

**Cover Sheet**

**Event:** 2012 AAU Junior Olympic Games - Houston Texas

**Date:** August, 2012

**Location:** Houston, Texas

**Report Date:** January 16, 2014

## Post Event Analysis

### 2012 AAU Junior Olympic Games - Houston Texas

#### I. Introduction

This post-event analysis is intended to evaluate the short-term tax benefits to the state through review of tax revenue data to determine the level of incremental tax impact to the state of Texas from the event. A primary purpose of this analysis is to determine the reasonableness of the initial incremental tax estimate made by the Comptroller's office prior to the event. The initial estimate is included in Appendix A.

This event, while authorized under the Major Event Trust Fund statute, does not attract a large number of people, particularly when compared with the population of the area in which it was held. Harris County has a population of more than 4.1 million people. The impact of 42,000 "additional" people over several days in a population of 4.1 million is difficult to measure. Simply put, smaller events create fewer "ripples in the pond" than large events, and the larger the pond, the more difficult to measure the ripples. Larger events, particularly "premier events" with heavy promotion, corporate sponsorship and spending, and "luxury" spending by visitors will tend to create larger ripples, and are therefore, straightforward and less problematic to validate.

Additionally, while an analysis of tax data may shed some light on tax impact, some factors must be considered when looking at tax collections data during the time of the event. The event market area is host to many national, regional and local events during any given month. These events, while they might not bring in a significant number of out-of-state visitors, might entice many in-state residents to travel and spend their dollars in this area. Additionally, by the event date in July 2012, Texas had emerged from the recession and regained many of the jobs that were lost, which boosted consumer confidence and fueled even more endogenous (local) spending, particularly when compared to the lackluster spending during the depths of the recession.

Determining the tax impact of the **2012 AAU Junior Olympic Games - Houston Texas** is affected by the timing of the event, which coincides with the recovery from the economic recession. The agency's analysis shows that the sales and use tax increases in the market area were higher than the statistical model would have predicted, as well as higher than the percentage statewide increases. While some of this increase was certainly due to the event, it also appears that some of the increase was due to other factors, most likely the economic rebound.

Determining the tax impact from an event is dependent upon how many out-of-state participants and visitors attend the event. The tax type that is the largest contributor to the economy is the sales and use tax, but the Hotel Occupancy Tax (HOT) tax most likely is the best indicator of how many out of market and out-of-state visitors an event may have attracted.

An assessment of July/August HOT revenues from 2003 to 2012 shows that, for the months of the event, the state received \$1,224,284 above-average collections (including adjustments for atypical

fluctuations that occur over any given period). Separately, the pre-event study provided by the organizer estimated 44,372 out of state visitors. The agency conducted a simple analysis to determine the reasonableness of the reported out-of-state attendee number, using the following assumptions:

1. Each room would cost \$133 per day and 2.35 persons would be in each room; and
2. 42,000 Out-of-state participants and visitors stayed for the four nights (the event was a total of 7 nights).

This simple analysis yields an amount of approximately \$570,485 in additional taxes to the state, an amount in line with the initial estimate and significantly less than the actual increase the analysis of state HOT taxes for the month.

While it is impossible to attribute increased economic activity to event participants and attendees given the data readily available to the Comptroller's Office, it is reasonable to assume that they did contribute some amount to the overall increase, and provides credence to the third party estimate of 35,570 out-of-state visitors.

Considering the attendance figure from the third-party study and actual observed HOT data, it could be inferred that the event host city experienced positive economic activity due to this event.

However, it is unknown:

- how much each of these out-of-state visitors spent;
- how many nights they stayed; and thus
- exactly how much they contributed to observed increases in tax revenues to the state from attending the event.

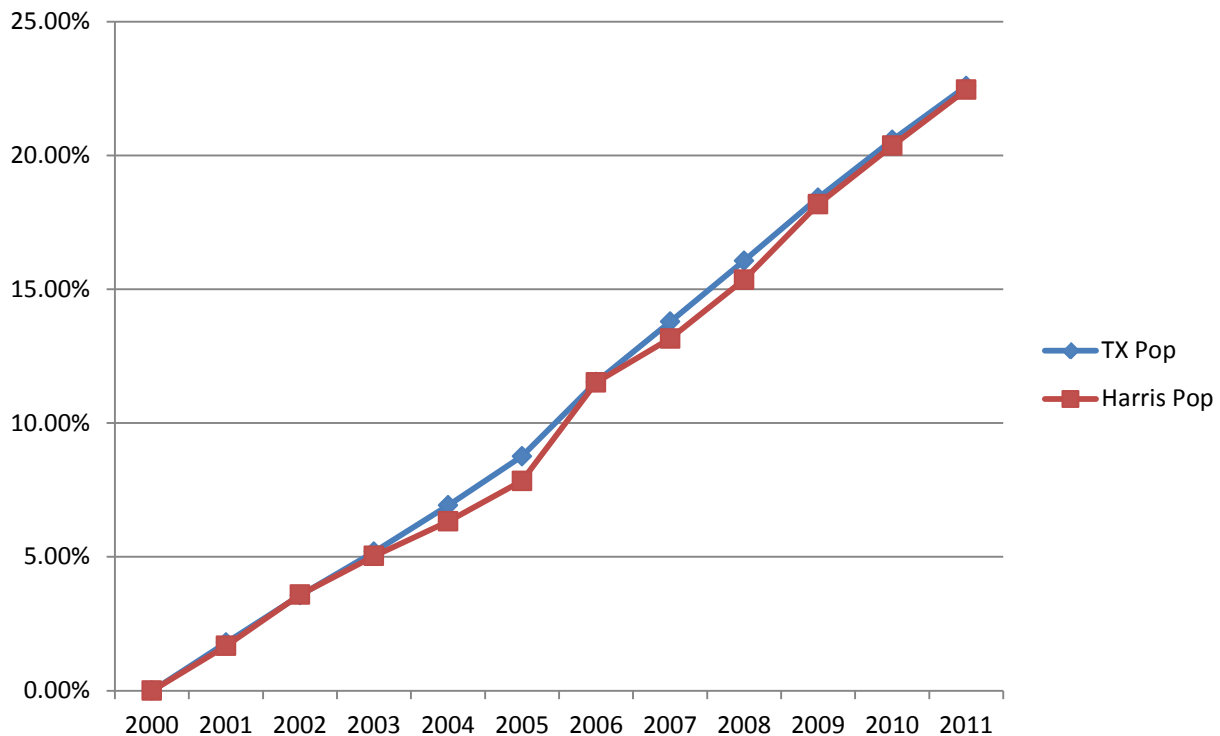
While the above example using HOT tax receipts provides a reasonable assessment that the event performed in line with expectations, the agency also performed additional analyses on the various state taxes to further study the tax performance during the event period.

### Overview of the Local Economy

While the rest of the United States was falling into a recession, the state of Texas was weathering the economic downturn better than most. Buoyed by the oil and gas industry and avoiding the housing crisis made Texas more economically viable than other states. Due in part to these and other factors, Texas experienced solid population growth over the past decade.

From 2000 to 2011, the Texas population grew at an average of roughly two percent per year. By 2011, the Texas and Harris County populations had grown by 22.58 and 22.45 percent, respectively, from their levels in 2000. The graph below illustrates the fact that Texas and Harris County populations grew at a steady pace at almost the same rate for the past twelve years. And, as the population grew, more working state residents contributed to the Texas economy.

