Mega-Events: Is the Texas-Baylor game to Waco what the Super Bowl is to Houston?

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June 2006

Abstract

This paper estimates the total sales and sales tax revenue impacts on host communities of a variety of professional and collegiate sporting events. Using 126 jurisdictions from Texas, covering every month from January, 1990 through April of 2006, the analysis finds that regular season games in the NBA, NFL, NHL, and MLB have widely disparate effects. The NBA and NFL regular season games are net losers of revenue, NHL and MLB games generate additional revenue. Collegiate regular season football games are revenue generators for small cities and towns home to D-I and D-IAA football, but cities that are home to teams from the old Southwest Conference or the new Big 12 conference do not gain revenues from home contests. The Super Bowl generated over $2 million in tax revenues for Houston, by far the largest revenue boost of any of the events in our data.

JEL Classification Codes: L83

Keywords: tourism, economic impacts, special events

Preliminary results: *Caveat Emptor*.

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1   Introduction

Super Bowls, Olympic Games, the NCAA Final Four, even political conventions are much sought after because cities believe that hosting them will be economically beneficial. It is clear to all, perhaps, that there are enormous psychological gains to the residents of a community that captures the right to stage one or more of these high profile, high prestige events. The opportunity to showcase one's hometown on a national or even international scale is, no doubt, an occasion of much pride. From the perspective of measurement, however, the value of these feelings of pride, joy, and satisfaction is virtually impossible to measure.

On the other hand, the jobs, income, and taxable sales created, and the tax revenues produced, by the events are not only quite measurable, they have also frequently been measured. (See for example papers by Baade and Matheson, 2001, 2004a, 2004b; Matheson and Baade, 2005; Coates and Humphreys, 2002; Porter, 1999; and Coates, 2005.) In fact, a large literature seeks to measure the effects of holding these events so that policy makers can know just how valuable the events can be for their city. If a city is to expend a large amount of public funds to attract and stage these events, it is imperative to know what the community can expect to receive in return. The general consensus in the academic literature that looks at the effects of these events after they have happened is that there really is not much return in jobs or incomes. The literature has not been nearly so developed on the issue of tax revenues generated.

Baade, Bauman and Matheson (2006) examines sales taxes in Florida, focusing specifically on the effects of sports strikes and lock-outs. In their analysis they also control for the effects of hurricanes and the opening of new stadiums or arenas as well as the expansion of new franchises in baseball, football, basketball, and hockey, but they do not include controls for the Super Bowls hosted in Miami, Tampa or Jacksonville. Nonetheless, one could think of the strikes and lockouts as megaevents, though of the negative variety, as they often last for a substantial period of time and cause the cancelation of a large number of games. Neither the work stoppages nor the opening of new facilities or arrival of new teams is found to have a statistically significant effect on the host city's share of state taxable sales. One can infer that because the events have no effect on taxable sales they also have no effect on tax receipts.

Coates (2005) is most similar in approach and question to what we do here. He uses a time series of monthly sales tax revenues for Houston, Texas to find the effects on local sales tax revenues of hosting the 2004 Super Bowl and the 2004 Major League All-Star game. Coates finds that hosting the Super Bowl may well have generated an increase in the sales tax revenues collected by Houston, but that the increment to revenues was probably smaller than the increased expenditures on security and sanitation and other public services that the event required. His findings regarding the All-Star Game are also not supportive of megaevents as large revenue generators. In fact, he finds that sales tax revenues in Houston are smaller in July 2004, the month of the All Star Game, than they would have been in the typical July.

This study attempts to build on the existing literature by examining an entire state over a long period of time, similar to Baade, Baumann, and Matheson (2006), but the focus is on the levels of taxable sales and of sales tax revenues, as in Coates (2005). Moreover, we are interested in what constitutes a megaevent, as the title suggests. For a large metropolitan area like Houston or Dallas, an event like the Super Bowl or the Major League All-Star Game, events that are spread over several days and are of national and international interest, may be what is typically meant by a megaevent. For those cities, a regular season home game of the Texans or Cowboys (both National Football League franchises) may be of far less significance than the megaevents, and a home contest of the University of Houston or the Southern Methodist University may be of less consequence still. However, for Waco or Lubbock or any other middle to small size city, not just in Texas but anywhere in the United States, a regular season home game of the local university football team may be a megaevent. Using an unbalanced panel of monthly tax revenues for 126 communities in Texas ranging over the period January 1990 through April 2006, we estimate the effects of sporting events of various types on real taxable activity and for real tax revenues.

The analysis finds several interesting results. First, regular season college football games do generate revenues for the communities hosting the events. Unfortunately, this appears only to be true if the home team is from a lesser caliber conference. Second, college football bowl games are not the economic windfall their sponsors think they are. Third, some megaevents are associated with increased sales tax revenues. Not all megaevents are created equal, however, and the various events are associated with substantially different tax revenues. Moreover, some are linked with tax revenue

reductions. Finally, regular season professional football games are far more harmful to local sales tax revenues than are college football games, even in the cities that host both.

The rest of this paper is organized as follows. We begin with a discussion of the empirical approach, in the next section, and follow that with a section that discusses of our data. The fourth section presents and interprets our results. A fifth section concludes.

2 Data and Empirical Model

Our goal is to estimate the effects of various sporting events on the tax revenue, alternatively taxable activity, that occurs in the event's tax jurisdiction. To accomplish this, data on monthly sales tax allocations for 126 Texas towns and cities from January 1990 through April 2006 were obtained from the Texas Comptroller.[1]

The state of Texas does not have a state income tax and raises a significant portion of the state government's revenues from a state sales tax, currently set at 6.5%. Local cities can charge up to an additional 2% in sales taxes which can be dedicated to general city funds or to specific projects, including mass transit, street maintenance, and stadium construction. Our data reflect the local jurisdiction's allocation of the overall sales tax charged in the jurisdiction. We also collected the prevailing state and local sales tax rates.

We obtain an estimate of real taxable activity by dividing the real tax revenues by the prevailing total (state plus local) sales tax. This measure of real taxable activity underestimates total taxable activity because not all activity is taxed at the local level, e.g., new and used car sales. On the other hand, the activity that is reflected by our estimate is likely the very type of activity that would be enhanced by the various sporting events we investigate. At the worst, the measurement error inherent in our estimated real taxable activity would push standard errors upwards, perhaps leading to Type II errors.

