepare for hosting the event as well as the expected spending from out-of-state visitation with tourism accounting for roughly half of the forecasted impact of the games.

Since the Texas I-O model is designed to estimate tourism impacts, only the visitation inputs from the University of Georgia study and UGA model will be used to compare assumptions within the Michigan Tourism Economic Impact Model (MITEIM), Georgia Economic Model of Developmental Events (GEMODE) and Texas Tourism Event Impact Calculator (TTEIC). Earnings and tax impacts, although included in some of the models, will not be compared as earnings estimates were not included in the Texas model due to the short-term nature of the employment generated and the fact that tax rates are different in each state and not easily compared.

The visitor profile information within the UGA model identifies the category of each visitor which appears to inform the spending estimates in a similar fashion to the MITEIM model. Those estimates will not be incorporated here, due to the fact that to generate comparable results within each state I-O model it will be necessary to limit the detail of the data inputs. Visitor-day estimates were generated in each model based on hypothetical inputs that resulted in uniform estimates for the TTEIC, MITEIM, and GEMODE models that were close to what was provided in the UGA study which could not be manipulated. The following table displays the out-of-state visitation estimates that will be used as the primary input for each state I-O model.

Table 4.4.1: Visitor-Day Assumptions for Olympic Hypothetical

	Visitor-Days	Visitor-Days (Paid Accommodations)
UGA	8,319,529	unknown
TTEIC	8,250,000	4,125,000
MITEIM	8,250,000	4,125,000
GEMODE	8,250,000	4,125,000

It was necessary to allocate a percentage of the total visitor-days generated as paid accommodations to inform the spending profiles used in the TTEIC, MITEIM and GEMODE models and which again was not available in the results of the UGA study. Half of the total visitor-days was used as an estimate for paid accommodations, which when assuming that the analysis is for a 25 day period translates to 165,000 rooms booked per day in the Atlanta metro area. Obviously, much of the detail built into the models is unique and difficult to compare in their entirety, but running a basic

scenario using the visitor-days provided above and adjusting for constant dollars does allow for comparable estimates.

The visitor spending, direct output, secondary output, total output and employment results from each model are displayed below adjusted to 2006 dollars. A more detailed look at the MITEIM, GEMODE, and TTEIC models is available in the appendix of this report that organizes a series of screenshots displaying estimates not directly discussed in this comparison as well as highlighting the function and appearance of each model.

Table 4.4.2: I-O Results for Olympic Hypothetical

	Visitor Spending	Direct Output	Secondary Output	Total Output	Employment
UGA*	$1,720,810,000	$1,558,930,000	$1,855,480,000	$3,414,410,000	41,039
TTEIC	$1,186,845,000	$825,959,269	$732,494,242	$1,558,453,511	15,533
MTEIM	$1,298,337,000	$1,073,205,000	$721,047,000	$1,794,252,000	16,557
GEMODE	$1,621,125,000	$1,113,575,481	$445,430,192	$1,559,005,673	23,326

* Spending and output estimate from the UGA model were adjusted from 1994 to 2006 dollars. Employment estimates remain in 1994 dollars as the information necessary to adjust these estimates was unavailable.

The UGA model generated the largest total output estimate for the Atlanta Olympics by a considerable margin, forecasting that the games will generate approximately twice the economic impact of the next closest estimate. Granted, the projections generated by the UGA model were based on slightly higher visitation estimates and were also completed more than ten years ago, which may affect direct comparisons with the other more recent models despite adjusting the dollar figures for inflation. The differences are large enough, however, to warrant closer examination.

Calculating the visitor spending per day, capture rate, multiplier and employment generated per million dollars of output based on the results displayed above more clearly defines the assumptions made in each model.

Table 4.4.3: Assumptions in I-O Analysis of Olympic Hypothetical

	Visitor Spending/Day	Capture Rate	Multiplier	Employment / Million Output
UGA*	$206.84	91%	2.19	16.34
TTEIC	$143.86	70%	1.89	9.97
MTEIM	$157.37	83%	1.67	9.23
GEMODE	$196.50	69%	1.40	14.96

* Spending and output estimate from the UGA model were adjusted from 1994 to 2006 dollars. Employment estimates remain in 1994 dollars as the information necessary to adjust these estimates was unavailable.

As expected, the UGA and GEMODE models relied on visitor spending estimates of nearly $200 per day, which is noticeably higher than the other models resulting in higher total visitor spending estimates. More discrepancies arise when examining the capture rate and multiplier effect used to generate the direct and secondary effects of visitor spending attributable to the event. These assumptions are necessary for conducting I-O analysis and have a significant impact on the estimates generated in each model.

The TTEIC and GEMODE models estimate that around 70% of the purchases made by visitors attending the event remained in the regional economy and could be applied to input-output analysis, which is similar to what had been identified in the literature review as a general rule for capture rates in an economic impact study related to tourism. The capture rates used in the MITEIM and especially the UGA model were significantly higher, 83% and 91% respectively. As stated earlier, any

overestimation of inputs in I-O analysis will be magnified after applying the multiplier effect.

The GEMODE model uses a fixed multiplier rate of 1.4 established for larger metros and does not provide an estimate for state-level analysis, however the lower multiplier was offset by high spending estimates when viewing total impacts. The TTEIC and MITEIM multipliers are comparable although the Texas multiplier is slightly higher, which could be explained by the larger size and diversity of the Texas economy compared to Michigan. The multiplier used in the UGA model of 2.19 is considerably higher than the other models and the only multiplier that more than doubles the direct output when calculating secondary impacts.

The employment generated per million dollars of output reveals that both the UGA model and GEMODE model use significantly higher assumptions regarding the employment generated by total output. This could be explained in part by lower wages in Georgia and an existing industry structure that creates more employment opportunities per million dollars of output generated by visitor spending than either Michigan or Texas. As mentioned throughout the report, it should be remembered that employment is a difficult impact to estimate when modeling the tourism generated by an event. The short-term nature of the jobs created and the difficulty in communicating these positions and their earnings as full-time equivalents is problematic.

The range of estimates provided by the models reviewed illustrates the influence of assumptions when conducting input-output analysis and the ease in which economic impact estimates can be manipulated through unrealistic spending estimates or multipliers, which has led some researchers to argue that most economic impact studies are no more than tools for political shenanigans to produce inflated numbers supporting a predetermined position (Crompton 2006). If this is the motivation for conducting an economic impact study, some additional mischievous tactics that can be employed along with choosing the assumptions highlighted above include incorporating local residents, exaggerating visitation estimates, including casual visitors and time switchers, and finally ignoring the costs to the community.

This is not to suggest that the significantly higher estimates generated through the UGA model were politically motivated. However, speaking to the last point of ignoring costs, the study does look beyond the input-output (I-O) analysis to identify some additional benefits or 'Olympic legacies' like media exposure, the construction of new facilities, and community-building benefits without considering any potentially negative impacts. This is not atypical among economic impact studies but in the case of the 1996 Summer Olympics this optimism may have been especially short-sighted. The following paragraphs will discuss some of the additional benefits and potential costs of hosting an event with the intent to increase tourism that are not captured in I-O analysis using examples drawn from Atlanta's experience hosting the 1996 Summer Olympics for illustrative purposes.

A study published shortly after the 1996 Olympic Games reexamined many of the forecasts made in the UGA study in a general discussion regarding the impact of the games and found that the forecasted economic impact was roughly $1 billion too high and that the 'Olympic Legacies', although beneficial for Atlanta, did not completely realize their potential for impacting the community (French and Disher 1997). It is not uncommon for ex ante studies to be optimistic in their forecasts, but it is rare to find ex post studies examining the impact of events after they have occurred which can provide important insights.

