Comparing the Visitor Impact of Events at Professional Sports Facilities

by

Robert Baumann[††]

Victor Matheson[†]

E. Frank Stephenson

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Abstract

This research estimates the economic impact of events at four professional sports facilities on the hotel industry in Houston, Texas: NRG Stadium (home of the NFL's Houston Texans), Minute Maid Park (Astros - MLB), Toyota Center (Rockets - NBA), and BBVA Stadium (Dynamo - MLS). In addition to hosting a professional sports franchise, these facilities also host a broad variety of other events including concerts, stand-up comedians, and sporting events not involving the primary tenant such as Super Bowl LI. Using daily data on hotel occupancy, prices, and revenue from December 2014 to November 2018, we find that games involving the primary sports tenant have smaller economic benefits than other events held at NRG Stadium and the Toyota Center. At Minute Maid Park, Astros games have a larger economic impact than other events, though there are relatively few non-Astros events at Minute Maid Park. Finally, Events at BBVA Stadium have either a negative or zero effect on economic activity.

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[††] Department of Economics, Box 192A, College of the Holy Cross, Worcester, MA 01610 USA, 508-793-3879 (phone), rbaumann@holycross.edu

[†] Department of Economics, Box 157A, College of the Holy Cross, Worcester, MA 01610 USA, 508-347-9778 (phone), vmatheso@holycross.edu

Introduction

Since the beginning of the North American stadium boom in 1990, over $65 billion (in 2020 dollars) has been on new stadiums and arenas in the five largest North American professional sports leagues, the National Basketball Association (NBA), National Football League (NFL), National Hockey League (NHL), Major League Baseball (MLB), and Major League Soccer (MLS). Of particular concern to policy makers has been the fact that over $30 billion of the construction costs of these facilities has been paid for through taxpayer subsidies. In addition, professional franchises have benefitted from a variety of other subsidies including the use of tax deductible municipal bonds for stadium construction, land giveaways, property and sales tax exemptions, and below market lease deals.

Taxpayers have grown increasingly leery of giving massive public subsidies to "millionaire players and billionaire owners" especially since the economic downturn of 2007-2009 known as the Great Recession. Prior to the Great Recession, the average direct public contribution to a professional stadium or arena construction project totaled roughly two-thirds of the construction cost with the teams and leagues picking up the remaining one-third. Following the Great Recession these percentages roughly switched with teams on average paying about two-thirds of the construction costs and taxpayers paying for the remainder. It should, however, be noted that due to the increasing costs of modern sports facilities, the real dollar public contribution to sports stadiums has actually risen in many cases even if taxpayers are paying a lower percentage of the overall construction bill. That being said, in order to justify continued public subsidies, teams have turned to new methods of selling these facilities to the public.

One common claim made by team owners is that sports facilities will be widely used for events other than games played by the stadium or arena's primary tenant(s). For example, following its $600 million dollar renovation in 2003, at the time the most expensive sports stadium project in US history, Soldier Field's management claimed that "the stadium grounds now host over 200 event usage days per year." (https://soldierfield.net/stadium-history) Similarly, the Worcester, Massachusetts city government justified its nearly $100 million in spending for a new minor league baseball stadium by claiming, "It is anticipated to host 125 year-round events including family affordable baseball games, outdoor concerts, other sporting events, community meetings/events and even a potential polling location." (http://www.worcesterma.gov/minor-league-baseball) Despite the fact that hosting non-sporting events is frequently used as an argument for public funding, there has been little inquiry or formal research into whether these facilities attract events outside of their primary tenants and the effect these events have on local economies.

This paper examines the extent to which professional sports facilities are able to attract events other than those produced by the facilities' primary tenant(s) and the extent to which these non-sporting events are able to generate economic activity with a case study of the Houston, Texas hospitality market. We find that other than the large, indoor arenas utilized by NBA and NHL teams, professional sports venues typically host few major events other than league sporting events. However, there is some evidence those non-sporting events that do take place have a larger impact on the local economy than the typical sporting event.

Background

Every team in the five major North American sport leagues, the NFL, NBA, NHL, MLB, and MLS, attracts an average of over ten thousand spectators per contest. This requires venues that can house these spectators, and also a substantial amount of infrastructure nearby the stadium such as parking, public transportation, and roads. All of this infrastructure produces a large geographic footprint, which is particularly costly in the congested metropolitan areas where most of these venues are located.