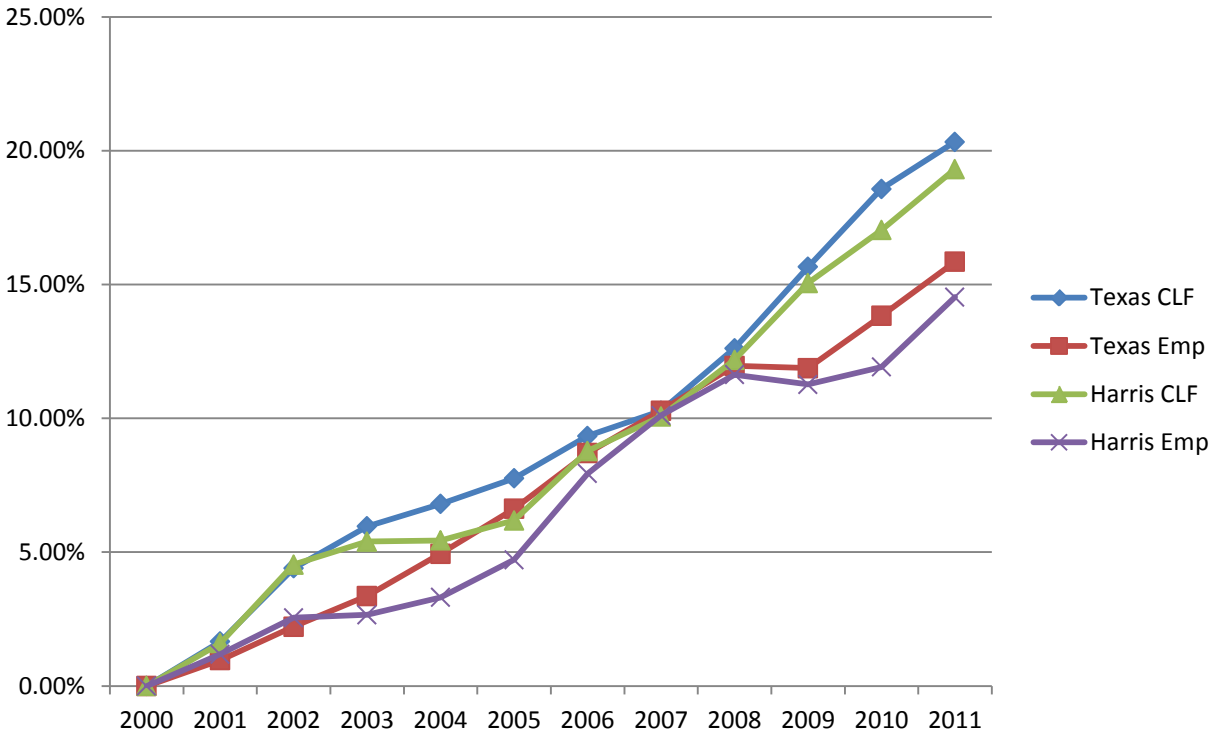
### Texas and Harris County Indexed Population Growth, 2000 = Base Year



Source: U.S. Census Bureau.

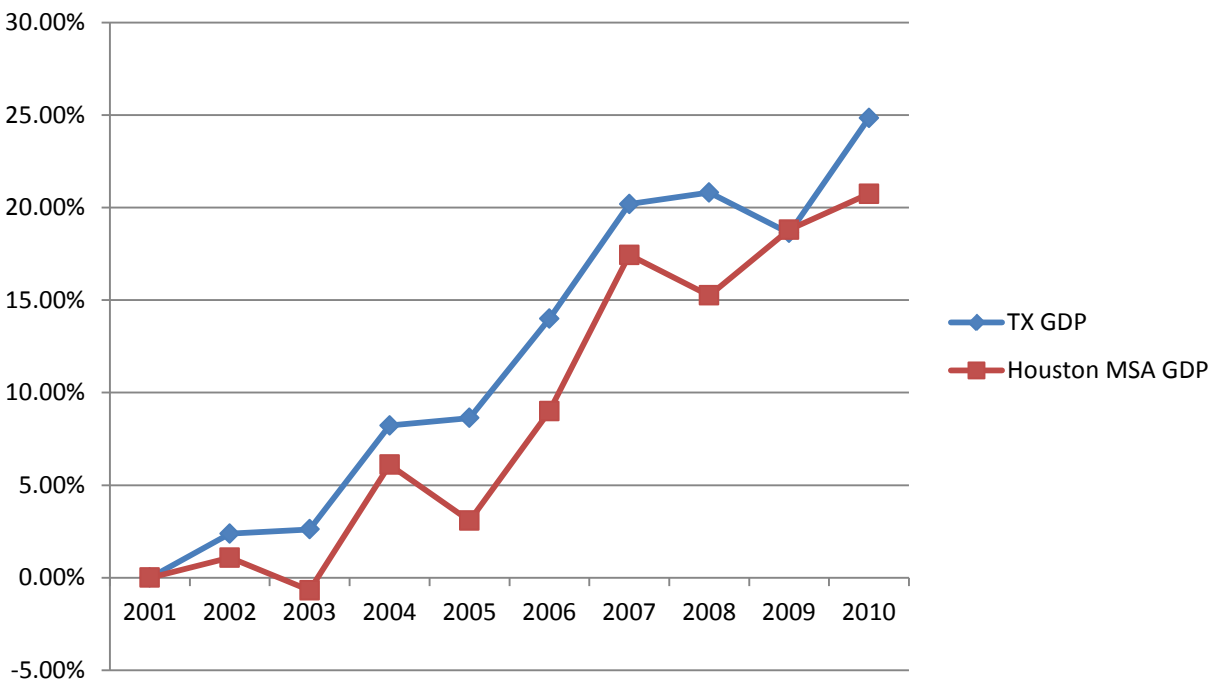
The growing population created an expanding Civilian Labor Force (CLF) and more employed people in Texas and Harris County. According to the Texas Workforce Commission, from 2000 to 2011, the CLF in Texas and Harris County had grown by 20.33 and 19.31 percent respectively. While the number of employed persons didn't keep pace with the CLF, from 2000 to 2011, employed persons in Texas and Harris County grew by 15.85 and 14.53 percent respectively. The graph below illustrates that the growth rates of Texas and Harris County CLF and employed persons track very close to each other. Only once during this period did the number of employed persons experience slower growth, which occurred between 2008 and 2009. The growing population and CLF provided some additional fuel to the economic engine of Texas.

### Texas and Harris County Civilian Labor Force (CLF) and Employment Growth Index, 2000 = Base Year



One measure of output for a state or local government area is Gross State Product (GSP) or Gross Regional Product (GRP). This is a measure of all of the value added by industries within the geographic area and is a counterpart to Gross Domestic Product (GDP)<sup>1</sup>. As the population increases and more people go to work for various industries, output grows and so does the corresponding measure of GDP. The graph below illustrates that industry output in Texas and the Houston Metropolitan Statistical Area (MSA) has been on an upward trend for the past decade. While Texas and the Houston MSA experienced a few years of slower growth in output, overall growth in industrial output over this period has been similar to growth in population and CLF.