A primary concern is the length of the sample period and the nominal measure of sales tax allocations. We convert the monthly sales tax allocations to real 2004 dollars using the monthly Consumer Price Index as reported by the Bureau of Labor Statistics.[2] Figures 1-3 provide some indication of the

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[1]We note that at this point our data collection is somewhat incomplete, and therefore the data actually represent an unbalanced panel. Additional data are being gathered contemporaneous to this presentation.

[2]Specifically, we used the Consumer Price Index - All Urban Consumers available at `www.bls.gov`, last accessed May

patterns of the real tax allocations for different sized cities. Figure 1 depicts monthly real allocations for three relatively large Texas cities: Arlington, Fort Worth, and Dallas. As can be seen, there is a significant difference in the averages between Dallas and, as a group, Arlington and Fort Worth. There is also considerable monthly variation in tax allocations, essentially corresponding to the more active shopping periods of the year, i.e., during major gift-giving holidays. Figure 2 depicts the same set of data for three relatively small cities: Canyon, Hurst, and Kingsville.[3] As can be seen in Figure 2, real monthly tax revenues have been relatively constant over time for Canyon and Kingsville but have been increasing over time for Hurst. The examples depicted in Figures 1 and 2 suggest that there is considerable intra-year variation in real tax revenues but that corresponding months across years have relatively similar levels of tax revenue. Moreover, the examples suggest that there might be city-specific fixed effects and city-specific time trends.

Figure 3 offers a closer view of the intra-year variation in real tax revenues by looking at real tax revenues to the city of Dallas, Texas, from January 2003 through December 2005. The figure clearly shows a spike in real tax revenue about once a quarter, with what seems to be a slight upward trend. This intra-year variation suggests some seasonality in the data. If the intra-year variation is not accounted for, the resultant specification error could lead to biased estimates or spurious results.

We gathered data on a number of different sporting events, including regular, post-season, and championship games in professional football, basketball, baseball, and hockey that took place in a given month in a given jurisdiction. We also gathered information on the number of college bowl games and regular season Division IA and I-AA college football games by month and jurisdiction. These events are differentiated, somewhat arbitrarily, as being "normal" sporting events and potential "megaevents."

Table 1 reports descriptive statistics of the data sample. The upper panel reports the average twelve-month change in real tax revenues, real taxable activity, and the local sales tax. As can be seen, the one-year change in real tax revenue averaged approximately $43,000 each month, and the average one-year change in taxable activity was approximately $521,000. There was considerable variation in

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[3]Canyon is a town of approximately 13,000 located about 18 miles south of Amarillo, Texas, and is the home of West Texas A&M University. Hurst is a city of approximately 33,000 people located just north of Arlington and does not host any professional or college teams. Kingsville is a city of approximately 25,000 people located about 45 miles south of Corpus Christi, and is home to Texas A&M University - Kingsville.

both variables, not only across cities but also within cities. For example, the city of Houston suffered the largest reduction in tax revenue of approximately $7.6 million in October 2002 (relative to October 2001), while also experiencing the largest increase in tax revenues of approximately $5.1 million in February 2004 (relative to February 2003). Over the course of the sample period the average local sales tax was 7.76 percent with a low of 7.25 and a high of 8.25, which is the state mandated limit to the combined state and local sales tax.

The lower panel of Table 1 reports the descriptive statistics of the various events that we analyze. The lower panel reports the number of non-zero observations for each type of event and the average number of events that took place in a given month. Amongst those tax jurisdictions that hosted regular season college football games, the average number of games per month was 1.87 games. During the various professional sports seasons, the average number of baseball games was approximately 13 games per month, the average number of basketball games was approximately 7 games per month, the average number of NFL regular season games was approximately 2 per month and the average number of regular season hockey games was approximately 6 games per month.

Of particular interest in this paper, there were approximately 83 city-month observations that corresponded with our arbitrarily defined megaevent. Of these non-zero observations a little over one event occurred per month. Moreover, sixty-eight city -month observations corresponded with a post-season college football bowl game.[4] Amongst the larger events, we have admittedly fewer observations with which to support our inference. For example, there are only five city-month observations during which NBA finals games took place (in Houston and San Antonio). Likewise, there are only two city-month observations that correspond with the MLB All-star game (Arlington and Houston).

Our basic estimated equation postulates a linear relationship between real tax revenues (real taxable activity) and various sporting events, the local tax rate and its quadratic, and a time trend:

$$DEP_{it} \;\; = \;\; \alpha_i + \lambda_i TIME_{it} + \beta EVENTS_{it} + \gamma_1 RATE_{it} + \gamma_2 RATESQ_{it} + \epsilon_{it}, \tag{1}$$

where i indexes the town, t indexes the month, DEP_{it} is, alternatively, real tax revenues or real

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[4]We include the annual Oklahoma-Texas "Red River Rivalry" game as a bowl game because of its large draw in a "neutral" site. The game is held annually in October in the Dallas Cotton Bowl during the Texas State Fair.

taxable activity, and ϵ_{it} is a zero-mean error term. The dependent variable is real monthly tax revenue allocations (real taxable activity) to (in) city i in month t in 2004 CPI adjusted dollars. The parameters to be estimated include α_i, a city-specific fixed effect constant over time, λ_i, a city-specific time trend, β, a vector of parameters that measure the net impact of various sporting events on the dependent variable, and γ_1 and γ_2, which reflect the relationship between the dependent variable and the local sales taxes and its quadratic, respectively.

To control for the intra-year variability we take annual changes in either real tax revenue or real taxable activity and the twelve month differences in the explanatory variables. We estimate the resultant differenced equation using a fixed effects estimator. Therefore, the fixed effect for city i in the estimated equation is actually the growth rate for city i, λ_i in equation (1, while the city-specific fixed effects α_i have been differenced out of the estimation.[5]

Given the relative paucity of events, our empirical specification has the added benefit of being interpretable as a difference-in-difference estimator. As a vast majority of the sample corresponds with city-month observations during which no sporting event occurred, these observations can be considered the control group in a series of quasi-natural experiments. For the most part the timing of the events we investigate is not directly controllable by city officials. Therefore, for an event such as a World Series or NBA Finals game, the city enjoys a net tax benefit or bears a net tax cost without having "bid" for the privilege, rather the success of the team could be considered exogenous to the city treasury. The parameter estimates on the various sporting events included in the specification can therefore be interpreted as the difference-in-difference marginal impact on the one-year change in tax revenues (taxable activity) having controlled for the local tax rates, the city-specific fixed effects, and the city-specific time trends.

