DIPLOMARBEIT

Titel der Diplomarbeit

„Impact of Sports Facilities and Franchises on City Income and Growth“

Verfasser

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Angestrebter akademischer Grad

Magister der Sozial- und Wirtschaftswissenschaften
(Mag. rer. soc. oec.)

Wien, im Juni 2009

Studienkennzahl lt. Studienblatt:	157
Studienrichtung lt. Studienblatt:	Internationale Betriebswirtschaft
Betreuer/Betreuerin:	Univ.-Prof. Dr. Neil Foster

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Abstract

This study gives insight into the relationship between the sports environment of major leagues[1] and the economies of 30 metropolitan areas in the U.S over the period 1990-2006. As sports facilities and franchises tend to be heavily subsidized by the public sector, that is, through money collected from taxpayers, it seems interesting to investigate the impact of franchises and facilities on real personal income.

In addition to a brief introduction and literature review on how sports franchises affect the economy of a region, an empirical model is estimated that examines the importance of the entry and exit of professional baseball, basketball and football franchises along with the construction of arenas and stadia, and sports related variables on city per capita incomes.

Like many existing studies, the empirical results indicate that sports franchises have only little effect on real per capita income. Additionally, the creation of one single workplace in the sports environment is associated with a cost of roughly $200000 casting doubt on the efficacy of using public funds to subsidize sports franchises and venues in order to enhance economic growth.

[1] Major League is a term to refer to the highest division in team sports in the U.S. The major leagues consist of: MLB (Major League Baseball), MLS (Major League Soccer), NBA (National Basketball Association), NFL (National Football League) and NAHL (National Hockey League).

1. Introduction

U.S state governments have invested in the playing facilities used by professional sports teams with the hope of producing a set of tangible and intangible benefits. The past 15 to 20 years have given rise to an almost unprecedented building boom involving new stadiums and arenas for professional sports teams.[2] Forty six major league stadiums and arenas were built or renovated for teams in the four principal professional U.S. sports leagues between 1990 and 1998 with more than $21.7 billion being spent on sports facilities. Public coffers contributed up to two-thirds of this amount. In 2002, at least 60% of the 120 plus major sports franchises were playing their home games in a facility built or remodelled since 1991, with average construction costs in excess of $175 million for an arena and $300 million for a stadium. The building boom initiated during the 1990s reflects a sports facility construction cycle of around 30 years. Thus, the beginning of a new construction cycle around the year 2020 will be anticipated .[3]

The focus of this paper is on investigating whether it is economically reasonable for a metropolitan area to subsidize sports franchises or facilities in order to enhance the local economy. To do so, I will investigate the impact of sports franchises and facilities on the real per capita income of metropolitan area citizens.

1.1 Cities and Subsidies[4]

Local politicians and owners of sports teams often claim that professional sports facilities and franchises are important engines of economic development in metropolitan areas, contributing millions of dollars of new spending and creating hundreds of new jobs (see Table 1.1). So far, economists have found little empirical support for a positive economic impact of professional sports teams and facilities on urban economies in terms of real income.[5] Given that at least two years have passed since the most recent study I have researched, it seems timely to return to this issue.

[2] Quirk and Fort (1999), p. 140
[3] Kennedy and Rrosentraub (2000), p.436; Siegfried and Zimbalist (2000), p.95
[4] For details and implications of the theoretical model see Owen (2003)
[5] Coates and Humphreys (2003), p. 335

Table 1.1 Claimed Benefits by Pro Stadium Impact Studies

Year of Study	Metropolitan area	Team (League)	Annual economic impact ($mil)	Annual personal earnings ($mil)	Permanent jobs created	State/local taxes ($mil)	Total impact of construction ($mil)	Construction jobs created
1998	Phoenix	Diamondbacks (MLB)	319	-	4110	14.9	694	4626
1999	Hartford	Patriots (NFL)	171	71	2757	15.6	-	-
1999	Boston	Red Sox (MLB) - current stadium	120	-	1597	-	-	-
		Red Sox (MLB) - new stadium	186	-	2629	-	492	4769
1999	Washington/Baltimore	Ravens (NFL)	202	96	2772	11.6	-	-
1999	San Antonio	Spurs (NBA)	77	43	-	3.3	372	-
2000	Green Bay	Packers (NFL)	144	89	1620	9.6	-	-
2000	Houston	Rockets (NBA)	187	91	2400	13.0	-	-
2001	Kansas City	Chiefs (NFL) & Royals (MLB)	328	218	4418	19.8	-	-

Source: Rappaport and Wilkerson (2001), p.59

It is a legitimate question to ask why governments grant such subsidies to sports franchises. Cities or local governments hope to stimulate economic development and regional recreational patterns through the presence of a professional sports franchise. In some instances, however, the public cost for each job created in the area adjacent to a facility has exceeded $200000, easily exceeding the costs of creating a job when governments invest in other jobs.[6] The aim of the public sector is to minimize the subsidy, ensure revenue streams generated by the team to repay debt and operating expenses caused by the construction of a facility, and enjoy intangible benefits from a team in the community.[7] For local residents to be willing to pay a subsidy to a sports team there must be some benefit that the team cannot capture. Those sources of benefit might include: economic growth, job creation, civic pride, and consumer surplus.[8]

City subsidies granted to sports teams are usually based on claims by stadium proponents that teams provide a public good element to them that teams themselves are not able to capture through ticket sales, broadcasting contracts, etc. The existences of intangible benefits, such as

[6] Kennedy and Rosentraub (2000), p. 437
[7] Kennedy and Rosentraub (2000), p.441
[8] Owen (2003), pp. 187-188

civic pride, and so on are acknowledged by economists. Whether the value of the external benefits of a major league team to consumers really does exceed stadium subsidies is uncertain, but by no means implausible.[9]

The number of teams that exist is determined by the groups of owners that have joined together to form the four major professional sports leagues. Each league seeks to ensure that there is at least one region (and perhaps two or three) that does not have a team. These regions become the "chasers," offering teams generous incentive packages to encourage them to relocate into their metropolitan area.[10] The key to team owners' negotiating power is their ability to control the geographic mobility of franchises as well as the authority to anoint new franchises.[11]

Table 1.2 MLB Teams Seeking New Facilities in the 1980s and 1990s

League/Team	Situation	Resolution
Arizona Diamondbacks	New stadium part of expansion bid	$238 million subsidy from county (sales tax)
Atlanta Braves	Sought new stadium	Moved into remodelled Olympic Stadium
Baltimore Orioles	Demanded new stadium	Camden Yards, $200+ million subsidy in 1992
Chicago White Sox	Threatened to move to Florida	New stadium in 1991, 100% public subsidy
Cincinnati Reds	Threatened to move to Florida	New stadium approved in 1996, $250+ million subsidy
Cleveland Indians	Threatened to move out of region	New stadium in 1994, $150+ million subsidy
Colorado Rockies	New stadium part of expansion bid	$215 million subsidy (sales tax)
Detroit Tigers	Threatened to move to suburbs	New stadium approved in 1997; $240 million public subsidy
Houston Astros	Threatened to leave the region	New stadium approved in 1997; $180+ million public subsidy
Milwaukee Brewers	Threatened to leave the region	New stadium approved in 1997; $250+ million public subsidy
Minnesota Twins	Threatened to move to North Carolina	Plan for new stadium rejected in North Carolina; Unresolved
Montreal Expos	Threatening to move	New Ballpark unlikely in Montreal
New York Mets	Requesting new ballpark	Unresolved
New York Yankees	Threatening to leave New York City	Unresolved
Philadelphia Phillies	Requesting new stadium	Unresolved
Pittsburgh Pirates	Threatening to leave the region	New stadium plan approved; $100+ million subsidy
San Diego Padres	Seeking new ballpark	$275 million public investment
San Francisco Giants	Threatened to move to Florida	New private stadium
Seattle Mariners	Demanded new stadium	$360 million public subsidy for new stadium
Tampa Bay Devil Rays	Stadium part of bid	City paid for stadium in 1990 and renovations in 1997-1998
Texas Rangers	Threatened to leave Arlington	New stadium in 1994, $135 million public subsidy
Toronto Blue Jays	New stadium opened in 1989	Public subsidy in excess of $262 million (Canadian)

Source: Kennedy and Rosentraub (2000), p.442

[9] Noll and Zimbalist (1997b), p. 58; also see Baade and Dye (1990)
[10] Kennedy and Rosentraub (2000) pp. 437-439, Piraino (1996), pp. 1677-1678
[11] Siegfried and Zimbalist (2000), p.99; also see Kennedy and Rosentraub (2000).