### Texas and Houston Metropolitan Statistical Area Real GDP (2005 Chained Dollars) Growth Index, 2001 = Base Year



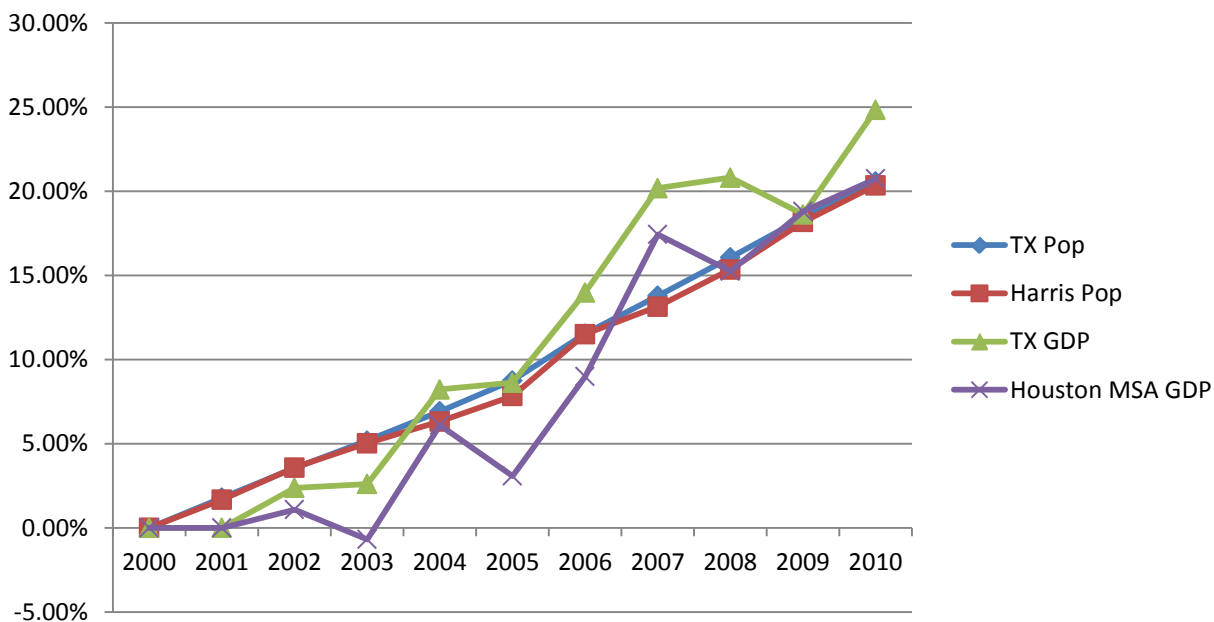
Source: U.S Department of Commerce Bureau of Economic Analysis.

<sup>1</sup> For the purposes of this discussion, GSP and GRP will be referred to as GDP for the state and local area.

When the growth index for population, CLF and GDP are compared for Texas, Harris County and the Houston MSA, it becomes apparent how closely they track together over time. Growth for these three measures is about 20 percent higher than the base year, which also illustrates how closely these three measures are tied together.

The graph below illustrates the previous point that the Texas, Harris County and Houston MSA population and GDP grew at similar rates over the past decade. While the population indices show a steady growth over time, the GDP indices reflect the changes that occur in a more volatile and dynamic environment like the economy. Also, the diverse economy in Texas is able to weather shocks to one or a few industry sectors and still remain viable. As one industry sheds workers and productivity, another is there to pick up some of those workers and productivity that was lost.

### **Growth Index for Texas, Harris County and Houston MSA for Population and Real GDP (Population base year = 2000; Real GDP base year = 2001)**



*Source: U.S. Census Bureau and the U.S. Department of Commerce Bureau of Economic Analysis.*

While taxable sales and revenues to the state may appear to rise due to a major event, the fact is that the Texas economy has been growing in terms of output and employment for many years now. Even during the recession the Texas economy was still growing relative to where it was earlier in the same decade, though that growth occurred at a slower rate. So, it is important to remember that the Texas economy has been on an upward trend. And in a state with steady population and civilian labor force growth, it's not hard to realize steady gains in output as well.

While Houston and Harris County undoubtedly benefitted from hosting a major event, gauging that benefit within the backdrop of a growing economy can be challenging.

## II. Methodology

The METF statute requires the Comptroller's office to estimate the incremental increase in taxes for both the state and any municipality (or county) that contributes local matching funds. For the purposes of this analysis, staff attempted to determine if there was a measurable change in **state** taxes due to the event. This presents challenges for two primary reasons: the size and population of the state and the fact that taxes are remitted to the state based on receipts from 30-90 day periods, depending on the tax type. The incremental tax increase in the state due to an event in a large and dynamic tax system may not be readily distinguishable from incremental changes due to other factors.

Also, measuring the actual incremental tax increase produced as a result of a particular event with accuracy requires certain information that is not readily available. The primary determinants that would be required to accurately measure the incremental increase in taxes are:

- the number of out-of-state visitors;
- the length of stay for those visitors; and
- the expenditures per day for those visitors.

The incremental taxes attributable to the out-of-state visitors for the event make up the majority of the estimate (approximately 60 to 70 percent of the total estimated incremental taxes).

Since the exact number of out-of-state visitors, length of stay, and expenditures per day is not known with certainty, our analysis relies on overall changes in tax collections to make an informed judgment as to whether the initial estimate was reasonable.

Incremental tax impact to the state, for these purposes, is estimated by gauging exogenous or out-of-state spending. It is assumed that all attendees have limited disposable income for entertainment, and that Texas residents would likely have chosen to spend their entertainment dollars at another Texas venue or event in the absence of the event in question. While it is impossible to track all out-of-state visitors and their spending habits, a noticeable increase in taxable sales points to a positive economic impact due to a major event. This analysis uses two methods for examining tax data.

Method 1 looks at the past 10 years of quarterly (or monthly) tax data to determine average collections for any given quarter (or month). Standard deviations are calculated and if collections for the period when the event occurred are beyond the average and standard deviation, it is assumed that an event must have pushed sales upward. The more the sales deviate from the average plus the standard deviation or outside the normal distribution, the stronger the indication of the magnitude of the impact.



Method 2 looks at only the quarter (or month) in question for the past 10 years (2003 to 2012). Based on sales subject to tax, average collections and standard deviations are calculated. Like the method described previously, if collections for the period when the event occurred are beyond the average and standard deviation, it is assumed that an event must have pushed sales upward. The magnitude of the impact can be gauged by measuring the amount of state taxes collected over the average plus the standard deviation.

The methodology used for this analysis focuses on direct taxes, since indirect and induced impacts are calculated using a dynamic modeling software package, and are dependent on the direct taxes.

The Comptroller's Office also ran statistical tests (Appendix B) on the three tax types that generated the most revenue that could be verified (Sales and Use, Hotel Occupancy, and Mixed Beverage). The test indicated at the 99 percent confidence level that the amount subject to state tax was not normal during the period that the event occurred and is statistically different from similar collections from the same time period in previous years. This statistical difference implies that the event may have been at least partly responsible for the difference in tax collection levels for the period.

### **Analysis**

The METF statute requires that the Comptroller estimate the incremental tax increase that is expected for an event for five specific tax types:

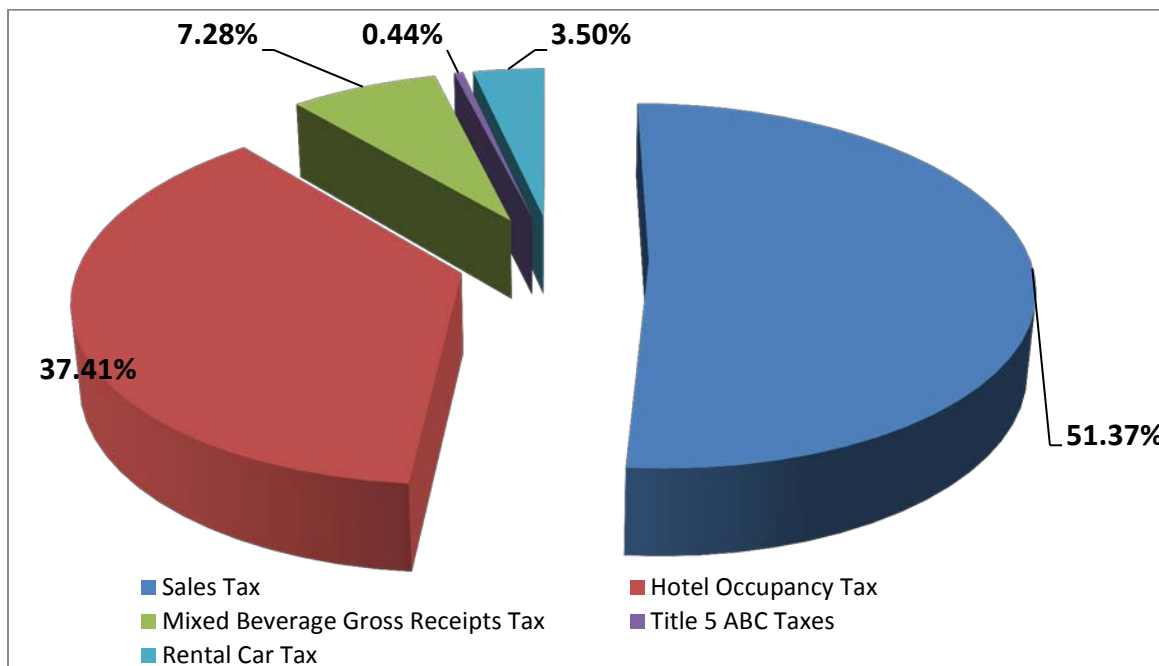
1. Sales and Use Tax
2. Hotel Occupancy Tax
3. Rental Car tax
4. Mixed Beverage Tax
5. Title 5, Alcoholic Beverage Code tax

