THE STADIUM GAME: ASSESSING THE ECONOMIC RATIONALE FOR SPORTS STADIUM CONSTRUCTION

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Economics

Abstract

Stadium construction is currently in a boom period. Advocates of publicly subsidized stadium projects argue that attracting a franchise through the construction of a stadium will spur economic growth in the local community. This paper builds upon previous research done by Baade and Dye (1990) by attempting to find a relationship between the construction of professional baseball and football stadiums on income per-capita, employment and aggregate personal consumption expenditures. 12 Standard Metropolitan Statistical Areas in the United States are examined between 1990 and 2005. By using new variables and an updated data set, this paper attempts to better capture the economic impact of stadium construction in specific Metropolitan areas. Pooled regression analysis is employed to examine the effect the independent variables have on income per-capita, employment and personal consumption. The results show a positive relationship between stadium construction and income per-capita. Additionally, a positive relationship is seen between the construction of baseball stadiums and employment in the 12 Standard Metropolitan Statistical Areas.

KEYWORDS: (Stadium, Metropolitan, Development)

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED UNAUTHORIZED AID ON THIS THESIS

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CHAPTER I

INTRODUCTION

Stadium craze is currently sweeping across the United States.[1] Owners and high-powered executives argue that government subsidized stadium construction and franchise development will create significant local benefits that can cover the incredible costs associated with the venues erection. Independent research on the economic impact of stadiums and arenas has uniformly found that there is no statistically significant positive correlation between sport facility construction and economic benefit.[2] However, positive externalities associated with stadium construction do occur and can be evaluated through multiple techniques.

There is an existing body of literature on the economics of the sports industry that has analyzed the impact of stadium construction on the local economy. While most of these analyses do not find any significant positive impact of stadium building on local economic development, ambiguity exists in the findings thus giving reason for further examination. This thesis will focus on answering the question of whether publicly funding the construction of sports stadiums is an engine for local economic development in metropolitan areas. The motivation of this thesis is to look at the impact of stadium construction on metropolitan areas and how the capital invested is being reallocated to

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[1] Baade and Dye, 1990

[2] Noll and Zimbalist 1997, 525

different stratas of society, or only to its wealthiest members. This introduction will begin with a breakdown of the structural format of the arguments for and against public spending for stadium construction followed by a brief analysis of the benefits and costs associated with such an investment. An overview of how this thesis will differ from past research regarding data collection, methodology, and analysis will conclude this introduction.

When looking at the costs and benefits of stadium construction, economic scholars frequently divide the topic into arguments for and against public spending. While it is simplified in its approach, this methodology allows for an overall picture of the pros and cons of assuming the large risks associated with stadium construction.

Arguments Against Public Spending

Due to a market of high metropolitan demand for franchises, in which teams have market power, local governments interested in hosting a franchise frequently find themselves making a difficult decision: either subsidize the costs involved or lose the option all together. "For the 17 football and baseball stadiums built since 1994, the average public contribution has been 66 percent of the total cost."[3] Owners of teams are part of a safety net due to belonging to a premier league, and thus possess substantial negotiating power. Knowing this, metropolitan areas are forced to take on the majority of the risk in the hope of high rewards.

In addition to understanding the concept of government subsidization and the huge costs associated with stadium development, it is necessary to analyze where the investment capital and profits usually end up. Although not in all cases, the majority of

[3] Rappaport and Wilkerson 2001, 55-85

government spending and eventual revenues find their way into the pockets of players, owners, and executives. More about how invested capital and revenues do or do not trickle back into the local community will be discussed in chapter two.

Arguments For Public Spending

The positive externalities generated by a new stadium/franchise are usually broken down into two categories: indirect and direct benefits.

Indirect Benefits

Indirect benefits occur if the team and stadium bring about a net increase in the area's average income. More tourist attraction in the team's host city increases hotel stays, restaurant clientele, and overall economic activity within the area. Through a multiplier effect this increase in activity can reallocate the tourist consumption dollars into the incomes of the local community.[4]

Direct Benefits

Direct benefits can be classified as "any incremental consumer surplus from all of the consumption activities produced at the stadium for inhabitants of the city." [5] Although difficult to quantify, the cultural significance of some direct benefits exceeds the valued costs. For example, the civic pride created for the community by a new sports team or franchise is nearly impossible to evaluate but still must be investigated. Due to the difficulty of evaluating direct benefits, few studies have been successful in using their results to combat the costs associated with stadium construction.

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[4] Johnson and Whitehead 2000, 48-58

[5] Noll and Zimbalist 1997, 55-92

Scholarly economic research has shown the intricacies of evaluating post construction economic outcomes. While assessing the costs of stadium construction is far more straightforward, evaluating the intangible benefits received by the local community proves to be far more complex. Existing work by Coates and Humphreys (1999), Johnson and Whitehead (2000), and other scholars argues that including variables such as prices, employment, covering larger data sets (geographical analysis), race, and willingness to pay could create better evidence for further research. [6]

As opposed to previous research, this thesis will include variables representing population per square mile, number of teams in a host city, employment figures, and personal consumption statistics. Regression analysis will be employed to show the effect stadiums and sports franchises have on metropolitan area aggregate income, employment, and personal consumption expenditures. The Standard Metropolitan Statistical Area (SMSA) aggregate income, employment, and personal consumption figures will be regressed using the previously mentioned independent variables, capturing the economic atmosphere of the observed metropolitan areas before and after the construction of a sports stadium.

Unlike previous studies that have defined the local market narrowly by focusing on a small area outside the stadium, the present study will more broadly define the community by analyzing SMSA data. Prior studies have shown that including the entire SMSA can cause the sports franchise to become a trivial part of the entire cities income. This study will use a number of dummy variables to protect against the possibility of distorted results.

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[6] Noll and Zimbalist 2000, 48

The research done for this thesis will focus solely on stadium effects of major league baseball and football stadiums and the host cities they are within. The time period of analysis will concentrate on any major league baseball or football stadium that has been constructed since 1990 through 2005. Ultimately, this thesis will test a previous hypothesis by using an expanded and updated data set as well as new variables.

The added variables, as well as more recent data, will allow for a greater chance of determining the positive impact associated with stadium construction within an SMSA. By using employment along with personal consumption figures, it is expected that the results will provide evidence of the possibility of evaluating benefits that previously have been overlooked. These new local benefits for SMSAs will provide areas for future research and development. With the use of new beneficial outcomes caused by stadium development, scholars will be able to provide greater evidence of positive externalities associated with franchise investment, thus lessening the large discrepancy between costs and potential value.

This thesis is organized as follows: Chapter two discusses the economics of stadium construction and provides a comprehensive literature review on the existing studies analyzing the impact of stadium construction on the local economy, along with their findings. Next, chapter three introduces the empirical model, the description of the variables, and their sources. This is then followed by the regression results and analyses. Finally, chapter four concludes this thesis by highlighting the key findings, and policy implications. Further areas of research will also be discussed.

CHAPTER 2

LITERATURE REVIEW

Section 2.1: The Economics of Stadium Construction

Local political figures and the owners of franchises frequently argue that the construction of new stadiums will serve as an engine for economic development, creating significant overall benefit. The funding for these projects customarily lies squarely on government subsidy, mainly comprised of taxpayer dollars. Realizing where the capital for investment originates, and the high number of stadiums recently constructed, benefits must spillover from such a sizeable investment. The decision to build a stadium depends on whether the costs are covered by the projected potential benefits from building the venue. However, existing research and literature on the economic impact of stadiums and franchises has found that no statistical significant correlation exists between sports facility construction and economic development.[1] In order to ascertain any concrete evidence of whether facility construction is a wise investment, one must clearly understand the existing literature representing the arguments for and against public spending.

[1] Coates and Humphreys 1999, 601-624

The majority of the existing literature fails to find any significant impact of stadium construction on local economic development. The next three sections attempt to synthesize the broad existing research on this topic.

Section 2.2: The Initial Emerging Literature on Economic Impact of Stadium Construction

Some of the earliest research on stadium economics has shown that future revenues are unable to compensate stadium construction costs. Benjamin Okner (1974) conducted one of the earliest studies. The author shows that while stadium construction and the revenues that follow are able to cover general stadium operating expenses, they are unable to compensate the other major costs associated with such an investment. These costs include wages, utilities, repairs and insurance.[2] The literature review will chronologically progress through the existing research.