3 Results and Discussion

In this section we discuss the results of estimating the relationship between real sales tax revenues or real (sales) taxable activity and the number of sporting events hosted in a community.

Table 2 reports the results of estimations when all Megaevents are treated as equal. Table 3 allows

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[5]This does require an adjustment to the standard errors. Specifically, the fixed effects estimator will calculate the standard errors based on $NT - N - k$ degrees of freedom whereas the correct degrees of freedom are actually $NT - 2N - k$.

each of the events to have its own effect. We talk about each in turn, with emphasis on the latter table as the data clearly reject the null hypothesis that all megaevents are alike.

Consider first that virtually all of the variables in the model carry a coefficient that is significantly different from zero at the 1% level or better. That is in itself an interesting result because it means that there is a link between all sorts of collegiate and professional sporting events and the sales tax revenues collected by the hosting community. Unfortunately for the sports as economic development engine crowd, the results are frequently that an additional sporting event reduces sales tax revenues and taxable sales in the community.

For example, looking across each model in the table, of tax revenues or of taxable activity, the results indicate that an additional NFL game played in the city lowers the dependent variable. One more Cowboys or Oilers/Texans regular season game costs the host city about $570,000 in tax revenues or $7.8 million in taxable activity. By contrast, hosting an NCAA football game is a wonderful deal. Each additional game in a month raises between $20,000 and $34,000 in revenue and from $281,000 to $465,000 in taxable sales. This difference may be surprising. After all, each event is a football game that draws a large, often fanatical crowd. We suspect that the difference is related to out of town visitors and city size.

For the college football games, many of the teams are in relatively small cities.[6] But Huntsville and Prairie View, for example, are small cities with populations in the thousands (35,800 and 4635, respectively in 2004). In 2005, Sam Houston State University (Huntsville), with 15,300 students in 2005, averaged 9268 fans at its four home football games. That means average attendance at Bearkat football games was 25% of the city population. Figures for Prairie View, home of Prairie View State University, are similar. For the typical home game played in Prairie View in 2005, attendance was one to three thousand. In this range, attendance was 20% to 25% of the town's population. One game, against Mississippi Valley State, attracted over 7000 in attendance. In cases like this, it is easy to believe that the influx of out of town visitors was sufficient to generate an increase in sales tax revenues large enough to swamp the sales tax revenues lost as local people substitute game spending for other types of spending.

For cities like Dallas (2000 population 1.1 million) or Houston (2004 population of 2 million),

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[6]The Data Appendix lists all the cities in our sample and indicates what type of teams each hosts.

which attract large numbers of visitors year round and for whom a football crowd of 20,000 or even 70,000 is a small share of the population, out of town visitors may be a relatively smaller share of the attendees than for the small towns like Prairie View and Huntsville. As a result, the increases in spending brought by these visitors to Dallas and Houston are offset by the substitutions in spending by the locals who attend the game rather than do something else. We see this result in the second and fourth columns of the table, as the Big NCAA Conference Games variable is negative and close to the same size as the NCAA Football Games variable. In fact, one can not reject the null hypothesis that the coefficients on the NCAA Football Games and the Big NCAA Conference Games variables add to zero. In other words, an NCAA football game has no effect on sales tax revenues in the big conference cities of Dallas, Houston, Fort Worth, Austin, College Station, Lubbock and Waco. But in the smaller college football towns, a game may raise between 20 and $35,000 in sales tax revenues. Note that the same story is told if the focus is on taxable sales activity.

Consider now the professional sports games. For the NFL and the NBA, these results are not good news. Both regular season and playoff games reduce taxable sales activity and sales tax revenues by statistically significant amounts. In fact, an NBA regular season or playoff game looks like a relative bargain. An additional regular season NBA game costs the city about $16,000 in sales tax revenue while one more regular season NFL game reduces the sales tax revenues by $568,000. Interestingly, the disparity is much smaller when one looks at the playoff games. Still, presenting an NBA playoff game costs the city $126,000 in tax revenues and a Cowboy's home playoff football game costs the city of Irving $156,000 .

Both regular season and playoff games in MLB and the NHL have positive revenue and sales activity effects. The interesting thing about these results is that an additional MLB or NHL regular season game has about the same, but a slightly smaller, effect on the sales tax revenues of Arlington or Dallas as does a Sam Houston State University Bearkat football game have on the sales tax revenues of Huntsville. Baseball playoff games generate a much larger boost to sales and to sales tax revenue than either regular season games or hockey playoff games. One more playoff game for the Astros or the Rangers in a month translates into about $465,000 in sales tax revenues. A Dallas Stars' home playoff game generates about $138,000 in sales tax revenues.

Finally, the megaevents variable is significant and positive in all four equations. The implication

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is that an additional megaevent raises about \$207,000 of revenue or about \$3 million of sales taxable activity. This is substantially less revenue than an MLB playoff game (about 45% as much) and only \$70,000 more than an NHL playoff game. These magnitudes seem unrealistic. After all, one has to wonder how a week-long event like hosting the Super Bowl could possibly have a smaller impact than a single MLB playoff game. The problem is that the megaevent variable imposes the condition that all the megaevents, Super Bowl or All Star Game or Political Convention, have the same effect. If this is not true, then the megaevent variable is biased. We turn to a discussion of the results when that assumption of equal effects is relaxed next.

Table 3 shows the results of re-estimating the models with separate variables for each of the different megaevents. Before focusing on the megaevent variables, consider the NCAA, NFL, NBA, MLB, and NHL regular season and playoff games, as were discussed above.

As before, an NCAA football game has a positive, but slightly smaller, effect on the revenues and taxable sales activity in the smaller cities, but continues to have no effect in the big conference cities. Regular season and playoff NFL and NBA games continue to cost their cities tax revenues, and of essentially the same sizes as above. Likewise, MLB and NHL regular season and playoff games have the same positive effects on sales tax revenues and taxable sales activity. In other words, the effects of splitting the megaevents into the separate events that comprised the single variable in Table 2 is to marginally change the parameter estimates for the college football games, and the regular season and playoff games of the NFL, NBA, NHL, and MLB.

