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The effect of professional sports on earnings and employment in the services and retail sectors in US cities

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Abstract

This paper explores the impact of professional sports teams and stadiums on employment and earnings in specific sectors in US cities. Previous research focused on aggregate measures of income or employment. We find that professional sports have a small positive effect on earnings per employee in one sector, amusements and recreation, and an offsetting decrease in both earnings and employment in other sectors, supporting the idea that consumer spending on professional sports and spending in other sectors are substitutes. This helps to explain the negative total economic impact of sports found in other studies.

Keywords: Local economic development; Public finance; Professional sports; Stadiums and arenas

JEL classification: R58; J30; H71

1. Introduction and motivation

There has been a significant increase in the construction of new professional sports stadiums and arenas in the past 15 years; over 40 new stadiums and arenas

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have been built for professional football, basketball and baseball teams since the mid-1980s. In some cases, the construction takes place prior to, or concurrent with, a new or relocated franchise moving to the city. This trend shows no sign of slowing. Five new arenas for professional basketball and a new professional baseball stadium opened in 1999, two new professional baseball stadiums opened in 2000 and four additional new stadiums are currently under construction.

Most professional sports construction projects receive substantial government subsidies. Potential increases in employment, income and other benefits often are used to justify these subsidies and prospective 'economic impact' studies, commissioned and paid for by proponents of new sports construction projects, claim to quantify these economic benefits. In some cases, prospective estimates of jobs created by these projects run into the thousands.[1] These impact studies often assume that spending at restaurants, bars, hotels, and motels will rise as a consequence of building a stadium and attracting a professional sports team.

Opponents of stadium and arena construction counter that the spending and income generation effects of sports are quite limited. Spending on sports substitutes for spending on other types of entertainment, and on other goods and services more generally, so there is very little new income generated. Indeed, Coates and Humphreys (1999, 2001) provide evidence that professional sports actually reduces local incomes. Key to this argument is the extent to which spending on sports-related activities substitutes for spending on other goods and services.

This paper addresses this substitution by focusing on the relationship between the sports environment and the employment and earnings of workers in those sectors of the economy most closely linked to the sports environment, eating and drinking establishments, hotels and other lodgings, and amusements and recreation, as well as the broader service and retail sectors. Specifically, if the pro-stadium/pro-sports argument is correct, then employment and earnings in each of these sectors should be higher with professional sports than without it. If the anti-stadium argument is correct then one might find decreases in earnings and employment at eating and drinking establishments and in hotels and other lodgings. The effect of sports on earnings and employment in amusements and other recreation is ambiguous, as professional sports is one component of this sector.

We formulate econometric models of the determination of employment and earnings in specific economic sectors in Metropolitan Statistical Areas (MSAs). We estimate these models using employment and earnings data collected from the US Bureau of the Census' Regional Economic Information System (REIS) and data reflecting the sports environment in these MSAs drawn from a wide variety of sources. In contrast to the results found in most prospective 'economic impact'

[1] A 1993 economic impact study of the new Seattle baseball stadium claimed that over 2000 new jobs would be created.

studies, we find that although sports may increase wages within the Amusements and Recreation sector (SIC 79) by a small amount, they also reduce earnings in the Eating and Drinking Establishments sector (SIC 58) and employment in the larger Services and Retail Trade sectors. On balance the overall impact of sports on employment and earnings in MSAs is negative.

Several previous studies found no evidence that professional sports teams, stadiums and arenas created jobs in MSAs, and this work is best seen as an extension of these studies. Baade and Sanderson (1997) reported four instances where the number of professional sports teams and new stadiums in a city were associated with an increase in the share of state employment in two sports-related industries (Amusement and Recreation, SIC 79, and Commercial Sports, SIC 794) located in cities in that state with professional sports teams and facilities; they also reported five instances where the number of professional sports teams and stadiums were associated with *decreases* in the employment share. For those instances where the effect was positive, the results reported by Baade and Sanderson suggest that the average increase across these two industries amounted to about 200 jobs. Baade (1996), using a similar approach, found no statistically significant effects of professional sports franchises, stadiums and arenas on employment shares for the same two industries.

Rosentraub et al. (1994) analyzed Indianapolis' sports-led economic development program which consisted of eight capital construction projects including a basketball arena and a football stadium. The program began in the 1970s and lasted for over 18 years. This study compared Indianapolis' growth in employment to the growth in employment in other mid-western cities over the period 1977 to 1989. It concluded that the sports-led economic development program had no impact on either employment or earnings relative to the experience of the other cities. Rosentraub (1997) drew similar conclusions regarding the impact of other professional sports construction projects on employment and earnings in MSAs.

The next section of the paper describes the empirical model and the estimation scheme for the analysis. This is followed by a description of the data. Presentation and discussion of the results comes after the data description. The paper ends with a brief conclusion.

2. The determination of wages and employment in local labor markets

Coates and Humphreys (1999, 2001) analyze the effects of the professional sports environment on the level and growth rate of real per capita personal income in an MSA using a linear reduced form empirical model. In this paper we adapt that approach to focus on the effects of the sports environment on wages and employment in the Retail—Division G in the Standard Industrial Classification (SIC) System—and Service—Division I in the SIC system—sectors of cities in the United States. Additionally, we have enough data to analyze the impact of

professional sports on wages, but not employment, in two subsectors of the Services and Retail sectors. These subsectors are, Hotels (Major Group 70 in Services), Amusements and Recreation Services (Major Group 79 in Services), and Eating and Drinking Places (Major Group 58 in Retail Trade).

This latter point is particularly valuable because the existing literature rarely takes so fine a cut at the income and employment data for a large set of cities over time.[2] Advocates of sports-led growth frequently state that the impact of sports will be felt most heavily in specific sectors of the economy. New teams and stadiums will attract people to the area of the stadium where they will spend money on food and beverages, hotels, and consumer items such as souvenirs and team paraphernalia. This new spending will drive up demand for waitresses and waiters, hotel staff, and sales clerks, resulting in both higher earnings by people employed in these ways and in the number of people with such jobs.

Opponents of using subsidies to professional sports as a tool of economic development suggest that the job and income creation effects of franchises and stadiums will be minimal.[3] Opponents argue that much of the sales of food and drink and retail merchandise arising from a stadium will simply substitute for similar sales at establishments in the city that are relatively distant from the stadium. Moreover, consumers may substitute attendance at sporting events for other types of recreational activities, such as attending movies or the theater or going bowling. If this argument is correct then one would expect to find no effect of the sports environment on wages and employment in the Eating and Drinking, Hotels, and Amusements sectors of the economy.