Further complicating matters is that the five major American professional sports use their venues only a small percentage of the time. Table 1 illustrates the usage rates of each of the major American professional sports, where the maximum of each range represents the number of home contests for the longest possible playoff run.

Table 1: Sports Usage Rates at Professional Sports Facilities

	Home Dates (including pre-season[1])	Annual Occupancy Rates
NBA	43 or 44 + post-season	12 to 15%
NFL	10 + post-season	2.7 to 3.3%
NHL	44 or 45 + post-season	12 to 15%
MLB	81 + post-season	22 to 24%
MLS	17 + post-season + other	5 to 7%

A number of teams share facilities although this has become increasingly rare in US professional sports. The most common sharing arrangement is between basketball and hockey teams where 11 venues serve both NBA and NHL franchises.[2] For these venues,

1 The NBA and NHL pre-seasons do not have a standardized number of games, and typically each NBA team plays two or three home pre-season contests and each NHL plays three or four home pre-season contests.

2 For the 2019-20 NBA/NHL seasons, the 11 shared venues were Madison Square Garden (New York City), United Center (Chicago), TD Garden (Boston), Wells Fargo Center (Philadelphia), Capital One

the occupancy rates from just professional sports are 24 to 30%, or the sum of each league's usage rate. Four venues in 2019 served both MLS and NFL teams[3] raising the occupancy rate from primary tenant sporting events in these venues to 7% to 10%. There are also a number of facility sharing arrangements spread throughout the leagues either involving unusual arrangements between major leagues (i.e. MLS and MLB sharing Yankee Stadium) or more common sharing arrangements involving college teams, the Women's National Basketball Association (WNBA), the National Women's Soccer League (NWSL), or other minor league sports. In the most extreme example, the Staples Center in Los Angeles plays host to two NBA franchises, an NHL team, and a WNBA franchise. All told this results in a utilization rate of that facility of over 40% from just sporting events alone.

Usage rates for sports venues for events other than games scheduled by the primary tenant are much more difficult to identify. There are no uniform reporting standards stadiums and arenas. This paper utilizes Pollstar, a trade publication founded in 1981 that covers the concert industry. It compiles box office data (ticket price range, gross sales, and attendances) on performances. Pollstar gathers data on "any event performed at any venue that has tickets for sale to the public" and this excludes free or non-ticketed events.[4] These data are self-reported by its members, which includes concert

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Arena (Washington, D.C.), Pepsi Center (Denver), Staples Center (Los Angeles – shared by Lakers (NBA), Clippers (NBA), and Kings(NHL)), Scotiabank Arena (Toronto), American Airlines Center (Dallas), Barclays Center (Brooklyn), and Little Caesars Arena (Detroit).

3 For 2019 these shared venues were Gillette Stadium (Boston), Mercedes-Benz Stadium (Atlanta), CenturyLink Field (Seattle), and Dignity Health Sports Park (Los Angeles).

4 See Pollstar's Box Office Reporting Policy at https://www.pollstar.com/box-office-reporting-policy (accessed 11 February 2020).

promoters, booking agents, and venue officials. Pollstar data are available by artist, venue, or company such as artist management or booking agency. Access to Pollstar data requires a subscription.

Pollstar does not maintain a comprehensive catalogue of every type of event that occurs at a venue. For example, Pollstar does not provide data on most professional sports events including league games from any of the major North American leagues, exhibition matches, college football regular season, playoff or bowl games, and most college basketball games. Non-ticket events such as graduation ceremonies, political rallies, religious services, and convention usage are also not included. Pollstar does, however, include nearly all major music concert tours, many other culture events such as comedians, kid-themed shows, Circ du Soliel shows, and some sporting events such as wrestling, ice skating exhibitions, and the Harlem Globetrotters.

Table 2 shows the annual number of events reported by Pollstar at four different types of venues between January 1, 2000 and the cessation of public events nationwide in the middle of March 2020 due to COVID19. The four types of facilities are NFL stadiums (including those in simultaneous use by either MLS or MLB clubs during any portion of the time period in question), indoor arenas used by NBA or NHL franchises (or both), soccer specific stadiums used by MLS, and baseball stadiums used by MLB (not including dual purpose stadiums in regular use by NFL teams.) As can be seen in the data, there is simply no evidence of widespread use of large outdoor stadiums as a venue for concerts or other major ticket events with the typical facility averaging only 1 or 2 events per year.