The big difference between Table 2 and Table 3 is in the detailed knowledge of the effects of the megaevents. For example, an NCAA football bowl game costs the host city a bit less than \$1.5 million dollars in sales tax revenue and a bit over \$20 million in sales activity.[7] These estimates raise serious doubts about the efficacy of creating a bowl game as a source of tourism, added spending, and greater exposure for the host city.

Turn now to the professional sports megaevents in our analysis. These include the Super Bowl, World Series, NBA and NHL finals, and All Star Games for MLB and the NBA. The two All Star Games make for an interesting comparison. Each is held mid-season and each event is spread over several days. For example, prior to the NBA game there is the Slam Dunk Contest, while MLB holds

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[7]Yet, all bowl games may not be created equal. For example, the Cotton Bowl held annually on or around New Year's Day may have a different impact than the Fort Worth Bowl.

a home run contest before its game. There the similarity ends, as the NBA game is associated with a boost in sales and sales tax revenues while the MLB All Star Game costs the host city. Clearly, all megaevents are not created equal.

In the NBA, NHL, and MLB, the championship is determined by a series of games between the same two teams. Games in each of these final series generate boosts to revenues and taxable activity. An NBA finals game raises revenues about $65,000 clearly better than the regular season NBA game that costs the city $21,000 in revenue, but far less than an NHL finals game, $281,000 or an MLB finals (World Series) game, $1.16 million.

Matheson and Baade (2005) studied the World Series over the period 1972-2001 and concluded that the best guess of per game economic impact is about $6.8 million. Our estimates are quite similar to theirs, coming in at just under $6.3 million of taxable sales activity. This similarity is quite remarkable given the very different methodologies employed in their study and this one.

The NHL-NBA finals comparison is especially interesting because the seasons largely overlap and the final championship series in the two sports often are going on simultaneously. Moreover, the NHL is largely viewed as of little interest to most sports fans, unlike the NBA, and hockey is not a natural fit in the Texas climate. Hockey championship series in Texas only occurred in Dallas, whereas NBA finals have occurred in both Houston and San Antonio in our data. Splitting the NBA finals between the two cities, we found that an additional game in Houston generated about $177,000 but an additional game in San Antonio had no effect on tax revenues. It is still surprising to us that the NHL championship series has a larger impact on sales and tax revenues than the NBA Finals, and especially that San Antonio seems shut out of the benefits while Houston and Dallas both reap gains from participating in the finals. This is a topic for further exploration.[8]

Perhaps the most interesting, and most prominent, of the megaevents is the Super Bowl, the championship game for the NFL. Many people have studied the Super Bowl and its effects from a

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[8]One possible explanation is the recent championship experience of the opponents each franchise faced. For example, the Dallas Stars hockey team faced a Buffalo Sabres team in 1999 that had not made the Stanley Cup Finals since 1975. One might surmise that could have resulted in a large contingent of Buffalo fans making the trip to Dallas for the championship series. Likewise, in 1994, the Houston Rockets played the New York Knicks for the NBA championship. New York had not reached the NBA finals since 1973. San Antonio, by contrast, played the Knicks in 1999, only five years after the last Knick trip to the finals; they played the New Jersey Nets in 2003 when the Nets were in the finals for a second consecutive year; and they played the defending champion Detroit Pistons in 2005. In other words, for those instances where finals games have large positive impacts, the opponents have not had recent finals experience which may have resulted in especially large numbers of fans traveling to Texas for the games. But in the case where the finals have had no impact, the opponents have been in the championship series quite recently.

variety of perspectives. The first evaluation of the Super Bowl we mention is that of Phil Porter (1999). He finds that in the Florida (Dade and Hillsborough) and Arizona (Maricopa) counties that held Super Bowls between 1979 and 1996 only in one out of 18 specifications was a Super Bowl found to have a positive and statistically significant effect on real sales. Baade and Matheson (2004b) find that Super Bowl impacts are generally about one-fourth of the $300 million boosters generally claim. Coates (2005) examined the Houston case and found that after accounting for an already existing upward trend is sales tax revenues the Super Bowl had little impact. Coates and Humphreys (2002) found that the city whose team won the Super Bowl experienced a one year boost to income of about $140 per capita, though hosting the game had no effect. Matheson (2005) contests that view, finding substantially smaller effects for the winning city, about $50 or $60 that are not statistically significant.

Our results add to the understanding of the effects of the Super Bowl on local economies. The analysis indicates that Houston earned about $2.5 million in sales tax revenue from hosting the Super Bowl in 2004, with an increase in taxable sales of about $34.7 million. This is, by far, the largest sales or revenue boost of any of the sporting events in our data. Note that it takes more than two World Series games, ten NHL finals games, and 38 NBA finals games to match the revenue output of one Super Bowl. In addition, it would take 112 MLB regular season games to generate the tax revenue of hosting one Super Bowl. Of course, an MLB season only has 81 regular season home games, so that one Super Bowl did as much for Houston as 1.5 seasons of the Houston Astros, at least in terms of generating tax revenue. In this regard, then, one can truly consider the Super Bowl as a megaevent.[9]

One last event is included in our analysis, the 1992 Republican National Convention. This convention was held in Houston in August of that year. Like any event that is expected to draw lots of visitors, the political conventions held every four years to select a presidential candidate would be expected to be a great boon to local business. The evidence here is that is not true. The political convention is found to have reduced taxable sales by over $20 million and to have cost tax revenues of just under $1.5 million. An interesting question for future research is whether other conventions have a similar impact. For example, when the ASSA meets in Dallas, do Dallas' merchants and the city treasury suffer as much as when the Republicans meet there? [10]

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[9]Of course, to determine if hosting the Super Bowl is worthwhile from a fiscal perspective, we compare the costs to the revenues of doing so. Estimated costs of the Houston Super Bowl were $1.5 million. Hence, the Super Bowl appears to have generated a small net surplus for the City of Houston.

[10]The last time the ASSA meetings were held in Dallas was 1984, therefore we cannot test this question.

4 Conclusion

So, is the Texas-Baylor game to Waco what the Super Bowl is to Houston? Absolutely not. The Super Bowl is, according to our results here, an enormous source of sales tax revenue, far more than any regular season game in any professional sport or in college football. On the other hand, the Prairie View-Mississippi Valley State game in Prairie View, Texas may generate a substantial amount of tax revenue, relatively speaking, for that host city. We find that the average college football game outside of the Southwest Conference-Big 12 Conference generates more than $20,000 of sales tax revenue. For Prairie View, Texas, with a population of less than 5,000, that is likely to be a tidy sum. Of course, we have not mentioned the extra costs to the city in terms of security and sanitation that the game may also entail.