Probably the most difficult of the Olympic legacies to quantify is the marketing benefits accrued by the host city that can be leveraged to encourage business recruitment, tourism and other means of growth. It is inarguable that the international coverage of the games raised the global awareness of Atlanta, which prior to the Olympics was often confused with Atlantic City in some international locations (French and Disher 1997). The benefits accrued from positive media coverage can be easily lost however, if negative perceptions are encouraged through mismanagement of an event.

In the 1996 Atlanta Olympics case, the bombing in the Centennial Olympic park generated negative attention, but this is an atypical scenario. The congestion across the city resulting from event related visitation and the related costs, however, is a scenario common to most events and is a negative impact and cost to the community that is difficult to capture in I-O analysis. Tourism generating events are

often cited for displacing residents as attractions and amenities that they enjoy are overrun by visitors. Considering the benefits of media attention and tourism investment for improving amenities these costs may be offset somewhat, but must still be evaluated on a case by case basis.

Investment in anticipation of hosting the games allowed Atlanta to improve many of their sporting facilities, creating perhaps the most geographically concentrated and versatile collection of venues in the country. Other public works improvements were completed in preparation for the games which may not have been addressed if not for the desire to improve the perception of Atlanta to event attendees and viewers. The Olympics also inspired many beautification projects, most notably Centennial Park which was the largest open space project in the United States at the time. Smaller scale beautification projects were also completed in Olympic gateways across the city which is more common to other types of events.

The community-building opportunities made available by the investment introduced above, however, did not meet many of the goals established by leadership and communicated to the community like encouraging redevelopment in distressed neighborhoods (French and Disher 1997). The Olympic investment was not coordinated well with existing plans, which may have limited some of the potential benefits to the community. Not addressing equality in distribution when estimating the impact of tourism events was identified as a shortcoming of I-O analysis and may be especially relevant when examining capital investments. More recently, this has

been a focus of planners looking to leverage the capital investment generated by sporting event facilities into lasting community benefits (Chapin 2004).

The additional benefits and costs incurred when hosting an event as highlighted above are difficult to capture through I-O analysis and support the call for more holistic methods of estimating the impact on communities such as the Computable General Equilibrium approach introduced in the literature review. Bringing the conversation back to the role of I-O analysis when evaluating the impact of events, the estimates generated are an important consideration to stakeholders which when transparent and standardized can provide important insights but should not be the only aspect of the event impacts considered.

Chapter Five - Conclusion

The preceding discussion and finally the Olympic hypothetical illustrates the role of input-output (I-O) analysis in determining the economic impact of an event, which is often to serve as the primary evidence presented when examining the viability of recruiting an event as part of a larger economic development strategy. Returning to the call for standardization in impact modeling stated in the opening of this report, the Olympic hypothetical also displayed how different assumptions can lead to wildly different economic impact estimates when using input-output (I-O) analysis. The Texas Tourism Event Impact Calculator (TTEIC) speaks to the recommendation for standardization by providing a consistent starting point for estimating the economic impact of events at the state-level using fairly conservative assumptions. While the model does provide a consistent and comparable methodology, certain considerations should be made before using the model to estimate the impacts of an event.

First, the event attendance and the share of non-residents and paid accommodations inputs should reflect the best estimates available and will likely require a primary survey to improve accuracy. The model will not reject unreasonable inputs so supplying accurate data is an important responsibility of the researcher using the model. Second, assumptions within the TTEIC model are designed to estimate tourism impacts at the state-level and communicating the estimates as local impacts would be misleading. Finally, the unique features of each

event and community may not be reflected within the assumptions built into the TTEIC model which in some cases could generate less accurate estimates.

Additional research could be used to strengthen aspects of the model, such as the spending estimates, perhaps by conducting a series of primary surveys at events across the state. Adding more detail to the commodities purchased through visitor spending would allow for more accurate industry allocations and tax impact estimates. Regionalizing the model using spending profiles and multiplier information unique to different geographic areas of Texas could help to create more accurate economic impact estimates at the local level. Special attention should be given to the impacts of events in smaller more rural areas as compared to cities as the current TTEIC model does not include the ability to make this distinction.

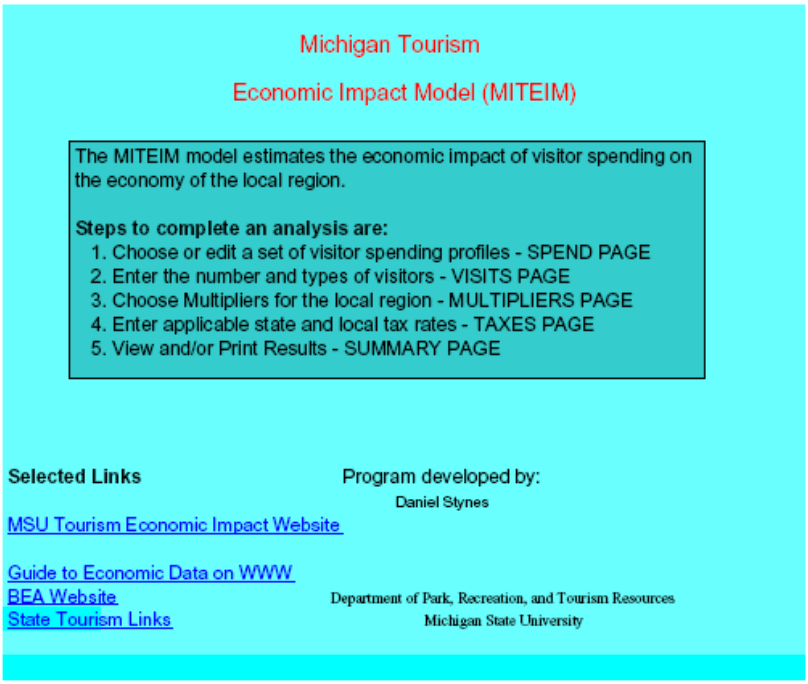
Despite the potential for future improvements, the final deliverable of this research effort in its current state will be a useful tool when estimating and comparing the impacts of different events across Texas. As a final thought, the larger question of whether recruiting events is a viable economic strategy remains debatable and it is hoped that this report may encourage additional attention and ideas in regards to this issue. Events generate investment and encourage economic growth across communities, especially in the tourism sector, but the argument can be made that more traditional economic development incentives target growth in industrial sectors that provide higher paying full-time jobs generating more desirable and long lasting benefits for communities. In the end, the choice to pursue tourism and recruit events

as a means to encourage economic development cannot be recommended to all communities, but for those who choose to follow this path the concepts and methodologies established in this report should support those ambitions.

Appendix

The following screenshots display the MITEIM, GEMODE and TTEIC models and the results of the Olympic hypothetical discussed in chapter four. The pages follow the order that the tabs appear in each of the spreadsheets to illustrate how users interact with the model and create custom estimates of the tourism impact of an event through input-output analysis.