Although some of these studies are somewhat outdated, Robert Baade has written, or co-written, a few of the most cited works concerning the topic of the economic outcome of building a stadium. Each of Baade's studies suggests a negative effect on economic development caused by this type of construction. As Baade has published more works concerning this topic, he has narrowed the scope of the economic effects he attempts to analyze.

Baade (1988) measured the manufacturing industry as it was impacted by professional franchises for eight cities from 1965 to 1978. The study examined the economic changes in Buffalo, Cincinnati, Denver, Miami, New Orleans, San Diego, Seattle, and Tampa Bay. Since stadiums are believed to transform a community into a

[2] Okner, 1974

service-based economy, Baade used a regression model that explored the changes within local manufacturing. The model uses variables representing manufacturing employment value added and new capital expenditures. Along with these variables, Baade (1988) used dummy and trend variables. To focus the research, Baade used specific sports variables to differentiate changes in baseball and football leagues. While Baade used a small sample size, which lessened the credibility of the research, he did find that with the exception of one stadium (San Diego) the research showed no positive relationship between the construction of a major league sports franchise (football or baseball) and an increase in local manufacturing employment or income.[3]

Desiring a more specific outcome, Baade authored another study in 1987 that specifically looked at the effect of a professional sports team on the host city's income growth, or decline. In this study, Baade examined the same eight host cities as the previous article. Like many other studies, Baade compared the host city with its neighboring communities. By using a ratio of the income in the host city's SMSA to the average incomes of the surrounding areas, Baade was able to establish a negative relationship between a host city's stadium construction and income growth in that SMSA relative to that of the surrounding area.[4]

To explain the outcome of his works, Baade concluded that stadiums do not necessarily create new jobs, but instead employment is "diverted from the manufacturing economy to the service economy, or from high-skilled to lower-skilled occupations."[5] This shift from high-skilled positions to low-skilled positions could also serve as

[3] Baade 1988, 37

[4] Baade and Heartland Institute, 1987

[5] Ibid

explanation of why income within the host city's SMSA precipitated a decline in average incomes. However, the imperfections of these studies must be taken into account when analyzing the outcomes. Stadium supporters frequently point to the intangible benefits that are difficult, if not impossible, to measure as rationale for taxpayer's contributions for the construction of these massive structures. Baade cited these intangible benefits as the "essence" of the debate. Baade's argument thus suggests that it is the numerous intangible benefits that must be measured in order to truly assess the effects of such stadium projects.

Three years later Baade and Dye (1990) authored another study on the economic impact of stadium construction. The study investigated if the construction of a sports stadium in a standard metropolitan area creates economic spillovers that benefit the local community. In addition, Baade and Dye (1990) also evaluated the effects the construction/refurbishing of a stadium or a new professional baseball or football team has on the "municipality's share of regional economic activity."[6] To answer these questions, regression analysis was used to evaluate the impact stadiums have on nine different cities aggregate income, spending and development. The nine cities Baade and Dye analyzed were Cincinnati, Denver, Detroit, Kansas City, New Orleans, Pittsburgh, San Diego, Seattle, and Tampa Bay. Baade and Dye (1990) analyzed this data between the years of 1965 and 1983. The model used was employed to capture the previously mentioned variable before and after the creation of stadiums and professional sports teams. Baade and Dye (1990) structured their regression equation with per-capita income as the dependent right side variable. Baade and Dye (1990) used multiple independent left side variables to capture the changes in population and stadium development. They also used

[6] Baade and Dye, 1990

certain variables to control for the effects of population and time changes to ensure credible results. These included a trend term and a set of dummy variables that acted as controls for possible unrelated influences to per-capita income.

Even with these specific considerations, the results showed an insignificant impact on area income for all but one SMSA. Alone, Seattle showed significant positive impact due to stadium construction. Although other aspects of the study showed negative and positive effects, the overall results provided evidence of an insignificant impact of stadiums on the level of SMSA income.

When relating the effects of stadium construction to the level of municipalities share of regional economic activity, ambiguity reigns in the results. While some stadiums show small positive correlations, the overall impact of stadium construction on the areas share of regional economic activity is "negative and significant."[7]

Ultimately Baade and Dye's 1990 study attempted to analyze the effects of stadium construction on nine SMSAs without using the popular trade-multiplier effects frequently cited in previous impact studies. Through their regression models an uncertain outcome is represented in regard to aggregate figures in relation to economic activity. One possible reason is that the regressions for each city represented only 19 observations, from 1965 to 1983. Even more interesting is the resulting negative effects stadium construction has on the overall share of regional economic activity in the nine target cities. Although Baade and Dye showed a very ambiguous and negative outlook on the

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[7] Ibid

stadium dilemma they did choose to point out the possible "intangible or external benefits from 'civic pride' or psychological identification with big time sports."[8]

In 1994 Baade authored another article in which he expanded the data set (more cities) in order to strengthen his earlier claims which were flawed in their approach. Although he analyzed forty-eight MSAs annually for 30 years, Baade nonetheless established similar findings as his previous studies. From 1958 to 1987 of the thirty-two cities that experienced changes in the number of teams within their SMSA, only two encountered related changes in per-capita income growth rate. In fact, of the two cities, one experienced positive income growth while the other showed negative growth (Indianapolis and Baltimore respectively).[9]

As explained by Dean Baim (2003), although Baade did remedy some errors in his previous two studies, he also created new problematic scenarios concerned with his variable choices.

> [By] using the total number of sports teams as his independent variable [he] creates two problems. First, it is impossible to discern if a particular sport has any *specific* impact on per-capita income since Baade's model implies that the number of sports teams is the determining factor, not the type of sports team...This leads to the second problem arising from using the total number of franchises rather than classifying sports by franchise. If a city gains a franchise in one sport coincidentally with the loss of a franchise in another sport, Baade's method would assume that even if there was an impact to be felt because of a sports team, there should be no difference in the economy.[10]

While these are the most significant errors Baade committed in this particular study, other smaller errors occurred further skewing his results. Like all studies, no matter how

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[8] Baade and Heartland Institute, 1987

[9] Baade and Heartland Institute (Chicago, Ill.), 1994

[10] Baim, San Diego (Calif.) and Citizens' Task Force on Chargers Issues, 2003

exhaustingly thorough the researchers are, errors and miscalculations do occur leaving room for future research and analysis.

Section 2.3: The Next Stage of Impact Studies

While the previous section discusses some of the initial literature on the impact of stadium construction, there are also some recent bodies of literature that have emerged over the last decade. In the spring of 1998, Andrew Zimbalist published his research on the advantages and disadvantages of municipality investment in the construction of sports stadiums. In order to explain why cities continually fight for franchises, he cited the monopolistic effects teams have within the market. By reducing the amount of teams below the level of demand, the high-powered leagues have leverage against cities both occupying teams and vying for new franchises. To combat the belief that teams can create massive positive movement for a typical economy, Zimbalist showed evidence that the average NFL team makes up only 0.5 percent of the overall local economy. He argued that many previous papers embellish statistics to make stadium projects seem far more attractive than they truly are. Zimbalist, like many other academics, highlighted the substitution effect as a major cause of the negative multiplier. He argued that that the typical household has a certain amount of disposable income that can be used on alternate leisure entertainment.[11] While some families may spend money either directly or indirectly on stadium events, these spent dollars will be taken from purchases that would have been made at restaurants, movies, ice skating etc. To the untrained eye, this reallocation of expenditures may seem trivial since the money will still be spent locally.

[11] Zimbalist 1998, 17

However, in an article written four years later by Siegfried and Zimbalist (2002), "Approximately 53% to 60% of total revenues in National Hockey League (NHL), Major League Baseball (MLB), National Football League, (NFL) and National Basketball Association (NBA) go to the players as salaries and benefits. Another large share of the balance goes to high-paid executives and owners."[12] Since these salaries are so high, they are subject to comparable marginal tax rates. In addition, high incomes create high savings rates. As a result of these taxes and saving rates, little revenue is re-circulated into the local economy. For the monetary benefit of the community, purchases from local merchants are far more likely to trickle back into the local economy. Given this information, keeping citizens dollars locally spent on small businesses is imperative. Zimbalist suggested that legislation should be created to combat monopolistic behavior and lessen the detrimental effects of stadium economics.[13]

In an excellent two-part study, Coates and Humphreys (1999a) attempted to provide evidence of the effects of stadium development on the level of per capita income. In comparison to Baade's (1990) earlier study that only used nine SMSAs, Coates and Humphreys expanded that number to 37 and included all United States professional football, basketball and baseball teams between 1969 and 1994. In addition to the inclusion of a greater number of teams, Coates and Humphreys also used variables assigned to the specific sports environments. As they explained in their study "we expand the sports environment variables to include franchise entry and exit, [and] stadium

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[12] Siegfried and Zimbalist 2002, 361-366

[13] Zimbalist 1998, 17

construction and capacity. By expanding the sports environment variables, [they] hope to better capture the impact of the sports environment on a metropolitan economy."[14]

Although now somewhat outdated, Coates and Humphreys' (1999b) study showed evidence of overall negative impact. This outcome differs from other studies that conclude no impact from franchises on metropolitan areas. Coates and Humphreys offered "one possible explanation for [our] observed negative effect might be that residents of SMSAs with sports franchises are willing to accept lower real income because of positive non-pecuniary benefits derived from the presence of these franchises."[15] This explanation provides evidence of positive benefits unable to be measured in fiscal terms thus giving strength to the more difficult argument of stadium advocates attempting to fiscally address non-quantifiable benefits. Due to the difficulty, if not inability, of measuring these types of positive externalities, further research must be completed in order to evaluate their overall local contributions.