Of these 5 taxes, the estimate of general Sales and Use tax, Hotel Occupancy tax (HOT), and Mixed Beverage tax are the largest verifiable tax types. In the case of the event in question, the Sales and Use tax and the HOT made up roughly 51 and 37 percent respectively, while the Mixed Beverage tax made up slightly more than 7 percent. The Rental Car tax made up 4 percent and the Title 5 Alcohol tax made up just over three-tenths of one percent.

Rental car taxes are paid by rental car companies at the state-wide level and are not attributable to specific geographic locations. Title 5 Alcohol taxes make up a small percentage of the overall estimate and due to the small amount, any change due to a specific event is difficult to calculate. Due to these challenges involved and relatively minor amounts of rental car tax and Title 5 alcohol, this analysis uses initial estimates and does not attempt to quantify changes in these two tax types.

## II A Analysis—All Tax Types

**Tax Type breakdown for the 2012 AAU Junior Olympics**



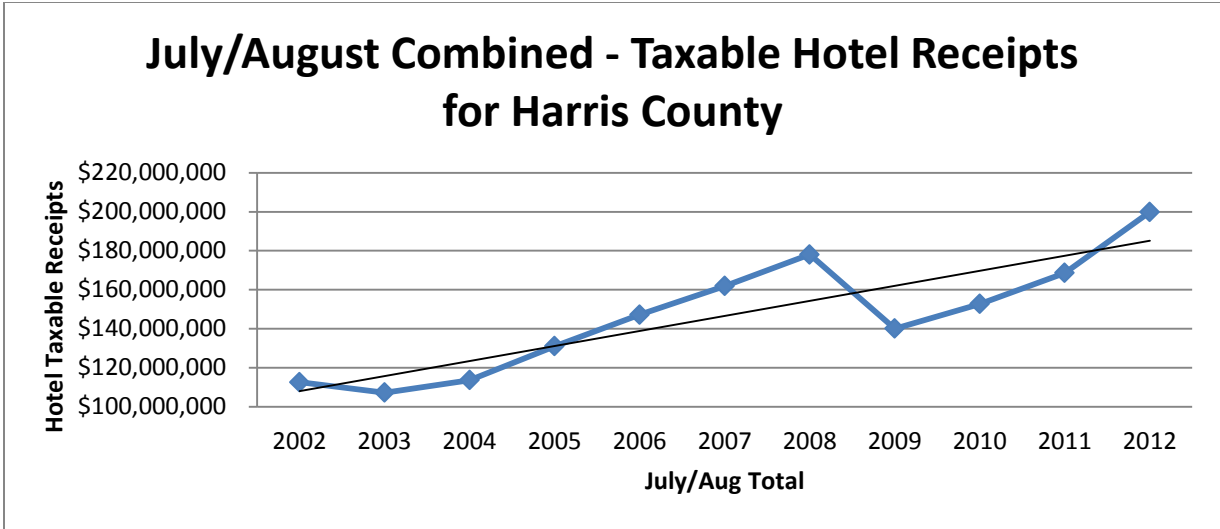
Source: Texas Comptroller of Public Accounts

The above chart illustrates that sales tax makes up the majority of additional estimated revenue to the state from major events. **Taxes collected from sales tax, mixed beverage tax, and hotel occupancy tax make up 89 percent of the funds generated by the event for the 5 specific tax types that are addressed in the statute.**

The charts below depict HOT taxable receipts, mixed beverage tax allocations, and gross sales subject to state tax.

### **II B Analysis--Hotel Occupancy Tax:**

This graph does not represent all monthly HOT receipts, but only those that are taxable. The dollar value that corresponds to any year represents the HOT taxable receipts that are attributable to that year's July/August combined. This graph includes HOT taxable receipts for the event market area. The event in question took place on July 25 – August 4, 2012.



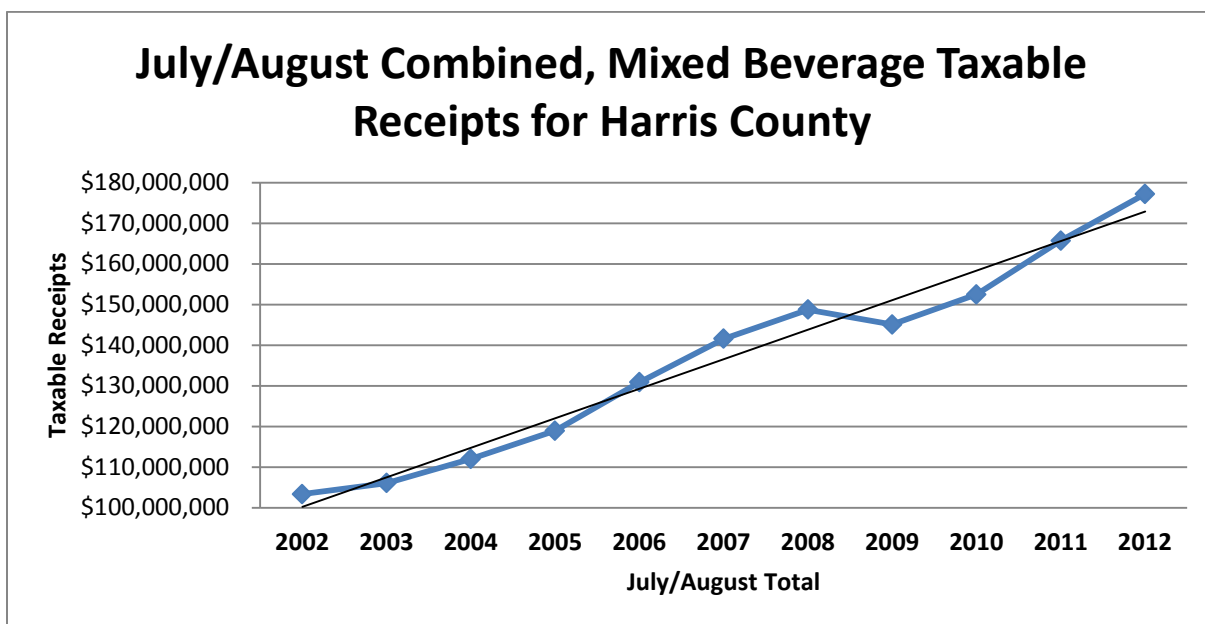
Source: Texas Comptroller of Public Accounts

The average HOT taxable receipts for this area from July/August 2002 to July/August 2012 were \$149,997,426 with a standard deviation of \$28,079,471. The line represents the Trend Line assuming normal growth – It is clear that the actual results for July/August 2012 are above the normal trend. The average taxable receipts plus the standard deviation is \$178,076,897, which is \$21,755,256 more than receipts during the months when the event occurred. This represents additional tax revenue of \$1,305,315 during this month. This fact is illustrated in the graph by the fact that the actual receipts for July/August 2012 is higher than the trendline suggests should have taken place.