Our approach has two distinct but complementary thrusts. Firstly, we estimate linear reduced form econometric models of the determination of earnings and employment in specific sectors of cities' economies and test the null hypothesis that the sports environment variables are jointly insignificant. If proponents of sports-led development are correct then we should be able to reject the null hypothesis. We also use the estimated parameters from these reduced form models to generate within-sample forecasts of the effect of the sports environment on the dependent variable in each year in each city and generate separate within-sample forecasts for each of the professional sports for every city.

This latter information is potentially helpful to cities faced with the threat of departure or to franchises seeking a new facility. For example, if our forecast of the effect of professional baseball on wages and employment in Minneapolis is positive and significant, that buttresses the case of the Twins ownership for a new

[2] An exception is Baade and Sanderson (1997) which looks specifically at employment in Amusements and Recreation and, more finely cut still, the Commercial Sports sectors. The dependent variable in their analysis is the cities' employment in the sector relative to employment in that sector in the entire state. They also estimate the models for each city rather than pooled. They find little support for the notion that sports franchises and stadiums generate substantial job growth.

[3] See, for example, the volume edited by Noll and Zimbalist (1997b).

stadium.[4] If that forecast is negative and significant then the opponents' position is supported. We will have more to say about these forecasts below.

We estimate linear reduced form models of the determination of both wages and employment in the two SIC divisions (Services and Retail) and models of the determination of wages for the three major groups (Hotels, Amusements, and Eating and Drinking Places) discussed above. These linear reduced form models of the determination of wages and employment take the general form

$$y_{jit} = \beta_j x_{it} + \gamma_j z_{it} + \mu_{jit}. \quad (1)$$

In this notation t ($t = 1969, 1970, \ldots, 1997$) indexes time, i ($i = 1, 2, \ldots, 37$) indexes MSAs and j ($j = 1, 2, \ldots, 7$) indexes the dependent variables of interest: wages in Services, Retail, Hotels, Amusements and Recreation, and Eating and Drinking Places and employment in Services and Retail. Each of these seven dependent variables are modeled as functions of the same set of explanatory variables, x_{it} and z_{it}. The impact of each of these explanatory variables on the dependent variables are assumed to differ, so we estimate a different vector of unknown parameters, β_j and γ_j, for each dependent variable.

The vectors of explanatory variables, x_{it} and z_{it}, capture the effects of two different types of factors on earnings and wages in the cities in the sample. x_{it} describes the general economic climate in each city over the sample period. This vector contains four control variables that reflect various aspects of the economic climate:

- the lagged value of the dependent variable ($y_{ji,t-1}$);
- the growth rate of the population in each MSA, expressed in percentage terms;
- year dummy variables that capture other omitted factors that affect all MSAs in the sample in each year;
- MSA-specific time trends that capture secular trends in individual MSAs.

The inclusion of a lagged dependent variable makes this model a dynamic panel model. Although lagged dependent variables cause bias in the parameter estimates, Monte Carlo evidence in Judson and Owen (1997) suggests that the bias affects the parameter on the lagged dependent variable, not the parameters on the independent variables. Kiviet (1995) reports similar results from panels with time

[4]The Twins' situation is particularly relevant now as they are one of the two teams mentioned as likely candidates for abolishment under the recently unveiled plan for Major League Baseball to contract. Our model predicts that the sports environment in Minneapolis costs an average of almost 4300 Services sector jobs and 3400 Retail sector jobs annually, and reduces annual earnings by workers in Eating and Drinking establishments by about $127. The other team mentioned frequently, the Montreal Expos, is not part of our sample because it is not a United States based team.

dimensions 20% of the sample in this study. We investigate the effect of inclusion of a lagged dependent variable in the section on robustness below.

We have developed a panel of city-specific data for as long a sample period as possible for the 37 US cities that were home to a professional football, basketball, or baseball franchise. The data from the Regional Economic Information System (REIS) made available by the Department of Commerce, Bureau of Economic Analysis are the primary source of data for this paper. The REIS contains a variety of county- and SMSA-specific economic and demographic data that could be used as control variables in our reduced form models of the determination of earnings and employment. However, many of these variables are probably correlated with the equation errors in our empirical models, making them poor candidates for control variables. Rather than include other economic variables from the REIS as controls in our empirical models, we use a set of economic controls that are likely to be uncorrelated with the equation error term.

z_{it} is a vector of variables that capture the 'sports environment' in each city and year in the sample. This vector consists of a variety of variables to capture the variation in the sports environment in each of the 37 cities that currently have or at some time in the past 30 years had a professional football, basketball or baseball franchise. This vector includes:

- three dummy variables indicating the presence of a football, basketball or baseball franchise;[5]
- dummy variables indicating the 10-year periods following all football, basketball and baseball franchise entries and exits, including separate variables for multiple departures from a given city in each sport;
- variables indicating the 10-year period following construction or renovation of a stadium or arena;
- variables indicating whether the stadium in each city is a single or multiple use structure;
- the seating capacity of all football, basketball and baseball facilities and those capacities squared.

Measurement of the 'sports environment' in a city is difficult, but any econometric analysis of the economic impact of professional sports on local economies must quantify the nature, size and scope of professional sports. Data limitations place considerable restrictions on economists' ability to quantify the sports environment in a city. Early studies that used simple measures like the number of professional

[5]We omit professional hockey from the analysis because a significant number of hockey franchises are in Canada and we do not know of a source of Canadian city-specific data comparable to the US data in the Regional Economic Analysis System. Hockey teams also play in the same arenas as NBA franchises in most instances with seasons that substantially overlap.

sports franchises in a city, like Baade (1996), typically found no detectable economic impact, but such simple metrics may not reflect underlying events. Our vector of sports environment variables balances data availability with the claims made by proponents of sports-led economic development schemes. These proponents have repeatedly claimed that attracting franchises and building stadiums will lead to tangible economic benefits. Our vector of sports environment variables reflects franchise moves and stadium construction, along with the presence of existing franchises. It also treats each sport separately in order to avoid aggregation bias. Although many of the variables in this vector were not individually statistically significant at conventional levels in previously published research, joint F-tests of their significance have shown them to be highly significant in linear reduced form models of income determination.