To narrow the scope of the previous study conducted in 1999, Coates and Humphreys examined the effects of professional sports teams on specific sectors (construction, hospitality etc.) of the previous 37 SMSAs employment and earnings figures. This study conducted one year later found that "the presence of a sports team increases employment and earnings in the amusement and recreation sector but decreases it in all other sectors by an amount that offsets the increase in the amusement and recreation sectors."[16] This provides evidence strengthening previous literature that explains this type of increase as a reallocation of spending from other areas of the local

[14] Coates and Humphreys 1999, 601-624
[15] Ibid

[16] Miller 2002, 159

economy to the sectors involved in sporting events. It also strengthens the claims and confusions of their previous study in which negative outcomes could be attributed to the substitution of employment and spending from other economic areas.

Due to his interest and expertise in the sports multiplier, Andrew Zimbalist performed further research after his 1998 study regarding how much revenue is re-circulated into the economies of host cities. Zimbalist and Siegfried (2002) explored the popular claim that many professional athletes have permanent residences outside of the host city they play for. Although this has been a popular claim, the actual effects of the housing choices these players have made had not yet been assessed. In order to bring greater light to these effects, Zimbalist and Siegfried used NBA athletes' home addresses in their work. These data were used to find the percentage of NBA athletes that actually lived within the city they played for. During their sample time period, the 1999-2000 season, Zimbalist and Siegfried found that only 29% of players lived in their host city while 71% of these athletes did not. On the other hand, Siegfried and Zimbalist found that on average, only 93% of employees that worked within the host city lived in that same city. While the residency differences are substantial, it is far more important to see how the 29% who did live within their host city contributed to their local economy. "If the typical NBA player, regardless of where he lives, pays a marginal rate of 45% in federal and state taxes, saves 30% of his after-tax income, and spends 10% of his marginal disposable income on imports, 10.05% of gross payroll would be injected into the local economies of NBA teams."[17] When comparing this average to that of the average local employee (while making assumptions for the amount of savings and

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[17] Siegfried and Zimbalist 2002, 361-366

consumption, 5% savings, 5% consumption), their average amount re-circulated into the economy would be 58.75%. To simplify, the proportional difference of payroll introduced back into the local economy is 0.1005 for NBA athletes compared to 0.5875 for the average employee, an overall percentage difference of 485%.[18]

In order to ascertain the multiplier figures, assumptions had to be made within Siegfried and Zimbalist's 2002 study such as average savings and consumption figures. Due to the myriad of assumptions used, the authors intended the research to be a textual illustration of the significant leakages associated with revenues within professional athletics and more specifically players' salaries. In no way did they aim for the calculations to be used as exact figures.

The previous studies have used similar techniques to establish similar outcomes. A more recent study by Fenn and Crooker (2005) chose a different road in attempting to provide evidence of positive or negative economic growth. Instead of evaluating the benefit of a team in certain locales, Fenn and Crooker (2005) measured the average Minnesotan's willingness to pay for a new Vikings stadium. Ultimately, the study showed the willingness to pay of the Minnesotan public as "$96.6 million, far below the proposed price tag of $450-500 million."[19] Unlike previous studies, Fenn and Crooker used a larger target audience to observe the complete interest in the construction of a new stadium in Minnesota. Even looking at a metropolitan sample as well as a rural sample,

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[18] Ibid

[19] Fenn, Aju and John R. Crooker, 2005

the study falls short of providing evidence that stadium construction in Minnesota and the taxation of the states citizens is an intelligent investment.[20]

While novel in their approach, Fenn and Crooker (2005) were unable to identify the interest/benefits attributed to stadium development in Minnesota. Although growth does occur, academics have had a difficult time pinpointing what types of benefits are attributed to this growth and how to evaluate them in fiscal terms.

The next section of this literature review will discuss the existing literature regarding the benefits of housing a sports franchise and the cases of positive growth attributed to stadium development.

Section 2.4: Some Other Aspects of Stadium Impact Analysis

In the last decades city interest in housing a professional franchise has soared. These costly investments are frequently justified by arguments claiming that bringing a franchise into a struggling city will spur economic growth through the creation of new jobs and the addition of new dollars in the economy from tax revenue. While this may be the general sentiment of politicians and teams vying for a new stadium, independent research has shown that there is no statistically significant correlation between stadium erection and economic development.[21]

One might think given this information that investment in stadium development is detrimental to a community. However, almost all independent work on stadium economics has failed to introduce an important variable in the debate, the quality of life

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[20] Ibid
[21] Coates and Humphreys 1999, 601-624. Okner, 1974. Baade, 1988. Baade and Dye, 1990. Coates and Humphreys, 2003.

of the local community. While not directly affecting the average income of an SMSA, when included, public subsidization of local stadiums can be a worthwhile investment for the happiness of local fans. While difficult to measure, research has shown the extent to which a sports team creates elements of civic pride and entertainment all adding to the quality of life of the community.

In regard to quality of life, Rappaport and Wilkerson (2001) conducted the most cited research on the benefits of hosting a sports franchise. This thorough research attempted to provide evidence of the intangible benefits frequently left out of the stadium debate. While they run into the most frequent difficulties of quantifying these benefits, Rappaport and Wilkerson were nonetheless able to show the significance and size of these economic benefits through alternative methodology.[22]

The most obvious form of increase in quality of life is the happiness of sports fans. The most evident form of this happiness is the actual attendance of a sports game. While this may seem like pure increase in quality of life, the audience pays for their pleasure. The actual quality of life is the amount they would pay in excess of what they actually paid to view the game. This figure is usually generated through survey analysis in specific areas.

A second cause for fan happiness is being able to follow a local sports team. Rooting for a team's success becomes part of life in daily discussions, leisure reading, fashion choices, etc. For this happiness fans pay nothing directly. This communal

[22] Rappaport and Wilkerson 2001, 55

interest also creates a sense of "civic pride" through being a citizen of a "world class" city.[23]

The happiness a person obtains from viewing a sports game either first hand or at home is not observable and therefore very difficult to evaluate. Even so, research has shown that methods do exist that place value on personal happiness derived from being a fan or just a member of a franchise community.

The first method used is similar to the method employed earlier by Fenn and Crooker in their 2005 study. In 2001, Johnson, Groothius and Whitehead surveyed Pittsburgh residents asking what they would be willing to pay to keep the Penguins in Pittsburgh. The results showed that the value of the Penguins to Pittsburgh for 30 years was between $26.9 million and $74.7 million or between $0.83 and $2.30 per resident.[24] While the lower level seems to only cover job creation and tax benefit, the higher level of willingness to pay draws near the average government contribution of $84 million. These numbers might even be low considering the fact that the quality of life benefits are lowest for the NHL since they are not nearly as popular as football, baseball, or basketball. Another reason for a somewhat low outcome is that Pittsburgh already houses the NFL Steelers and MLB Pirates and that since the surveyed audience was not faced with the realistic possibility of losing their hockey team, they may have undervalued their willingness to pay.

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[23] Ibid, 55

[24] Johnson, Groothuis and Whitehead 2001, 6-21

A second method of assessing the benefits accrued through quality of life is comparing them to other elements that create increases in quality of life.[25] Rappaport and Wilkerson (2001) identify the quality of life benefits associated with one extra day of excellent weather as being comparable in scale to public sentiment regarding stadium development. Therefore, if the quality of life increase of one extra day of good weather is as significant as the increase from hosting a professional sports team the investment in stadium erection may be reasonable. While this technique is seldom used due to ambiguity in evaluating social changes, it is still a valuable method to develop a benchmark for desire.