While an analysis of tax revenues might not tell how much of this spending came from out-of-state visitors, a comparison of other direct spending estimates, using different assumptions and methodologies, can help put these numbers into perspective. As stated previously, an analysis of additional HOT revenues to the state was estimated to be \$1,305,315. The initial pre-event estimate had predicted \$570,264 in additional HOT revenue, while a third-party post-event analysis estimated a direct spending impact to state HOT revenues of \$414,417.

Tax Type	Initial Estimate	Third-Party / Post Event
Hotel Occupancy Tax	\$570,264	\$414,417

## II C Analysis--Mixed Beverage Tax:



Source: Texas Comptroller of Public Accounts

This graph includes only historical mixed beverage taxable receipt amounts for the combined months of July and August. The dollar value that corresponds to any year represents the Mixed Beverage taxable receipts that are attributable to that year's July/August. The beverage taxable amounts per year correspond to the July/August in which they were distributed. This graph includes amounts for Harris County.

The average mixed beverage taxable receipts for this area, during July/August 2002 to July/August 2012, were \$136,535,438 with a standard deviation of \$23,324,113. The average taxable receipts plus the standard deviation is \$159,859,551, which is \$17,347,827 less than receipts during the quarter when the event occurred. This fact is illustrated in the graph by the fact that the actual receipts for July/August 2012 is higher than the trendline suggests should have taken place.

The second method of analysis considered mixed beverage tax receipts only for the months of July/August for Harris County from 2002 to 2012. The average taxable receipts, which are 14 percent of gross receipts, were \$19,114,961 with a standard deviation of \$3,265,376. The average taxable receipts plus the standard deviation is \$22,380,337 which is \$2,428,696 less than receipts during the month when the event occurred. The state gets roughly 79 percent of taxable receipts. This represents additional revenue of \$1,918,670 during the month of the event.

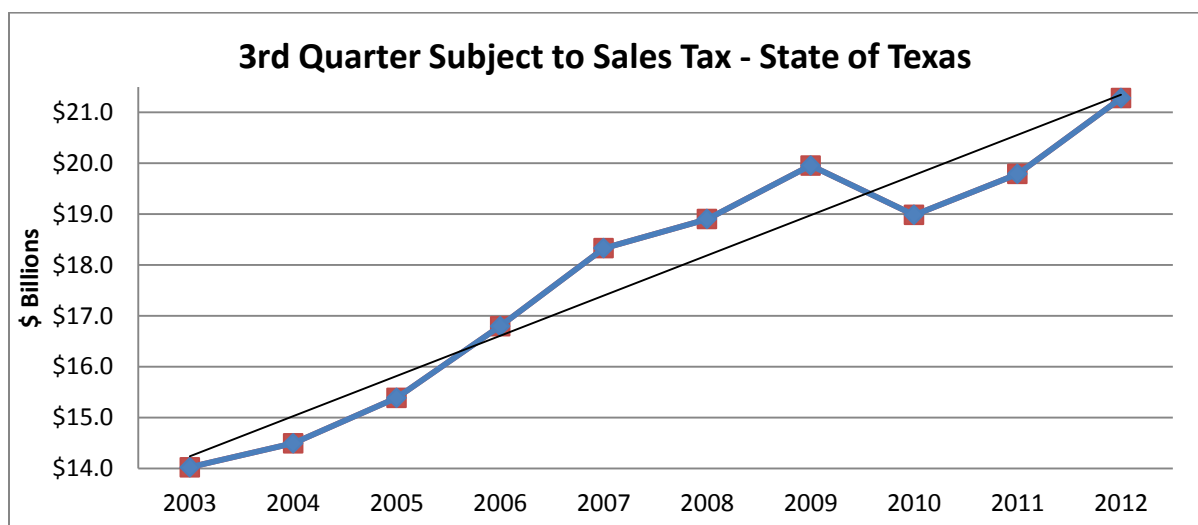
The second method of analysis of mixed beverage revenues estimated that the state received an additional \$829,283. The initial pre-event estimate had predicted \$111,041 in additional revenue.

### II D Analysis--Sales and Use Tax:

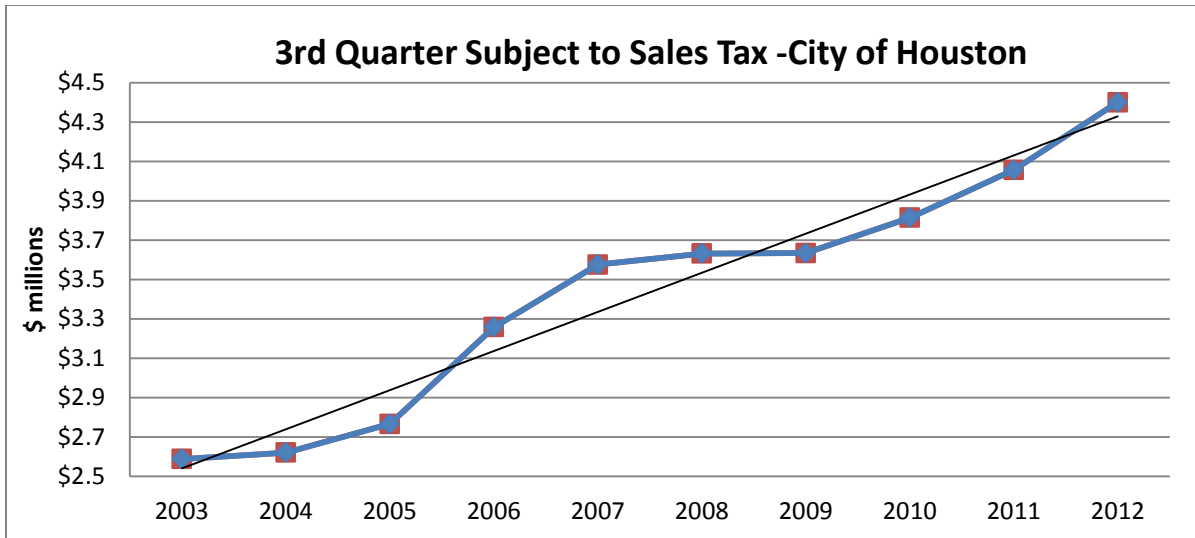
The graph below is the sum of taxable sales within the following 2- and 3-digit North American Industry Classification System (NAICS) code categories: NAICS code 72 (Accommodation & Food Services Industry); NAICS code 71 (Arts, Entertainment, & Recreation Industry); NAICS code 445 (Food and Beverage Stores); NAICS code 446 (Health and Personal Care Stores); NAICS code 448 (Clothing and Clothing Accessories Stores); NAICS code 451 (Sporting Goods, Hobby, Musical Instrument, and Book Stores); and NAICS code 452 (General Merchandise Stores). This graph includes taxable sales amounts for the event market area. The graph includes data only from holders of sales tax permits; businesses that sell only goods that are outside the sales tax base are not covered by these reports. A business that files yearly reports will show up only in a single quarter.

Looking at Harris County, the average amount subject to sales tax for the 3<sup>rd</sup> quarter from 2003 to 2012 was \$4,325,904,272 with a standard deviation of \$600,186,734. The amount subject to sales tax in the quarter during when the event took place was \$5,315,030,926, which is \$388,939,919 more than the sum of the average amount subject to sales tax and the standard deviation. At the state sales tax rate (6.25%), this amounts to an additional \$24,308,745 to the state as a result of increased sales within Harris County.