Table 2: Non-League Sporting Event Stadium usage by type: 2000-Covid19

Stadium Type	Number of stadiums	Events/year	Avg. Attendance
Baseball	34	1.9	36,956
Football	37	2.4	37,937
Soccer	22	2.0	13,509
BB/Hockey	27	24.9	9,299

The question now turns to the extent to which the events promote economic activity in the cities that host them. The consensus among sports economists is that public subsidies toward stadium construction provide little to no net economic return for host cities. (See tons of papers here. We will cite the right ones when the journal referee asks for his or her particular papers to be cited during their referee process.) One primary explanation given for the apparent lack of economic impact generated by sports franchises is known as the substitution effect. As the majority of fans at any contest are likely to be local residents, their spending at a game substitutes for other spending that they would have done elsewhere in the local economy in the absence of the sporting contest. However, to the extent that events can bring new people and spending from outside the local area, economic activity can increase as the result of either a sporting event or another activity planned at a sports venue.

For this reason, numerous papers have proposed using hotel occupancy as a proxy for overall economic activity generated by an event as an increase in hotel use implies that an event is attracting consumers from outside the local region. For example, Lavoie and Rodriguez (2005) use monthly hotel occupancy data to analyze the effect of various sports franchises and sports labor interruptions on major Canadian cities. Stephenson and Depken (XXXX) examine stuff too.

Hotel data also has the advantage that is available at a daily frequency from Smith Travel Research, Inc., a vendor of hotel industry data for the U.S. and many other countries. Concerts and other events at stadiums and arenas often take place during the middle of sport seasons so even the use monthly data is not sufficient to disentangle the impact of concerts or other events from sporting events. Several other researchers including Baumann, Matheson, and Muroi (2009) and Mills and Rosentraub (2014) have noted the both the general rarity of the use of daily data in economic impact studies as well as the advantages of its use in detecting small impacts on local economies.

Data

We focus here on the four venues that host major professional teams in Houston: NRG Stadium (home the NFL's Houston Texans, capacity about 70,000), Toyota Center (NBA Rockets, capacity about 18,000), Minute Maid Park (MLB Astros, capacity about 41,000), and BBVA Stadium[5] (MLS Dynamo, capacity about 22,000). The capacities are estimates since concert setups can vary. While typically associated with their primary sports tenants, these venues also represent four of the five highest-capacity facilities within 50 miles of Houston.

For each venue, we estimate models with three different dependent variables: the number of hotel rooms occupied, the average daily rate of the hotel rooms rented, and the total revenue generated by hotels from room rentals. Table 3 provides summary statistics

[5] BBVA Stadium also plays host to the Houston Dash of the NWSL. But given regular attendance for that team of fewer than 4,000 per game, their matches were excluded from our analysis.

for these variables for all hotels within 5 miles of the Houston central business district.[6] Estimating models with three different dependent variables provides different insights into the economic impact of events in the city. Estimates of the number of additional rooms occupied provide an estimate of the number of overnight visitors due to a sporting event or concert. Estimates of price effects associated with events address issues related to demand that are not reflected in equilibrium quantities. It should be noted that large room price increases suggest greater leakages and smaller multiplier effects because the increased prices generally represent return to capital whose shareholders may reside outside of the host city's metropolitan area as opposed to returns to labor for workers living in and around Houston. Finally, since lodging expenses comprise a large portion of visitor spending, estimating the marginal change in hotel revenues is an important step towards determining the total economic impact as a result of a city hosting a sporting event or another cultural event. Of course, hotel revenues do not include spending on items such as restaurants, retail sales, or local ground transportation which are also part of a typical visitor's spending, as well as the cost of the tickets themselves, they do represent an important component of visitor spending on cultural events in the city of Houston.

We merge these hotel data with (1) the game schedules of the Rockets, Texans, Astros, and Dynamo and (2) the event schedules at these venues available at Pollstar. We find that the economic benefit is smaller for Texans and Rockets games at NRG Stadium and the Toyota Center, respectively, compared to other events held at these facilities. At

[6] BBVA Stadium, Minute Maid Park, and the Toyota Center, along with numerous large hotels and the convention center are all with a short walk of each other in the middle of downtown Houston. NRG Stadium along with another collection of hotels sit roughly 5 miles south of downtown Houston.

Minute Maid Park, Astros games have a larger economic impact than other events, though there are relatively few non-Astros events at Minute Maid Park. Finally, Events at BBVA Stadium have either a negative or zero effect on economic activity.