Several other potential candidate variables for the vector of sport environment exist, but we have chosen to omit them from this analysis. Measures of on-field team success, like winning percentage or total wins, is one example. These data are readily available over the sample period for the sports analyzed in this paper. However, on-field success has never been part of the claims made by proponents of sports-led economic development projects. To our knowledge, a prospective team owner has never said 'build me a new stadium and *if* we have a winning team the city will be better off economically' when seeking public funding. The appropriate test of the economic impact of professional sports on local economies should be based on the presence of teams or facilities and not on the presence of successful teams.

Attendance is a second potential candidate for inclusion in the vector of sports environment variables, but a number of strong arguments exist for not including this variable. Firstly, we include stadium capacity (and capacity squared to allow for a nonlinear impact), the upper bound on attendance per game, in the vector of sports environment variables, so the effects of attendance are not omitted from the model. Secondly, like on-field success, the claims made by advocates of sports-led economic development are not contingent on the level of attendance at games. Thirdly, reported attendance varies across sports and across leagues within some sports. Some sports report turnstile attendance and others report the total number of tickets sold as attendance, introducing a possible source of measurement error into the vector of sports environment variables. Finally, if tickets to professional sporting events are normal goods, then the income effect implies that attendance may depend on the level of real income in the city. In this case, including attendance in the vector of sports environment variables would lead to bias in the estimated parameters of the empirical model. The same cannot be said for the stadium capacity variable.

We assume that the 'novelty effect' of a new stadium or franchise on the local economy lasts 10 years, and that this impact differs by type of facility, it does not differ by sport in the case of multi-purpose stadiums. Coffin (1996) found that the novelty effect of a new stadium on attendance in baseball began to decline in the

third year following the opening of a new stadium. However, our analysis focuses on economic impact, not on attendance, and we do not know of any similar evidence about the dynamic properties of the economic impact of new facilities or franchises. This assumption is consistent with existing literature on the economic impact of professional sports.

By assumption, the disturbance terms take the form

$$\mu_{jit} = e_{jit} + v_{ji} + u_{jt} \tag{2}$$

where v_{ji} is a disturbance specific to dependent variable j in MSA i which persists throughout the sample period, u_{jt} is a time t specific disturbance which affects all areas in the same way, and e_{jit} is a random shock to dependent variable j in MSA i at time t which is uncorrelated across dependent variables and MSAs as well as over time. Estimated this way, the regression purges the dependent variable of the effect of national events on each jurisdiction in a given year and generates an MSA-specific impact. In other words, the level of earnings and employment in an MSA at any point in time is determined by time- and location-specific events as well as the circumstances regarding sports franchises and stadiums. We assume that the disturbance terms are uncorrelated across all the dependent variables analyzed and estimate each of the seven empirical models separately.

3. Data

Our analysis focuses on the effect of professional sports franchises and stadiums on labor market activity in several specific sectors of the economies of US cities. These sectors are the Retail Trade and Services sectors, as well as the Service sector industries Amusements and Recreation Services (SIC 79) and Hotels and Other Lodging Places (SIC 70), and the Retail sector industry Eating and Drinking Places (SIC 58).

In general, the Retail Trade sector includes firms that sell merchandise for personal or household consumption, including rendering services incidental to the sale of the merchandise. The Retail Trade sector is divided into eight major groups in the Standard Industrial Classification system: Building Materials (SIC 52), General Merchandise Stores (SIC 53), Food Stores (SIC 54), Automotive dealers and Gasoline Service Stations (SIC 55), Apparel and Accessory Stores (SIC 56), Home Furniture and Furnishings (SIC 57), Eating and Drinking Places (SIC 58), and Miscellaneous Retail (SIC 59). Of these major groups, Eating and Drinking Places would seem to be the most closely related to professional sports in a metropolitan area. Economic impact studies commonly claim that the primary beneficiaries of sports-related spending in metropolitan areas will be restaurants, bars, and other eating and drinking establishments located near the stadium or arena. The idea is that people attending events will stop in a nearby restaurant for a

meal or a drink before or after the game. Professional sports affect these establishments directly, by bringing in more customers than they would have attracted otherwise.

The Services sector includes firms engaged in providing a wide variety of services to individuals, businesses and government. This sector differs from Retail Trade in that no merchandise is produced, and also in that other firms and the government represent important components of the demand for the output of this sector. The Services sector is divided into 16 major groups in the SIC system. Of these major groups, Amusement and Recreation Services contains professional sports, as well as dance studios, theatrical productions, orchestras, bowling alleys, race tracks, gyms, public (but not private or miniature) golf courses, amusement parks and coin operated arcades. Clearly this industry should reflect the economic impact of professional sports, as any direct spending on athletes and other club employees would be reflected in the earnings and employment in this industry. If proponents of professional sports as engines of economic growth are correct, then several other industries in this sector should also benefit. This would include Hotels and Other Lodging Places, which would attract more customers staying over night to attend or participate in sporting events than they would have otherwise attracted. It would also include Automobile Parking (SIC 752) services, which contains short-term garages and parking lots. Unfortunately, data at this level of detail are not readily available by MSA.

Our measures of labor market activity include wage and salary earnings per employee,[6] total employment, and the share of total employment for the two-digit SIC code industries Amusements and Recreation (SIC 79), Eating and Drinking Establishments (SIC 58), and Hotels and other Lodging Places (SIC 70) as well as one-digit SIC code industries Services (SIC 7) and Retail Trade (SIC 5).

The data cover the period 1969 to 1996. Income, population, earnings and employment data were taken from the Regional Economic Information System, distributed by the US Department of Commerce, Bureau of Economic Analysis. Data on sports franchises and stadia came from information in Noll and Zimbalist (1997a), Quirk and Fort (1992) and the Information Please Sports Almanac (1996). Our sample includes 37 cities, the universe of MSAs in the United States that had either a professional football, basketball, or baseball franchise during the period 1969 through 1996.

Table 1 presents variable definitions and descriptive statistics for the full sample, city-specific descriptive information is available upon request. The means for the wage and salary variables need clarification. For WHOPE, wages and salaries in Hotels and other Lodgings per service sector employee, the mean value

[6]The number of employees is not available for the two-digit SIC codes so the employee figure used is the number working in the one-digit industry. For example, earnings in Amusements and Recreation is measured per service employee as is earnings in Hotels and other Lodgings. Earnings of Eating and Drinking establishments is measured per retail employee.