Measuring the value of a team to a city is much more difficult than measuring the value to its owners, as measuring the surplus value of a sports franchise to the fan will face empirical obstacles. Revenues that teams earn through ticket sales and other sources such as broadcast rights fees do not completely reflect the value of the team to local area residents. However, owners of sports franchises have been successful in absorbing portions of the consumer surplus, as they frequently received subsidies if threatened to relocate to another metropolitan area.[12] Basically, the battle over stadium funding can be viewed as a bargaining problem between teams and cities.[13] Even though the presence of a professional sports franchise is associated with huge public expenses, cities are willing to offer big incentive packages (see Table 1.2).

1.2. Costs vs. Benefits

This chapter examines the costs and benefits to cities resulting from subsidizing professional sports facilities in order to find out whether the proliferation of public investments in professional sports venues can be justified. These benefits can be identified through a cost-benefit analysis.[14] Stadium proponents claim that hosting professional franchises enhances the local economy in terms of job creation and further increase the local tax revenue. Also an improvement in quality of life is stated as another form of benefit. In contrast, the costs, namely stadium subsidies, can account for two thirds of the actual construction costs. As intangible benefits are difficult to measure, I will focus on the effects in terms of job creation and tax revenue and review some of the existing studies that have undertaken such an analysis.

A common measure of economic activity is to look at the creation of new jobs. Correlations across metropolitan areas among population, employment, wages, and house values observed in order to assess how much a metropolitan area benefits from net job creation caused by a professional sports environment.[15]

Economists have estimated metropolitan area benefits to range from $0 to $1500 per net job created and the number of jobs created is estimated to be less than 1000 (see Table 1.3). Even

[12] Owen (2003), pp. 187-188
[13] Owen (2003), p. 184
[14] See Rappaport and Wilkerson (2001); Hamilton and Kahn (1997)
[15] See Coates and Humphreys (2001); Baade and Sanderson (1997)

if the benefit is at its upper bound estimate of $1500, the total benefit still is insignificant to a metropolitan area. Another source of benefits is increased tax revenue that may arise from hosting a team. Imported sales tax revenue benefits the local area by reducing the amount of taxes necessary to be raised from local residents. To estimate the amount of imported sales tax, the number of nonlocal fans who visit to attend sports games must be estimated and multiplied by the fans' estimated average spending in the sports environment. Assuming an extremely high local sales tax rate of 5 percent suggests that hosting a sports team imports from $696000 per year for an NHL team to $1.5 million for NFL teams. Some metropolitan areas hosting professional sports teams also levy local income taxes. Applying a 2 percent income tax rate to the estimated team payroll suggests that increased local income taxes range from $868000 per year for NHL teams to $1.4 million per year for NFL teams. The assumed 2 percent income tax represents the upper bound at which local governments tax income. Indeed, many teams play in metropolitan areas where no income taxes are levied.[16]

Table 1.3 Net Job Creation Effect of a Professional Sports Team (Estimate)

Number of net jobs created	0 to 1000
Benefit per net job created	$0 to $1500
Baseline annual benefit (500 jobs * $750 benefit per job)	$375000

Source: Rappaport and Wilkenson (2001), p.65

Adding together all the aforementioned benefits, the benefits of hosting a professional franchise range from $1.9 million per year for an NHL team to $2.9 million per year for an NFL team. In order to compare benefits and costs, the benefits are converted into net present values. The question being here is the willingness of a metropolitan to spend for each dollar of annual benefit while hosting a franchise. The estimated value of the combined benefits from a franchise ranges from $26.7 million to $40.3 million. In contrast, the average public contribution for the 17 football and baseball stadiums built between 1994 and 2004 accounted for $188 million and for the 19 basketball and hockey arenas, the average public share was $84 million[17] (see Table 1.4).

[16] Rappaport and Wilkerson (2001); pp. 61-68

[17] Those outlays further support aforementioned calculations of costs required to create a workplace in the sports environment. $188 million (public costs)/ 1000 (jobs created) = $188000

In this calculation annual public expenses and municipal services such as the maintenance or operating costs of running the facility (police, fire, water costs, etc.) are not even included. Those costs are estimated to account for $ 5-10 million dollars, depending on the size and type of the sports facility. Typically the public covers 100% of these municipal services.[18]

Table 1.4 Stadium/ Arena Openings and expected Benefits

	Number of facilities	Avg. cost ($mil)	Avg. public cost ($mil)	Public cost as percent of total
1994 - 2000 new				
NFL/MLB	17	286	188	66
NBA/NHL	19	185	84	45
2001-04 new				
NFL/MLB	15	366	230	63
NBA/NHL	3	225	114	51

Estimates Of Jobs And Tax Benefits, 2000 Season

Baseline annual benefit value (% of total job + tax benefit):	NFL	MLB	NBA	NHL
Net job creation benefit	$375000 (12.8%)	$375000 (12.9%)	375000 (17.8%)	$375000 (19.3%)
Imported sales tax benefit	$1134000 (38.7%)	$1537000 (53.0%)	$732000 (34.7%)	$696000 (35.9%)
Increased income tax benefit	1418000 (48.4%)	$990000 (34.1%)	$1000000 (47.5%)	$868000 (44.8%)
Total annual benefit value	$2927000	$2902000	$2107000	$ 1939000
Net present value of jobs and tax benefits from hosting a team for 30 years using 6% interest rate (annual benefit times 13.76)	$40275520	$39921520	$28992320	$26680640

Source: Rappaport and Wilkerson (2001); pp. 57-59

It is obvious that costs for most sports facility projects exceed the above estimated benefits by far. Further the baseline values estimated rather overestimate the benefits, as many local areas tax spending below 5 percent. Rappaport and Wilkerson suggest that the net present value of the jobs and tax benefits may be no more than $5 to $10 million from hosting a major league team. The benefit to a city from increased economic activity such as job creation and increased tax revenues falls far short of the public outlays needed to attract professional sports franchises. Nevertheless, subsidies for sports franchises still seem to grow. Hence, there must be some other benefits from hosting a professional sports team which an analysis focusing on economic activity and tax revenue is not able to capture and highlight.[19]

[18] Long (2005), pp.15-16
[19] Rappaport and Wilkerson (2001); pp. 57-58; 68-77

2. Economic Impact Studies assessing the Sports Environment

Economic impact analysis (EIA) estimates changes in economic activity within a region caused by actions such as hosting sport events, or building a production facility.[20] Broadly speaking, there are two common methods of conducting EIA. These are discussed briefly below:

2.1 Economic Impact Analysis: Introduction and Theory

Ex ante economic impact studies in respect to the sports environment are applied to estimate the number of visitors/admissions an event/franchise/facility is expected to draw, the number of days each spectator is expected to stay and the amount of money visitors will spend. Also, one can compare economies of cities/regions where the sports environment has changed with that of cities where it has not changed. From these estimates, a direct economic impact is derived. Subject to a multiplier, an indirect economic impact can be further estimated.[21] The multiplier is a scaling factor that links dollars spent directly on pro sports to a net effect on the entire local economy among other factors.[22] However, ex ante studies suffer from theoretical deficiencies namely the substitution effect and effects of leakage.

> ***The Substitution Effect:*** The majority of consumers have a relatively inflexible leisure budget. If sports team moves to town, the money one spend taking a family to a game typically is money that is not spent on other forms of entertainment and leisure. Many Impact analysis studies ignore reductions in spending on other forms of entertainment due to substitution in private spending.[23] Only spending that would not have occurred in the absence of the sports franchise should be included as part of the initial economic impact. Further, out of state fans at sporting events might come to town with the game not being their main reason. Rather, their visit is based on business reasons or other forms of leisure. If not at the game,

[20] Chang (2001), p.3.
[21] Baade et al. (2008), Coates and Humphreys (1999), p.2
[22] Coates and Humphreys (1999), p. 602; The U.S Department of commerce maintains RIMS II, a set of multipliers for each industry in each state of the union. The RIMS II multipliers are designed to take all leakages, taxes and imports into account. Sporting events are categorized as part of hotels, lodging places and amusement industries. Source: Hefner (1990), p.8
[23] Coates and Humphreys (2003), p. 342

they would spend their money on other forms of entertainment in the city.[24] To strengthen these observations, little or no increase in hotel occupancy rates, retail sales, or airport traffic was reported in cities that hosted Super Bowls or the Olympic Games in the U.S. in the past ten years.[25]

Leakages: Approximately 55 to 60 percent of NHL, NBA, NFL and MLB team revenues go to player salaries, which is regulated in the collective bargaining agreement. With variations in league payroll rules, when team revenues rise after relocating, a big share of the revenue goes directly to the athletes. The remaining 40 to 45 percent goes to the owners or is necessary to cover the costs associated with the new facility. Players and owners usually face the top federal marginal tax rate at 39.6 percent, further they are taxed an additional 1.45 percent for Medicare. Hence, more than 40 percent of their income leaks directly to Washington, D.C. High incomes also lead to higher savings rates, with athletes' salaries leaking out of the local economy and into the world's money markets. Also, more often than not, players do not choose the local community as their permanent residence, and owners tend not to do so either. Further, food prices at sporting venues are substantially higher than at alternative retail establishments, provided by a concessionaire company, which often is based outside the local area.[26]