As for other megaevents, All Star Games, league championships, and political conventions, our evidence is quite mixed. Among the All Star Games, only the NBA All Star game generates increased taxable sales and increased sales tax revenues. Games during the championship series for the NBA, NHL, and MLB titles all generate increases in sales and sales tax revenues. However, the effects differ substantially, with World Series contests providing the greatest boost, and an NBA championship series game the smallest. Political conventions appear to be bad for the local fiscal situation. The 1992 Republican National Convention reduced real sales activity in Houston by over $20 million and cost the city almost $1.5 million in sales tax revenues. The upshot is, therefore, that these megaevents are not necessarily the economic windfall that their proponents portray them to be.

An open, and important, question comes back to those smaller communities that are home to colleges and universities or to minor league baseball franchises. Do the home games of those teams in sports other than football provide benefits in terms of economic activity and tax revenues that the communities would not have absent the teams? The data set used here goes part way toward allowing us to address this question. What remains is for the data to be expanded to include games played in the other sports. Future research will attempt to address these questions.

References

Baade, Robert A. and Victor A. Matheson. 2001. "Home Run or Wild Pitch? The Economic Impact of Major League Baseball's All-Star Game on Host Cities," Journal of Sports Economics, 2(4):307-326.

. 2004a. "The Quest for the Cup: Assessing the Economic Impact of the World Cup," Regional Studies, 38(4):343-354.

. 2004b. "Padding Required: Assessing the Economic Impact of the Super Bowl," College of the Holy Cross, Department of Economics, Faculty Research Series, Working Paper No. 04-03.

Baade, Robert A., Robert Baumann and Victor A. Matheson. 2006. "The Economic Consequences of Sports Strikes and Lockouts: Revisited," College of the Holy Cross, Department of Economics, Faculty Research Series, Working Paper No. 06-04.

Braham, Denis. 2004. Super Bowl is expected to bring economic benefits to its host city. `http://www.winstead.com/articles/articles/Sports_TheArtoftheDeal-BringingSuperBowltoHouston(HBJ-Braham).pdf`, last accessed June 2006.

Coates, Dennis. 2005. "The Tax Benefits of Hosting the Super Bowl and the MLB All-Star Game: The Houston Experience," mimeo.

Coates, Dennis and Brad R. Humphreys. 2002. "The Impact of Post-season play in professional sports," Journal of Sports Economics, 3(3):291-299.

Matheson, Victor A. 2005. "Contrary Evidence on the Economic Effect of the Super Bowl on the Victorious City," Journal of Sports Economics, 6: 420 - 428.

Matheson, Victor A. and Robert A. Baade. 2005. "A Fall Classic? Assessing the Economic Impact of the World Series," College of the Holy Cross, Department of Economics, Faculty Research Series, Working Paper No. 05-01.

Murphy, Bill. 2004. "Pinning down Bowl boon tricky; Postgame wrap-ups run the gamut," Houston Chronicle, Wednesday, May 19, 2004, Business, page 1.

Porter, Philip K. 1999. "Mega-Sports Events as Municipal Investments: A Critique of Impact Analysis," in Sports Economics: Current Research, edited by John Fizel, Elizabeth Gustafson, and Lawrence Hadley, Praeger Publishers.

Table 1: Sample Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ΔTax Revenue	20828	43,369.11	297,679.60	-7.64E+06	5.11E+06
ΔActivity	20828	520,722.90	3.95E+06	-1.05E+08	7.05E+07
Local Tax Rate	20828	7.77	0.38	7.25	8.25
Megaevent	83	1.18	0.61	1.00	4.00
NCAA Reg. Season Games	619	1.87	0.83	1.00	5.00
NCAA Bowl Games	68	1.00	0.00	1.00	1.00
NBA Reg. Season Games	275	6.68	1.84	1.00	11.00
NBA Playoff Games	48	2.96	2.11	-2.00	8.00
NBA Allstar Games	2	1.00	0.00	1.00	1.00
NBA Finals Games	5	3.00	1.00	2.00	4.00
MLB Reg. Season Games	182	12.65	3.39	1.00	19.00
MLB Allstar Games	2	1.00	0.00	1.00	1.00
MLB Playoff Games	10	2.10	1.60	1.00	5.00
World Series Games	1	2.00	0.00	2.00	2.00
NFL Reg. Season Games	102	1.96	0.67	1.00	4.00
NFL Playoff Games	16	1.25	0.45	1.00	2.00
Super Bowl	2	1.00	0.00	1.00	1.00
NHL Reg. Season Games	79	5.82	2.00	1.00	9.00
NHL Playoff Games	16	3.19	2.07	1.00	6.00
NHL Finals Games	2	3.00	0.00	3.00	3.00
Political Convention	1	1.00	0.00	1.00	1.00

Notes: Upper panel reports one year change in monthly real tax revenues and real taxable activity (measured in 2004 CPI adjusted dollars), as well as the prevailing total local sales tax rate. Bottom panel reports the number of non-zero observations for the various events analyzed. A Megaevent is defined as a NCAA Bowl Game, MLB Allstar Game, NBA Allstar Game, Superbowl, NHL finals, or a political convention. Mean value is the average number of each event taking place in a given month when at least one event took place. The Houston Super Bowl took place on February 1, 2004. Therefore, the Super Bowl dummy variable takes a value of one for both January and February 2004.