Table 1
Variable definitions, means and standard deviations

Variable	Mean	S.D.	Definition
ESV	375,693.1	346,223	Tot. emp., services
ERT	216,103.6	151,943.8	Tot. emp., retail trade
RTESHARE	0.188	0.019	Emp. share, retail trade
SVESHARE	0.295	0.062	Emp. share, services
WHOPE	0.609	0.286	Earn. per service emp., hotels
WARPE	0.582	0.290	Earn. per service emp., amuse.
WEDPE	2.62	0.468	Earn. per retail emp., eat/drink
DPOP	0.013	0.014	Growth rate of population (%)
BBCAP	36.536	31.272	Baseball stadia capacity, 000s
FBCAP	48.098	35.077	Football stadia capacity, 000s
BACAP	10.473	9.966	Basketball stadia capacity, 000s
BBCO	0.033	0.179	Baseball sta. const., last 10 years
FBCO	0.096	0.295	Football sta. const., last 10 years
BBFBC	0.102	0.303	Baseball/football sta. const., last 10 years
BACO	0.225	0.418	Basketball arena const., last 10 years
BBF	0.615	0.487	Baseball franchise present
FBF	0.705	0.456	Football franchise present
BAF	0.598	0.491	Basketball franchise present
BBE	0.079	0.270	Baseball franchise entered, last 10 years
BAE	0.231	0.422	Basketball franchise entered, last 10 years
FBE	0.101	0.302	Football franchise entered, last 10 years
BBD	0.028	0.165	Baseball franchise left, last 10 years
BAD	0.103	0.304	Basketball franchise left, last 10 years
FBD	0.056	0.230	Football franchise left, last 10 years
BADS	0.008	0.089	Year following basketball team departure

Means are computed for 1970 to 1996.

is 0.609, or \$609. Because employment in hotels and other lodgings is not available in the data, we adjust by assuming that the hotels and lodgings wages as a share of service sector wages is the same as hotel and other lodgings share of service sector employment. Converting the mean using this share, wages and salaries per hotel and other lodgings employee is about \$15,225 per year. Similarly, the mean of 0.582 for WARPE, wages and salaries in Amusements and Recreation per Service sector employee, translates into \$582, or \$19,400 per Amusements and Recreation employee; the mean for WEDPE, wages and salaries in Eating and Drinking Establishments per Retail sector employee is 2.62, or \$2620. This works out to about \$9704 per Eating and Drinking establishment employee.

The entry, exit and construction variables take on a value of 1 in each of 10 years, the year a franchise moves, or the year a stadium or arena opens, and the 9 subsequent years. One might question the choice of this metric as ad hoc. We defend it on the basis of the length of time it takes for the novelty of a new franchise or stadium to wear off, as has been reported in this literature (Baade,

1996), or for the despair from losing a team to subside.[7] One set of entry and departure variables (BBE1, BBE2, FBE1, BAE1, BAE2, BBD1, BBD2, FBD1, BAD1, BAD2) allows for a differing effect on the dependent variable in each instance of an arrival or departure of a franchise; a second set of entry and departure variables (BBE, FBE, BAE, BBD, FBD, BAD) combines these multiple entries and departures, implicitly forcing an equal effect on each event.

Unlike the existing literature, which imposes a time invariant effect of franchises on the economy, our analysis allows for variable effects over time through inclusion of dummy variables indicating the presence of a franchise and the entrance or exit of a franchise in the last 10 years. We also allow for both the existence and the entrance and exit of franchises in each of three major professional sports, thus allowing for the effects of a franchise in one sport to be net of the effects of goings on with other sports or other franchises in the same sport. Our specification does not, however, control for any symbiotic or mutually detrimental effects of franchises in more than one sport. We control for construction of new facilities with dummy variables and, combined with the presence of a franchise, which must have had an existing facility, we address the issue of whether a new stadium replaces an old stadium or a new stadium is constructed where none previously existed. Additionally, one of the construction variables controls for multiple-sport facilities, as was common in the 1970s. The wide variety of our explanatory variables controls for the gamut of sports environments experienced in the United States. Because we examine the effects of entrance and exit of franchises over a 10-year period, few MSAs have no variation in these explanatory variables. For example, a city which obtained its first football franchise in 1965 has a value of 1 for FBE1 for 1969 through 1974, and zero thereafter. This differs from much of the existing literature, where such an observation would have value 1, indicating the presence of a football franchise, for every year in the sample.

4. Results and discussion

This section begins with a general overview of the results of seven different regressions, one for each of seven different dependent variables, employment in the Services sector, employment in the Retail sector, wages per employee in Eating and Drinking Establishments, wages per employee in Hotels, wages per employee in Amusements and Recreation, the Retail share of total employment, and Services share of total employment, that reflect the areas of the local economy most likely to be affected by the sports environment. The discussion then focuses on the estimated effects of the sports environment variables on earnings and

[7] Baade and Sanderson (1997) estimate the novelty effect for each of 10 cities. They find effects in the range of from 7 to 10 years.

employment. The analysis here is unique in that it looks not only at the general effects of sports environment variables but it also examines the effects of specific sports in specific cities. So, for example, if one wants to know if the Dallas Cowboys have been good for the Retail or Services sectors in Dallas, we estimate that impact.

Each of the equations we estimated included a large set of identical explanatory variables. These are the population growth rate in the city, year-specific dummy variables, city-specific time trends, city-specific intercepts, and the 19 sports environment variables. Each equation also included the lagged value of the dependent variable as a regressor. In every equation except that for the Retail share of employment, the growth rate of population is statistically significant at the 5% level or better. In that case it is significant at the 10% level. In all equations, the lagged value of the dependent variable is significant at the 1% level or better. In the employment and employment share equations, the majority of the year-specific effects and city-specific trends are individually significant at conventional levels. In the earnings per employee equations fewer of these variables are individually significant, though many are. The null hypothesis that all city-specific fixed effects are zero is easily rejected for every equation.[8]

Turning to the sports environment variables, Table 2 shows the F-statistic and the P-value for the null hypothesis that every coefficient on a sports environment variable is equal to zero. Tables 8 and 9 report the coefficient estimates for the five regressions with P-values below 0.1. Table 2 shows the F-statistic and P-value for the hypothesis tests

$$H_o: \quad \gamma_{1j} = \gamma_{2j} = \ldots = \gamma_{Nj} = 0$$
$$H_a: \quad \text{At least one } \gamma_{ij} \neq 0.$$