The second methodology in the literature uses cross section and/or time series data from metropolitan areas or regions in order to conduct a regression analysis. The economic impact is then assessed using ***ex post*** evaluations.[27] *Ex post* analyses, following empirical rules of conduct more strictly find that *ex ante* studies exaggerate the benefits of mega-events often by up to a factor of 10. Such optimistic estimations can be explained due to ignoring the substitution effect, simply including spending that would occur even in the absence of sports events.[28] The academic work on the economic impact of sports facilities and teams compares the local economic performance of areas with and without stadiums, arenas, and teams, controlling for other variables that affect local economic conditions.[29] The majority of previous independent studies of mega-events have concentrated on data regarding personal income, per capita income, or employment data to estimate the *ex post* economic impact of sports. [30]

[24] Hudson (2001), p.27
[25] Coates and Humphreys (2003), p. 343; Hudson (2001), p.28
[26] Siegfried and Zimbalist (2000), p. 106
[27] Coates and Humphreys (1999), p. 6
[28] Baade et al. (2008), Coates and Humphreys (1999), p.2
[29] Siegfried and Zimbalist (2000), p. 104
[30] Baade et al. (2008), Coates and Humphreys (1999), Coates and Humphreys (2003), Baade and Matheson (2001), Baade and Matheson (2004).

2.2 Literature Review

Keating for example finds that that the presence of pro sports is not statistically significant in determining economic growth rates as large taxpayer expenditures for sporting facilities have failed to enhance economic growth and job creation.[31] Michael Walden, a North Carolina State University economics professor, looked at the determinants of growth in jobs from 1990 to 1994 in 46 cities and found that cities with major league sports teams have grown more slowly in the 1990s.[32] Indeed, a study from University of Maryland economist's Denis Coates and Brad Humphreys found that new stadiums and teams actually make cities poorer: their results show a $100 drop in per capita income for cities with new ballparks and a $400 decline in income for cities with new baseball teams.[33]

In an ex ante study from 2006, Matheson estimated the direct economic benefits of the U.S. Open Tennis tournament in Flushing Meadows, New York at $420 million for the tri-state area, more than any other sports or entertainment event in any city in the United States. This sum represents 3% of the total annual direct economic impact of tourism for New York. It is hard to believe that 1 in 30 tourists visiting New York City in any given year are visiting the city solely to attend the U.S. Open.[34]

Leagues, team owners, and event organizers have a strong incentive to provide economic impact numbers that are as large as possible in order to justify heavy public subsidies. For example, the National Football League (NFL) typically claims an economic impact from the Super Bowl of around $300 to $400 million, Major League Baseball (MLB) attaches a $60 to $75 million benefit to the All-Star Game, and up to almost $250 million for the World Series.[35]

In contrast, Baade and Matheson's research on the impact of the MLB All-Star Game suggests that employment growth in host cities was lowered by 0.38 percent in comparison to other cities. They investigated employment rates and changes in the absence of the MLB All-Star Games and then compared that estimate to actual employment levels to assess the

[31] Keating (1999), p. 25
[32] See Walden (1997). However, 7 of the 10 MSAs with the biggest projected growth rate in Gross Metropolitan Product from 2007-2012 do host major league franchises. Source: *http://www.forbes.com/2008/01/30/economy-cities-alabama-biz-cx_bw_0130econcities_slide_5.html?thisSpeed=25000*
[33] see Coates and Humphreys (2001)
[34] Matheson (2006), pp. 4-5. The methodology to obtain these estimates was not described.
[35] Matheson (2006), p.2

contribution of the event. Their model included variables as deviations from city norms, explaining regional and metropolitan growth patterns. Therefore, they defined a regression analysis assessing changes in employment attributable to the All-Star Game in host cities between 1973 and 1997. Further, sales tax data were examined. Taxable sales are generally good indicators for the assessment of the economic impact of sporting events, as a direct relationship between sales tax collections and sports events can be observed. Further, they can be isolated from cumulative economies. Such isolation enables forecasts with better precision, as sales data can be even collected and assessed on a weekly basis and areas can be isolated down to city levels. The key to calculate the impact was to isolate factors common to the economy as a whole from factors being specific to the city being studied. If an event such as the All-Star Game significantly increased economic activity in the host city, then the host city's taxable sales as a percentage of taxable sales in the rest of the state increased as well. By comparing the city/rest-of-state ratio in an All-Star Game time period to other time periods, they assessed changes in taxable sales. In contrast to MLB studies claiming that an All Star Game increases economic activity creating up to 1000 additional jobs in the year a city hosts an All Star Game, Baade and Matheson's regression analysis reported employment numbers to fall by roughly 8000. Further an examination on taxable sales revealed that sales have not only failed to increase during All-Star Games, but have on average fallen nearly $30 million below what would have normally been expected in these host cities.[36]

In 1990, Robert Baade and Richard Dye assessed ex post the economic impact of stadia and franchises. In their model, the real aggregate personal income in a Standard Metropolitan Statistical Area (SMSA) was explained by population, a time trend, and dummy variables for facility construction and franchise presence of baseball and football teams. Further, they investigated the SMSA share of regional income using the SMSA share of regional population, a time trend and dummy variables. Baade and Dye concluded that stadia and new franchises have small but negative impact on the income level of an SMSA with the one exception being Seattle.[37]

Lertwachara and Cochran also confirmed negative income effects triggered by sport franchises in local economies in their study from 2007. Both scholars examined both the short-term and long-term economic impact of professional sport franchises in metropolitan

[36] Baade and Matheson (2001), pp. 311-322; also see Baade and Matheson (2008)
[37] Baade and Dye (1990)

statistical areas.[38] In their study, the impact of sports franchises on per capita income and the per capita growth rate was assessed using the event study model considering the MLB, NBA, NFL and NHL. The whole U.S. economy was taken into consideration to account for macroeconomic conditions that influence local economies. Further, specific characteristics of each local economy were included. An event was defined as the establishment of a new professional sports team in an MSA through expansion or relocation. They used per capita income at the MSA level and gross domestic product (GDP) as proxies for the local and overall U.S economy to estimate a linear relationship between the nation's economy and economy of each MSA. In Summary, Lertwachara and Cochran focused on how an estimated league-wide regression equation fits a new or relocated franchise.[39] The scholars provide evidence that a professional sports franchise significantly slows the growth rate of per capita income in the short run as well as in the long-run. The decrease ranges from 0.33% for a hockey team to 7.08% for a football team. An estimated decrease in per capita income of $1116.96 occurred during any franchise's first year regardless of the sport in the MSA and $13901.08 during the 10-year period immediately following the establishment or relocation of the franchise. The linear regression analysis they conducted indicates that, in the long run, an additional football team increases the unexpected income by $109.99, whereas an additional basketball team would decrease the unexpected income by $88.14. They also found that the number of existing teams has no meaningful impact on the local income. In line with results for per capita income, the results also indicate no relationship between the growth rate of income and the number of existing teams. The conclusion they draw is that estimated local income in the presence of a professional sports franchise is lower than what would be estimated in the absence of a professional sports franchise.[40]

In 1999, Coates and Humphreys investigated the effect of professional sports on local economies by pooling data from each city that had a professional football, baseball, or basketball team at any time during the period 1969 to 1995. The study used panel data techniques to control for city and year specific influences with respect to the level of income per capita by defining multiple variables to capture the entire spectrum of sport's effects on the local economies. Dummy variables for the entry or exit of teams within the past 10 years were introduced, as well as variables controlling for the construction of stadiums within the past ten years, followed by variables for the capacity of sport facilities in the respective cities, and further variables describing the presence of a team in the MLB, NBA and NFL. In order

[38] For details, implications of the model and methodology see Lertwachara and Cochran (2007)
[39] Lertwachara and Cochran (2007) pp. 244-248
[40] Lertwachara and Cochran (2007) pp. 248-253

to estimate the economic effect, they applied a reduced form linear model. The overall conclusion of their study was that the sports environment tended to reduce the per capita personal income in the city by a small but statistically significant amount.[41]

Later in 2000, Coates and Humphreys examined the economic impact of strikes and lockouts of professional sports leagues. Again, this framework employed a linear reduced form empirical model which relates the level of real per capita personal income in a metropolitan area in a given year to a vector of variables describing the economic and business climate in that area during that particular year and to a vector of variables which capture the role of stadia and franchises in the determination of economic activity. In order to determine the effect of the work stoppages in professional sports on local economies, two dummy variables were added, one each for baseball and football strikes. Coates and Humphreys conclude that the evidence does not support the assertion that professional sports influence the economic health of SMSAs. Work stoppages in baseball and football have never had significant impact on local economies. The departure of a franchise in any sport, particularly in basketball, has never significantly lowered real per capita personal income in a metropolitan area.[42]