Table 2: Annual Change in Monthly Real Tax Revenue and Monthly Real Taxable Activity: Restricted Models

	ΔTax Rev (1)	ΔTax Rev (2)	ΔActivity (3)	ΔActivity (4)
Megaevent	207,041***	206,664***	3,032,450***	3,026,100***
	(7.57)	(7.56)	(8.28)	(8.27)
NCAA Reg. Season Games	20,838*	33,547**	280,788*	465,159**
	(1.92)	(2.45)	(1.94)	(2.54)
Big Conf. × NCAA Reg. Season Games		-30,488		-477,023
		(-1.37)		(-1.60)
NFL Reg. Season Game	-569,274***	-568,282***	-7,849,572***	-7,835,405***
	(-19.38)	(-19.38)	(-19.97)	(-19.97)
NFL Playoff Game	-155,956***	-159,838***	-2,146,509***	-2,209,553***
	(-2.70)	(-2.76)	(-2.77)	(-2.85)
NBA Reg. Season Game	-16,106**	-16,004**	-220,889**	-219,592**
	(-2.40)	(-2.39)	(-2.46)	(-2.45)
NBA Playoff Game	-125,564***	-125,981***	-1,653,686***	-1,672,447***
	(-10.43)	(-10.53)	(-10.23)	(-10.43)
MLB Reg. Season Game	28,959***	28,958***	399,469***	398,294***
	(6.05)	(6.05)	(6.23)	(6.22)
MLB Playoff Game	465,577***	467,444***	6,358,503***	6,385,740***
	(11.72)	(11.82)	(12.02)	(12.02)
NHL Reg. Season Game	21,092***	21,078***	295,800***	294,684***
	(2.87)	(2.87)	(3.00)	(3.00)
NHL Playoff Game	138,096***	138,090***	1,904,889***	1,904,765***
	(6.29)	(6.30)	(6.49)	(6.49)
Local Tax Rate	1,792,535***	1,814,822***	16,529,129**	24,633,367***
	(3.46)	(3.39)	(2.38)	(3.44)
Big Conf. × Local Tax Rate		-12,130,516***		-223,361,301***
		(-4.36)		(-6.00)
Local Tax Rate Squared	-96,332***	-98,301***	-867,909*	-1,394,828***
	(-2.86)	(-2.83)	(-1.92)	(-3.00)
Big Conf. × Local Tax Rate Squared		837,074***		14,915,472***
		(4.50)		(6.00)
Houston Time Trend	1,212,917***	1,211,554***	17,147,704***	17,061,951***
	(19.67)	(19.67)	(20.77)	(20.77)
Constant	27,873***	27,753***	356,294***	355,029***
	(13.91)	(13.91)	(13.31)	(13.31)
Observations	20,828	20,828	20,828	20,828
Number of Cities	126	126	126	126

Dependent variables measured in 2004 real dollars. Specification is based on 12 month differences in dependent and independent variables. Local tax rates measured in pennies between 0 and 8.25. A Megaevent is defined as a World Series game, NHL Finals game, NBA Finals Game, Super Bowl, NCAA Bowl game, MLB All-star Game, NBA All-star Game, or national political convention. Parameter estimates reflect net change in total real tax revenues or total real taxable activity in the city per event. t-statistics reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: Annual Change in Monthly Real Tax Revenue and Monthly Real Taxable Activity: Unrestricted Models

	ΔTax Rev (1)	ΔTax Rev (2)	ΔActivity (3)	ΔActivity (4)
NCAA Reg. Season Game	13,731 (1.29)	22,346* (1.65)	182,633 (1.28)	310,653* (1.72)
Big Conf. × NCAA Reg. Season Game		-19,538 (-0.89)		-325,950 (-1.11)
NCAA Bowl Game	-1,485,028*** (-9.35)	-1,486,158*** (-9.37)	-20,248,276*** (-9.54)	-20,304,999*** (-9.57)
NFL Reg. Season Game	-567,560*** (-19.57)	-566,866*** (-19.57)	-7,825,330*** (-20.17)	-7,815,269*** (-20.17)
NFL Playoff Game	-153,196*** (-2.69)	-155,675*** (-2.73)	-2,108,108*** (-2.77)	-2,151,844*** (-2.82)
Super Bowl	2,506,312*** (17.79)	2,500,837*** (17.69)	34,795,411*** (18.48)	34,679,714*** (18.38)
NBA Reg. Season Game	-21,306*** (-3.22)	-21,208*** (-3.21)	-292,998*** (-3.31)	-291,657*** (-3.29)
NBA Playoff Game	-128,309*** (-10.83)	-128,709*** (-10.83)	-1,690,667*** (-10.63)	-1,709,125*** (-10.83)
NBA All-star Game	1,616,256*** (10.13)	1,616,465*** (10.13)	22,286,139*** (10.43)	22,289,599*** (10.43)
NBA Finals Game	65,682* (1.93)	65,578* (1.93)	1,156,418** (2.55)	1,157,821*** (2.56)
MLB Reg. Season Game	22,220*** (4.63)	22,216*** (4.63)	305,110*** (4.76)	303,837*** (4.74)
MLB Playoff Game	460,068*** (11.82)	461,383*** (11.82)	6,280,013*** (12.02)	6,300,016*** (12.02)
MLB All-star Game	-285,302** (-2.07)	-285,310** (-2.07)	-3,856,583** (-2.09)	-3,858,812** (-2.11)
World Series Game	1,159,747*** (8.26)	1,159,910*** (8.27)	15,983,937*** (8.51)	15,986,478*** (8.53)
NHL Reg. Season Game	21,458*** (2.96)	21,424*** (2.96)	300,853*** (3.11)	299,464*** (3.09)
NHL Playoff Game	138,571*** (6.41)	138,561*** (6.42)	1,911,459*** (6.61)	1,911,261*** (6.61)
NHL Final Game	341,267*** (5.27)	341,267*** (5.28)	4,707,131*** (5.44)	4,707,131*** (5.45)
Political Convention	-1,491,485*** (-7.58)	-1,491,518*** (-7.58)	-20,581,845*** (-7.82)	-20,590,759*** (-7.83)

Table 3: Annual Change in Monthly Real Tax Revenue and Monthly Real Taxable Activity: Unrestricted Models

	ΔTax Rev (1)	ΔTax Rev (2)	ΔActivity (3)	ΔActivity (4)
Local Tax Rate	1,778,533***	1,797,341***	16,344,693**	24,401,329***
	(3.48)	(3.41)	(2.40)	(3.46)
Local Tax Rate Squared	-95,432***	-97,177***	-856,052*	-1,379,912***
	(-2.88)	(-2.84)	(-1.93)	(-3.02)
Houston Time Trend	1,285,495***	1,283,408***	1,8177,614***	1,8077,593***
	(20.07)	(20.07)	(21.26)	(21.17)
Big Conf.× Local Tax Rate		-1,2072,237***		-222,561,456***
		(-4.40		(-6.07)
Big Conf.× Local Tax Rate Squared		833,271***		14,863,268***
		(4.55)		(6.07)
Constant	27,910***	27,789***	356,762***	355,502***
	(14.11)	(14.11)	(13.51)	(13.52)
Observations	20,828	20,828	20,828	20,828
Number of Cities	126	126	126	126