The results indicate that the null cannot be rejected in the Retail employment or the wages per employee in Eating and Drinking Establishments equations at any reasonable level of significance. Of the other equations, only for the wages per

Table 2
F-tests on significance of vector of sports variables

Dependent variable	F-statistic value	P-value
Emp., retail trade sector	1.11	0.33
Emp., services sector	2.73	0.00
Earn., eating, drinking est. per emp.	1.17	0.27
Earn., amusements, recreation per emp.	3.08	0.00
Earn., hotels, other lodging est. per emp.	1.56	0.06
Emp. share, retail trade sector	1.83	0.02
Emp. share, services sector	1.70	0.03

[8]These results are available upon request.

employee in the Hotel and Other Lodging establishments can the null be rejected at the 5% level, but it cannot be rejected in this case at the 10% level. In other words, these equations provide some evidence that the sports environment has a statistically significant impact on the Retail and, especially, the Services sector of the local economy.

The pattern of these results allows us to infer even more about the effects of sports on the local economy. Namely, that effect is really very localized; it impacts the Services sector but little else. Moreover, the effects are greatest on the Amusements and Recreation portion of the Services, that segment of the economy in which professional sports most naturally falls and in which it is classified under the Standard Industrial Classification system. Looking at Table 3 we see that in the Services sector, the average predicted effect of the sports environment on employment across all cities in the sample is a net loss of 1924 service sector jobs. At the same time, earnings are predicted to rise for workers in the Amusements and Recreation and Hotels and other Lodgings portions of the service sector, though these predicted impacts are modest.

Earnings in Eating and Drinking Establishments fall very slightly, $44 per Retail sector worker, or $162 per employee in Eating and Drinking Establishments. The mean increase for earnings in Hotel and other Lodgings per Service sector worker is about $0.40 or $10 per Hotel and other Lodgings worker. Remember, these changes are in annual earnings, so these figures suggest very little impact. Earnings in Amusements and Recreation, on the other hand, rise by about $15 per Service sector worker which translates into about $490 per employee in Amusements and Recreation. This seems a fair gain from the sports environment. However, recall that this sector includes the professional athletes, the coaching staffs, and trainers. These individuals have earnings well above those of the other workers in the Amusements and Recreation sector, so this $490 per worker is potentially very misleading. In summary, these figures indicate that those workers most closely connected to the sports environment, who are not themselves athletes, see little improvement in their earnings as a result of the local professional sports environment.

Table 4 shows the mean impact by sport on earnings. The clear result of this

Table 3
Predicted mean impact of sports variables

Dependent variable	Predicted mean impact
Emp., retail trade sector	−1822
Emp., services sector	−1924
Earn., eating, drinking est. per emp.	−$162
Earn., amusements, recreation per emp,	$490
Earn., hotels, other lodging est., per emp.	$10
Emp. share, retail trade sector	0.0001
Emp. share, services sector	0.0008

Table 4
Predicted mean impact of sports variables on earnings, by sport

Dependent variable	Predicted mean impact		
	Football	Basketball	Baseball
Earn., eating, drinking est. per emp.	$6	−$17	−$144
Earn., amusements, recreation per emp.	$1200	−$173	−$503
Earn., hotels, other lodging est. per emp.	−$75	$155	−$38

table is the tiny impact of sports on earnings in any of the three sectors. Moreover, six of the nine mean effects are negative, indicating that the individual sports on average reduce earnings in those industries. Football appears to be the most beneficial of the three sports with two of the three effects positive, and one of those, that for Amusements and Recreation, actually quite large. However, this may also be misleading. Note that football teams currently have 53 man rosters plus coaches, trainers, and practice squad players. Basketball teams have 12 man rosters, baseball teams 25 man rosters. This means that a football team has more individuals contributing to raising the average salary in the Amusements and Recreation sector than do the other sports, although the average salary of football players is lower than for players in the other sports. Nonetheless, professional football players make far more than do the typical Amusements and Recreation industry workers. For 1997, the minimum salary of a player with 5 years experience was $275,000, and the average salary was over $770,000.[9] Take these individuals out of the mix, and the additional salary for Amusements and Recreation workers associated with a football team is likely far smaller than the $1200 indicated in the table.

We also predict the effect of the sports environment for each of the MSAs. Table 5 reports the mean effects of the sports environment on employment and earnings per employee for each of the MSAs in the sample. Note the effect of the sports environment on employment in the services sector is negative in 25 of the 37 SMSAs. The effect on Retail employment is negative in 28 SMSAs. The effect on earnings in the Eating and Drinking establishments is negative in 35 of the 37 SMSAs and in seven out of 19 SMSAs for which earnings in the Hotels and Other Lodgings are available. Of the 32 SMSAs for which earnings in Amusements are available, those earnings are adversely affected by the sports environment in nine. In other words, city by city there is substantial evidence of a harmful effect from the sports environment on employment and earnings in those sectors of the economy that stadium advocates claim will be beneficiaries of sports-led development policies.

Consider Indianapolis which had an explicit 20-year-long strategy of sports-led development. The impact of this strategy has been examined by Rosentraub

[9]This figure is based on the salary cap figure of $40.95 million per team and 53 players per team.

Table 5
Predicted mean impact of sports variables, by MSA

MSA	Emp. services	Emp. retail	Earn. eat/drink	Earn. amusements	Earn. hotels
Atlanta	−4499	−2351	−199	1077	–
Baltimore	−1796	−2983	−182	353	–
Boston	−6409	110	−153	−500	–
Buffalo	−509	−714	−17	2037	–
Charlotte	1035	268	6	160	205
Chicago	1213	−5107	−515	−1553	−715
Cincinnati	−4732	−3307	−143	–	568
Cleveland	−3199	−4907	−393	–	−798
Dallas	−6245	−2752	−197	1470	1370
Denver	−2956	−4744	−448	160	–
Detroit	−5224	−3347	−209	1873	–
Green Bay	1245	−579	−20	1350	–
Houston	−2454	−2599	−189	430	538
Indianapolis	3049	1456	−19	140	–
Kansas City	−12,211	−3266	−157	–	–
Los Angeles	−3490	−3224	−214	2077	−373
Miami	−1092	−905	−46	2237	–
Milwaukee	−7851	−2405	−239	−3057	445
Minneapolis	−4292	−3367	−127	–	–
New Orleans	869	−444	0	2217	−110
New York	13,930	−2551	−594	−3993	−843
Oakland	−2512	−910	−171	47	–
Orange Co	−2234	−3996	−284	103	−683
Orlando	556	193	−6	–	–
Philadelphia	−4495	−3956	−265	890	–
Phoenix	987	1087	−38	330	170
Pittsburgh	−4294	−4384	−189	1063	–
Portland	−96	907	−42	−390	28
Sacramento	809	346	−12	−3	–
St. Louis	−801	−2947	−165	267	–
Salt Lake City	443	537	−21	−143	123
San Antonio	961	722	−30	−213	273
San Diego	−4496	−3908	−223	710	173
San Francisco	−3709	−4408	−241	977	−303
Seattle	−2384	−1789	−180	877	1088
Tampa	742	−67	−1	1550	43
Washington	−1274	−902	−54	−33	–