Further, in 2001, Coates and Humphreys explored the impact of professional sports teams and stadiums on the wages of individuals employed in occupational groups closely linked to the sports environment in 37 U.S. cities from 1977 to 1998. Wage equations for individual workers employed in food service, hotel services, retail sales, or sports and recreation were estimated, including controls for individual characteristics and the local labour market as seen in typical human capital wage equations. A regression model was applied, including vectors of variables describing factors other than the professional sports environment that affect wages of individual workers (i.e. gender, race, age, educational descriptors, etc.), as well as variables controlling for the sports environment (i.e. presence, entry/exit of a franchise, etc.). They concluded that the effect of sports results in an annual average decrease in inflation adjusted earnings of $46.11 for workers. The results of this study confirmed conclusions of earlier research that the overall sports environment is statistically significantly affecting wages negatively.[43]

[41] Coates and Humphreys (2003), pp. 341.
[42] Coates and Humphreys (2000), pp. 314-324
[43] Coates and Humphreys (2001), pp. 2-11

2.3 A critical View

Many league-sponsored economic impact studies ignore the costs of hosting such an event. Most leagues and event organizers require sparkling new stadiums and arenas before awarding the privilege of hosting a mega-event to a city. Public expenditures on sports infrastructure and event operations necessarily entail reductions in other government services, an expansion of government borrowing, or an increase in taxation, all of which produce a drag on the local economy. While *ex ante* estimates often do a credible job in determining the economic activity that occurs as a result of a mega-event, they generally do a poor job of accounting for substitution effects and almost never acknowledge the problems associated with the application of incorrect multipliers. [44] Wassmer suggested in 2001 that an overall multiplier of 0.5 is more appropriate than the multiplier range of 1.5 to 2.0 usually used.[45]

Misleading conclusions also occur when different definitions of the geographic area are applied for different aspects of the analysis. Some studies used small areas in order to capture a large amount of visitors, yet at the same time a bigger geographical area was defined in order to utilize a larger multiplier. An impact study of the Commonwealth Games in Victoria, British Columbia used such a method, considering anyone outside of the city being a tourist, but the entire providence was used as a sample to measure the economic impact. Thus, altering the geographical area of interest represents a serious flaw in the analysis, with the purpose to optimize numbers and exaggerate the economic impact. [46]

In addition to the applied multipliers in the respective studies, Table 2.1 includes two columns, named *Locals included* and *Casuals included* in order to reveal whether the studies are capturing only additional money which is coming from outside the "local" area. In fact, most of the studies do include local spending, which is diverted money from other local businesses, as part of economic impact. Hence, a yes will appear in the *Locals Included* column. Given this situation, ignoring to highlight only the true additional cash flows coming from outside the local economic area, it is also unlikely that tourists are separated into those primarily interested in the pursuit for the sporting event per se, and those who would have visited for different reasons. If out of town tourists were investigated to be genuine additions to the tourist population, a "no" will stand in the Casuals Included column. Many studies focus on

[44] Matheson (2006), pp. 11-13
[45] Wassmer (2001), p. 267.
[46] Crompton (1995), p.24

the gross impact rather than the net impact, which is argued by economists to be the correct methodology.[47]

Table 2.1 Economic Impact Studies and Multipliers

Study	Multiplier	Locals Included	Casuals Included
Mayer Hoffman McCann & Mid-America Regional Council (1989): Gross	2.9	Yes	Yes
Mayer Hoffman McCann & Mid-America Regional Council (1989): Net	2.9	No	Yes
Maryland Department of Economic Development (1987)	1.9	Yes	Yes
Centre of Economic Education 1996	1.7	Yes	No
Deloitte and Touche (1993): State	1.9	Yes	Yes
Deloitte and Touche (1993): City	1.6	Yes	Yes
City of Chicago (1986): State, new park	2.0	Yes	Yes
City of Chicago (1986): City, new park	1.7	Yes	Yes
Blair and Swindell (1997)	1.7	No	No
Conway and Beyers (1996)	1.5	No	Yes

Source: Hudson (2001), p.32

Money being substituted from one use to another is not captured in gross impacts. Net impacts capture only funds that are genuinely additional. Based on the calculation of the initial impact being expanded further by the multiplier in order to get a final measure for the total economic impact, the distinction between these techniques is crucial.[48]

Economic impact studies are powerful tools in the subsidization debate with the objective to determine the economic impact of the team to a local area realistically. Disappointingly, many violations were identified as acceptable practices in the way these studies were conducted as discussed earlier, with many studies being funded by leagues, pro lobby interest groups or local governments. The economic impact of highly paid athletes and vendors in fact is hardly affecting the public. Still, economic impact studies have been successful weapons in convincing voters, by arguing that sports teams are important economic catalysts for the region.[49] If the goal of a municipality is to increase their citizens' per capita income, maybe cities should reconsider attracting professional sports teams to their markets by spending huge amount of public funds.[50]

[47] Hudson (2001), p.31-33
[48] Hudson (2001), p.27
[49] Hudson (2001), pp. 23-37
[50] Lertwachara and Cochran (2007), p. 253

3. The Empirical Model[51]

In this section, an empirical model will be constructed in order to assess the relationship between the presence of sports franchises and facilities and real per capita personal income and its growth rate in 30 U.S American Cities (Standard Metropolitan Statistic Areas) from 1990 until 2006. Following the approach adopted in several studies conducted by Brad Humphreys and Dennis Coates using regression analysis, I will investigate if similar results can be observed with more recent data. Several variables describing the sports environment will be considered in order to capture the economic impact of professional sports and facilities on the metropolitan economy as precise as possible.

The following questions will be addressed:

1) **Do sport franchises affect the level of real per capita personal income in a metropolitan area?**

2) **Do sport franchises have an influence on the growth rate of real per capita personal income in a metropolitan area?**

[51] The empirical framework in throughout chapter 3 is adopted from Dennis Coates and Brad Humphreys' collaborative publications, where they investigated the economic impact of sports leagues under several circumstances. I will heavily base my research on the models both scholars have applied and conduct research derived from their insights. For more details, see Coates and Humphreys (1999), Coates and Humphreys (2000), Coates and Humphreys (2003).

3.1 Theoretical Concept

It is important to distinguish these two questions from an economic perspective as an increase in income in a single year may not imply a long-run impact on economic growth.[52]

To address the first question, a linear reduced form empirical model will be used. This enables one to relate real per capita income (y) to variables representing the economic climate (x) and additionally to variables describing stadia and franchises (z) for each year (*t*) in each city (*i*). Hence, the model takes following form:

$$y_{it} = \beta x_{it} + \gamma z_{it} + \mu_{it} \qquad \textbf{(1)}$$

Where β and γ are vectors to be estimated, and μ is the normal iid disturbance term. If γ is significantly different from zero, real per capita personal income in a metropolitan area is affected by the sports environment, otherwise sports franchises and facilities have no influence on the local economy.

An alternative method to address the first question is to use the event study methodology, commonly used to assess the impacts of law and regulations on the value of firms in the finance literature.[53] In this case the model is:

$$g_{it} = \alpha + \beta y'_t + \sum \gamma_k D_{kit} + \mu_{it} \qquad \textbf{(2)}$$

Again, the variable (y) represents real per capita personal income, (y') is the average real per capita personal income across all metropolitan areas and D is a dummy variable describing an event (k).

The average level of income across the sampled metropolitan areas is an explanatory variable. An advantage of applying the event study methodology is to allow the data to determine the relationship between changes in real per capita personal income in the metropolitan areas with changes in average real per capita personal income. In this model, variables specific to the Standard Metropolitan Statistical Areas (SMSA) are included as regressors. As the regression

[52] Coates and Humphreys (1999); p.3
[53] Coates and Humphreys (1999); p.10

includes the average level of income across all metropolitan areas, year specific variables have to be omitted. To explain this, the average value of income obviously will take the same value for each city in a certain year. Hence, the inclusion of year specific effects would not allow this model to be estimated, as those variables are perfectly collinear with the average income variable.[54]

For the assessment of the second question, the same models will be applied. However, this time, the growth rate of real per capita income will be the dependent variable in the analysis. While the event study model is being conducted, the average level of real per capita personal income will be replaced by the average growth rate of real per capita personal income as the explanatory variable.

3.2 Data

The data for this research covers the time period from 1990 to 2006. Income and population data are taken from the Regional Economic Information System, which is distributed by the U.S Department of Commerce, Bureau of Economic Analysis, available at www.bea.gov. Data on sports facilities are taken from www.ballparks.com. Data on the specific sports franchises are taken from the official websites of the respective sports leagues; www.nba.com, www.nfl.com and www.mlb.com.