Using historical lessons to understand the importance a team has to a locale is also an excellent method in evaluating quality of life. By looking at the actions metropolitan areas have taken that have lost sports teams, one can see the economic effects of both hosting and not hosting a team within the exact same location. Historically, this measure has proven to be one of the best. Since 1980, only 12 U.S. metropolitan cities have lost major league teams. When looking at football, of the metro areas that have lost NFL teams, all but Los Angeles have consequently spent far more to attract a new team then they would have had to spend to keep their previous franchise.[26] In 1987, St. Louis refused to spend $120 million to construct a new football stadium. As a result their franchise, the St. Louis NFL Cardinals, left for a city that would allocate the necessary funds. Three years later, in order to attract a new team, St. Louis spent $280 million.[27]

[25] Rappaport and Wilkerson 2001, 55

[26] Ibid

[27] Ibid

Although this does not specifically show the benefits associated with having a franchise, it does provide evidence that a stadium is something citizens and politicians want and will pay for.

In order for a team to explore the economic feasibility of the construction of a stadium in a certain locale, research must be completed to evaluate the possible benefits and repercussions associated with the erection of the structure. "In November of 2006, the San Francisco 49ers announced plans to explore the feasibility of developing a new 68,000-seat stadium in Santa Clara."[28] Authors of this impact study, given the large audience of California, looked into the potential non-quantifiable benefits associated with the construction of this new state-of-the-art stadium. Their analysis cited that geographic regions that host NFL teams receive significant benefit from being in the spotlight due to the media attention created from having such a franchise. This media attention creates "goodwill" toward the host city precipitating subtle economic benefits such as a communal sense of identity and cohesion thus increasing quality of life.[29]

While NFL teams give back to the community by offering fans the happiness of viewing their games, they also give back by offering their time and money to various non-profit organizations and charitable groups within the host city. In a 2007 article on the fiscal impacts of a new stadium in Santa-Clara, the author mentioned how the 49ers have raised and collected over $4 million for non-profit organizations.[30] In addition, 49er players give back through outreach programs for troubled youth, contributions to

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[28] *Economic and fiscal impacts of a new state-of-the-art stadium in Santa Clara.*

[29] Ibid

[30] Ibid

community groups, and violence prevention programs. Although many of these players are seen spending copious amounts of money on themselves, it seems apparent that NFL teams urge, if not require, significant contributions to the community and the citizens who fill their stadium seats. Having explored the teams that have fostered increases in quality of life, it is equally necessary to look at the locales that have shown robust economic improvement from possessing a sports franchise.

Although many stadiums have caused their specific locales significant economic downfall, the Staples Center in Los Angeles has created economic growth for their community. Probably the most feasible explanation of this positive economic growth is the taxpayer friendly payment plan. To build the Staples Center "The cost to taxpayer's lies somewhere between $12.6 Million and $71.1 million."[31] Although this seems like a significant financial burden, compared to other publicly funded projects the Staples Center used very little taxpayer money.

How did the city of Los Angeles fair so well in these negotiations? First, its imperative to realize the power L.A. has concerning sports and sporting venues. Due to their high population and appearance as a chic sexy city, L.A. has significant market power since investors know their investment will be profitable. Beyond their geographical and sociological advantages, Los Angeles assumed very little financial risk by making it clear through negotiations that they will incur no debt services. This risk protection came at the expense of allowing the private sector (L.A. Arena Development Company) to assume nearly all of the revenue collected once the new stadium opened.

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[31] *Assessing the Economic Impact of The Staples Center.*

"It would not be misleading to say that the City of Los Angeles traded some uncertain revenue for the certainty of not having debt service expenses."[32]

Some economic research has shown that the arguments for public expenditures on the construction of sports stadiums hold little weight when assessed solely on economic grounds. Since few stadiums have been built on private dollars, there seems to be a strong suggestion that stadium revenues are unable to cover the massive costs associated with their initial construction and operation. While these arguments are valid, stadium advocates' arguments focus on different variables and valuation methods. Instead of purely looking at the outcomes in terms of fiscal impacts, these supporters spotlight indirect benefits that are significant and thus deserve public support. Most studies have discerned if a stadium has caused economic progress by comparing the economic atmosphere before and after construction. However, these studies have only assessed a few of the many intangible benefits associated with stadium construction. Instead, economic scholars must pinpoint these other non-quantifiable benefits that have escaped the lens of many previous studies.[33]

The next chapter of this thesis will impartially investigate if there has been a positive impact on local economic development due to the presence of a professional baseball or football team. The current study will attempt to bring greater light to the relationship between real per capita income, employment, and personal consumption and the creation of a professional athletic venue/team, using an updated data set. Finally, the

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[32] Ibid, 10

[33] Although intangible benefits do play a major role in the debate on publicly subsidizing stadium construction, fiscal impacts have the greatest influence on the decisions made between city officials and sports teams. As a result, the current study will focus on the effects stadium construction has on fiscal outcomes so as to show the possibility of positive local economic growth through sports stadium development.

conclusion will incorporate the previous chapters to succinctly bring to a close the overall study and also highlight some future areas of research.

CHAPTER III

ECONOMETRIC ANALYSIS OF THE IMPACT OF STADIUM CONSTRUCTION

This chapter uses regression analysis to assess the effect stadium construction has on SMSA local economic development. The chapter analyzes the impact of stadium construction on three different aspects of local economic benefit: per-capita income, employment, and personal consumption. Specific cities are examined due to their substantial development in the last fifteen years. This recent development expectantly spurs volatility and creates valuable results via the empirical model. These results serve as the foundation of the evidence supporting or refuting publicly subsidized stadium construction specifically on economic terms. As mentioned in the previous chapter, intangible benefits must be recognized as part of the overall picture. However, this study leaves out these types of benefits by looking solely at fiscal outcomes in order to combat the popular belief that stadium construction leads to zero or negative economic development.

Regression analysis is employed because the study focuses on specific dependent variables. This type of analysis is best implemented in a study involving a time-series of data. Since this study uses data in relation to yearly change, regression analysis is most appropriate and effective. In any regression analysis, the dependent variable is subject to error. Due to this assumption, a variable representing error is used.

Section 3.1: Coverage of Empirical Analysis

The cities examined are diverse in their socio-economic atmosphere, thus causing the possibility of greater variability in the data and results. To begin with, two major players, Los Angeles and New York are included on the basis of size, population density, and overall importance to professional sports. Although Los Angeles and New York have not built a football or baseball stadium since 1990, they will be included for comparative analysis. The other 10 cities analyzed are Atlanta, Baltimore, Chicago, Cincinnati, Denver, Detroit, Houston, Philadelphia, Pittsburgh, and Tampa. These 10 cities will potentially give the strongest results due to the fact that each one has built both a baseball and football stadium in the last 15 years as seen in Table 3.1 and 3.2. Additionally, when averaging the total costs of public subsidization (tax-payer dollars) for their stadium construction projects, these 10 cities are in the higher public spending brackets. For example, when looking at The National Football League's (NFL) stadium costs, the 10 previously mentioned cities have an average of 75.92% in publicly subsidized dollars for investment. When looking at Major League Baseball's (MLB) stadium costs, these 10 cities have an average of 68.19% in taxpayer dollars for investment.[1]

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[1] Komisarchik and Fenn, 2007

TABLE 3.1: NFL

SMSA	Team	Stadium/Arena	Year Opened	Capacity	Public Share
Atlanta	Falcons	Georgia Dome	1992	71,228	100.00%
Baltimore	Ravens	M&T Bank	1998	69,000	89.70%
Tampa	Buccaneers	Raymond James Field	1998	65,700	80.70%
Denver	Broncos	Invesco Field	2000	76,100	75.00%
Cincinnati	Bengals	Paul Brown Stadium	2000	65,500	71.10%
Pittsburgh	Steelers	Heinz Field	2001	64,500	56.20%
Detroit	Lions	Ford Field	2002	65,000	83.30%
Houston	Texans	Reliant Stadium	2002	69,500	80.90%
Philadelphia	Eagles	Lincoln Financial Field	2003	68,500	56.40%
Chicago	Bears	Soldier Field II	2003	61,500	65.90%
Los Angeles	*Raiders*	*McAfee Coliseum*	*1966*	*63,132*	*98.50%*
New York	*Giants*	*Giants Stadium*	*2009*	*80,000*	*35.30%*
New York	*Jets*	*Giants Stadium*	*2009*	*80,000*	*35.30%*

Source: Komisarchik, Maya and Aju J. Fenn. 2007. Trends in Stadium and Arena Construction, 1995-2010.