(1997). Employment in the Services sector is forecast to be larger by 3049 employees per year on average in our analysis as a result of the Indianapolis sports environment. As a percentage of all wage and salary employees this figure is about one half of 1%; as a share of Service sector employees this is about 1.8%. By contrast, Rosentraub finds for the Indianapolis MSA that all jobs increased by 41% between 1977 and 1989 and that Service sector jobs increased by 128%. Our

sample is much longer than his, but the clear indication is that sports had very little to do with either the increase in all jobs or the increase in Service sector jobs in Indianapolis.

Consider another example. The report from Johnson Consulting, Inc. (1999) on the effects of replacing Fenway Park in Boston with a new expanded facility finds that 3085 new full-time equivalent jobs will result from the project.[10] We find that the average effect on employment in the Services sector of the sports environment in Boston over the 27 years of our sample is a net loss of 6409 employees per year on average, with a range of −10,509 to −757, and on the Retail sector a net gain of 110 employees, with the range of −2813 to +1443. Even under the best case scenario, the effect of sports on employment in these two sectors is only 686 employees. Note, this is employees and, to the extent that some of these employees work only part-time, overstates the full-time equivalent employment created by professional sports.

The effects of the sports environment on wages in Eating and Drinking Establishments and in Amusements and Recreation in Boston are also quite small. The overall impact, on average, for Eating and Drinking Establishments is −0.04, a net loss of about $40 per Retail sector employee, or $153 per employee in Eating and Drinking establishments; for Amusements it is −0.015, or a loss of $15 per Service sector employee, $500 per Amusements employee. Again, the effects of the sports environment are to reduce earnings of those most closely linked to the sports environment.

Note finally that for the Retail sector, the null hypothesis of no effect can be rejected only for the Retail share of employment. But if the sports environment has impact on the shares of employment in the other sectors, and we see that it does affect the Services share, then it must have effects on the other shares as well, since the shares must add to one. Retail seems to be the most likely sector to respond to changes in Services. Each is a direct point of contact with customers and, in many instances, provide similar products. For example, stadiums and arenas offer snack bars and food courts which would directly compete with restaurants outside the facility. Souvenir shops within the stadium sell sports wear, clothing with team logos, coffee mugs, beer steins, pennants, and photos of players, all again in competition with department and other stores outside the stadium.

This point is very important. Sports-led development hinges on the argument that spending at the stadium generates incomes and further spending outside the stadium that ripple through the economy resulting in additional incomes and jobs for people outside the sports sector. The argument is also made that spending on sports-related entertainment does not substitute for spending on other activities. The evidence provided here is the first direct evidence on the strength of this

[10]C.H. Johnson Consulting advertises itself as ‘Experts in Convention, Sports and Real Estate Consulting’.

multiplier and the extent of the substitution in spending. The ripples of jobs and earnings creation from the sports environment are like those of a tiny pebble tossed into the ocean on the tides, inconsequential in any practical sense, although negative in terms of overall impact.

5. Robustness tests

One might argue that we have misspecified our empirical model by including a lagged value of the dependent variable as a regressor. If present, such misspecification could lead to bias in the estimated impact of the sports environment variables. The most troublesome type of bias would be the case where we find no effect of the sports environment variable on the local economy where one exists. We believe that few would be concerned that the results in the previous section are not negative enough. This bias could arise if the sports environment influences the levels of earnings or employment, but has no effect on the growth of those variables. In this case, a model with a lagged value of the dependent variable might lead us to conclude there is no effect, or a negative effect, where a positive effect exists. The issue is whether the lagged value of the dependent variable accounts for much or all of the effect of sports on the current value of the dependent variable. If so, then including the sports environment variables separately leaves nothing for them to explain when the lagged value of the dependent variable is a regressor.

Firstly, note that Coates and Humphreys (1999) pointed out that when advocates of sports-led growth talk about the benefits of stadiums it is not clear whether they mean the stadium will affect the level of income or the growth rate of income. This previous research showed that there was no effect of the sports environment on the growth rate of personal income per capita, but a negative effect on the level of personal income per capita in models including the lagged dependent variable. In other words, this prior evidence suggests that the specification using the lagged dependent variable is not simply an alternative means of estimating a growth model.

In order to check the robustness of our results, we estimated the basic empirical model, Eq. (1), using several alternative specifications of the control variables and re-calculated the predicted mean impact of the sports environment variables on each dependent variable for each alternative model specification. Table 6 shows the predicted mean impacts. In Table 6, model 2 replaces the lagged values of the dependent variable with lagged real per capita income from each city. We have argued that the lagged dependent variable captures the impact of unobservable but important factors. Lagged real per capita income should also capture these factors. Model 3 excludes the lagged dependent variable from the empirical model. Note that although we do not report them, the P-values on the overall F-tests of significance of the vector of sports environment variables are 0.0 in each of these

Table 6
Predicted mean impact of sports variables: alternative specifications

Dependent variable	Predicted mean impact	
	Model 2	Model 3
Emp., retail trade sector	−5596	1800
Emp., services sector	−1462	−2445
Earn., eating, drinking est. per emp.	$50	$112
Earn., amusements, recreation per emp.	$1494	$1555
Earn., hotels, other lodging est. per emp.	−$322	$470
Emp. share, retail trade sector	0.003	0.003
Emp. share, services sector	0.002	0.003

alternative model specifications. The vector of sports environment variables are unambiguously significant in both alternative model specifications.