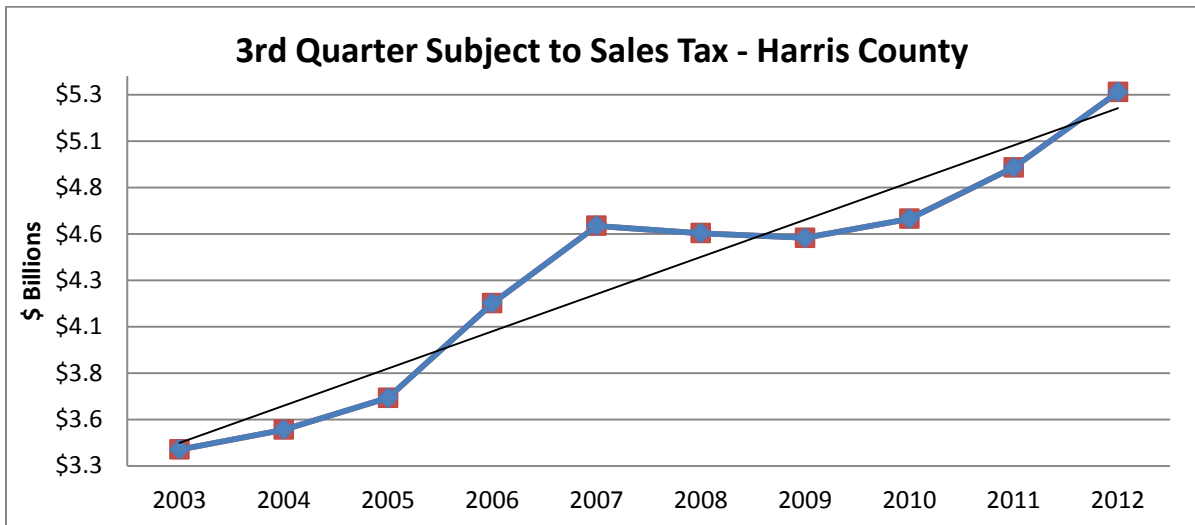
Just looking at the City of Houston, the average amount subject to sales tax for the 3<sup>rd</sup> quarter from 2003 to 2012 was \$3,435,079,483 with a standard deviation of \$584,521,057. The amount subject to sales tax in the quarter during when the event took place was \$4,400,277,485, which is \$380,676,946 more than the sum of the average amount subject to sales tax and the standard deviation. At the state sales tax rate (6.25%), this amounts to an additional \$23,792,209 to the state as a result of increased sales just within the City of Houston.



Source: Texas Comptroller of Public Accounts



Source: Texas Comptroller of Public Accounts



Source: Texas Comptroller of Public Accounts

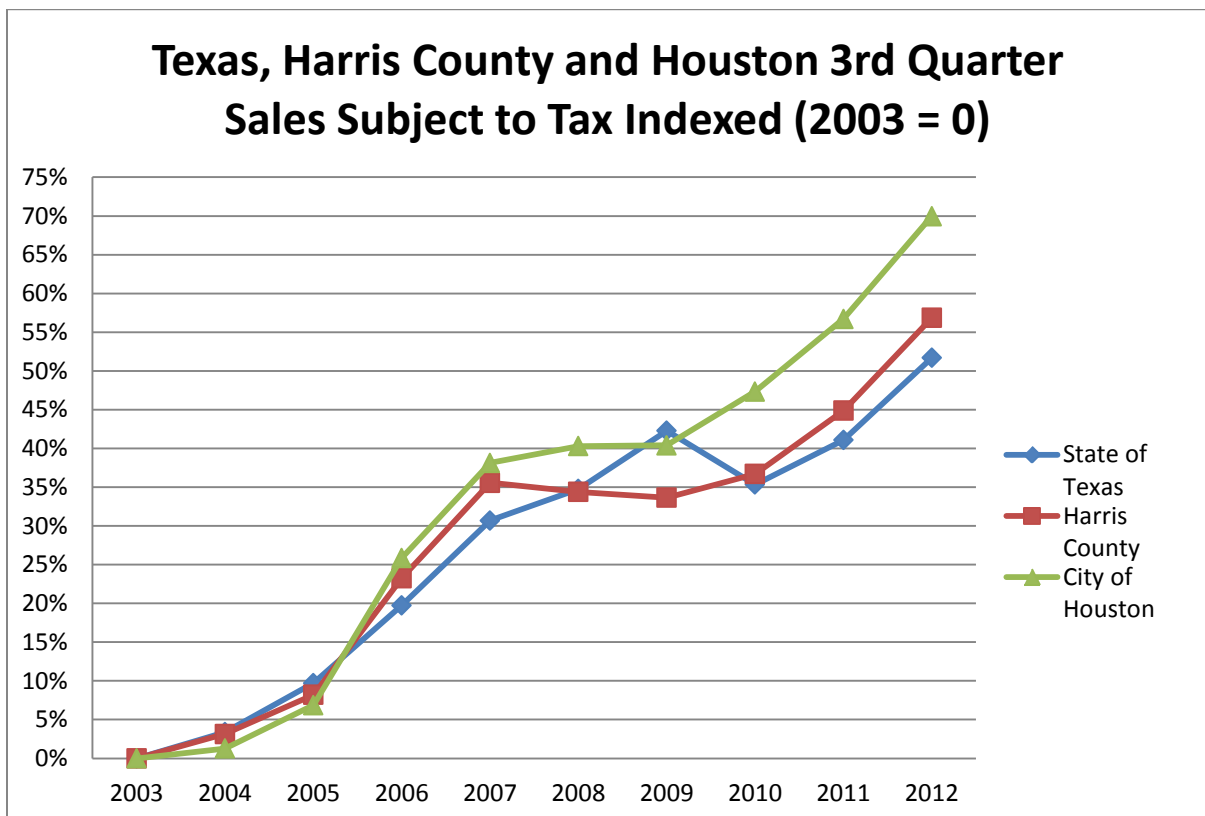
As illustrated in the above graphs, while the amount subject to sales tax for the 3<sup>rd</sup> quarter for the State of Texas is fairly close to the amount projected in the trendline, the amount subject to sales tax for both Harris County and the City of Houston is noticeable higher than projected by the trendline.

While there clearly was increased sales tax revenue collected during the same time an event occurred in a given area, the increase is almost certainly not all due to one major occurrence (see section below titled "Texas and Houston 3<sup>rd</sup> Quarter Sales Subject to Tax Indexed). This method of analysis estimates that the state of Texas received \$22,279,643 additional sales tax dollars from the event market area during the third quarter of 2012. A pre-event analysis estimated that the state

would receive an additional \$783,116 in sales and use tax due to the event, while a third-party post-event analysis estimated a direct spending impact to state revenues of \$1,131,345.

Tax Type	Initial Estimate	Third-Party / Post Event
Sales & Use	\$783,116	\$1,131,345

The graph below illustrates that 3rd quarter taxable sales in Houston, the entire of Harris County and the state as a whole were growing at comparable rates using 2003 as a base year. In fact, from 2008 through 2012, Houston’s taxable sales subject to sales and use tax actually grew at a faster rate than Texas’. While the growth in taxable sales and the corresponding tax revenue might seem uncharacteristically large for Houston and Harris County, the rest of the state was also experiencing this same growth.



Source: Texas Comptroller of Public Accounts

The second method used to analyze the impact of the event that estimated a drastic jump in state revenues during the first quarter of 2012 can partially be explained by an overall growth in taxable sales in the state of Texas. Houston and Harris County host many events during a given quarter, and more people from in-state and out-of-state spending their dollars at these events push tax collections up. Coupled with an overall increase in taxable sales, endogenous and exogenous spending can appear to have an even greater impact on state tax revenues.

### **II E Analysis--Rental Car Tax:**

The state of Texas imposes a tax on motor vehicle rentals, but the rate is based on the length of the rental contract. For contracts of 1-30 days, the state rate is 10 percent of gross receipts less discount and separately stated fees for insurance, fuel, and damage assessments.