Figure A1: MITEIM “Welcome”



Notes This is NAICS version for IMPLAN files after 2000
Price indices thru 2006

Figure A2: MITEIM “SPEND”

Table 1. Visitor Spending by Lodging Segment in Michigan — Party-night — General Tourism-Medium — 2006

CATEGORY	Day	Motel	Camp	Seas	VFR	SEGMENT							AVG PER UNIT	TOTAL ($ 000's)	PCT
Motel, hotel cabin or B&B	0.00	91.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.68	376,850	29.0%
Camping fees	0.00	0.00	18.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.0%
Restaurants & bars	22.19	48.02	16.43	20.88	13.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.96	255,448	19.7%
Groceries, take-out food/drinks	6.09	12.27	12.27	15.33	21.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.02	140,435	10.8%
Gas & oil	21.34	26.41	25.01	19.45	20.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.37	192,825	14.9%
Other vehicle expenses	0.48	1.72	2.09	5.09	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	8,096	0.6%
Local transportation	1.53	7.30	3.22	4.54	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	33,104	2.5%
Admissions & fees	12.38	12.80	6.61	4.73	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.88	73,255	5.6%
Clothing	5.05	7.70	3.61	5.05	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	43,120	3.3%
Sporting goods	0.40	1.00	1.08	1.48	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.23	10,184	0.8%
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.0%
Souvenirs and other expenses	21.73	17.87	11.32	11.57	22.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	165,020	12.7%
Total	91.18	226.45	99.91	88.12	88.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	157.37	1,298,337	100.0%

Scroll down for options

Import Spending Data

A. Generic Spending Profiles

choose one of the following

General Tourism

- ○ Low
- ● Medium
- ○ High

Select Low, Medium, or High Spending

B. Import Custom Spending Profiles

○ Import Custom Spending Profile

Figure A3: MITEIM “VISITS”

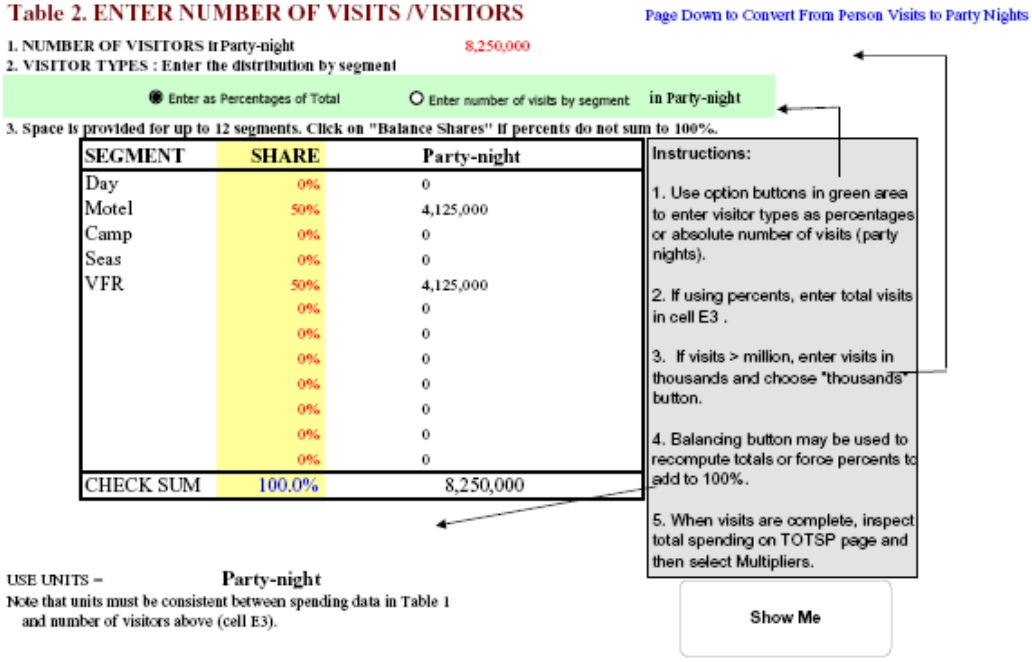
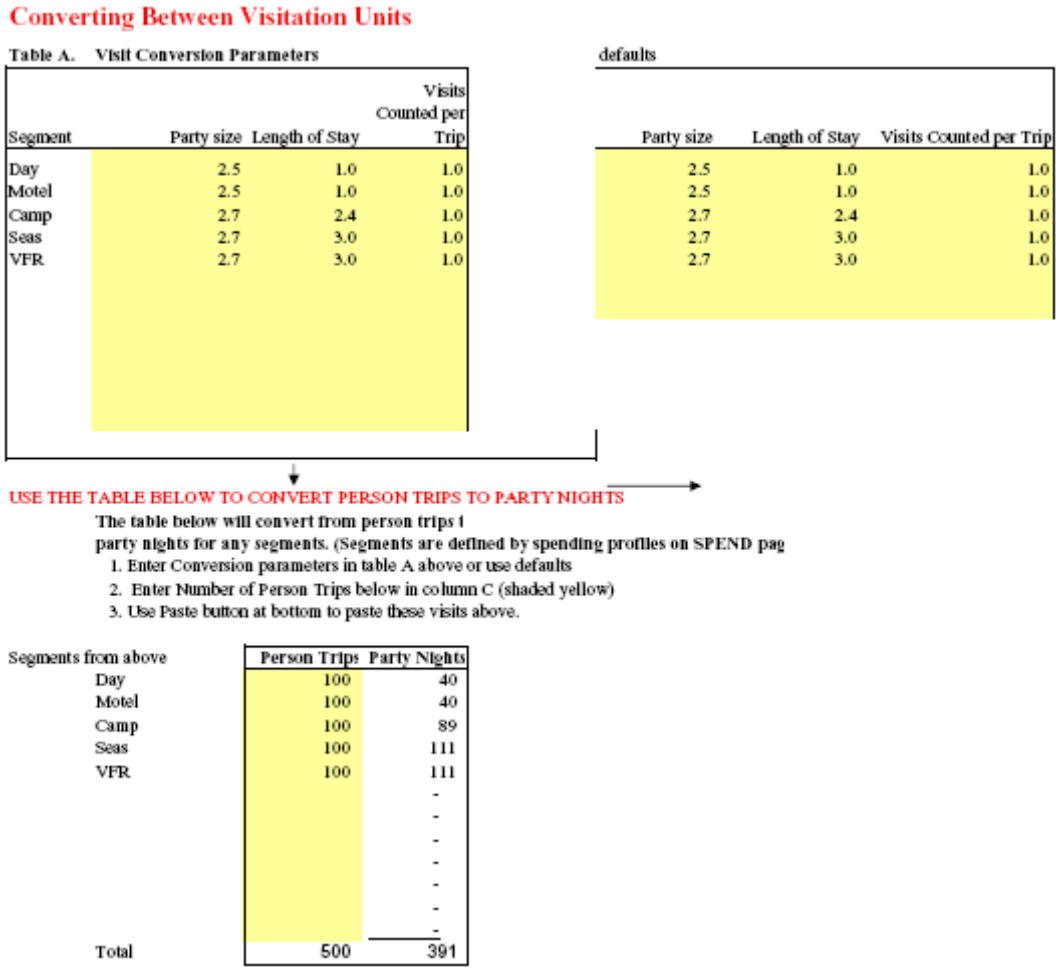


Figure A4: MITEIM “VISITS” (continued)



Converting Between Visitation Units

Table A. Visit Conversion Parameters

Segment	Party size	Length of Stay	Visits Counted per Trip
Day	2.5	1.0	1.0
Motel	2.5	1.0	1.0
Camp	2.7	2.4	1.0
Seas	2.7	3.0	1.0
VFR	2.7	3.0	1.0

defaults

Party size	Length of Stay	Visits Counted per Trip
2.5	1.0	1.0
2.5	1.0	1.0
2.7	2.4	1.0
2.7	3.0	1.0
2.7	3.0	1.0

USE THE TABLE BELOW TO CONVERT PERSON TRIPS TO PARTY NIGHTS

The table below will convert from person trips t
party nights for any segments. (Segments are defined by spending profiles on SPEND pag

1. Enter Conversion parameters in table A above or use defaults
2. Enter Number of Person Trips below in column C (shaded yellow)
3. Use Paste button at bottom to paste these visits above.