TABLE 3.2: MLB

SMSA	Team	Stadium/Arena	Year Opened	Capacity	Public Share
Tampa	Devil Rays	Tropicana Field	1990	45,000	90.70%
Chicago	White Sox	US Cellular Field	1991	40,615	100.00%
Baltimore	Orioles	Oriole Park	1992	48,876	96.20%
Denver	Rockies	Coors Field	1995	50,381	78.10%
Atlanta	Braves	Turner Field	1997	49,831	0.00%
Houston	Astros	Minute Maid Park	2000	42,000	72.00%
Detroit	Tigers	Comerica Park	2000	40,950	38.30%
Pittsburgh	Pirates	PNC Park	2001	38,365	70.10%
Cincinnati	Reds	Great American Ballpark	2003	42,059	86.20%
Philadelphia	Phillies	Citizens Bank Park	2004	43,000	50.30%
Los Angeles	*Dodgers*	*Dodger Stadium*	*1962*	*56,000*	*0.00%*
New York	*Mets*	*Mets Stadium*	*2009*	*45,000*	*0.00%*
New York	*Yankees*	*Yankee Stadium*	*2009*	*50,800*	*22.00%*

Source: Komisarchik, Maya and Aju J. Fenn. 2007. Trends in Stadium and Arena Construction, 1995-2010.

Section 3.1.1: Time Period of Analysis

While prior studies assessed the effect of franchise development and stadium construction on specific locales, much of the data are outdated or poorly collected. Similar to the current study, Baade and Dye's (1990) study used income as the dependent variable in their regression model. However, their data are now outdated, spanning from 1965-1983.[2] In this study, data were collected from 1990-2005 and examined to find the effects of using an updated data set. While Baade and Dye (1990) used only nine SMSAs, this present analysis uses a more expanded coverage of 12 SMSAs.[3] This analysis serves as a renewal of Baade and Dye's (1990) study. Further upgrading Baade and Dye's study, the current investigation uses several different independent variables to better assess the atmosphere post stadium construction.

Data on personal consumption are not easily accessible. As a result, 16 consecutive years of data are not present within this study. Instead, only four years of successive information could be found on the statistic. It is these four years that are examined in the following sections. Nonetheless, valuable results are found, giving strength to previous and new claims.

Section 3.2: The Model

Three regression models are used to assess the impact of having a professional stadium on SMSA per capita income, employment, and personal consumption based on a number of independent variables. Regression analysis is utilized to evaluate how franchise and stadium development has affected the previously mentioned 12 cities. To

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[2] Baade and Dye, 1990

[3] Ibid

understand the full impact stadium construction has, this study upgrades Baade and Dye's (1990) model by placing employment and personal consumption, along with per-capita income as dependent variables on the left hand side of the equation. To examine specific kinds of stadiums (baseball, football, or both), four regressions are run for each dependent variable. In addition, to assess year-to-year change, a trend variable is included as a right hand side independent variable. To give a full account of changes within the time span, four more regressions are run that incorporate the trend term. All 24 regressions incorporate different facets of the stadium construction gamut. While some regressions use all 16 years of analysis, other data were only available for shorter time spans forcing a smaller duration of analysis. The following models grant the structure for the necessary regression analysis:

MODEL 1:

$$\mathbf{Pincome_i} = b_0 + b_1\,POP\_SQML + b_2\,EMPLYMNT + b_3\,STAD_i + b_4FOOT_i + b_5BASE_i + TREND + e_i$$

MODEL 2:

$$\mathbf{LEMPLYMNT_i} = b_0 + b_1\,POP\_SQML + b_2STAD_i + b_3\,FOOT_i + b4\,BASE_i + TREND + e_i$$

MODEL 3:

$$\mathbf{LPCONS_i} = b_0 + b_1\,POP\_SQML_i + b_2\,Pincome_i + b_3 STAD_i + b_4 FOOT_i + b_5 BASE_i + TREND + e_i$$

Section 3.2.1: Variables and Data Sources

The data for each SMSA spans from 1990-2005. A pooled regression method is employed by combining data for each SMSA over the full time period. Also, there may be some immeasurable variables that over time may affect income, employment, or consumption. Given this possibility, for further sensitivity analysis a trend term is also used to run these regressions. In order to give a greater understanding of what areas of economic growth or decline are being assessed, an explanation of each variable follows.

PIncome = one of the three dependent variables in the regressions. Also used as a left side variable. Represents the i^{th} SMSA's real aggregate per-capita income. Income is used because it is the most attributable characteristic of socio-economic change. The data for real aggregate personal income were retrieved from The Bureau of Economic Analysis Regional Accounts.[4]

[4] U.S. Bureau of Economic Analysis. Regional Accounts.

EMPLYMNT$_i$ = one of three dependent variables. Also used as a left hand side variable. Represents the change in overall employment in a certain SMSA before and after the construction of a new sports stadium. The data for SMSA employment were retrieved from The U.S. Bureau of Labor Statistics and Real Estate Center at Texas A&M.[5]

PCONS$_i$ = one of three dependent variables. Represents the average personal consumption in a certain SMSA before and after the construction of a sports stadium. Personal consumption statistics were retrieved via the U.S. Bureau of Labor Statistics, "Consumer Expenditures."[6]

POP/SQML$_i$ = a measure of the increase or decrease of persons per square mile in the i^{th} SMSA. The data for population per square mile were retrieved from the Bureau of Economic Analysis as well as the U.S. Census Bureau.

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[5] The U.S. Bureau of Labor Statistics. Texas A&M. Real Estate Center.

[6] U.S Bureau of Labor Statistics. Consumer Expenditures.

$STAD_i$ = a dummy variable that assumes a 0 value before the specific SMSA builds a stadium. A value of 1 is assigned once the SMSA completes the construction process. The data for this variable were retrieved via the World Stadiums website (www.worldstadiums.com).[7]

$FOOT_i$ = a dummy variable that receives a 0 value if the specific SMSA does not have a football stadium, and a 1 if it does or constructs one during the 15 year data span. The data for this variable were retrieved via the World Stadiums website (www.worldstadiums.com).[8]

$BASE_i$ = a dummy variable that takes a 0 value if the specific SMSA does not have a baseball stadium, and a 1 if it does or constructs one during the 15 year data span. The data for this variable were retrieved via the World Stadiums website (www.worldstadiums.com).[9]

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[7] www.worldstadiums.com

[8] Ibid

[9] Ibid

TREND = a variable that denotes the year being analyzed ranging from 1990-2005 where 1990 receives a value of 1 and 2005 a value of 16. The main purpose of this variable is to act as a control against broad manipulations to aggregate per-capita income.

e_i = a term reflecting the stochastic error. In a regression analysis the dependent variable is never fully determined by the independent variables. In the case of stadium economics, many other variables exist that can influence the dependent variable. Therefore, it is necessary to include error within the equation.

TABLE 3.3: OVERVIEW OF VARIABLES

Variables Abbreviated	Variable Name	Definition
PIncome	Per-capita Personal Income	Dependent/independent variable representing the i^{th} SMSA's real aggregate personal income
$EMPLYMNT_i$	Employment	Dependent/independent variable that measures the increase or decrease of employed persons before and after the construction of a sports stadium
$PCONS_i$	Aggregate Personal Consumption Expenditure	Dependent/independent variable representing average personal consumption for persons in a specific locale before and after the construction of a sports stadium
$POP/SQML_i$	Population Per Square Mile	Independent variable that measures the increase or decrease of persons per square mile in the i^{th} SMSA
$TMSDWNTWN_i$	Teams Downtown	Independent variable representing the number of teams in a specific SMSA where a 0 value is used for a locale with only one team while 1 represents an area with both a baseball and football team
$STAD_i$	Stadium Construction	A dummy variable that assumes a 0 value before the construction of a sports stadium and a 1 post stadium construction
$FOOT_i$	Football Stadium Construction	A dummy variable that assumes a 0 value before the construction of a football stadium and a 1 post football stadium construction
$BASE_i$	Baseball Stadium Construction	A dummy variable that assumes a 0 value before the construction of a baseball stadium and a 1 post baseball stadium construction
TREND	Year	An independent variable that denotes the year being analyzed ranging from 1990-2005 where 1990 receives a value of 0 and 2005 receives a value of 16
e_i	Stochastic Error	A term reflecting the stochastic error

Section 3.2.2: A Priori Expectations

For Model 1, with income per-capita as a left hand side variable, higher employment is expected to increase per-capita income. As such, b_2 is expected to be positive. Similarly, a higher population per square mile is expected to lower per-capita SMSA income. As a result, b_1 is expected to take on a negative value. On the other hand, the dummy variables can take on a positive or negative sign. A positive and significant co-efficient with the dummy variable implies that having a stadium leads to a rise in per-capita income.