Thirty SMSAs are included in the sample, each of which hosted at least one major league franchise during the sample period, though in most cases the sampled cities host multiple major league sports franchises. The explanatory variables also include the lagged level of real per capita income or the growth rate of real per capita income, as well as the level of population change. Dummy variables specific to the metropolitan area are additionally included to control for factors specific to each SMSA that may impact upon income or growth. Finally, dummy variables describing the sports environment are defined. These include the following variables[55]:

[54] Coates and Humphreys (1999); p.12

[55] See Coates and Humphreys (1999)

-) entry/exit of sports franchises
-) presence of a sports franchise
-) construction of sports facilities
-) capacity of sports facilities

The entry/exit and presence and construction of sports franchises variables are dummy variables describing the change in the sports environment in the past ten years. The entry/exit, presence and the construction variables take on a value of 1 in the year in which each of these events occur plus the following nine years to account for the delayed effects of each of these events. The variable describing the capacity of sports franchises is not a dummy variable, and is included in the model to investigate a possible relationship between changes in real per capita income and the size of a sports facility.

There are a number of cases where the value of the above dummy variables is zero throughout the period for particular cities. This can be explained easily as stadiums or arenas tend to have a life cycle of more than ten years. If a facility was constructed in 1980, it would take the value of 0 for my research during the whole sample period. If a stadium was built in 1990, the construction variable would take the value 1 from 1990 to 1999 (ten years), and zero afterwards. Second, as opposed to the late 1960s and 1970s which were part of Coates and Humphreys sample period in their publication, far less relocations or entries have occurred since 1990.

4. Results and Interpretation

In this section, the results will be discussed. Table 4.1 presents variable definitions. As mentioned in the previous section, entry/exit, construction and presence variables take on the value of 1 in each of the ten years a franchise moves or a facility is constructed plus the nine subsequent years.

Table 4.1 Variable Definitions

Variable	Definition
DPOP	Change in Population Growth Rate
RPCPI	Real per Capita Personal Income
GRRPCPI	Growth in Real per Capita Personal Income
PCIBAR	Average Real per Capita Personal Income
GRBAR	Average Growth Rate in RPCPI
BACAP	Capacity of Basketball Arena
FBCAP	Capacity of Football Stadium
BBCAP	Capacity of Baseball Stadium
BAE1	1st basketball franchise arrived
BAE2	2nd basketball franchise arrived
FBE1	1st football franchise arrived
FBE2	2nd football franchise arrived
BBE1	1st baseball franchise arrived
BBE2	2nd baseball franchise arrived
BAD1	1st basketball franchise left
BAD2	2nd basketball franchise left
FBD1	1st football franchise left
FBD2	2nd football franchise left
BBD1	1st baseball franchise left
BBD2	2nd baseball franchise left
BACO	basketball arena constructed
FBCO	football stadium constructed
BBCO	baseball stadium constructed
BBFB	baseball/football stadium constructed
BAF	basketball franchise present
FBF	football franchise present
BBF	baseball franchise present
BAE	any basketball franchise arrived
FBE	any football franchise arrived
BBE	any baseball franchise arrived
BAD	any basketball franchise left
FBD	any football franchise left
BBD	any baseball franchise left

The entry and exit variables capture the different impacts on income in each instance of arrival or departure. In this study, a distinction between single and multiple entry/exit is being made. The set of multiple entry and departure variables (BBE1, BBE2, FBE1, BAE1, BAE2, BBD1, BBD2, FBD1, BAD1, BAD2) allows for a differing effect on per capita income in each instance of an arrival or departure of a franchise; The set of single entry and departure variables (BBE, FBE, BAE, BBD FBD, BAD) combines multiple entries and departures, forcing an equal effect on each event.[56] [57]

Table 4.2 lists summary statistics for the main economic variables for each of the 30 metropolitan areas. The population size of the metropolitan areas ranges form approximately 1.2 million (Nashville) to 18 million (New York), per capita income ranges from roughly $24100 (San Antonio) to $40700 (San Francisco) with real per capita income growth rates between 3.6 percent (Cleveland) to 7.5 percent (Phoenix). The small table at the bottom lists statistics for the average size of sports facilities - approximately 15600 for basketball arenas, 33000 for baseball and 56000 for football stadiums.

[56] Coates and Humphreys (1999), p.13.

[57] Keep in mind that the professional sports environment in the US has changed over the last 30 years. Professional sports leagues have expanded, and at the same time managed to decrease the number of relocations. Broadly speaking, only a handful of franchises have relocated/departed to other metropolitan areas from the 1990s on, which is the period being subject to my research. Further only very few SMSAs host multiple professional sports franchises within the same league. The results of the single entry/exit model and the multiple entry/exit model will not be identical, although they might be similar, given the recent development of sports landscape and the time period chosen for this study.

Table 4.2 **Mean Values 1990-2006**

City	Population (in ten thousands)	Total Personal Income (in millions of Dollars)	Real per Capita Personal Income	Real per capita Personal Income Growth Rate
Atlanta	410.12	122537.89	29186.75	0.071
Boston	409.30	159257.62	36575.81	0.054
Charlotte	129.13	38519.75	29158.00	0.072
Chicago	845.20	286198.14	31735.25	0.05
Cincinnati	188.79	56337.54	28041.19	0.05
Cleveland	213.85	62260.19	29123.75	0.036
Dallas	419.12	153630.57	30071.00	0.07
Denver	197.35	70517.46	33141.94	0.072
Detroit	443.16	135251.89	30442.63	0.042
Houston	463.01	144742.67	30571.38	0.068
Indianapolis	149.71	44018.14	29035.81	0.057
Jacksonville	110.49	30378.73	27018.75	0.066
Los Angeles	1218.70	359383.14	29270.31	0.047
Miami	485.34	145846.14	29623.56	0.059
Milwaukee	149.81	45068.07	29987.13	0.047
Minneapolis	290.00	97693.02	33269..63	0058
Nashville	120.54	36744.96	28258.19	0.068
New Orleans	128.62	31718.60	24874.13	0.05
New York	1797.05	659778.60	36382.19	005
Philadelphia	534.40	179870.01	31704.00	0.048
Phoenix	299.39	82989.69	25732.69	0.075
Pittsburgh	243.93	69043.77	28396.00	0.04
Portland-Vancouver	187.56	54773.49	28764.69	0.061
Salt Lake City	94.32	41109.99	25345.63	0.071
San Antonio	167.51	83812.08	24123.81	0.068
San Diego	276.38	164748.40	29978.63	0.058
San Francisco-Oakland	401.74	24336.86	40687.00	0.059
Seattle	296.73	100779.92	33522.63	0.061
Tampa-St Petersburg	223.99	63406.25	26416.19	0.06
Washington	472.01	180953.47	37790.69	0.059

	Mean	Standard Deviation
BBCAP	33170.78	20499.79
FBCAP	55908.77	28589.57
BACAP	15621.37	7888.29

4.1 Impact of the sports environment on Real Per Capita Income

Table 4.3 documents the results assessing the influence of the sports environment on real per capita personal income. In other words, it is the estimation of equation (1).

Additional variables included in the regression model include DPOP which describes the change in population for each metropolitan area, quadratic terms to allow for a non-linear relationship between capacity and per capita income (or growth) (BACAP_sq, BBCAP_sq and FB_sq) and L.RPCPI (L.GRRPCPI) which is the lagged level (growth rate) of real per capita personal income.

4.1.1 Results for single entry/departure model:

The dependent variable in Table 4.3 is RPCPI, real per capita personal income. In terms of the non-sports variables, the lag of the real per capita income (L.RPCPI) is positive and significant, while the change in the population has a negative and significant impact on per capita personal income.

Turning to the sports-related variables we find a number of variables that are significant. Firstly, a non-linear relationship between basketball arena capacity and real per capita income can be observed. As indicated by the negative coefficient on the level of BACAP and the positive coefficient on BACAP_sq, there exists a negative relationship between arena capacity and income for low arena sizes, but beyond some point the impact becomes positive. The estimated turning point, where the marginal impact becomes positive, is found to be at a capacity of 30896. There are however no basketball arenas with a capacity that would indicate a positive impact of capacity on real per capita income as the largest arena in this dataset only holds 24042 people. The results do indicate however that the negative effects of stadium capacity are diminishing as stadium size increases.

Two of the three franchise variables are significant. The presence of the basketball team is associated with an increase in per capita income of $1180. The presence of a football team however is associated with a lower per capita income of $577.

Three of the six entry/exit variables are significant at the 10% level or better. The entry of a football franchise is positive with an impact of $409 and the exit is negative with an impact of $525. The entry of a baseball team suggests an increase in real per capita personal income of almost $600.