Segments from above	Person Trips	Party Nights
Day	100	40
Motel	100	40
Camp	100	89
Seas	100	111
VFR	100	111
		-
		-
		-
		-
		-
		-
		-
Total	500	391

Figure A5: MITEIM “TOTSP”

Table 3. Total spending by Visitors ($ 000's)

	SEGMENT												Total
	Day	Motel	Camp	Seas	VFR	0	0	0	0	0	0	0	
Motel, hotel cabin or B&B	0	376,850	0	0	0	0	0	0	0	0	0	0	376,850
Camping fees	0	0	0	0	0	0	0	0	0	0	0	0	0
Restaurants & bars	0	198,102	0	0	57,345	0	0	0	0	0	0	0	255,448
Groceries, take-out food/drinks	0	50,628	0	0	89,807	0	0	0	0	0	0	0	140,435
Gas & oil	0	108,931	0	0	83,894	0	0	0	0	0	0	0	192,825
Other vehicle expenses	0	7,075	0	0	1,021	0	0	0	0	0	0	0	8,096
Local transportation	0	30,103	0	0	3,002	0	0	0	0	0	0	0	33,104
Admissions & fees	0	52,817	0	0	20,439	0	0	0	0	0	0	0	73,255
Clothing	0	31,776	0	0	11,343	0	0	0	0	0	0	0	43,120
Sporting goods	0	4,112	0	0	6,072	0	0	0	0	0	0	0	10,184
Gambling	0	0	0	0	0	0	0	0	0	0	0	0	0
Souvenirs and other expenses	0	73,698	0	0	91,323	0	0	0	0	0	0	0	165,020
Total	0	934,092	0	0	364,245	0	0	0	0	0	0	0	1,298,337

If total spending values are all zero, you forgot to enter visits on VISITS page.

When satisfied with spending estimates, proceed to choose multipliers on MULTIPLIER page to complete the impact analysis

Figure A6: MITEIM "Multipliers"

Choose generic or custom sets of multipliers

Regional economic impacts are obtained by applying the changes in spending to a set of economic ratios and multipliers for the region. The defau multipliers in Table M are for a typical rural region. Four sets of generic multipliers may be chosen by selecting buttons at the right. These represent regions of increasing economic development. You may also import multiplier for specific regions using the "Import custom multipliers" button.

Computations of Direct and Total effects are shown below in Tables M1 and M2 using the chosen multipliers. Most users may proceed directly to the SUMMARY page, where overall economic impacts are summarized .

Generic Multipliers

- ○ Rural
- ○ Smaller metro
- ○ Larger metro
- ◉ State

Model Name Michigan 2001 **YEAR** 1996

Table M. Multipliers for selected tourism-related sectors

	Direct effects				Total effects multipliers				Total Economy		adjusted job/sales	
Sector	Jobs/ MM sales	Personal inc/sales	Property Inc/sales	Value Added /sales	JobsII/ sales II MMsales		IncII/ sales	VA II/sales	Sales I		Direct	Total
Hotels and motels, includi	23.76	0.44	0.18	0.71	1.59	30.21	0.65	1.06	1.22	1,020.2	24,237.5	18.49	23.51
Other accommodations	7.77	0.12	0.14	0.29	1.85	16.38	0.42	0.80	1.62	657.1	5,107.5	6.05	12.75
Food services and drinkin	27.96	0.40	0.00	0.46	1.78	35.63	0.64	0.87	1.41	12,697.6	355,058.6	21.76	27.73
Other amusement, gambli	14.24	0.37	0.20	0.62	1.63	21.28	0.60	1.00	1.29	3,090.0	44,013.7	11.09	16.56
Automotive repair and mai	7.21	0.21	0.23	0.48	1.71	14.03	0.46	0.86	1.46	10,512.3	75,782.3	5.61	10.92
Transit and ground passer	29.95	0.52	0.02	0.59	1.74	38.19	0.79	1.01	1.29	371.6	11,131.8	23.31	29.72
All other food manufacturi	4.06	0.19	0.09	0.29	1.64	9.96	0.39	0.64	1.42	135.9	552.1	3.16	7.75
Cut and sew apparel manu	9.01	0.17	0.10	0.27	1.47	13.70	0.35	0.56	1.28	192.1	1,731.0	7.01	10.66
Petroleum refineries	0.36	0.10	0.02	0.13	1.70	4.71	0.27	0.46	1.54	1,083.6	390.3	0.28	3.67
Sporting and athletic good	5.77	0.26	0.06	0.34	1.68	12.30	0.50	0.73	1.39	222.7	1,285.6	4.49	9.58
Buttons, pins, and all othe	7.01	0.34	0.15	0.50	1.55	12.50	0.53	0.81	1.25	207.4	1,453.0	5.45	9.73
Retail Trade	**20.09**	**0.48**	**0.04**	**0.62**	**1.73**	**28.12**	**0.75**	**1.06**	**1.31**	**30,192.05**	**589,304.44**	15.63	21.89
Wholesale trade	6.71	0.38	0.09	0.67	1.59	13.29	0.61	1.03	1.25	28,427.5	190,848.2	5.22	10.34

Retail is average or sum of the 7 retail trade sectors

Values in yellow below may be changed

Click here to reduce jobs multipliers by 10%

Figure A7: MITEIM "Multipliers" (continued)

Table M1 . Computation of Direct Effects Spending, sales, income and value added in ($ 000's)

	Spending	Retail Margin	Wholesale Margin	RPC	R Margin captured	W Margin	Sales Captured	Direct Jobs	Personal Income	Property Inc	Value Added
Motel, hotel cabin or B&B	376,850			100%	-	-	376,850	6,968	164,881	68,753.5	266,880.6
Camping fees	-			100%	-	-	-	-	-	-	-
Restaurants & bars	255,448			100%	-	-	255,448	5,559	103,151	(908.9)	116,272.2
Groceries, take-out food/drinks	140,435	25.3%	12.3%	53%	35,530	17,273	46,480	147	8,991	4,320.3	13,668.2
Gas & oil	192,825	22.3%	8.3%	29%	43,000	16,004	39,273	11	3,817	826.3	5,218.6
Other vehicle expenses	8,096			100%	-	-	8,096	45	1,689	1,832.1	3,857.9
Local transportation	33,104			100%	-	-	33,104	772	17,159	622.4	19,372.0
Admissions & fees	73,255			100%	-	-	73,255	812	27,343	14,449.3	45,743.6
Clothing	43,120	41.6%	16.6%	7%	17,938	7,158	1,270	9	219	126.1	348.9
Sporting goods	10,184	34.3%	11.4%	4%	3,493	1,161	196	1	50	12.3	66.7
Gambling	-			100%	-	-	-	-	-	-	-
Souvenirs and other expenses	165,020	50.0%	11.4%	3%	82,510	18,812	1,929	11	648	294.8	965.5
Retail Margin captured				100%			182,471	2,853	86,770	8,152.1	113,454.2
Wholesale margin captured				91%			54,831	286	21,089	5,191.1	36,862.4
Total	1,298,337				182,471	60,409	1,073,205	17,474	435,806	103,671	622,711
Capture rate	83%										
Local Goods production							89,149	178	13,725	5,580	20,268

Retail Margins from Census of Retail trade, 1996. BR/97-RV. Current Business Reports. Annual Benchmark Report for Retail Trade, January 1988 through December 1997
Wholesale Trade Margins from Annual Benchmark Report for Wholesale Trade, January 1988 through December 1997

Table M2 . Computation of Total Effects Spending, sales, income and value added in ($ 000's)