Unlike the other tax types, rental car tax is not reported to the Comptroller by location address. For example, if a corporate taxpayer has multiple locations in the state, they file one return for all gross rental tax. Taxpayers do not report to the Comptroller's Office based on location and the Comptroller's Office does not permit the taxpayer based on each location. For this reason, an examination of this tax type by location provides no useful data for these analyses.

In order to provide a complete estimate of direct-spending tax revenue from this tax type, the CPA initial estimate number was used for this post-event analysis. A third-party post-event analysis estimated a direct spending impact to state revenues of \$124,724.

<b>Tax Type</b>	<b>Initial Estimate</b>	<b>Third-Party / Post Event</b>
Rental Car	\$53,297	\$124,724

### **II F Analysis--Title V Alcoholic Beverage Code Tax:**

The state of Texas also imposes a tax on the amount of alcohol that manufacturers sell to retail establishments. The tax rate varies by class on the amount of alcoholic content of beverages by class per gallon. Distilled spirits are taxed at the highest rate at \$2.40 per gallon, while beer that has an alcoholic content of 4% and lower is taxed at \$0.193548 per gallon.

While wholesalers do not report wholesale alcohol sales by location, they do submit how much volume they sold to retail establishments. Determining how much volume each retail establishment in the event market area purchased for each class of alcohol, then deriving how much tax was paid based on the volume and class would be complex. Therefore, given how much state revenue is derived from this tax type (less than one-half of one-percent of the total of all taxes collected for this analysis) comparative to the other tax types, for the purpose of this analysis, the initial estimate was used.



## Conclusion

Considering the attendance figure from the third-party study and actual observed tax data, it could reasonably be stated that the event host city experienced positive economic activity due to this event.

### 1. Third-Party Post-Event Analysis

Post event analysis conducted by a third-party vendor estimated economic impact based on direct spending and multiplier effects. Based on their analysis, they estimated that the total impact to the state of Texas was **\$5,400,000** in additional state tax revenues. It was estimated that total direct state taxes would increase by \$4.2 million due to the event with induced and indirect spending adding an additional \$1.2 million.

### 2. Comptroller Analysis

**The Comptroller estimated, prior to the event, an incremental tax increase to the State of Texas of \$1,524,446.** This amount plus the amount of indirect and induced tax gain to the state as calculated by the Comptroller and required by the METF legislation of \$858,507 plus the local match from the City of Houston and Harris County of \$381,273 totaling a Major Event Trust Fund of \$2,764,226.

Comptroller data suggest that the Houston metro area experienced increased economic activity during the event. The precise state share of this increased economic activity due to out-of-state consumption is unknown given the inability of available data to identify the amount contributed directly from out-of-state visitors. Additionally, it is worth noting that while a large metropolitan area that hosts a large event will almost certainly see a noticeable increase in tax revenues, the additional revenues are not as identifiable with smaller events such as this one. That being said, the amount of additional tax revenue the state received from the major tax types does exceed the initial estimates. **This office concludes that the initial estimate of direct, indirect, and induced tax impact of \$2,382,953 is reasonable based on the tax increases that occurred in the market area during the period in which the event occurred.**

**APPENDIX A**

The tables below show the various tax types and the additional revenue amount estimates. The first table illustrates the three largest verifiable tax revenue generators and the amount estimated by three different analyses. The last two tables show the analysis of additional revenue to the state from all five tax types as estimated by two different methods. For a third party assessment of visitor impact, see Appendix C.

<b>Tax Type</b>	<b>Initial Estimate</b>	<b>3Q 2012 Actual minus 3Q Average and Standard Deviation (2003-12)</b>	<b>Third-Party Post-Event</b>
Sales and Use	\$783,116	\$22,858,691	\$1,131,345
HOT	\$570,264	\$350,949	\$414,417
Mixed Beverage	\$111,041	\$829,283	Not offered
<b>Total</b>	<b>\$1,464,421</b>	<b>\$24,038,923</b>	<b>\$1,545,762</b>

<b>Initial Estimate (Pre Event)</b>		
<b>Revenue Type</b>	<b>State Percent of Total</b>	<b>State Amount</b>
Sales Tax	51.37%	\$ 783,116
Hotel Occupancy Tax	37.41%	\$ 570,264
Mixed Beverage Gross Receipts Tax	7.28%	\$ 111,041
Title 5 ABC Taxes	0.44%	\$ 6,730
Rental Car Tax	3.50%	\$ 53,297
<b>Total</b>	<b>100%</b>	<b>\$ 1,524,448</b>

<b>July/August 2012 Actual minus July/August Average and Standard Deviation (2002-12)</b>		
<b>Revenue Type</b>	<b>State Percent of Total</b>	<b>State Amount</b>
Sales Tax	87.16%	\$22,279,643
Hotel Occupancy Tax	5.59%	\$1,428,512
Mixed Beverage Gross Receipts Tax*	7.01%	\$1,792,760
Title 5 ABC Taxes**	0.03%	\$6,730
Rental Car Tax**	0.21%	\$53,297
<b>Total</b>	<b>100.00%</b>	<b>\$25,560,942</b>

\*Initial estimate used due to how this tax is reported. See "Analysis" section (II E and II F) for further explanation.

\*\*State share was derived using Gross Collections for January (2002-12); not quarterly

Historical averages and standard deviations were calculated and subtracted from 2012 actual figures. The tax rate was then applied to the difference to arrive at the "State Share of Sales Tax" figure.

## APPENDIX B

Given the historical amount subject to state tax, is it statistically feasible that the event caused the observed increase in taxable sales? A single sample test of hypothesis was conducted to answer this question. The steps used in conducting these tests for each tax type are as follows:

### Sales and Use Tax:

1. Stating the hypothesis:
  - a. Null Hypothesis (Ho): The increase in the amount subject to state tax in the event market area during the time of the event is equal to what would have been expected.
  - b. Alternative Hypothesis (Ha): The increase in the amount subject to state tax in the event market area during the time of the event is not equal to what would have been expected.
  
2. Level of Significance (probability of rejecting Ho when it is true): According to Lind, Marchal and Wathen<sup>2</sup>, it is traditional to use the following levels of significance for the following types of studies:
  - a. 0.1 (10%) for political polling;
  - b. 0.05 (5%) for consumer research projects; and
  - c. 0.01 (1%) for quality assurance.

For the purpose of this analysis, we use the 0.01 (1% level) of significance. This means that we want to be 99% confident that the Ho would not be rejected if it is true.

3. Test Statistic: 2-tailed, t-test is used to test for a population mean when the sample size is small.
4. Decision Rule: Reject Ho if the estimated t value (t\*) is less than -3.169 or greater than 3.169.
5. Test

Sales and Use Tax	Are observed tax collections statistically probable?	Using Nominal Values
Hypothesis	Null (Ho)	u = \$5.3 Billion
	Alternative (Ha)	u not = \$5.3 Billion
Level of Significance (Confidence Interval)		0.01 (99%)
Statistical Test = 2-tailed t-test		
Decision Rule	Reject Ho if	t* < -3.169
		t* > 3.169
Estimated t =	t*	4.9441
Action (result)		Reject Ho
<b>Based on the test, the actual collections subject to state tax for the period in question is not statistically probable. This means that the sales and use tax collected for the period is not normally seen given historical data.</b>		

<sup>2</sup> Basic Statistics for Business and Economics (5<sup>th</sup> Edition), McGraw-Hill Irwin.

**Hotel Occupancy Tax (HOT):**

1. Stating the hypothesis:
  - a. Null Hypothesis (Ho): The increase in the amount subject to state tax in the event market area during the time of the event is equal to what would have been expected.
  - b. Alternative Hypothesis (Ha): The increase in the amount subject to state tax in the event market area during the time of the event is not equal to what would have been expected.
  