Table 4.3 Dependent Variable: RPCPI (single entry/departure model)

Variable	Coefficient	t-Stat.
C	1270.95	3.98
L.RPCPI	1.02	94.55
DPOP	-45160.99	-12.73
BBCAP	-10.77	-0.81
FBCAP	17.40	1.44
BACAP	-65.50	-1.85
BBCAP_sq	0.19	0.95
FBCAP_sq	-0.15	-1.25
BACAP_sq	1.06	2.04
BAF	1180.44	2.29
FBF	-577.20	-1.80
BBF	-191.83	-0.86
BACO	78.40	0.59
FBCO	61.24	0.43
BBCO	42.20	0.27
BBFB	-71.52	-0.21
BAE	-203.17	-0.93
FBE	408.50	1.82
BBE	598.62	3.06
BAD	184.64	0.40
FBD	-525.04	-1.70
BBD	-521.36	-1.44
BAE1		
BAE2		
FBE1		
FBE2		
BBE1		
BBE2		
BAD1		
BAD2		
FBD1		
FBD2		
R_sq		0.974
adj. R_sq		0.973

4.1.2 Results for multiple entry/departure model:

Table 4.4 also documents the results and influence of the sports environment on real per capita personal income (RPCPI). This time however, the event study methodology is being applied. In other words, it is the estimation of equation (2)

Turning immediately to the sports-related variables in Table 4.4 we again find a non-linear relationship between basketball capacity and per capita income with the turning point occurring at a capacity of 30287, so marginal impact becomes positive.

The franchises variables however tell a different story. In the multiple entry model, only one variable, the presence of a basketball franchise, is significant. It is associated with an increase in real per capita personal income of $1140.

The results on the entry/exit variables are also different to the previous set of results. Here, all entries of the first franchise of each major league sport have a significant impact and all exit variables are insignificant. The exit of the second basketball franchise indicates a negative impact on income of $670, though the coefficient is insignificant. Note that in most entry/exit cases, entries and exits of the second franchise of any sports will be insignificant, as Los Angeles and New York are the only metropolitan areas hosting two franchises competing in the same league. Even if a city is host to multiple major league franchises, losing all of them is improbable at the same time.

The entry of the first basketball franchise suggests a reduction in per capita income of $460. If a football franchise enters a metropolitan area, it is associated with a rise in per capita income of almost $600, while the entry of a baseball franchise is associated with an increase in of $650.

The overall picture obtained from Tables 4.3 and 4.4 is the following: While the entry of a basketball franchise has a negative impact, the presence of a basketball franchise is associated with a positive impact. One explanation for these results could be that while the entry initially causes huge costs, those might be offset after the franchise has settled and remained for a longer period in the same metropolitan area. Football entry initially seems to have a positive impact on income, but the presence of a football franchise seems to have a negative effect.

One possible assumption for the negative effect is that the facility of a football stadium is left vacant after the NFL season which is only 16 games long. Half of the games are additionally played away from home, which leads to the question how long a franchise needs to be present in a metropolitan area in order to pay back the investments of stadiums which are commonly subsidized by the public. This might be one reason explaining the limited overall effect on per capita income resulting from the regression analysis.

Table 4.4 Dependent Variable: RPCPI (multiple entry/exit model)

Multiple Entry/Exit Effects

Variable	Coefficient	t-Stat.
C		
L.RPCPI	1.018	97.08
DPOP	-46756.78	-12.83
BBCAP	-11.18	-0.84
FBCAP	15.48	1.23
BACAP	-61.18	-1.71
BBCAP_sq	0.22	1.08
FBCAP_sq	-0.15	-1.19
BACAP_sq	1.01	1.94
BAF	1137.38	2.19
FBF	-472.86	-1.39
BBF	-178.00	-0.80
BACO	118.06	0.90
FBCO	123.29	0.86
BBCO	31.43	0.20
BBFB	346.99	0.84
BAE		
FBE		
BBE		
BAD		
FBD		
BBD		
BAE1	-458.46	-1.66
BAE2	64.17	0.18
FBE1	599.91	2.29
FBE2	-236.50	-0.56
BBE1	654.57	3.05
BBE2	0.00	0.00
BAD1	1.03	0.00
BAD2	-667.48	-1.29
FBD1	-69.57	-0.16
FBD2	-472.06	-0.87
R_sq		0.974
adj. R_sq		0.973

4.1.3 Results for single entry/departure - Event Study Model:

Tables 4.5 and 4.6 investigate the effect of sports environment variables on the income in an event study framework. Analogous to Coates and Humphreys, the SMSA specific variables do have significant explanatory power, increasing the R^2 of the regression from 0.84 to 0.99. An F-Test of the significance of these variables also indicates that there are significant differences among these city-specific variables. Given this, I will concentrate mainly on the results of the columns which take SMSA specific effects into account.

Considering the final two columns of Table 4.5 in terms of the non-sports variables, the mean average per capita income (PCIBAR) is positive and significant. More than half of the variables are significant, with absolute values above 1.75. The stadium capacity variables in this case tell an interesting story. These variables again indicate nonlinear relationships.

Once again, the coefficients on basketball capacity indicate a negative impact on income initially, but a positive effect beyond a certain capacity, though the coefficients are not significant. The football and baseball capacity variables are significant; both suggesting an initial negative impact on income being offset after a certain capacity is reached.

Interestingly, when SMSA specific trends were not included in the regression (Columns 1 and 2) only the variables representing baseball capacity were significant – again indicating a non-linear relationship. In this case however, a small stadium is associated with a rise in per capita income, being offset with a negative impact after the capacity reaches a certain threshold

Considering the final two columns of Table 4.5 one more time, we find that the only franchise reporting a significant coefficient is the presence of a basketball franchise. The coefficient estimate suggests that the presence of a basketball franchise lowers real per capita personal income by almost $1700. The presence of a basketball franchise in contrast is positive and significant, suggesting an increase in income of more than $3600.

Two of the four construction variables in the last two columns are significant. The estimated coefficient suggests that the construction of a multipurpose stadium will raise real per capita personal income by more than $2319. The construction of a baseball stadium in contrast is "only" associated with a rise in per capita personal income of $410.

None of the entry variables are significant, with t-statistics lying between 0.7 and 1 in absolute values, and with all coefficients indicating a negative impact of entry. Two of three exit variables are significant, both at the 5% level, with t-statistics above 2.

The departure of a football franchise is associated with a lower per capita personal income of around $950 per year, while if a baseball franchise leaves the effect is to reduce income by $1730 per year.

Table 4.5 Dependent Variable: RPCPI (single entry/exit - Event Study Model)

	Common Intercept		SMSA Specific Effects	
Variable	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**
C	-403856.00	-4.33		
PCIBAR	0.96	34.66	0.98	73.92
DPOP	-30275.19	-3.41	-27132.93	-5.43
BBCAP	286.70	9.44	-60.35	-1.76
FBCAP	42.18	1.46	-69.27	-2.66
BACAP	-57.19	-0.66	-147.10	-2.74
BBCAP_sq	-3.00	-6.49	0.11	0.28
FBCAP_sq	-0.35	-1.23	0.93	3.77
BACAP_sq	0.55	0.43	1.90	2.71
BAF	3666.19	2.90	-1698.99	-2.16
FBF	-1622.29	-2.13	-554.60	-1.27
BBF	-2136.05	-4.04	934.93	1.06
BACO	783.71	2.42	239.53	1.50
FBCO	649.65	1.84	60.39	0.31
BBCO	-939.59	-2.46	410.78	1.93
BBFB	4484.78	5.52	2319.65	4.68
BAE	-1503.98	-2.88	-334.56	-0.97
FBE	2705.86	5.07	-293.56	-0.85
BBE	-874.26	-1.79	-544.52	-0.71
BAD	1292.58	1.19	-456.87	-0.82
FBD	-3064.08	-4.22	-956.40	-2.20
BBD	4690.13	5.42	-1731.11	-2.65
BAE1				
BAE2				
FBE1				
FBE2				
BBE1				
BBE2				
BAD1				
BAD2				
FBD1				
FBD2				
R_sq		0.844		0.999
adj. R_sq		0.837		0.998

The following observations can be made when SMSA specific trends are not included (again, see Column 1 and 2): In terms of construction variables, the coefficient on multipurpose stadiums suggests that their construction raises per capita income by $4484. This suggests that a cost effective sporting facility might have the potential to raise the income level of a metropolitan area. Further, the construction of a basketball arena is associated with a reduction in per capita income of $940. Further, the presence of a football franchise and baseball franchise are both significant and negative, suggesting a drop in income by more than $1600 in both cases. When SMSA specific trends are excluded, all entry variables are significant. The entry of both basketball and baseball franchise have negative coefficients whereas football entry is positive suggesting a rise in per capita income of more than $2700. In terms of franchise departures, the exit of a football franchise is associated with a drop in income by over $3000 and if a baseball franchise leaves the coefficient indicates that income will increase by $4690 annually.