	Total Sales	Total Jobs	Personal Income	Total Value Added	Direct + Indirect Sales
Motel, hotel cabin or B&B	598,508	8,859	244,876	398,769.0	460,908
Camping fees	-	-	-	-	-
Restaurants & bars	453,455	7,083	164,547	221,679.5	360,932
Groceries, take-out food/drinks	76,032	360	18,169	29,628.8	65,880
Gas & oil	66,762	144	10,737	17,941.9	60,573
Other vehicle expenses	13,879	88	3,692	6,955.8	11,804
Local transportation	57,607	984	26,242	33,378.1	42,728
Admissions & fees	119,714	1,213	44,229	73,210.2	94,786
Clothing	1,873	14	443	711.8	1,626
Sporting goods	328	2	99	142.3	273
Gambling	-	-	-	-	-
Souvenirs and other expenses	2,987	19	1,024	1,571.2	2,410
Retail Trade	315,956	3,993	136,866	194,245.7	239,328
Wholesale Trade	87,150	567	33,339	56,322.1	68,520
Total	1,794,252	23,326	684,262	1,034,557	1,409,767

1.31 Type I sales

Figure A8: MITEIM “Taxes”

Tax Computations: Enter Tax rates in shaded area

Table T1. Tax Impacts of Direct Sales and Income ($ 000's)

		Tax rates			Tax Collections			Sales
Taxes on Spending	Spending	federal	state	local	fed	state	local	Total
Motel, hotel cabin or B&B	376,850	0%	6%	2%	-	22,611	7,537	30,148
Camping fees	-				-	-	-	-
Restaurants & bars	255,448		6%		-	15,327	-	15,327
Groceries, take-out food/drinks	140,435				-	-	-	-
Gas & oil	192,825	12%	19%		23,653	37,119	-	60,772
Other vehicle expenses	8,096				-	-	-	-
Local transportation	33,104				-	-	-	-
Admissions & fees	73,255		6%		-	4,395	-	4,395
Clothing	43,120		6%		-	2,587	-	2,587
Sporting goods	10,184		6%		-	611	-	611
Gambling	-				-	-	-	-
Souvenirs and other expenses	165,020		6%		-	9,901	-	9,901
Total Taxes on Spending	1,298,337				23,653	92,551	7,537	123,742
Taxes on Direct Income	435,806	14.6%	3.4%		63,628	14,817	-	78,445
Total Direct Taxes					87,281	107,369	7,537	202,187

NOTES: Tax receipts are computed on direct sales and income using the tax rates
Tax rates are applied to direct spending and income estimated in previous pages.
Income tax rates reflect an average tax accounting for normal deductions

Figure A9: MITEIM “SUMMARY”

SUMMARY OF RESULTS

Park	**Park name here**	
Region	**Define study region**	
Application	**Describe the application**	
Spending data set	Tourism-	
Year	2006	
Multipliers	Michigan 2001	
Visits	8,250,000	Party-night
Average spending	$ 157.37	Per Party-night

Table 1. Spending and Visits by Segment

Segment	Visits in Party-night ,	Avg Spending ($)	Total Spending $000's	Pct of Spending
Day	-	91.18	-	0%
Motel	4,125,000	226.45	934,091.6	72%
Camp	-	99.91	-	0%
Seas	-	88.12	-	0%
VFR	4,125,000	88.30	364,245.4	28%
	-	-	-	0%
	-	-	-	0%
	-	-	-	0%
	-	-	-	0%
	-	-	-	0%
	-	-	-	0%
	-	-	-	0%
TOTAL	8,250,000	157.37	$ 1,298,337	100%

Table 2. Economic Impacts of Visitor Spending : Direct & Secondary Effects

	Direct Effects			
Sector/Spending category	Direct Sales $000's	Jobs	Personal Income $000's	Value Added $000's
Motel, hotel cabin or B&B	376,850	6,968	164,881	266,881
Camping fees	-	-	-	-
Restaurants & bars	255,448	5,559	103,151	116,272
Admissions & fees	73,255	812	27,343	45,744
Gambling	-	-	-	-
Other vehicle expenses	8,096	45	1,689	3,858
Local transportation	33,104	772	17,159	19,372
Retail Trade	182,471	2,853	86,770	113,454
Wholesale Trade	54,831	286	21,089	36,862
Local Production of goods	89,149	147	8,991	13,668
Total Direct Effects	1,073,205	17,443	431,072	616,111
Secondary Effects	721,047	5,884	253,190	418,445
Total Effects	$ 1,794,252	23,326	$ 684,262	$ 1,034,557
Multiplier	1.67	1.34	1.59	1.68

Figure A10: MITEIM "SUMMARY" (continued)

Table 3. Marginal Impacts per dollar of spending and per 1,000 party nigh

	change per $1,000 of visitor spending	change per 1,000 party nights
Direct personal income	$ 332	$ 52,250
Direct value added	$ 475	$ 74,678
Direct jobs	0.013	2.114
Total personal income	$ 527	$ 82,939
Total value added	$ 797	$ 125,397
Total jobs	0.018	2.827

Table 4. Aggregate Economic Ratios

	Relative to Captured Sales	Relative to Visitor Spending
Capture Rate		83%
Direct effects		
Jobs per $ Million Sales	16.25	13.43
Income to Sales	0.40	0.33
VA to Sales	0.57	0.47
Total Effects		
Jobs per $ Million Sales	21.74	17.97
Income to Sales	0.64	0.53
VA to Sales	0.96	0.80

Table 5. Tax Impacts of Direct Sales and Income ($ 000's)

	Sales	Income	Total
Federal	23,653	63,628	87,281
State	92,551	14,817	107,369
Local	7,537	-	7,537
Total	123,742	78,445	202,187

Figure B1: GEMODE “Raw Data”

"GEMODE" = GEORGIA ECONOMIC MODEL OF DEVELOPMENTAL EVENTS
(Applicable to the analysis of the tangible economic impacts of cultural and sporting events on a local area)

Instructions: Lines in RED require YOU to enter information
Lines in ORANGE are default values entered in **Bold** that CAN be overriden with your own entries, if applicable.
Lines in PURPLE are default values entered in **Bold** that should NOT be altered or overriden
Lines in BLUE or in GREEN or in PINK are Section Headings or Subheadings and yield no numbers.
Lines in BLACK yield numbers that are automatically calculated by the program and should NOT be altered.
Lines in BROWN in the last "Total Impact" worksheet are final results to be reported as the total impacts

EVENT AND AUDIENCE DATA

	Entries	
A. Description of the Event		
Main Event: Number of Days	25	(Enter as 1, 2, 3.5 etc.)
Supplemental Days Pre and Post	0	(Enter as 1, 2, 3.5 etc.)
Total Event Days Combined	25	
Avg. NON-Hotel Visitor Length of Stay	25	From Survey data; If not known, enter B17 value)
Relevant Days Per Non-Hotel Visitor	25	(Automatically chooses lower of B17 and B18)
# Nights Stay of Avg. Hotel Visitor	25	
Population of Local Community	3	(Enter 1 if <50K; Enter 2 if 50K-250K; Enter 3 if >250K)
B. Description of the Audience		
Total Attendance at Event all days	330,000	(Enter as total for all days of event; enter as 145000 etc.)
Percent Attendees Non-Local	**100.0%**	(Default = 20; 35 for major sporting events)
Total Non-Local Visitors	330,000	
Percent Visitors Staying in Hotels	**50.0%**	(Default = 8, or lower for many events based on experience)
Total Visitors Staying in Hotels	165,000	
% Visitors in Hotel Primarily for Event	**100%**	(Based on Survey, or Default = 10)
Total Hotel Visitors DUE to Event	165,000	
Average Visitors Per Hotel Room	**1.0**	(Automatically entered as default 2.5)
Total Visitor Room Nights	4,125,000.00	
Percent Visitors not In Hotels	50.0%	
Total Visitors not staying in Hotels	165,000	
% NonHotel Visitors Primarily for Event	100%	(IF B18 = 1 or <1, this is likely close to 100%)
Total Non-Hotel Visitor Days	4,125,000	(Incorporates average visitor stay of total event days divided by 2)
Alternative Non-Hotel Visitor Days	4,125,000	
Relevant Non-Hotel Visitor Days	4,125,000	(Automatically chooses lower of B37 and B38)
Avg. Size of Non-Hotel Visitor Party	**1.0**	(Default = 2.0)
Total Non-Hotel Visitor Party Days	4,125,000	
Visitors Due to Event BUT not Attending	0	(Probably enter as 0 except for unique sporting events attracting "spillovers")
"Spillover" Visitor Days	0	(Incorporates average visitor stay of total event days divided by 2)
Spillover Visitor Party Days	0	(Assumes average party size of 2.0 for spillover visitors)