For Model 2, higher population is expected to raise employment. Also, a positive co-efficient with the dummy variables implies that stadium construction leads to a rise in employment for these SMSA's.

For Model 3, higher per-capita income is expected to raise personal consumption, while higher population may either positively or negatively affect consumption. Again, a positive and significant co-efficient for the dummy variables implies that stadium construction leads to higher personal consumption expenditures. This may be viewed as one of the indirect benefits of a professional stadium.

For all regressions, econometric consideration was made by testing to see if heteroscedasticity was present. Heteroscedasticity, or non-constant error variance, can occur when looking at cross-sectional data sets. When looking at the data and results, the assumption is made that there is constant error variance. However, tests for heteroscedasticity must be run to see if in fact the assumption is false. If heteroscedasticity is present, the results still can be used as an estimator but cannot be used to formulate hypotheses. Furthermore, when heteroskedasticity is present, the t-statistics and p values are no longer valid and thus cannot be used until fixed. While multiple solutions for heteroscedasticity problems exist, in the current regressions heteroscedasticity was not a problem and therefore did not need to be fixed.[10]

Section 3.3: Impact of Stadiums on Per-capita Income

The following regressions take into account the multiple variables involved in the impact of stadium construction in 12 different SMSAs on per-capita income. While all eight regressions are similar in their variable choices, regressions four through eight include the time variable TREND as mentioned in sub-section 3.1.1. The statistical results follow the model notations of the subsequent eight regressions:

Regression 1:

$LPincome_i = b_0 + b_1 \, LPOP\_SQML + b_2 LEMPLYMNT + b_3 \, STAD_i + e_i$

Regression 2:

$LPincome_i = b_0 + b_1 \, POP\_SQML + b_2 EMPLYMNT + b_3 \, FOOT_i + e_i$

Regression 3:

$LPincome_i = b_0 + b_1 \, LPOP\_SQML + b_2 LEMPLYMNT + b_3 \, BASE_i + e_i$

Regression 4:

$LPincome_i = b_0 + b_1 \, LPOP\_SQML + b_2 LEMPLYMNT + b_3 \, STAD_i + b_4 FOOT_i + b_5 BASE_i + e_i$

[10] Although over one hundred observations were used in the current regressions, chi-squared tables only go up to one hundred regressions. However, no values exceeded the 135.8 critical value for 100 degrees of freedom at the 1% level thus showing that heteroscedasticity was not an issue that needs fixing.

Regression 5:

$$LPincome_i = b_0 + b_1 LPOP\_SQML + b_2 LEMPLYMNT + b_3 STAD_i + TREND + e_i$$

Regression 6:

$$LPincome_i = b_0 + b_1 LPOP\_SQML + b_2 LEMPLYMNT + b_3 FOOT_i + TREND + e_i$$

Regression 7:

$$LPincome_i = b_0 + b_1 LPOP\_SQML + b_2 LEMPLYMNT + b_3 BASE_i + TREND + e_i$$

Regression 8:

$$LPincome_i = b_0 + b_1 LPOP\_SQML + b_2 LEMPLYMNT + b_3 STAD_i + b_4 FOOT_i + b_5 BASE_i + TREND + e_i$$

TABLE 3.4: PER-CAPITA INCOME OVERVIEW

Regression No.	Left Hand Variable	Right Hand Variables/Model
1	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 STAD $_i + e_i$
2	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ POP_SQML + b_2EMPLYMNT + b_3 FOOT $_i + e_i$
3	= Log of Per-capita Income (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 BASE $_i + e_i$
4	= Log (Per-capita Income) (Pincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 STAD $_i$ + b_4FOOT $_i$ + b_5BASE $_i + e_i$
5	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 STAD $_i$ + TREND + e_i
6	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 FOOT $_i$ + TREND + e_i
7	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 BASE $_i$ + TREND + e_i
8	= Log (Per-capita Income) (LPincome)	$b_0 + b_1$ LPOP_SQML + b_2LEMPLYMNT + b_3 STAD $_i$ + b_4FOOT $_i$ + b_5BASE $_i$ + TREND + e_i

TABLE 3.5: LPINCOME REGRESSION RESULTS (1-4)

	Reg1	Reg2	Reg3	Reg4
C	**8.145*****	**8.756*****	**8.916*****	**8.188*****
	(28.240)	(27.007)	(29.748)	(29.033)
LEMPLYMNT	**0.147*****	**0.087*****	**0.057****	**0.126*****
	(6.582)	(3.554)	(2.438)	(5.604)
LPOP_SQML	-0.020	0.032	0.043	-0.021
	(-0.714)	(1.013)	(1.492)	(-0.759)
STADI	**0.205*****			**0.208*****
	7.470			(7.989)
FOOTI		0.034		0.028
		0.701		(0.702)
BASEI			**0.253*****	**0.264*****
			(4.123)	(4.956)
R-squared	0.309	0.106	0.178	(0.391)
N	192	192	192	192
F-stat.	**28.023*****	**7.450*****	**13.592*****	**23.835*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

TABLE 3.6: LPINCOME REGRESSION RESULTS (5-8)

	Reg1	Reg2	Reg3	Reg4
C	**8.841*** **	**8.765*** **	**8.878*** **	**8.760*** **
	(74.591)	(77.888)	(81.364)	(74.383)
LEMPLYMNT	**0.070*** **	**0.076*** **	**0.063*** **	**0.073*** **
	(7.524)	(8.950)	(7.467)	(7.767)
LPOP_SQML	0.009	0.000	0.011	0.000
	(0.765)	(0.037)	(1.068)	(-0.001)
STADI	0.005			0.008
	(0.354)			(0.663)
FOOTI		**0.048*** **		**0.049*** **
		(2.921)		(2.986)
BASEI			**0.058** **	**0.062*** **
			(2.526)	(2.721)
Trend	**0.040*** **	**0.040*** **	**0.039*** **	**0.039*** **
	(31.103)	(37.057)	(35.097)	(30.166)
R-squared	0.888	0.893	0.892	0.897
N	192	192	192	192
F-stat.	**370.914*** **	**389.674*** **	**384.878*** **	**268.592*** **

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

These regression analyses capture the nature of the effects employment, population, year, and overall stadium construction had on per-capita income. Independent variables (with the exception of the dummy variables) are changed into log form to ensure a linear set of data points and thus allow for a valuable linear regression.

Regressions results one through four of dependent variable LPIncome indicate decent to sub-par significance due to R-squared values of 0.309, 0.106, 0.178, and 0.391 respectively. While regression two and three (0.106 and 0.178) have low R-squared levels regression one and four (0.309 and 0.391) are close to the desired 0.40 level. Nonetheless, it is imperative to point out that these low R-squared levels are accompanied by extremely high F-stats (28.02, 7.45, 13.59, 23.84), which is a measure of the overall robustness of the regression model.

The results of regression one indicate levels of significance in LEMPLYMNT and $STAD_i$ with t-stats of 6.58 and 7.47 respectively. To paint a more vivid picture, the results of these significant t-stats and the positive coefficients (0.147 and 0.205) indicate they positively affect the dependent variable LPIncome. Furthermore, when looking at employment, a 1% increase in LEMPLYMNT leads to a .147% increase in the log of personal income. Even more substantial, when $STAD_i$, a dummy variable, becomes 1, results show a .205% increase in LPincome. Looking at these results intuitively, both positive relationships could make sense but nonetheless conflict with existing literature. For example, a small increase in the number of those employed could conversely relate to a small increase in overall per-capita income. Similarly aligning with the arguments of stadium advocates, the construction of a sports stadium could create greater economic activity and thus significantly raise per-capita income.

Although regressions two and three have low R-squared values, they also have significant coefficient values and high F-stats. In both regressions, employment shows a significant yet nominal relationship to income at 0.087 and 0.057. What is more interesting is that $FOOT_i$ is insignificant while $BASE_i$ has a strong positive impact on income per-capita.