4.1.4 Results for multiple entry/departure - Event Study Model:

Table 4.6 refers to the effect of sports environment variables on real per capita income, (RPCPI, the dependent variable) applying the event study methodology. In this particular case, the data describing the effects of multiple entries and exits is subject of my investigation. As observed in the case of single entry, we find a non-linear relationship between per capita income and capacity, with the effect being negative at low capacity levels. Among the capacity variables, the coefficient on baseball capacity is found to be not significant, which is the major difference between these and the results from the single entry model.

As for the capacity variables, in the single entry/ exit event study model, only baseball capacity was significant if SMSA specific trends were omitted. In this case, we find a reverse nonlinear relationship between capacity and real per capita income, initially suggesting negative impact on per capita income until a certain threshold; Speaking of the entry and exit variables, none of the variables indicates the presence of a franchise being significant, but in terms of the coefficients the results are similar to the single entry model. The presence of basketball and football franchises in a metropolitan area is associated with a smaller real per capita income, while the presence of a baseball franchise has a positive effect on real incomes.

The same construction variables as in the single entry model are positive and significant at the 5% level, the difference being the slightly larger positive effect on real per capita income in the multiple entry model.

A baseball stadium is associated with a rise in per capita personal income of almost $460; a multiple purpose stadium is associated with an increase in per capita income of almost $2800, the magnitude of the monetary effect being quite similar to that in the single entry model.

Table 4.6 Dependent Variable: RPCPI (multiple entry/exit - Event Study Model)

	Multiple Entry/Exit Effects			
	Common Intercept		SMSA Specific Effects	
Variable	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**
C	-5177.79	-5.56		
PCIBAR	0.99	35.74	0.98	73.41
DPOP	-27931.80	-3.06	-27366.19	-5.50
BBCAP	274.11	9.00	-47.36	-1.33
FBCAP	42.46	1.42	-90.70	-3.33
BACAP	-18.95	-0.21	-138.50	-2.58
BBCAP_sq	-2.82	-6.09	0.03	0.06
FBCAP_sq	-0.17	-0.55	1.05	4.19
BACAP_sq	0.05	0.04	1.79	2.56
BAF	3513.10	2.74	-1136.67	-1.42
FBF	-2166.96	-2.71	-678.18	-1.52
BBF	-1908.98	-3.61	876.07	1.23
BACO	286.45	0.90	228.86	1.41
FBCO	394.78	1.10	107.59	0.54
BBCO	-1146.53	-2.97	457.25	2.14
BBFB	5445.73	5.80	2794.14	5.36
BAE				
FBE				
BBE				
BAD				
FBD				
BBD				
BAE1	-2514.29	-3.80	-1152.99	-2.55
BAE2	305.51	0.35	551.24	1.13
FBE1	2029.82	3.18	148.37	0.35
FBE2	1698.09	1.78	-654.43	-1.36
BBE1	-2331.61	-4.35	-524.36	-0.96
BBE2	0.00	0.00	0.00	0.00
BAD1	288.82	0.26	-738.96	-1.29
BAD2	-490.54	-0.38	-1542.74	-2.36
FBD1	-3648.82	-3.83	-799.18	-1.52
FBD2	-2569.42	-1.92	126.43	0.15
R_sq		0.845		0.999
adj. R_sq		0.837		0.998

Among the entry/exit variables, only two have significance, both at the 5% level. The entry of the first basketball franchise is associated with a negative income effect of approximately $1150. The departure of the second basketball franchise is also associated with a reduction in real per capita personal income, reducing income by more than $1540.

Taking a look at the first two columns, we find some differences as SMSA specific trends are omitted. The columns show that all franchise variables are significant. The presence of a basketball franchise is associated with positive effects on income, raising it by more than $3500, while the presence of a football and baseball franchise indicate a negative impact on income. With respect to the construction variables, the construction of a baseball stadium is associated with a drop in income of almost $1150, while construction of a multi-purpose stadium is associated with a rise in per capita income of $5545.

In terms of entry, the first basketball franchise is significant and negative, indicating a drop in income of more than $2500. In the case of football franchises, both the first and the second franchise suggest positive impacts on income, with the magnitude being in excess of $1600. Baseball entry however is associated with negative effects on income, lowering it by $2331. In terms of departure, only football variables are significant. The departure of the first franchise indicates a drop in income of approximately $3650 and if the second franchise leaves, the impact on income is to reduce it by a further $2570.

4.2 Impact of the sports environment on the Growth Rate of Real Per Capita Personal Income

4.2.1 Results assessing the impact on the Growth Rate of Real Per Capita Personal Income:

Table 4.7 lists the results of estimating the effects of the sports environment variables on the growth rate of real per capita personal income (GRRPCPI). The finding from this analysis is that the data obtained cannot explain or support any significant effects of sports franchises, both in the single and multiple entry/exit models. In this case, the lagged growth rate of real

per capita personal income (L.GRRPCPI) and the change in population (DPOP) account for the majority of the variation in the dependent variable.

Among the non-sports variables, only the lag of the growth rate of real per capita personal income is significant and negative. In other words, a higher growth rate last year is associated with lower growth this year. The change in population is significant and positive, thus an increase in population is associated with higher growth.

Table 4.7 Dependent Variable: GRRPCPI (entry/exit model)

	Single Entry/Exit Effects		Multiple Entry/Exit Effects	
Variable	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**
C	0.07	8.04	0.07	8.10
L.GRRPCPI	-0.14	-2.87	-0.14	-2.80
DPOP	0.21	1.67	0.24	1.84
BBCAP	0.01	-1.44	-0.0007	-1.50
FBCAP	0.0003	0.74	0.0002	0.56
BACAP	-0.001	-0.97	-0.0015	-1.21
BBCAP_sq	0.00001	1.77	0.00001	1.82
FBCAP_sq	-0.000003	0.78	-0.000002	-0.54
BACAP_sq	0.00001	1.05	0.00002	1.21
BAF	0.02	1.01	0.021	1.20
FBF	-0.01	-0.92	-0.11	-0.95
BBF	0.006	-0.79	-0.006	-0.83
BACO	0.004	0.95	0.006	1.29
FBCO	0.001	0.31	0.0025	0.52
BBCO	-0.002	-0.32	-0.001	-0.19
BBFB	-0.004	-0.34	-0.005	-0.39
BAE	0.003	0.46		
FBE	0.008	1.03		
BBE	0.12	1.77		
BAD	-0.008	-0.48		
FBD	-0.006	-0.60		
BBD	-0.02	-1.68		
BAE1			0.009	0.97
BAE2			-0.008	-0.68
FBE1			0.006	0.66
FBE2			0.007	0.49
BBE1			0.01	1.37
BBE2			0.00	0.00
BAD1			-0.0014	-0.09
BAD2			-0.02	-1.17
FBD1			-0.007	-0.47
FBD2			-0.005	-0.25
R_sq		0.069		0.072
adj. R_sq		0.024		0.019

More importantly, the overall picture shows a general lack of significance of the sports variables. Only two variables in the single entry/exit model are significant. The entry of a baseball franchise is associated with an increase in the growth rate of 0.12%, and the exit of a baseball franchise is associated with a reduction of the growth rate by 0.02 %. In the multiple entry/exit model no sports environment variable has a significant coefficient, with a t-statistics mostly below 1. Such results lead to the conclusion that the sports environment has no significant impact upon the growth rate of real per capita personal income.[58]

Table 4.8 reports the results of single and multiple entry/exit event studies with the growth of real per capita income as the dependent variable. Here, the average growth rate of income of all SMSAs was included in order to examine whether changes in the sports environment account for any discrepancy between the growth rate in a particular SMSA and the national average growth rate.[59] For both the single and multiple entry/exit models, no variable takes a t-statistic greater than 1. As in Table 4.7, variables describing the sports environment in table 4.8 have no explanatory power that would suggest an impact on the growth rate of income.

One explanation why the local economy is not substantially affected by the sports environment might result from the effects of leakages. A big portion of a sports franchise's revenue goes to player salaries and franchise employees, which usually consist of roughly 100 members, who unlikely live in close proximity to the venue.

The reduction in the growth rate of per capita income can be seen as a compensating effect as residents of "major league cities" might enjoy intangible benefits such as civic pride, etc. In addition, increased public spending may indicate lower growth rates of per capita personal income and lower infrastructure levels with lower net production, driving the results obtained. These monies, generated form taxes, could be used instead to build infrastructure, or invest in education and public health for example.[60]

[58] The variable BBCAP_sq is positive and significant at the 5 % level.
[59] Also see Coates and Humphreys (1999); p.22
[60] Coates and Humphreys (1999), p.17-18.