Figure B2: GEMODE "Raw Data" (continued)

C. Visitor Non-Ticket Spending/Day

Average Hotel Room Rate/Night	**$95.00**	(Enter based on on-line Orbitz type survey pre-tax) (Default = 95)
Visitor Reported Hotel Room Rate	$95.00	(Based on survey; If not known, enter same as B48)
Per Night Hotel Room Spending	$95.00	(Automatically chooses lower of the two hotel spending rates)
Per Party Food & Beverage/Day	**$56.00**	(Based on survey, or use default = 56)
Per Party Non-Souvenir Shopping/Day	**$45.00**	(Based on survey, or use default = 45)
Per Party Souvenir Shopping/Day	**$33.00**	(Based on survey, or use default = 33)
Per Party Local Transportation/Day	**$15.00**	(Based on survey, or use default = 15)
Per Party Spending/Day Non-Hotel	$149.00	
Per Party Spending/Day Hotel Visitors	$244.00	

D. Visitor Non-Ticket Total Spending

Total Hotel Visitor Spending for Hotels	$391,875,000
Total Hotel Visitor Non-Hotel Spending	$614,625,000
Hotel Visitor Total Combined Spending	$1,006,500,000
Non-Hotel Visitor Total Spending	$614,625,000
Spillover Visitor Total Spending	$0
Total Visitor Non-Ticket Spending	$1,621,125,000

E. Non-Local Artist or Athlete Spending

# of Non-Local Artists or Athletes etc.	0	(Based on Survey or Historical Estimates)
Average Length of Stay of Artists etc.	25	(Based on Survey; Default = B19 value)
% of Non-Local Artists etc. in Hotels	**50%**	(Based on Survey; Default = B28 value)
Number of Artist Visitor Non-Hotel Days	0	
Number of Artist Visitor Hotel Days	0	(Assumes Avg. of one person/room)
Per Day Spending Artists not in Hotels	**89.40**	(Based on Survey; Default = 60% of B54)
Per Day Spending for Hotels by Artists	**95.00**	(Default = B49, same as other visitors)
Per Day Other Spend by Hotel Artists	**89.40**	(Based on Survey; Default = 60% of B54)
Total Spending by Artists not in Hotels	$0	
Total Spending by Artists for Hotels	$0	
Total Other Spending by Hotel Artists	$0	
Total Spending by Artists, Athletes etc.	$0	

F. Non-Local Media Visitor Spending (This category may be $0 for some events)

Number of Non-Local Media Personnel	0	(Based on Survey or Historical Estimates)
Average Length of Stay of Visiting Media	**25**	(Based on Survey; Default = B19 value)
% of Visiting Media Staying in Hotels	**50.0%**	(Based on Survey; Default = B28 value)
Number of Media Non-Hotel Days	0.0	
Number of Visiting Media Hotel Days	0	(Assumes Avg. of one person/room)
Per Day Spending by Non-Hotel Media	**$178.80**	(Based on Survey; Default = 1.2 x B54)
Per Day Spending for Hotels by Media	**$95.00**	(Based on Survery; Default = B49 same as others)
Per Day Other Spending by Hotel Media	**$178.80**	(Based on Survey; Default = 1.2 x B54)
Total Spending by Media Not in Hotels	$0	(Based on Survey; Default = 1.2 x B55)
Total Spending by Media for Hotels	$0	
Total Other Spending by Hotel Media	$0	
Total Visiting Media Spending	$0	

G. Total Visiting Spending Totals

Total Hotel Visitor Spending for Hotels	$391,875,000
Total Hotel Visitor Non-Hotel Spending	$614,625,000
Hotel Visitor Total Combined Spending	$1,006,500,000
Non-Hotel Visitor Total Spending	$614,625,000
Total Visitor Non-Ticket Spending	$1,621,125,000

Figure B3: GEMODE “Direct Tax Revenues”

LOCAL DIRECT TAX REVENUES	Entries	
A. Visitor Ticket Spending		
1. Average Ticket Price Approach		
Total Attendance by Visitors	330,000	(Entered automatically from Raw Data)
Total # FREE Tickets yielding $0	0	
Total Revenue Yielding Visitor Tickets	330,000	
Average Ticket Price	$0.00	(Insert real price inclusive of any taxes)
Total Visitor Ticket Spending	$0	
2. Share of Total Revenue Approach		
Total Ticket Revenue from All Sources	$0	(Enter known revenues inclusive of any taxes)
Percent Attendees Non-Local	100.00%	(Entered automatically from Raw Data)
Total Visitor Ticket Spending	$0	
3. Resulting Visitor Ticket Spending	$0	(Entered automatically as average of two approaches)
B. Ticket Generated New Revenue		
Total Sales Tax Rate	4.0%	(Enter as 5 or 6 etc = State 4 percent + applicable local rate)
Visitor Ticket Spending Net of Taxes	$0	
Local Sales Tax Rate Only	0.0%	(Enter as Total Sales Rate minus State 4 percent; enter as 1 or 2 etc,)
Local Sales Tax Revenue from Tickets	$0	
C. Visitor Non-Ticket Spending		
Total Visitor Spending For Hotels	$391,875,000	(Assumed net of all taxes based on derivation formula)
Total Visitor Non-Hotel Spending	$1,229,250,000	(Likely to include taxes as well non-tax spending)
Adjustment for Embedded Taxes	$1,181,971,154	
D. Direct Tax Rev : Non-Ticket Spend		
Local Hotel-Motel Tax Rate	7.0%	(Enter as 7.0 or other tax rate)
Hotel-Motel Tax Revenues	$27,431,250	
Sales Tax Base Adjustment	0.95	(Automatically entered as 0.95)
Non-Hotel Spending Tax Base	$1,167,787,500	
Adjustment for Embedded Taxes	$1,122,872,596	
Direct New Local Sales Tax Revenue	$0	
E. Total Local Tax Revenue Summary		
Total Direct Local Sales Tax Revenues	$0	
Total Direct Hotel-Motel Tax Revenues	$27,431,250	
Total Direct Local Tax Revenues	$27,431,250	

Figure B4: GEMODE “Indirect Impacts”

DIRECT AND INDIRECT IMPACTS

A. Total Direct Impact

Non-Local Coop and Other Funding	$0	(Insert total dollar amount of state coop or other non-local public or private sponsorship funds)
Total Visitor Ticket Revenues	$0	
Visitor Ticket Rev+Other NonLocal Funds	$0	
Percent Organizer Revenue Spent Locally	65.0%	(Insert % based on your use of local vs. non-local vendors; where do you spend money?)
Total "Value Added" Ticket Revenues	$0	
Total Visitor Hotel Spending	$391,875,000	(Assumed net of all taxed based on derivation formula)
Percent Hotel Spending Staying Local	0.6	
Total "Value Added" Hotel Spending	$235,125,000	
Total Visitor Non-Hotel Spending	$1,181,971,154	(Net of taxes based on adjustments in Direct Tax Revenues worksheet)
Percent Non-Hotel Spending Local	0.72	
Total "Value Added" Non-Hotel Spend	$851,019,231	
Total Direct Local Tax Revenues	$27,431,250	
Total "Value Added' Direct Local Impact	$1,113,575,481	