The results for model 2, which replaces the lagged dependent variable with lagged real per capita income, are similar to the results in Table 3 in that they show that the sports variables have different effects on the various sectors of the economy. Employment in Retail and Services fall, although the negative impact on the retail sector is substantially larger; earnings rise significantly in Amusements and Recreation and slightly in Eating and Drinking Establishments but fall in Hotels; the employment share in Retail and Services rises slightly. This is an especially important point when combined with the fall in employment *levels* in these two sectors. If the level of employment falls, but the share rises, then total employment must fall by proportionately more, indicating that other sectors of the economy also lose employment. In other words, the sports environment may be beneficial in some ways for those sectors of the economy most closely related to professional sports, but the impact on other sectors is strong and negative.

The results for model 3, which omits the lagged dependent variable, differ markedly from the results in Table 3. Although the impact of the sports environment on employment in Services is again negative, the impact on employment in Retail is positive; earnings rise across the board and the employment shares rise as well. The predicted mean impact from this specification suggests that the sports environment is generally beneficial to these particular sectors of local economies. However, this does not refute earlier evidence that the *overall* impact of the sports environment is negative, as this study focuses on only a few sectors. The results from this specification only suggest that the positive impact of the sports environment is broader than the results from the other specifications suggest.

The sensitivity of our results to the inclusion of a lagged dependent variable raises questions about the univariate time series properties and, in particular, the issue of the stationarity of the dependent variable. Since the seminal work of Granger and Newbold (1974), economists working with time series data have investigated the appropriate way to handle variables that are growing over time in

econometric models. Variables that grow over time, like the earnings and employment variables in this application, are non-stationary and may lead to econometric problems when the levels of these variables appear as levels in regression models.

The key issue in stationarity revolves around the process that generates these growing series and the implications of this process for empirical analysis using regressions. There are two competing processes that can generate a series that grows over time: a random walk with drift process

$$z_t = \mu + z_{t-1} + u_t$$

and a trend stationary process

$$z_t = \mu + \beta t + u_t$$

where z_t is a time series variable, u_t an independent and identically distributed random variable, t a deterministic time trend, and μ and β unknown parameters. The levels of a growing series generated by a random walk with drift should not be used in a regression model because a researcher may find statistically significant but spurious relationships between this variable and other explanatory variables. Growing variables generated by a random walk with drift process, also called a unit root process in the literature, should be differenced before being used in a regression model. The levels of a growing variable generated by a trend stationary process can be used in a regression, provided the trend is controlled for.

Empirical researchers using time series data face the important problem of distinguishing between unit root processes and trend stationary processes. Unit root tests are the most common tool used to distinguish between these alternative processes. In this situation the testing is made somewhat more complex because we employ a panel of data and not a univariate time series, but a considerable amount of recent research has focused on the issue of unit root tests in a panel data setting. We use the panel data unit root test developed by Im et al. (1997), hereafter referred to as the the IPS test, to investigate the time series properties of our data.[11] The IPS test is based on the regression

$$\Delta y_{it} = \rho_i y_{it-1} + \alpha_i + \delta_i t + \sum_{k=1}^{K} \theta_{ik} \Delta y_{i,t-k} + \varepsilon_{it}$$

where y_{it} is the dependent variable in the regressions described above where the j subscript, indexing different variables, has been omitted for notational simplicity. The IPS test statistic is based on the t-statistic on the null hypothesis that $\rho_{ij} = 0$ for each city in the sample; in other words, the null hypothesis that the series are $I(1)$—contain a unit root. The test statistic is

[11] See Maddala and Wu (1999) for a discussion of unit root tests using panel data.

$$\sqrt{N}\frac{(\bar{t}_{N,K}-\mu)}{\sigma} \tag{3}$$

where

$$\bar{t}_{N,K}=\frac{1}{N}\sum_{i=1}^{n} t_{i,K}.$$

The test statistic is asymptotically distributed normally with mean zero and variance 1. The values for the parameters μ and σ can be found in the Im et al. (1997) paper. This test combines information from N different Augmented Dickey–Fuller unit root tests, the most frequently used univariate unit root test, run on each variable in each city in the sample. Dickey and Fuller (1981) describe this test which is based on the null hypothesis that $\rho = 0$ in the regression above when applied to a single series; the test is augmented by adding additional lags of the differences of the dependent variable to control for the effects of serial correlation. The null hypothesis of this test is that the series in question appears to be generated by a unit root process. If the null is not rejected, the series should be differenced before using it in a regression to avoid inappropriate inference. If the null is rejected, then the evidence suggests the series is generated by a deterministic trend process and the levels of the variable can be used in regression models.[12]

Table 7 shows the *P*-values on the IPS test statistic for the earnings and employment series used in this paper. The number of lags used in the unit root test (K) must be selected by the researcher, and with the IPS test the lag length is the same for each of the cross-sectional units. In Table 7 we report the *P*-values for several different lag lengths. The results on this table suggest that the earnings and employment series are stationary around a trend. This implies that levels of the series can be used in regression models.

Given the different implications of the results from the alternative models, it is

Table 7
P-values for panel unit root tests

Variable	K			
	1	2	3	4
Earnings, amusements and recreation	0.00	0.02	0.02	0.06
Earnings, eating and drinking	0.00	0.00	0.00	0.00
Earnings, hotels and other lodging	0.00	0.00	0.00	0.00
Employment, retail	0.00	0.00	0.00	0.00
Employment, services	0.00	0.00	0.00	0.00

[12]We do not test for the possibility that the variable contains both a unit root and a deterministic time trend, as this case is widely believed to be unrealistic. See Perron (1988) for a discussion of this point.