Table 3: Summary Statistics for Hotels within Five Miles

	Mean	St. Deviation	Min.	Max.
Rooms Occupied	7,555	1,483		
Average daily room rate	$127.50	$27.18		
Total revenue	$988,592	$384,366		
Occupancy rate	68.94%	13.59%		

Table 4 provides summary statistics for the number of events at each facility. In the headings below, games refers to involving the primary professional sports tenant. This includes post-season events, but excludes pre-season due to low attendance. Table 4 illustrates a significant variation in hosting. For example, Toyota Center and Minute Maid Park are used more than twice as much as NRG Stadium or BBVA Stadium. The composition of events also varies. There are more events outside of the primary sports tenant at Toyota Center than any of the other venues, most of these are concerts. NRG Stadium is also heavily reliant on non-Texans events for programming, particularly the Houston Livestock Show and Rodeo which runs for 20 consecutive days each March. As the title implies, this event features livestock and rodeo, but it also has daily concerts with some of the biggest acts in popular music. Given four editions of the event in our sample frame, this means 80 of 127 non-Texans events at NRG Stadium are the Houston Livestock Show and Rodeo. NRG Stadium also hosted Super Bowl LI in 2017. Finally,

Minute Maid Park and BBVA Stadium are relatively under-utilized outside of their primary sports tenants, with only 13 total events over the roughly four-year sample size.

Table 4: Number of Events from December 1, 2014 to November 30, 2018

	NRG Stadium	Toyota Center	Minute Maid Park	BBVA Stadium
Games	32	191	322	89
Other Events	127	162	10	3
Total Events	159	353	332	92
Usage Rate	10.9%	24.2%	22.7%	6.3%

Estimation – Least Squares

We assess the impact of sporting and cultural events on four outcomes on the hotel industry: average daily room rate, total number of rooms sold, total revenue, and occupancy rate. The explanatory variables include separate binary variables for games involving the primary sports tenant (Texans, Rockets, Astros, and Dynamo) and all other events at each of the four facilities (NRG Stadium, Toyota Center, Minute Maid Park, and BBVA Stadium). We also control for the calendar patterns of hotel demand using binary variables for each day of the week, month of the year, and year in the sample. Finally, we create binary variables for two notable events in the sample frame: each occurrence of the Houston Livestock Show and Rodeo and Super Bowl LI. We begin with least squares estimations for each of the hotel outcome variables. Table 4 presents a subset of these results. Two of the estimations use a log-linear approach and the other two are linear. These specification decisions are made by comparing *r*-squared results

between the two models, and for brevity only the better fit of each are presented below. All results are available upon request.

Our main conclusion from Table 5 is the stark difference between the economic impacts of the primary professional sports tenants and other events. At NRG Stadium, non-Texans events increase total hotel revenue by about 9.2 percent (p-value = 0.005) while the estimated marginal impact on total revenue of Texans games is roughly half the size and statistically insignificant. This excludes Super Bowl VI and editions of the Houston Livestock Show and Rodeo, which yields even higher marginal impacts on hotel revenue. At the Toyota Center, non-Rockets events increase total revenue by about 4.25 percent (p-value = 0.004) while the estimated marginal impact on total revenue of Rockets games is roughly one-third the size and again statistically insignificant. This pattern changes for Minute Maid Park, where Astros home games have an estimated marginal impact on hotel revenue of 7.65 percent compared to a near-zero estimated impact of other events. Houston Dynamo games at BBVA Stadium have no statistically discernable economic impact on any of the four measures of hotel economic activity, while other events at BBVA Stadium suggest a negative economic impact. We also highlight that Super Bowl LI has, by far, the largest economic impact of any event in the sample. On the day of Super Bowl LI, room rates are nearly double and total revenue rises by roughly 70 percent over a typical Sunday in February 2017.

Table 5: Least Squares Estimations

	ln(average daily rate)	ln(total revenue)	number of rooms	occupancy rate
NRG Stadium (Texans)	-0.0258 (p = 0.155)	0.0469 (p = 0.319)	371.0 (p = 0.104)	3.575 (p = 0.083)