B. Indirect Multiplier Effect Impacts

Local Output Multiplier	1.4	
Total "Value Added" Local Output	$1,559,005,673	
Indirect "Value Added" Local Output	$445,430,192	
Indirect Spending Sales Tax Adjustment	0.92	(Adjusts for leakage from the sales tax base)
Indirect Local Sales Tax Base	$409,795,777	
Indirect Local Sales Tax Revenue	$0	
Local Employment Multiplier	21.24	
Total Local Direct + Indirect Employment	33,113.28	
Total Local Direct Employment	23652.34	
Total Local Indirect Employment	9460.94	
Known Number of People Hired		(Total number of LOCAL workers linked to event; 0 if unknown)
Direct Employment multiplier	1.3	(Automatically entered as 1.3)
Alternative Approach Total Employment	0.00	
Alternative Indirect Employment	0.00	
Average Direct Employment	11826.2	
Average Indirect Employment	4730.5	
Average Total Employment 2 Approaches	16556.6	
Local Personal Income Multiplier	0.659	
Total Direct + Indirect Personal Income	$1,027,384,739	

Figure B5: GEMODE “TOTAL IMPACTS SUMMARY”

TOTAL LOCAL ECONOMIC IMPACTS

A. Total Incremental Local Output

Total Direct Output Impact	$1,113,575,481
Total Indirect Multiplier Output Impact	$445,430,192
TOTAL LOCAL OUTPUT IMPACT	$1,559,005,673

B. Total Incremental Local Tax Revenues

Total Direct + Indirect Sales Tax Revenue	$0
Total Direct Hotel-Motel Tax Revenue	$27,431,250
TOTAL LOCAL TAX REVENUES	$27,431,250

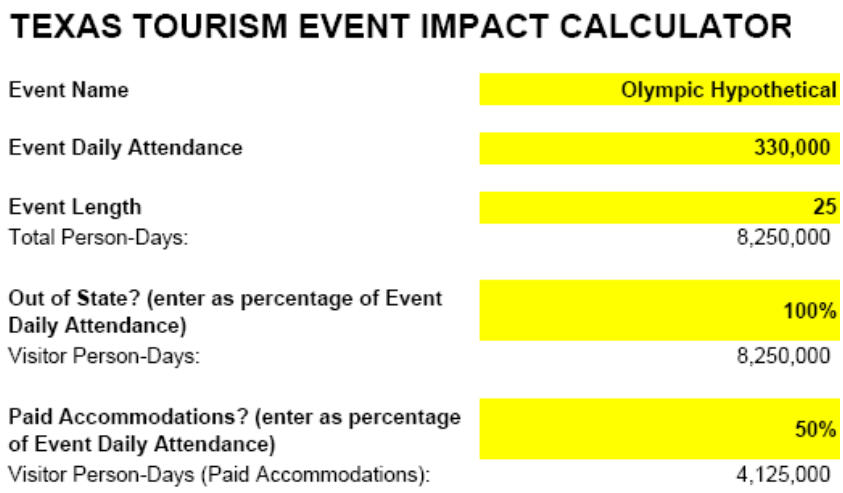
C. Total Short Term Local Employment

Total Incremental Direct Local Employment	11826.2
Total Incremental Indirect Local Employment	4730.5
TOTAL LOCAL EMPLOYMENT IMPACT	16556.6

D. Total Personal Income Local Impact

TOTAL LOCAL PERSONAL INCOME	$1,027,384,739

Figure C1: TTEIC “Input”



TEXAS TOURISM EVENT IMPACT CALCULATOR

Event Name	**Olympic Hypothetical**
Event Daily Attendance	**330,000**
Event Length	**25**
Total Person-Days:	8,250,000
Out of State? (enter as percentage of Event Daily Attendance)	**100%**
Visitor Person-Days:	8,250,000
Paid Accommodations? (enter as percentage of Event Daily Attendance)	**50%**
Visitor Person-Days (Paid Accommodations):	4,125,000

Figure C2: TTEIC “Output”

TEXAS TOURISM EVENT IMPACT CALCULATOR

Event Name	Olympic Hypothetical
Visitor Spending	$ 1,186,845,000
State Sales Tax Generated	$ 74,177,813
State Hotel-Motel Tax Generated	$ 23,512,500
Direct Output	$ 825,959,269
Indirect Output	$ 327,428,358
Induced Output	$ 405,065,884
Tourism Industry Jobs Supported	15533

Figure C3: TTEIC “Visitor Spending”

LEISURE		
Average Daily Visitor Spending (not including accommodations)	$ 96.36	
Dining	$ 23.62	24.5%
Entertainment	$ 13.40	13.9%
Retail	$ 22.52	23.4%
Transportation	$ 29.87	31.0%
Other	$ 6.95	7.2%
Accommodations	$ 95.00	
Event-Related Direct Visitor Spending	$ 1,186,845,000	
Dining	$ 194,865,000	
Entertainment	$ 110,550,000	
Retail	$ 185,790,000	
Transportation	$ 246,427,500	
Other	$ 57,337,500	
Accommodations	$ 391,875,000	
***Other Adjustment**	$ 1,186,845,000	
Dining	$ 209,199,375	
Entertainment	$ 124,884,375	
Retail	$ 200,124,375	
Transportation	$ 260,761,875	
Accommodations	$ 391,875,000	

Figure C4: TTEIC “Definition”

Commodity Purchased	NAICS Code	Implan Code	Direct*	Indirect*	Induced*
Dining	Food Service and Drinking Places (722)	481 Food service and drinking places	1	0.512914	0.457848
Entertainment	Performing Arts, Spectator Sports (711)	471 Performing arts companies	1	0.427431	0.582555
	Museums (712)	475 Museums, historical sites, zoos, and parks	1	0.451712	0.7447
	Amusement, Gambling (713)	478 Other amusement, gambling, and recreation industries	1	0.398159	0.440847
	Scenic and Sightseeing Transportation (487)	397 Scenic and sightseeing transportation and support	1	0.201154	0.755142
Retail	Food & Beverage Stores (445)	405 Food and beverage stores	1	0.348722	0.536537
	Clothing and Clothing Accessories Stores (448)	408 Clothing and clothing accessories stores	1	0.317822	0.416958
	Sporting Goods, Hobby, Book, and Music Stores (451)	409 Sporting goods, hobby, book and music stores	1	0.353573	0.518626
	General Merchandise Stores (452)	410 General merchandise stores	1	0.355841	0.540177
	Miscellaneous Store Retailers (453)	411 Miscellaneous store retailers	1	0.231477	0.598958
Transportation	Gasoline Stations (447)	407 Gasoline stations	1	0.293225	0.396356
	Taxi and Limousine Service (4853)	395 Transit and ground passenger transportation	1	0.433765	0.534722
	Charter Bus Industry (4855)	395 Transit and ground passenger transportation	1	0.433765	0.534722
	Parking Lots and Garages (812930)	490 Other personal services	1	0.499588	0.274047
	Interurban and Rural Bus Transportation (4852)	395 Transit and ground passenger transportation	1	0.433765	0.534722
	Passenger Car Rental (532111)	432 Automotive equipment rental and leasing	1	0.577552	0.391127
*Other (Allocated evenly among commodities listed above)	N/A	N/A	N/A	N/A	N/A
Accommodations	Accommodation (721)	479 Hotels and motels, including casino hotels	1	0.34839	0.463451
* Output					
** Employment per $million in output					