Dependent variables measured in 2004 real dollars. Specification is based on 12 month differences in dependent and independent variables. Local tax rates measured in pennies between 0 and 8.25. A Megaevent is defined as a World Series game, NHL Finals game, NBA Finals Game, Super Bowl, NCAA Bowl game, MLB Allstar Game, NBA Allstar Game, or national political convention. Parameter estimates reflect net change in total real tax revenues or total real taxable activity in the city per event. t-statistics reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figures

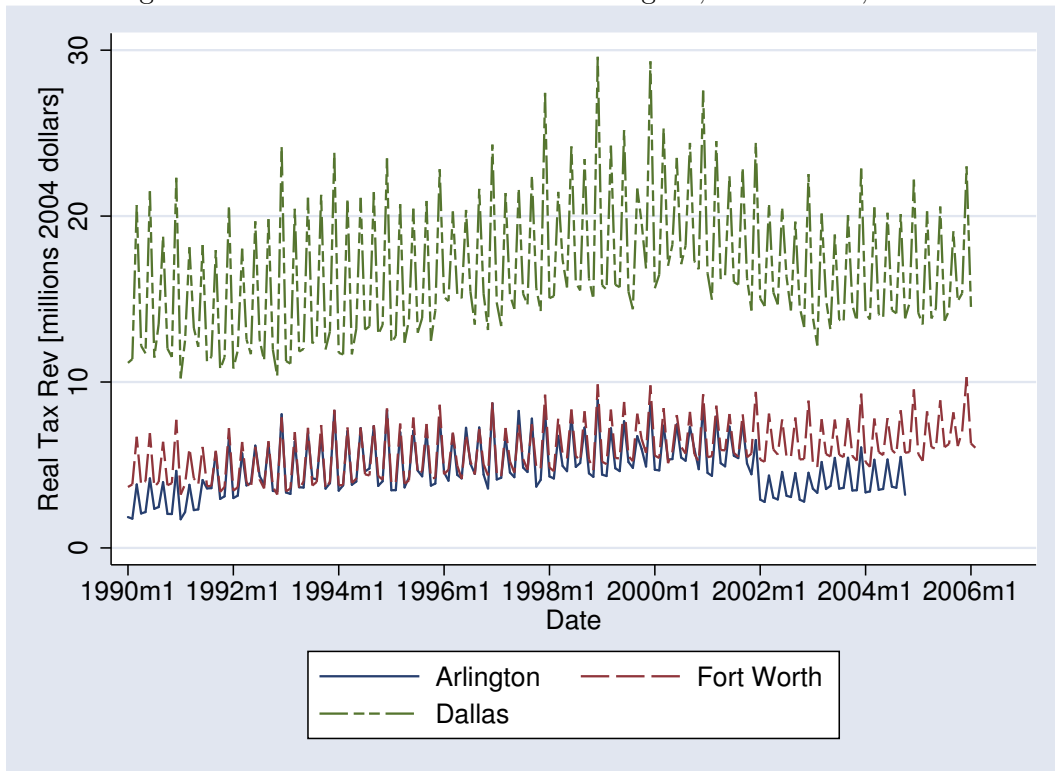Figure 1: Real Sales Tax Revenues: Arlington, Fort Worth, Dallas

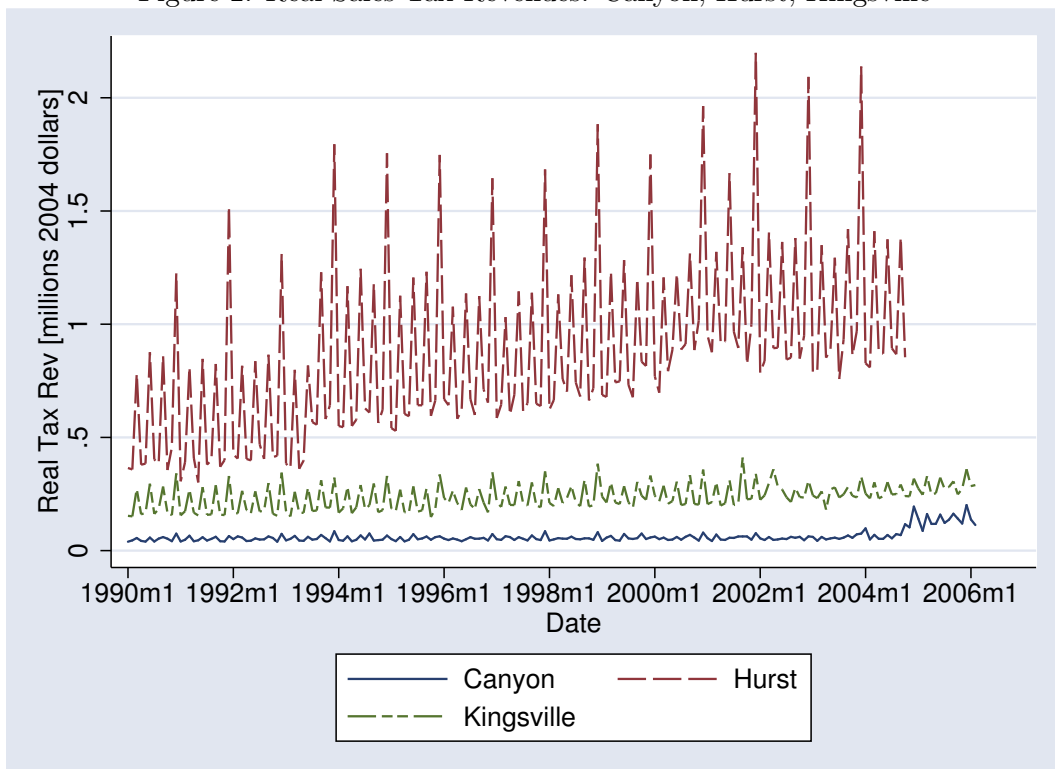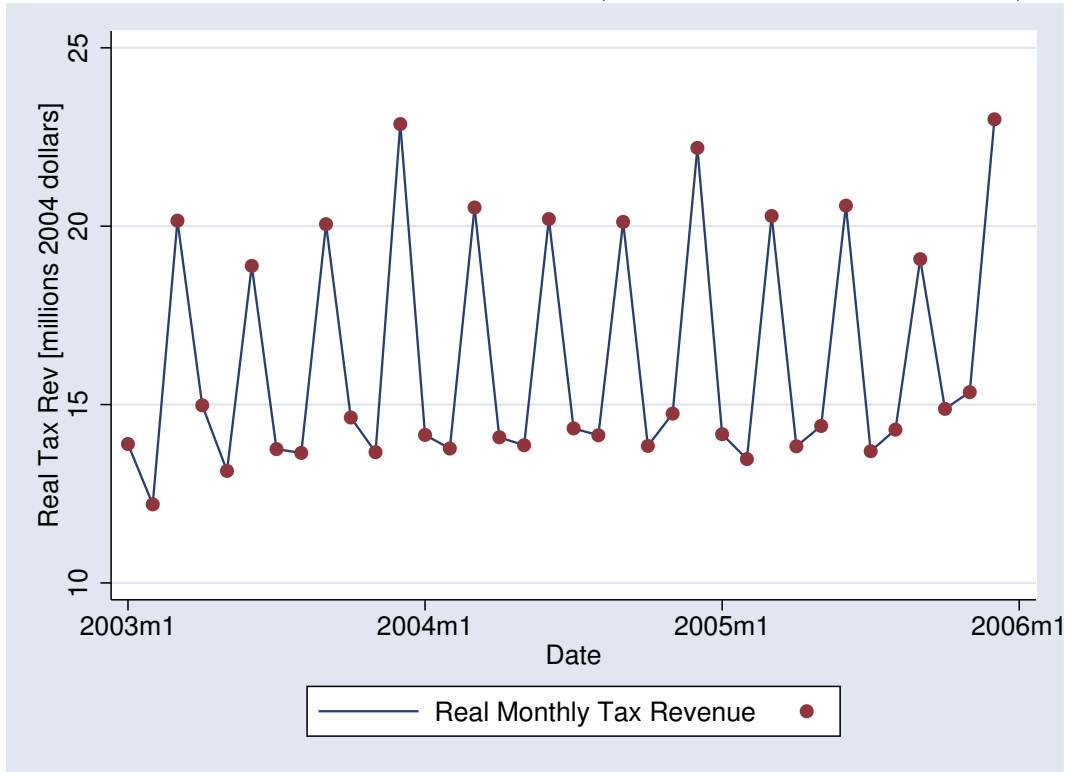Figure 2: Real Sales Tax Revenues: Canyon, Hurst, Kingsville