Regression four shows the highest R-squared value of 0.391, meaning approximately 40% of the change in LPIncome is attributed to the independent variables, while about 60% is attributed to other variables not tested in this study. Similar to regressions one through three, regression four shows positive significant values for LEMPLYMNT at the t-stat of 5.604. The coefficient value of 0.126 shows that a 1% increase in LEMPLYMNT will result in a 0.126% increase in the log of per-capita income. Also, similar to the previous regressions, regression four shows a positive and significant impact of $STAD_i$ and $BASE_i$ on LPIncome while no significance is present in $FOOT_i$. This may be attributable to the NFL only consisting of 16 teams and a 16 game regular season[11] compared to the MLB, which has 30 teams, and a 162 game regular season for a grand total of 2,430 games.[12]

In regressions five through eight, yearly change is accounted for by including the TREND term. While all other variables remain unchanged, the TREND value allows for a substantially stronger regression. To begin with, R-Squared values approximately double (0.888, 0.893, 0.892, and 0.897). In addition, F-stats also increase drastically giving greater robustness to the results. Also important to consider is the 99% level of

[11] NFL.com

[12] MLB.com

significance as seen by the probability and the three stars accompanying each of the significant values in the regression results.

When looking at Table 3.6, and the four regressions together, one can see all employment variables are significant. If averaged together for regression five through eight, LEMPLYMNT has t-stat significance of 7.9 and coefficients of 0.07. This means that a 1% increase in LEMPLYMNT results in a 0.07% increase in the log of personal income. When looking at the dummy terms $FOOT_i$ and $BASE_i$ (for all regressions they are involved in) one can see that when either variable equals a value of one, there is a 0.049% ($FOOT_i$) and 0.06% ($BASE_i$) increase in the log of PIncome. Lastly, it is necessary to include the statistical importance of the TREND variable. Results show positive significance for TREND in all four regressions with a coefficient around the 0.04 level. While not incredibly high, this level does show that the inclusion of a time variable is necessary and valuable for the results. The results show that having a stadium, either football or baseball, has a positive and significant impact on these SMSA's per-capita income.

Section 3.4: Impact of Stadiums on Employment

Similar to per-capita income, eight regressions capture the effect of stadium construction in 12 different SMSA's on employment figures from 1990 – 2005. Regressions one through eight use all the same variables, with the exception of a TREND variable representing annual change. Regressions five though eight use the TREND variable to account for yearly change. The subsequent eight regressions are followed by their data outcomes shown in Table 3.8 and 3.9.

Regression 1:[13]

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_1 \, STAD_i + e_i$$

Regression 2:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 \, FOOT_i + e_i$$

Regression 3:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_3 \, BASE_i + e_i$$

Regression 4:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 \, STAD_i + b_3 \, FOOT_i + b_4 \, BASE_i + e_i$$

Regression 5:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 STAD_i + TREND + e_i$$

Regression 6:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 \, FOOT_i + TREND + e_i$$

Regression 7:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 BASE_i + TREND + e_i$$

Regression 8:

$$LEMPLYMNT_i = b_0 + b_1 \, LPOP\_SQML + b_2 STAD_i + b_3 \, FOOT_i + b4 \, BASE_i + TREND + e_i$$

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[13] For further sensitivity analysis, both for income per-capita and employment, regressions were run using a pair of dummy variable together. This is shown in Appendix A. The results for these regressions remained largely unchanged.

TABLE 3.7: EMPLOYMENT OVERVIEW

Regression No.	Left Hand Variable	Right Hand Variables/Model
1	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_1 STAD $_i + e_i$
2	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2 FOOT $_i + e_i$
3	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_3 BASE $_i + e_i$
4	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2 STAD $_i$ + b_3 FOOT $_i$ + b_4 BASE $_i + e_i$
5	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2STAD $_i$ + TREND + e_i
6	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2 FOOT $_i$ + TREND + e_i
7	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2BASE $_i$ + TREND + e_i
8	= Log (Employment) (LEMPLYMNT)	$b_0 + b_1$ LPOP_SQML + b_2STAD $_i$ + b_3 FOOT $_i$ + b4 BASE $_i$ + TREND + e_i

TABLE 3.8: EMPLYMNT REGRESSION RESULTS (1-4)

	Reg1	Reg2	Reg3	Reg4
C	**10.835*****	**11.041*****	**10.434*****	**10.567*****
	(21.306)	(20.927)	(19.034)	(21.293)
LPOP_SQML	**0.608*****	**0.618*****	**0.532*****	**0.627*****
	(7.786)	(7.569)	(6.524)	(8.345)
STADI	**-0.479*****			**-0.408*****
	(-5.821)			(-5.152)
FOOTI		**-0.580*****		**-0.444*****
		(-4.290)		(-3.547)
BASEI			**0.696*****	**0.525*****
			(3.758)	(3.107)
R-squared	0.311	0.260	0.244	0.391
N	192	192	192	192
F-stat.	**42.746*****	**33.214*****	**30.577*****	**30.0*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

TABLE 3.9: EMPLYMNT REGRESSION RESULTS (5-8)

	Reg1	Reg2	Reg3	Reg4
C	**10.711*****	**11.029*****	**10.432*****	**10.578*****
	(21.730)	(20.836)	(18.982)	(21.631)
LPOP_SQML	**0.591*****	**0.614*****	**0.534*****	**0.619*****
	(7.815)	(7.459)	(6.510)	(8.352)
STADI	**-0.628*****			**-0.524*****
	(-7.060)			(-5.815)
FOOTI		**-0.578*****		**-0.415*****
		(-4.261)		(-3.351)
BASEI			**0.710*****	**0.376****
			(3.709)	(2.130)
Trend	**0.036*****	0.004	-0.003	**0.025****
	(3.751)	(0.004)	(-0.301)	(2.574)
R-squared	0.359	0.261	0.245	0.412
N	192	192	192	192
F-stat.	**35.160*****	**22.128*****	**20.317*****	**26.046*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

As seen above, all eight regressions use the log of employment as the dependent variable. While the first four are regressed without a notation of time, the second four regressions use a TREND variable to account for annual change. Unlike the regressions for per-capita income, when TREND is involved in the regressions for employment, little variation occurs in the results. Although the R-squared values for all eight regressions are statistically low (all but one being below the desired .40 level), the F-stat values are quite high. Realizing this, the overall picture is still a valuable representation of stadium construction impact on the 12 SMSAs examined.

When viewing the results, one must look at the probability statistics showing every coefficient significant at the 99% level. Beginning by examining the positive relationships first, regressions one through four show that if the log of population per square mile increases by 1% the log of employment increases by 0.608%, 0.618%, 0.532% and 0.627% respectively. In addition, in regression three and four, similar to the same regressions for per-capita income, the dummy variable $BASE_i$ has a positive coefficient of 0.696 and 0.525. The results show that when $BASE_i$ equals one, log of employment increases by 0.696% and 0.525% respectively. This positive value is comparatively noteworthy when looking at the other dummy variables ($STAD_i$ and $FOOT_i$) which show a significant negative relationship with employment. As mentioned before, this most likely is attributable to the discrepancy between the number of teams and the number of games played in the NFL and MLB. Due to this lack of stadium use, seasonal employment occurs instead of full time employment. This idea will be further highlighted in the next four regressions that include TREND as an independent variable.

With the inclusion of TREND some values slightly changed; however most stay more or less the same. The coefficient and t-stats for population per square mile are largely unaffected by the new independent variable, remaining both positive and significant. Similarly, the values for $BASE_i$ in the last two regressions using TREND[14] stay positive and significant, increasing in value when looked at alone without the other dummy variable and decreasing in value when looked at with the other dummy variables. As mentioned before, with a longer season and more games played, the MLB is able to offer employees a greater number of hours of employment.

Possibly the most intriguing aspect of the results is the significant and negative impact stadiums in general, and more specifically football stadiums, have on employment figures in the 12 SMSAs examined. A true testament of the existing literature, football stadiums seem to poorly reallocate employment post construction, causing strain on the job market. The results of the first two regressions reflect some of the present claims of the existing literature, namely the negative economic effect football stadiums have on employment. However, these regressions also conflict with past research due to the evidence of positive SMSA effect of baseball stadium construction on employment and both football and baseball venue construction on income per-capita.