Figure C5: TTEIC "Definition" (continued)

Commodity Purchased	NAICS Code	Implan Code	Total*	Type I Multiplier*	Type II Multiplier*
Dining	Food Service and Drinking Places (722)	481 Food service and drinking places	1.970763	1.512914	1.970763
Entertainment	Performing Arts, Spectator Sports (711)	471 Performing arts companies	2.009986	1.427431	2.009986
	Museums (712)	475 Museums, historical sites, zoos, and parks	2.196412	1.451712	2.196412
	Amusement, Gambling (713)	478 Other amusement, gambling, and recreation industries	1.839005	1.398159	1.839005
	Scenic and Sightseeing Transportation (487)	397 Scenic and sightseeing transportation and support	1.956296	1.201154	1.956296
Retail	Food & Beverage Stores (445)	405 Food and beverage stores	1.885259	1.348722	1.885259
	Clothing and Clothing Accessories Stores (448)	408 Clothing and clothing accessories stores	1.73478	1.317822	1.73478
	Sporting Goods, Hobby, Book, and Music Stores (451)	409 Sporting goods, hobby, book and music stores	1.8722	1.353573	1.8722
	General Merchandise Stores (452)	410 General merchandise stores	1.896018	1.355841	1.896018
	Miscellaneous Store Retailers (453)	411 Miscellaneous store retailers	1.830435	1.231477	1.830435
Transportation	Gasoline Stations (447)	407 Gasoline stations	1.68958	1.293225	1.68958
	Taxi and Limousine Service (4853)	395 Transit and ground passenger transportation	1.968487	1.433765	1.968487
	Charter Bus Industry (4855)	395 Transit and ground passenger transportation	1.968487	1.433765	1.968487
	Parking Lots and Garages (812930)	490 Other personal services	1.773635	1.499588	1.773635
	Interurban and Rural Bus Transportation (4852)	395 Transit and ground passenger transportation	1.968487	1.433765	1.968487
	Passenger Car Rental (532111)	432 Automotive equipment rental and leasing	1.968679	1.577552	1.968679
***Other (Allocated evenly among commodities listed above)**	N/A	N/A	N/A	N/A	N/A
Accommodations	Accommodation (721)	479 Hotels and motels, including casino hotels	1.811841	1.34839	1.811841
* Output					
** Employment per $million in output					

Figure C6: TTEIC "Definition" (continued)

Commodity Purchased	NAICS Code	Implan Code	Direct**	Indirect**	Induced**
Dining	Food Service and Drinking Places (722)	481 Food service and drinking places	19.568535	3.164976	3.62365
Entertainment	Performing Arts, Spectator Sports (711)	471 Performing arts companies	43.871372	4.265274	4.610644
	Museums (712)	475 Museums, historical sites, zoos, and parks	14.291198	4.13617	5.893944
	Amusement, Gambling (713)	478 Other amusement, gambling, and recreation industries	15.753052	2.972507	3.489089
	Scenic and Sightseeing Transportation (487)	397 Scenic and sightseeing transportation and support	7.844312	1.234654	5.976584
Retail	Food & Beverage Stores (445)	405 Food and beverage stores	17.049135	2.491079	4.246433
	Clothing and Clothing Accessories Stores (448)	408 Clothing and clothing accessories stores	16.091795	2.270348	3.300024
	Sporting Goods, Hobby, Book, and Music Stores (451)	409 Sporting goods, hobby, book and music stores	22.118866	2.525732	4.104676
	General Merchandise Stores (452)	410 General merchandise stores	16.392931	2.541941	4.27524
	Miscellaneous Store Retailers (453)	411 Miscellaneous store retailers	28.630745	1.653536	4.740464
Transportation	Gasoline Stations (447)	407 Gasoline stations	12.789759	2.094646	3.136965
	Taxi and Limousine Service (4853)	395 Transit and ground passenger transportation	19.013571	2.093605	4.232068
	Charter Bus Industry (4855)	395 Transit and ground passenger transportation	19.013571	2.093605	4.232068
	Parking Lots and Garages (812930)	490 Other personal services	5.980978	3.512403	2.168949
	Interurban and Rural Bus Transportation (4852)	395 Transit and ground passenger transportation	19.013571	2.093605	4.232068
	Passenger Car Rental (532111)	432 Automotive equipment rental and leasing	5.90664	4.022833	3.095584
*Other (Allocated evenly among commodities listed above)	N/A	N/A	N/A	N/A	N/A
Accommodations	Accommodation (721)	479 Hotels and motels, including casino hotels	11.863321	2.43318	3.667992
* Output					
** Employment per $million in output					

Figure C7: TTEIC “Multiplier Average”

Commodity Purchased	Sales to Output Ratio	Direct*	Indirect*	Induced*	Total*	Type I Multiplier*	Type II Multiplier*
Dining	100%	1	0.512914	0.457848	1.970763	1.512914	1.970763
Entertainment	100%	1	0.369614	0.630811	2.00042475	1.369614	2.00042475
Retail	29%	1	0.321487	0.5222512	1.8437384	1.321487	1.8437384
Transportation	16%	1	0.445276667	0.444282667	1.889559167	1.445276667	1.889559167
Accommodations	100%	1	0.34839	0.463451	1.811841	1.34839	1.811841

* Output
** Employment per $million in output

Commodity Purchased	Sales to Output Ratio	Direct*	Indirect*	Induced*	Total*	Type I Multiplier*	Type II Multiplier*
Dining	100%	$ 209,199,375	$ 107,301,288	$ 95,781,515	$ 412,282,388	$ 316,500,663	$ 412,282,388
Entertainment	100%	$ 124,884,375	$ 46,159,013	$ 78,778,437	$ 249,821,795	$ 171,043,388	$ 249,821,795
Retail	29%	$ 57,235,571	$ 18,400,492	$ 29,891,346	$ 105,527,421	$ 75,636,063	$ 105,527,421
Transportation	16%	$ 42,764,948	$ 19,042,233	$ 18,999,725	$ 80,806,899	$ 61,807,181	$ 80,806,899
Accommodations	100%	$ 391,875,000	$ 136,525,331	$ 181,614,861	$ 710,015,192	$ 528,400,331	$ 710,015,192

* Output
** Employment per $million in output

Capture Rate 70%

Figure C8: TTEIC “Multiplier Average” (continued)

Commodity Purchased	Sales to Output Ratio	Direct**	Indirect**	Induced**
Dining	100%	19.57	3.16	3.62
Entertainment	100%	20.44	3.15	4.99
Retail	29%	20.06	2.30	4.13
Transportation	16%	13.62	2.65	3.52
Accommodations	100%	11.86	2.43	3.67

* Output
** Employment per $million in output

Commodity Purchased	Sales to Output Ratio	Direct**	Indirect**	Induced**
Dining	100%	4093.73	339.61	347.08
Entertainment	100%	2552.63	145.50	393.31
Retail	29%	1147.96	42.26	123.55
Transportation	16%	582.44	50.50	66.81
Accommodations	100%	4648.94	332.19	666.16

* Output
** Employment per $million in output

Capture Rate 70%

Figure C9: TTEIC “Direct Taxes”

Commodity Purchased	State Tax Rates	Direct Taxes
Dining	0.0625	$ 13,074,960.94
Entertainment	0.0625	$ 7,805,273.44
Retail	0.0625	$ 12,507,773.44
Transportation	0.0625	$ 16,297,617.19
Accommodations	0.0625	$ 24,492,187.50
Accommodations	0.06	$ 23,512,500.00

Texas Applicable State Tax Rates	State
Sales and Use Tax	0.0625
Hotel Occupancy Tax	0.06

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Vita

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