NRG Stadium (other)	0.0012 ($p = 0.941$)	**0.0920** ($p = 0.005$)	**652.5** ($p < 0.001$)	**6.005** ($p < 0.001$)
Houston Rodeo	0.0284 ($p = 0.145$)	**0.1947** ($p < 0.001$)	**848.9** ($p < 0.001$)	**7.676** ($p < 0.001$)
Super Bowl LI	**1.0823** ($p < 0.001$)	**1.6317** ($p < 0.001$)	**3,549** ($p < 0.001$)	**30.758** ($p < 0.001$)
Toyota Center (Rockets)	0.0092 ($p = 0.505$)	0.0141 ($p = 0.603$)	35.40 ($p = 0.736$)	0.3481 ($p = 0.717$)
Toyota Center (other)	0.0118 ($p = 0.197$)	**0.0425** ($p = 0.004$)	**291.4** ($p = 0.002$)	**2.850** ($p = 0.001$)
Minute Maid (Astros)	**0.0341** ($p < 0.001$)	**0.0765** ($p < 0.001$)	**319.6** ($p < 0.001$)	**2.928** ($p < 0.001$)
Minute Maid (other)	-0.0093 ($p = 0.798$)	0.0043 ($p = 0.913$)	142.4 ($p = 0.407$)	1.355 ($p = 0.386$)
BBVA Stadium (Dynamo)	0.0006 ($p = 0.968$)	0.0131 ($p = 0.650$)	68.44 ($p = 0.586$)	0.6846 ($p = 0.549$)
BBVA Stadium (other)	**-0.0700** ($p = 0.032$)	**-0.1889** ($p = 0.004$)	-674.6 ($p = 0.106$)	-6.168 ($p = 0.093$)
r-squared	0.5233	0.4483	0.4256	0.4287

Bold estimates indicate statistical significance at $\alpha = 0.05$ or less.

Estimation – ARIMA Modeling

As a robustness check, we test whether time series modeling produces different estimates of the marginal economic effect of events. We begin by testing the stationarity of each of the four dependent variables using three standard stationarity tests: augmented Dickey and Fuller (1979 and 1981; henceforth ADF), Phillips and Perron (1988; PP), and Kwiatowski, Phillips, Schmidt, and Shin (1992; KPSS). Both ADF and PP testing have a similar structure and the same null hypothesis that the time series has a unit root. The main difference is that ADF models autocorrelation using lags of the differenced time series as independent variables, whereas PP corrects the standard errors using a Newey-West approach. KPSS is an alternative approach that notably reverses the positions of the null and alternative hypotheses compared to ADF or PP testing; in KPSS, stationarity is

the null hypothesis. Another difference is the KPSS test statistic is based on the estimated error variance rather than a coefficient estimate as in ADF and PP.

We begin by testing for stationarity of each dependent variable in the absence of a trend at Table 5, where 11 of the 12 estimations support a stationarity process. The lone exception is the KPSS result for the natural log of revenue, where a five percent significance rule produces a stationarity outcome but a ten percent threshold suggests the opposite. Though not presented below, controlling for a time trend yields stationary results for each of the three stationarity tests of the natural log of revenue. We conclude that three of the four dependent variables are stationary over a constant, and, at worst, the fourth is trend stationary.

Table 6: Stationarity Testing

	Augmented Dickey-Fuller	Phillips-Perron	Kwiatowski-Phillips-Schmidt-Shin
ln(average daily rate)	-5.320 ($p < 0.001$) lags = 23	-12.234 ($p < 0.001$) lags = 23	0.388 ($0.05 < p < 0.1$) lags = 23
ln(total revenue)	-5.964 ($p < 0.001$) lags = 22	-19.022 ($p < 0.001$) lags = 22	0.707 ($p > 0.1$) lags = 22
number of rooms	-5.836 ($p < 0.001$) lags = 23	-14.399 ($p < 0.001$) lags = 23	0.200 ($p > 0.1$) lags = 23
occupancy rate	-5.757 ($p < 0.001$) lags = 22	-19.070 ($p < 0.001$) lags = 22	0.165 ($p > 0.1$) lags = 22
null hypothesis	H_0: unit root	H_0: unit root	H_0: stationarity

Given the results in Table 6, we turn to autoregressive-moving average (ARMA) modeling of each dependent variable. We again use binary variables to control for

patterns in hotel economic activity specific to the day of the week, month, and year in the sample, but we focus on the coefficient estimates of events at the four Houston professional sports facilities. We again include separate binary variables for the Houston Livestock Show and Rodeo and Super Bowl LI due to their importance in the least squares estimations. ARMA modeling requires specification of the AR and MA terms. We follow the standard Box-Jenkins process, which is a grid search approach that seeks to minimize either the Akaike Information Criterion or the Bayesian Information Criterion. The spirit of the Box-Jenkins process is to find the ARMA structure that best fits the data, and we present estimates from only the optimized fit at Table 7.