Table 4.8 Dependent Variable: GRRPCPI (entry/exit - Event Study Model)

	Single Entry/Exit Effects				Multiple Entry/Exit Effects			
	Common Intercept		SMSA Specific Effects		Common Intercept		SMSA Specific Effects	
Variable	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**	**Coefficient**	**t-Stat.**
C	-0.001	-0.16			-0.0006	-0.07		
GRBAR	0.988	12.05	0.991	11.95	0.99	12.02	0.995	11.94
DPOP	0.308	3.05	0.068	0.51	0.33	3.13	0.061	0.45
BBCAP	-0.0003	-0.96	0.0005	0.5	-0.0004	-1.01	0.0004	0.37
FBCAP	0.0003	0.84	-0.0004	-0.64	0.0002	0.69	-0.0004	-0.51
BACAP	-0.0003	-0.34	0.0006	0.41	-0.0005	-0.53	0.0006	0.44
BBCAP_sq	0.000006	1.13	-0.000006	-0.06	0.000006	1.17	-0.000003	-0.03
FBCAP_sq	-0.0000036	-0.93	0.000006	0.84	-0.000002	-0.76	0.000005	0.83
BACAP_sq	0.000007	0.47	-0.000005	-0.26	0.000008	0.59	-0.000005	-0.28
BAF	0.006	0.43	0.009	0.46	0.009	0.60	0.007	0.31
FBF	-0.008	-0.89	-0.01	-0.9	-0.008	-0.82	-0.011	-0.93
BBF	-0.004	-0.67	0.011	0.47	-0.004	-0.71	-0.003	-0.15
BACO	0.004	1.19	0.003	0.73	0.005	1.38	0.003	0.65
FBCO	0.003	0.76	0.0009	0.17	0.003	0.89	-0.00003	-0.01
BBCO	-0.002	-0.41	-0.005	-0.86	-0.001	-0.30	-0.005	-0.87
BBFB	-0.004	-0.45	0.00004	0	-0.008	-0.75	-0.007	-0.49
BAE	-0.0001	-0.02	-0.004	-0.41				
FBE	0.006	0.94	0.008	0.91				
BBE	0.009	1.65	-0.013	-0.63				
BAD	-0.006	-0.51	-0.001	-0.65				
FBD	-0.005	-0.57	0.009	0.76				
BBD	-0.012	-1.23	-0.013	-0.74				
BAE1					0.005	0.72	-0.0006	-0.05
BAE2					-0.009	-0.95	-0.006	-0.46
FBE1					0.005	0.65	0.005	0.44
FBE2					0.009	0.81	0.016	1.26
BBE1					0.009	1.54	0.002	0.11
BBE2					0.000	0.00	0.000	0.00
BAD1					-0.002	-0.16	-0.009	-0.59
BAD2					-0.009	-0.59	-0.014	-0.77
FBD1					-0.007	-0.66	-0.0005	-0.03
FBD2					0.005	0.33	0.019	0.86
R_sq		0.282		0.801		0.284		0.801
adj. R_sq		0.249		0.777		0.247		0.776

5. Conclusion

The objective of this research was to give insight into how the sports environment is affecting the economy of a metropolitan area. Interactions between leagues, franchise owners and the public sector were briefly discussed in order to provide a better understanding of the mechanisms and forces that lead to subsidies or eventual relocations of sports franchises.

In the past, league and industry-sponsored studies have forecasted that sports franchises, facilities and events increase economic activity by hundreds of millions of dollars and thus affect income positively. The regression analysis I have conducted did not deliver distinctive results to support these claims. Therefore my research also supports previous academic papers which generally find little or no positive impact of the professional sports environment on in terms of new net jobs created or per capita income the respective local economies.

Generally, sports facilities with big capacities seem to affect income positively rather than small capacity venues as mostly a non linear relationship between capacity and per capita income could be observed. The construction of a small capacity venue is associated with a reduction in income. Once the capacity reaches a certain threshold however, the sporting facilities are associated with a positive impact on income. Baseball and football stadiums usually are constructed beyond that threshold point. Based on my observations, however, basketball arenas seem to be too small to suggest a positive impact on real per capita personal income. For pure normative reasons, it is plausible that a bigger venue has more opportunity to generate bigger cash flows resulting from larger admission revenues.

Additionally, construction of a multipurpose stadium is associated with a boost in per capita income by more than $2000. Thus it seems more reasonable to build multi purpose facilities instead of single use facilities which have been more common in the past 15 to 20 years.

Even if the results are not consistent with observations obtained by Brad Humphreys and Dennis Coates in 1998, I was not able to find indicators for a significantly huge positive impact of the sports environment in respect to the real per capita personal income among the sampled areas. Based on the time period and metropolitan areas I used for my sample, some franchises do positively affect real per capita income. Still, the general picture does not

indicate a substantial positive economic impact of sports franchises and facilities as advocates and proponents of stadium construction want the public to believe. Further, I found that the sports environment has no impact on the growth rate of per capita personal income.

To make public investments pay off in the long run when sports franchises are subsidized, sports facilities should meet the requirements to host hundreds of events each year as is the case with the Staples Centre in Los Angeles. Further, it also should be an anchor for commercial and residential development of an entire section of a city. Los Angeles is one of the few cities where the sports environment has actually had a positive impact on the local economy. The Staples Centre in downtown Los Angeles is used by two NBA franchises, the L.A Lakers and the L.A Clippers and further by another major league franchise, the Los Angeles Kings, who are a member of the NHL. Besides that it can be also utilized as an event hall, where annually more than 250 events take place. The Staples Centre attracts over four millions of paid admissions each year, setting an example of how sporting facilities can generate positive economic impact for a local economy[61].

If these or similar criteria cannot be met, public monies being spent for municipal services might be more useful to enhance real per capita income and thus improve the economy of the metropolitan area. However, economic scholars acknowledge the intangible benefits generated by sports franchises. If professional sports teams enhance the quality of life in a metropolitan area such as parks and museums, local politicians should decide whether to attract sports teams by offering subsidies. This, however, is subject to future studies.

[61] Los Angeles, San Diego, Indianapolis are recent examples where new facilities had positive impact on the economy of a district. In Los Angeles, the Staples Center was built as a part of a multi billion dollar entertainment project to redevelop the downtown district. The success of this plan is underscored by the fact that even at the height of mortgage and credit crisis in the U.S in 2007, commercial rents in downtown Los Angeles were still rising and attracting tenants from other parts of the county. See Rosentraub (n.a), Source: *www.edmonton.ca/city_government/documents/CityGov/RosentraubReport.pdf*

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Zusammenfassung

in den Vereinigten Staaten von Amerika nehmen Metropolen große Summen auf sich, um professionelle Sportvereine zu subventionieren bzw. in ihre Städte zu locken. Aus diesem Grund wurden in den letzten 20 Jahren über 20 Milliarden US Dollar in Stadien und Sporthallen investiert. In den meisten Fällen übernahm der öffentliche Sektor etwa 60% der Kosten, die sich je nach Einrichtung zwischen 175 und 300 Millionen US Dollar belaufen.

Analysen, die der Existenz professioneller US amerikanischer Sportvereine, der Major League Franchises, in Städten und Metropolen positive ökonomische Effekte subsumierten, hatten bisher diese Investitionen legitimiert. Jedoch konnten zahlreiche unabhängige akademische Studien keine positive wirtschaftliche Auswirkung mit der Existenz von Major League Franchises in Verbindung setzten. In den meisten Fällen wirkte sich ein professioneller Sportverein negativ auf das Einkommen aus. Die Schaffung eines einzigen Arbeitsplatzes im Profisportbereich verursacht Kosten von etwa 200000 US Dollar, ein Wert der die durchschnittlichen Arbeitsplatzschaffungskosten bei weitem übertrifft. Es stellt sich daher die Frage nach der wirtschaftlichen Sinnhaftigkeit solcher Investitionen, wenn diese Gelder in den Bildungsbereich oder beispielsweise in Infrastruktur fließen könnten.

Der Schwerpunkt dieser Arbeit liegt darin, die Existenz von Major League Franchises und deren Auswirkung auf das reale pro Kopf Einkommen von Einwohnern in 30 US amerikanischen Städten im Zeitraum von 1990 – 2006 an Hand eines Regressionsmodells zu erforschen. Die Resultate dieser Studie unterstützen grundsätzlich die Ergebnisse vorhergehender akademischer Studien. Keine signifikanten Effekte auf das reale pro Kopf Einkommen noch auf dessen Wachstumsrate konnte festgestellt werden.

Trotz dieser Erkenntnisse kämpfen viele amerikanische Metropolen um die Gunst der Major League Franchises. Möglicherweise wird jenen Institutionen ein positiver Effekt unterstellt, der monetär nicht erfasst werden kann. Dies stellt jedoch ein Diskussionsthema für zukünftige Forschungen dar.

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