Figure 3: Real Sales Tax Revenues: Dallas (January 2003 to December 2005)

Data Appendix: Cities Included in Sample

City Name	Obs.	Sample %	City Name	Obs.	Sample %
Abilene	166	0.80	Henderson	164	0.79
Allen	164	0.79	Hereford	164	0.79
Amarillo	164	0.79	Houston*+†‡ ⊗	182	0.87
Angleton	164	0.79	Huntsville+	182	0.87
Arlington*	166	0.80	Hurst	164	0.79
Athens	164	0.79	Irving*+	182	0.87
Austin+	182	0.87	Jacksonville	164	0.79
Balch Springs	164	0.79	Keller	164	0.79
Bay City	164	0.79	Kerrville	164	0.79
Beaumont	182	0.87	Kilgore	164	0.79
Bedford	164	0.79	Kingsville+	182	0.87
Beeville	164	0.79	La Marque	164	0.79
Belton	164	0.79	La Porte	160	0.77
Benbrook	164	0.79	Lake Jackson	164	0.79
Big Spring	164	0.79	Lamesa	164	0.79
Borger	164	0.79	Lancaster	164	0.79
Brenham	164	0.79	League City	164	0.79
Brownsville	164	0.79	Levelland	164	0.79
Brownwood	166	0.80	Live Oak	164	0.79
Burkburnett	164	0.79	Longview	164	0.79
Burleson	164	0.79	Lubbock	182	0.87
Canyon	182	0.87	Mansfield	164	0.79
Cedar Hill	164	0.79	Marshall	164	0.79
College Station+	182	0.87	McAllen	164	0.79
Collyville	164	0.79	McKinney	164	0.79
Commerce	182	0.87	Mercedes	164	0.79
Conroe	164	0.79	Mesquite	164	0.79
Coppell	164	0.79	Midland	164	0.79
Copperas Cove	164	0.79	Misson	164	0.79
Dallas*†‡ ⊗	182	0.87	Mount Pleasant	164	0.79
De Soto	164	0.79	Nacogdoches+	182	0.87
Denison	164	0.79	Nederaland	164	0.79
Denton+	182	0.87	New Braunfels	164	0.79
Donna	164	0.79	North Richland Hills	164	0.79
Dumas	164	0.79	Odessa	164	0.79
Duncanville	164	0.79	Palestine	164	0.79
Edinburg	164	0.79	Pampa	164	0.79
El Campo	164	0.79	Paris	164	0.79
El Paso+†	182	0.87	Pasadena	164	0.79
Ennis	164	0.79	Pearland	164	0.79
Euless	164	0.79	Pecos	164	0.79
Forest Hill	164	0.79	Pharr	164	0.79
Fort Worth+†	182	0.87	Port Arthur	164	0.79
Freeport	164	0.79	Portland	164	0.79
Gainesville	164	0.79	Prairie View+	162	0.78
Galveston	164	0.79	Robstown	164	0.79
Grand Prairie	164	0.79	Rockwall	164	0.79
Groves	164	0.79	Rosenberg	164	0.79
Haltom City	164	0.79	Round Rock	164	0.79
Harlingen	164	0.79	San Angelo+	166	0.80

City Name	Obs.	Sample %
San Antonio*+† ⊗	182	0.87
San Benito	164	0.79
San Juan	164	0.79
San Marcos+	182	0.87
Seguin	166	0.80
Shcertz	164	0.79
Sherman	164	0.79
Snyder	164	0.79
Sugar Land	164	0.79
Sulphur Springs	164	0.79
Sweetwater	164	0.79
Taylor	164	0.79
Terrell	164	0.79
Texas City	164	0.79
The Colony	164	0.79
Tyler	164	0.79
Universal City	164	0.79
Vernon	164	0.79
Victoria	164	0.79
Waco	182	0.87
Watauga	164	0.79
Waxahachie	164	0.79
Weslaco	164	0.79
White Settlement	164	0.79
Wichita Falls	164	0.79

Notes: * Home of a professional sports franchise, + Home of a NCAA football team, † Home of a NCAA Bowl Game. ‡ Political Convention, ⊗ Professional sports final game.