Table 8
Employment regression results

Variable	Service emp.		Service emp. share		Retail emp. share	
	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
esv1	8.09E−01	43.52	–	–	–	–
sveshar1	–	–	8.16E−01	45.18	–	–
rteshar1	–	–	–	–	7.50E−01	34.68
pop1	1.74E+05	4.20	−1.63E−01	−9.68	−1.83E−02	−1.82
bbco	2.56E+03	1.05	2.26E−03	2.36	1.17E−03	2.01
fbco	1.41E+03	0.88	−3.14E−04	−0.49	−4.11E−04	−1.06
baco	2.53E+03	1.81	−9.20E−04	−1.66	−3.17E−04	−0.94
bbfbc	−1.02E+03	−0.55	5.68E−04	0.77	1.11E−04	0.25
bbe	−7.04E+02	−0.36	3.07E−04	0.39	9.02E−04	1.90
bae	−3.26E+02	−0.23	−8.88E−04	−1.56	−7.38E−04	−2.15
fbe	2.96E+03	1.61	−1.06E−03	−1.45	−2.06E−04	−0.46
bbd	−9.96E+03	−3.19	−2.37E−04	−0.19	2.53E−03	3.37
bad	1.20E+02	0.08	−6.34E−04	−1.02	−3.00E−05	−0.08
fbd	9.75E+03	3.97	1.15E−03	1.18	7.46E−05	0.13
bafr	1.12E+03	0.19	−2.53E−03	−1.10	8.63E−04	0.62
bbfr	−1.81E+04	−0.90	−7.31E−03	−0.92	6.45E−03	1.34
fbfr	2.64E+04	2.13	4.47E−03	0.90	2.78E−04	0.09
bbcap	2.37E+02	0.38	1.51E−04	0.61	−1.83E−04	−1.22
bbcapsq	−3.57E−01	−0.07	−9.54E−07	−0.48	9.67E−07	0.80
bacap	−1.49E+02	−0.27	4.93E−04	2.28	−1.92E−05	−0.15
bacapsq	4.67E+00	0.47	−9.55E−06	−2.42	3.98E−07	0.17
fbcap	−6.22E+02	−2.10	−5.94E−05	−0.50	1.60E−05	0.22
fbcapsq	3.38E+00	1.93	1.65E−07	0.24	−2.11E−07	−0.50
Constant	4.96E+04	8.59	4.64E−02	11.03	4.56E−02	12.09
F	2975.6		186.7		2749.9	

Year- and SMSA-specific effects and SMSA-specific time trends are included but not reported.

necessary to determine which specification should be preferred. We believe our original specification should be the preferred specification for several reasons. Firstly, the lagged dependent variable captures myriad factors that we have not otherwise captured through the city-specific effects, city-specific trends, and year variables. One of those effects is the economic vitality of the city economy in a given year resulting from influences specific to that city at that time. Such influences might include new plant expansion or contraction by local businesses, or firms moving into or out of the area. Inclusion of the lagged dependent variable is one means of controlling for such events. Omitting the variable pushes these events into the equation error. In other words, the model without the lagged dependent variable suffers from omitted variable bias.

The effects of those included variables that are positively correlated with the omitted variable, which itself has a positive effect, will be biased upward. The predicted effects from a model using lagged real personal income per capita rather than the lagged dependent variables are informative here. The effects on

Table 9
Earnings regression results

Variable	Hotels and lodgings		Amusements and recreation	
	Coefficient	*t*-statistic	Coefficient	*t*-statistic
whope1	7.09E−01	22.02		
warpe1			7.43E−01	27.63
pop1	6.33E−01	2.60	6.00E−01	2.19
bbco	−2.01E−02	−1.56	6.92E−03	0.45
fbco	1.90E−02	1.97	−9.57E−03	−0.94
baco	2.98E−03	0.32	−6.03E−04	−0.07
bbfbc	1.89E−02	1.15	1.25E−02	0.84
bbe	8.54E−03	0.74	−1.11E−02	−0.85
bae	4.91E−03	0.60	1.65E−02	1.74
fbe	7.28E−03	0.63	−4.01E−03	−0.31
bbd	9.66E−03	0.46	−1.68E−02	−0.77
bad	1.27E−02	1.29	−9.53E−03	−0.89
fbd	−1.67E−02	−0.98	−2.41E−02	−1.55
bafr	−4.59E−02	−1.12	−2.35E−02	−0.60
bbfr	3.33E−01	2.34	−5.32E−02	−0.38
fbfr	4.16E−02	0.35	−1.04E−01	−1.26
bbcap	−8.95E−03	−2.32	3.37E−03	0.80
bbcapsq	5.36E−05	1.86	−4.52E−05	−1.39
bacap	5.05E−03	1.27	3.75E−04	0.10
bacapsq	−1.05E−04	−1.50	1.24E−05	0.19
fbcap	−6.47E−04	−0.25	2.87E−03	1.45
fbcapsq	−7.24E−07	−0.05	−7.71E−06	−0.67
Constant	1.99E−01	5.98	1.10E−01	4.20
F	40.01		82.98	

Year- and SMSA-specific effects and SMSA-specific time trends are included but not reported.

employment levels are each negative in this specification, a bit less harmful in Services than reported in Table 5 but much worse in Retail. The effects on earnings are also interesting. Wages in Eating and Drinking rise as a result of the sports environment, but much less so than if the lagged dependent variable is omitted entirely. Earnings in Hotels are predicted to be lower as a result of the sports environment, and earnings in Amusements and Recreation are about the same as predicted by the model without the lagged dependent variable.[13] In other words, accounting for the overall vitality of the local economy using lagged per capita personal income rather than the lagged dependent variable produces results that are similar to the models with the lagged dependent variable in some cases and similar to those without it in others.

The conclusion we draw from these various alternative specifications is that

[13]Predicted effects from the growth rate models show positive effects of the sports environment variables on Services employment and earnings in Amusements and Recreation but negative effects on Retail employment, and on earnings in both Eating and Drinking and Hotels.

there is only one specification that shows sports having generally positive and large effects on employment and earnings. That specification, however, suffers from omitted variable bias. An alternative specification used to reduce that bias finds results similar to those reported in Table 3.

6. Conclusions

In this paper we have examined the impact of professional sports on employment and earnings in narrowly defined sectors of the economies of US cities. Our results suggest that professional sports has a small positive effect on earnings per employee in the Amusements and Recreation sector, but that this positive effect is offset by a decrease in both earnings and employment in other sectors of the economy.

These results have several important implications. Firstly, these results call into question the validity of multipliers as a tool for assessing the overall impact of sports on the economy. The multiplier approach attempts to quantify indirect benefits flowing from professional sports by assuming that each dollar of direct spending on sports propagates through the economy and increases spending and income in other sectors. Our results suggest that the direct spending on sports does not lead to additional earnings in other sectors of the economy like restaurants, bars and hotels. Instead, spending on sports and spending in other related areas appear to be substitutes.

Secondly, our results shed new light on the reason that professional sports reduce the level of income in cities. The negative effect of sports on earnings of employees of restaurants and bars, and on employment in Retail and Services supports the idea that sports reduce real per capita income in cities through both substitution in private spending and through the creation of new jobs which pay less than the average prevailing wage.

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