2. Level of Significance (probability of rejecting Ho when it is true): According to Lind, Marchal and Wathen<sup>3</sup>, it is traditional to use the following levels of significance for the following types of studies:
  - a. 0.1 (10%) for political polling;
  - b. 0.05 (5%) for consumer research projects; and
  - c. 0.01 (1%) for quality assurance.

For the purpose of this analysis, we use the 0.01 (1% level) of significance. This means that we want to be 99% confident that the Ho would not be rejected if it is true.
  
3. Test Statistic: 2-tailed, t-test is used to test for a population mean when the sample size is small.
4. Decision Rule: Reject Ho if the estimated t value (t\*) is less than -3.106 or greater than 3.106.
5. Test

<b>Hotel Occupancy Tax (HOT)</b>	<b>Are observed tax collections statistically probable?</b>	Using Nominal Values
Hypothesis	Null (Ho)	u = \$199 Million
	Alternative (Ha)	u not = \$199 Million
Level of Significance (Confidence Interval)		0.01 (99%)
Statistical Test = 2-tailed t-test		
Decision Rule	Reject Ho if	t* < -3.106
		t* > 3.106
Estimated t =	t*	5.9979
Action (result)		Reject Ho
<b>Based on the test, the actual collections subject to state tax for the period in question is not statistically probable. This means that the hotel occupancy tax collected for the period is not normally seen given historical data.</b>		

<sup>3</sup> Basic Statistics for Business and Economics (5<sup>th</sup> Edition), McGraw-Hill Irwin.

**Mixed Beverage Tax:**

1. Stating the hypothesis:
  - a. Null Hypothesis (Ho): The increase in the state share of gross receipts in the event market area during the time of the event is equal to what would have been expected.
  - b. Alternative Hypothesis (Ha): The increase in the state share of gross receipts in the event market area during the time of the event is not equal to what would have been expected.
  
2. Level of Significance (probability of rejecting Ho when it is true): According to Lind, Marchal and Wathen<sup>4</sup>, it is traditional to use the following levels of significance for the following types of studies:
  - a. 0.1 (10%) for political polling;
  - b. 0.05 (5%) for consumer research projects; and
  - c. 0.01 (1%) for quality assurance.

For the purpose of this analysis, we use the 0.01 (1% level) of significance. This means that we want to be 99% confident that the Ho would not be rejected if it is true.
  
3. Test Statistic: 2-tailed, t-test is used to test for a population mean when the sample size is small.
4. Decision Rule: Reject Ho if the estimated t value (t\*) is less than -3.106 or greater than 3.106.
5. Test

<b>Mixed Beverage Tax</b>	<b>Are observed tax collections statistically probable?</b>	Using Nominal Values
Hypothesis	Null (Ho)	$\mu = \$19.6$ Million
	Alternative (Ha)	$\mu \neq \$19.6$ Million
Level of Significance (Confidence Interval)		0.01 (99%)
Statistical Test = 2-tailed t-test		
Decision Rule	Reject Ho if	$t^* < -3.106$
		$t^* > 3.106$
Estimated t =	t*	5.5143
Action (result)		Reject Ho
<b>Based on the test, the state share of gross receipts for the period in question is not statistically probable. This means that the state share of gross receipts for the mixed beverage tax for the period is not normally seen given historical data.</b>		

<sup>4</sup> Basic Statistics for Business and Economics (5<sup>th</sup> Edition), McGraw-Hill Irwin.

## APPENDIX C

The following tables are from a third party economic impact report created after the 2012 AAU Junior Olympics. It illustrates the monetary impact on the market area by self-described visitors.

Exhibit 3-2

2012 AAU Junior Olympic Events Findings: Direct Spending in Harris County		
	(a)	(b)
Category	Visitor Impact	Visitor and Incremental Local Impact <sup>4</sup>
Number of Unique Attendees (individual people attending event)	51,550	51,550
Local Residents (not Visitors, from within Harris County)	3,710	1,875
Incremental Local Residents from within Harris County	0	1,835
Number of "Incremental" Visitors that did not attend AAU Junior Olympic Events <sup>1</sup>	3,090	3,090
<b>Number of "Incremental" Visitors: Count Towards Economic Impact<sup>2</sup></b>	<b>45,250</b>	<b>47,080</b>
Average Expenditure Estimates		
Spending by County Residents		
Average Number of Days Stayed Per County Resident	4.5	4.5
Average Daily Expenditure Per County Resident Outside of Events	\$47	\$47
<b>Total Direct Spending of Locals Outside of Events<sup>3</sup></b>	<b>\$783,350</b>	<b>\$395,990</b>
Visitor Spending		
Average Number of Days Stayed Per "Incremental" Visitor	5.2	5.2
Average Daily Expenditure Per "Incremental" Visitor Outside of Events	\$132	\$132
Average Expenditure for Entire Trip Per "Incremental" Visitor Outside of Events	\$690	\$690
<b>Total Direct Spending of "Incremental" Visitors Outside of Events<sup>2</sup></b>	<b>\$31,046,760</b>	<b>\$32,305,520</b>

<sup>1</sup> Question 6 of the survey asked the respondent to state the total number of people in the visiting party that did not attend the AAU Junior Olympic Events. Of the average party of 11.1 persons, 0.6 incremental visitors did not attend any of the 2012 AAU Junior Olympic events. These individuals should be included in the spending outside of the event areas.

<sup>2</sup> Incremental visitors, or those in town for the primary purpose of attending the AAU Junior Olympics are used in the economic impact analysis. Spending by "time-switchers", and "casual" visitors were not included. These non-incremental visitors accounted for 5 percent of the visiting population.

<sup>3</sup> Spending by local residents is calculated for informational purposes only, and is not included in the direct spending economic impact calculations.

<sup>4</sup> Accounts for the 79% of Harris County residents that would be likely to travel outside of the State if the event were not hosted in Texas. Spending per person and per trip is considered equal to that of an average visitor.

Exhibit 3-3

Economic Impact of 2012 AAU Junior Olympics Events on Harris County - Output		
	(a)	(b)
Projected Direct Spending <sup>1</sup>	Visitor Impact	Visitor and Incremental Local Impact <sup>2</sup>
Transportation	\$2,747,267	\$2,858,652
Rental Car	\$1,247,241	\$1,297,809
Retail	\$5,529,186	\$5,753,361
Lodging	\$6,906,948	\$7,186,982
Entertainment	\$3,767,115	\$3,919,848
Food & Beverage	\$8,805,224	\$9,162,222
Miscellaneous	<u>\$2,043,781</u>	<u>\$2,126,644</u>
<b>Total Incremental Visitor Spending Outside of Events</b>	<b>\$31,046,763</b>	<b>\$32,305,518</b>
Business Spending <sup>3</sup>	\$2,159,576	\$2,159,576
<b>Total Direct Spending</b>	<b>\$33,206,338</b>	<b>\$34,465,093</b>
<b>Indirect Spending</b>	<b>\$27,103,215</b>	<b>\$28,135,085</b>
<b>Total Economic Impact</b>	<b>\$60,309,553</b>	<b>\$62,600,179</b>

<sup>1</sup> Does not include impacts from spending inside of event areas.

<sup>2</sup> Accounts for the 79% of Harris County residents that would be likely to travel outside of the State if the event were not hosted in Texas.

<sup>3</sup> Business spending includes all incremental spending by event organizers and non-local corporations. This includes infrastructure investments by the HCHSA to host the event. It also includes net revenues from wristband sales. See Methodology section for details.

Source: 2012 AAU Junior Olympic Games – Economic & Fiscal Impact Analysis (A Primary Study), Prepared for Harris County-Houston Sports Authority, Strategic Marketing Services SportsEconomics, LLC., September 25, 2012