Table 6: ARMA Estimations

	ln(average daily rate)	ln(total revenue)	number of rooms	occupancy rate
NRG Stadium (Texans)	0.0095 (p = 0.135)	**0.0694** (p < 0.001)	**443.9** (p < 0.001)	**4.084** (p < 0.001)
NRG Stadium (other)	**0.0266** (p = 0.006)	**0.1522** (p < 0.001)	**975.8** (p < 0.001)	**8.800** (p < 0.001)
Houston Rodeo	-0.0064 (p = 0.870)	-0.0960 (p = 0.386)	-457.3 (p = 0.336)	-4.264 (p = 0.331)
Super Bowl LI	**0.4923** (p < 0.001)	**0.7947** (p < 0.001)	**2,340** (p < 0.001)	**21.22** (p < 0.001)
Toyota Center (Rockets)	0.0022 (p = 0.386)	0.0105 (p = 0.116)	59.12 (p = 0.093)	0.5748 (p = 0.074)
Toyota Center (other)	-0.0011 (p = 0.762)	**0.0228** (p = 0.008)	**157.7** (p < 0.001)	**1.488** (p < 0.001)
Minute Maid (Astros)	0.0070 (p = 0.258)	0.0314 (p = 0.052)	**156.4** (p = 0.047)	**1.444** (p = 0.043)
Minute Maid (other)	-0.0018 (p = 0.917)	0.0225 (p = 0.535)	165.6 (p = 0.308)	1.547 (p = 0.290)
BBVA Stadium (Dynamo)	-0.0008 (p = 0.846)	0.0085 (p = 0.503)	59.21 (p = 0.360)	0.5359 (p = 0.365)

BBVA Stadium (other)	-0.0190 (p = 0.528)	-0.0481 (p = 0.468)	-156.9 (p = 0.603)	-1.684 (p = 0.537)
AR(1)	**1.319** (p < 0.001)	**1.120** (p < 0.001)	**0.962** (p < 0.001)	**0.961** (p < 0.001)
AR(2)	**-0.529** (p < 0.001)	**-0.331** (p < 0.001)	**-0.211** (p < 0.001)	**-0.210** (p < 0.001)
AR(3)	**0.084** (p = 0.030)	0.052 (p = 0.103)		
AR(4)	**-0.953** (p = 0.005)		**0.091** (p < 0.001)	**0.094** (p < 0.001)
AR(5)	**0.135** (p < 0.001)	**0.055** (p = 0.001)		

Bold estimates indicate statistical significance at $\alpha = 0.05$ or less.

The ARMA specifications draw many of the same conclusions as the least squares estimations at Table 4 with some notable exceptions. First, the impact of Texans games at NRG Stadiums now statistically significant, though the marginal effects of other events at this venue remain roughly twice as high. Second, the Houston Livestock Show and Rodeo does not have a statistically significant impact, meaning that this event's impact is roughly the same as non-Texans NRG Stadium events, or about 15 percent more revenue each day. Finally, events at BBVA Stadium have no discernable impact on the local hotel industry, whereas the least squares estimates suggested negative effects. We conclude that the least squares findings are largely robust to time series modeling.

Conclusions

Venues of the four major American professional are large pieces of infrastructure. The sports franchises, which typically serve as the primary tenants of these venues, occupy these facilities for, at most, no more than a quarter of the year. For NFL stadiums, the occupancy rate is a scant three percent. This leaves ample opportunity for hosting events outside of the venue's primary sports tenants. In some cases, the need for a

modern facility in order to host more non-sporting events is highlighted by advocates of public financing for sports venues. For this reason, we see this issue as larger than a facilities management problem as the total public contributions to sporting venue construction totals several billion dollars over the last decade alone. Despite the wealth of research into the economic impact of the franchises, there is comparatively little on frequency and profitability of non-sporting events at professional sports facilities.

Using four large professional sports facilities in Houston, we test for the economic impact of events involving both the primary sports tenant and all other events. Our measures of economic activity are outcomes in the nearby hotel industry, which allows us to merge the calendar of events with daily economic data. Our main finding is that the economic impact differs across types of events. At NRG Stadium and Toyota Center, the economic impacts of the primary sports tenants (NFL's Texans and NBA's Rockets, respectively) are smaller than other events held at these venues. At Minute Maid Park, home games for the MLB Astros tend to have a larger economic impacts than other events at the stadium, with the caveat that Minute Maid Park does not host many non-Astros events. Finally, events at BBVA Stadium have either a negative or zero effect on local hotel economic activity. We conclude that outside events are vital to economic activity, particularly given the small usage rates of sports facilities in the United States.

Citations

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