Section 3.5: Impact of Stadiums on Personal Consumption

Data on personal consumption expenditures for these 12 SMSAs were only available for four years, 1996 to 1999. As such, the regression results presented are limited to a sample size of 48. Similar to the previous regressions, the last four include

[14] Each SMSA has different characteristics and attributes. These may affect the results. In order to control for the differences, some further regressions were run using dummy variables for each SMSA. These results for income per-capita and employment are shown in Appendix B.

an account for time by using the TREND variable. A regression model breakdown is followed by statistical regression outcomes as shown in Table 3.8 and 3.9:

Regression 1:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 STAD_i + e_i$

Regression 2:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 FOOT_i + e_i$

Regression 3:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 BASE_i + e_i$

Regression 4:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 STAD_i + b_4 FOOT_i +$

$b_5 BASE_i + e_i$

Regression 5:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 STAD_i + TREND + e_i$

Regression 6:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 FOOT_i + TREND + e_i$

Regression 7:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 BASE_i + TREND + e_i$

Regression 8:

$LPCONS_i = b_0 + b_1 LPOP\_SQML_i + b_2 LPincome_i + b_3 STAD_i + b_4 FOOT_i +$

$b_5 BASE_i + TREND + e_i$

TABLE 3.10: PERSONAL CONSUMPTION OVERVIEW

Regression No.	Left Hand Variable	Right Hand Variables/Model
1	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3 STAD$_i$ + e_i
2	= Log (Personal Consumption) (LPCONS)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3 FOOT$_i$ + e_i
3	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3 BASE $_i$ + e_i
4	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3STAD $_i$ + b_4FOOT $_i$ + b_5BASE $_i$ + e_i
5	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3STAD $_i$ + TREND + e_i
6	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3FOOT $_i$ + TREND + e_i
7	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$+ b_3BASE $_i$ + TREND + e_i
8	= Log (Personal Consumption) (LPCON)	$b_0 + b_1$ LPOP_SQML$_i$ + b_2 LPincome $_i$ + b_3STAD $_i$ + b_4FOOT $_i$ + b_5BASE $_i$ + TREND + e_i

TABLE 3.11: PCON REGRESSION RESULTS (1-4)

	Reg1	Reg2	Reg3	Reg4
C	**3.465*****	**3.408*****	**3.328*****	**3.245*****
	(4.371)	(5.115)	(3.858)	(4.415)
LPINCOME	**0.740*****	**0.742*****	**0.755*****	**0.760*****
	(9.319)	(11.110)	(8.516)	(10.040)
LPOP_SQML	**-0.075*****	**-0.058*****	**-0.077*****	**-0.059*****
	(-4.931)	(-4.322)	(-4.880)	(-4.188)
STADI	-0.009			0.010
	(-0.575)			0.660
FOOTI		**-0.086*****		**-0.092*****
		(-4.266)		(-4.214)
BASEI			-0.014	-0.017
			(-0.336)	(-0.457)
R-squared	0.685	0.777	0.683	0.781
N	47	47	47	47
F-stat.	**31.145*****	**49.899*****	**30.917*****	**29.301*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

TABLE 3.12: PCON REGRESSION RESULTS (5-8)

	Reg1	Reg2	Reg3	Reg4
C	**3.002******	**2.841******	**2.787*****	**2.574******
	(3.012)	(3.425)	(2.593)	(2.839)
LPINCOME	**0.788*****	**0.800*****	**0.812*****	**0.829*****
	(7.805)	(9.523)	(7.315)	(8.861)
LPOP_SQML	**-0.077*****	**-0.060*****	**-0.079*****	**-0.062*****
	(-4.968)	(-4.446)	(-4.938)	(-4.350)
STADI	-0.008			0.011
	(-0.521)			(0.735)
FOOTI		**-0.087*****		**-0.093*****
		(-4.323)		(-4.313)
BASEI			-0.018	-0.021
			(-0.427)	(-0.578)
TREND	-0.007	-0.008	-0.007	-0.009
	(-0.773)	(-1.140)	(-0.850)	(-1.249)
R-squared	0.689	0.784	0.689	0.790
N	47	47	47	47
F-stat.	**23.289*****	**38.010*****	**23.219*****	**25.011*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

Similar to the previous regressions, personal consumption is regressed with and without a TREND term which captures yearly change. In all eight regressions using personal consumption as the dependent variable, R-squared values are well above the desired 0.40 level. In regressions one through four, R-squared values are 0.685, 0.777, 0.683 and 0.781 respectively. In regressions five through eight, R-squared values are 0.689, 0.784, 0.689 and 0.790 respectively. Further strengthening the results are f-stats significantly above the desired level.

In regressions one through eight, all coefficients are significant at the 99% level with the exception of $BASE_i$ and $STAD_i$ which are insignificant. As expected, LPIncome holds positive coefficient values and the highest t-stat significance. The process seems reasonable; as income grows, disposable income increases, leading to higher personal consumption. On the other hand, unexpected outcomes occur concerning population per square mile. As Table 3.11 and 3.12 show, a negative relationship occurred in which population per square mile has a negative effect on personal consumption. While population change does affect some variables, it is surprising that it has a negative effect on aggregate personal consumption. One reason for this may be that a higher population could lead to lower income per-capita, which in term reduces personal consumption expenditures.

Similar to previous studies, $FOOT_i$ shows a negative and significant overall effect with and without using TREND with the dependent variable personal consumption. However, it is surprising that with the advent of a stadium, and thus more consumption possibilities, personal expenditure would decrease. Even though football stadiums specifically show this data, as seen in the tables directly above, the dummy variable for stadiums in general and baseball stadiums specifically came out negative yet insignificant. Nonetheless, the results show that income is positively related to personal consumption while population per square mile negatively affects consumption. At the same time football stadium construction negatively and significantly impacts personal consumption expenditures in the 12 SMSAs examined.

This empirical chapter brings forward three key results. Firstly, income per-capita is positively affected by stadium construction, both baseball and football. Secondly, the impact on employment is mixed. While a baseball stadium in a city positively affects SMSA employment, a football stadium reduces it. Thirdly, the results do not show any significant positive effect of stadium construction on personal consumption. This chapter is followed by a conclusion which will succinctly combine areas of further research and summarize all previous chapters so as to effectively synthesize the various aspects of this thesis.

CHAPTER IV

CONCLUSION

This research examines the impact of stadium construction on local economic development. As seen in this study, stadium construction in the United States is currently in a boom period. Cities are becoming increasingly interested in the construction of a sports stadium for the purposes of urban renewal and the stature that comes with hosting a professional team. While stature certainly comes with being a host city for a team in a well-respected league, urban renewal and the projected economic growth that follows is not always a guarantee. Although the large body of recently published research has shown that little to no economic benefits arise from hosting a sports franchise, stadium construction numbers have nonetheless been steadily increasing.

Almost all of the existing literature on stadium economics has shown "no significant positive correlation exists between sports venue construction and economic development."[1] A plethora of reasonable arguments exists against the construction of sports stadiums for the purpose of urban renewal. To begin with, franchises and team owners have an incredible amount of market power when looking for a host city to take on the majority of the risk and cost. Since so many cities are demanding this type of investment, thus creating a sellers market for owners, local governments are forced to

[1] Coates and Humphreys 1999, 601-624. Okner, 1974. Baade, 1988. Baade and Dye, 1990. Coates and Humphreys, 2003.

shoulder the majority, if not all of the investment capital. Since this money is mainly comprised of tax-payer dollars, substantial payoffs for the community must come as a result of the new franchise.

Stadiums are frequently considered an economic engine or catalyst for local development. However, it is commonly argued that the monetary gain through revenue does not necessarily trickle back into the local community. Impact studies administered by local teams and owners frequently overestimate the multiplier that evaluates the amount of capital returned to the local community. It is usually these multipliers that serve as the backbone of impact studies supporting publicly subsidized stadium construction.

Baade and Dye (1990) attempt to use income as a dependent variable to explain economic effects of stadium construction. However, even when they alter their study to include more teams or greater areas, they are still unable to show any positive economic developmental effects.[2] Along with Baade and Dye, Coates and Humphreys (1999) also use income as a dependent right hand side variable and show similar negative results in regard to stadium construction.

While most studies have shown the negative side of stadium construction, other studies have attempted to show the positive impact stadiums have on their local community. Usually these benefits are separated into two categories: direct and indirect. As mentioned in the introduction, indirect benefits involve an overall increase in aggregate income within the city.[3] This is a main reason why income is the most popular

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[2] Baade and Dye, 1990

[3] Johnson and Whitehead, 2000

dependent variable in existing research. On the other hand, direct benefits are simply the public goods created by the addition of the franchise.[4] These benefits are far more difficult to prove on economic grounds as they are non-quantifiable changes such as civic pride, or community spirit.

As mentioned earlier, studies assessing direct benefits, such as civic pride have been completed. Rappaport and Wilkerson (2001) bring light to these types of positive changes by looking at a number of different direct benefits caused by stadiums. While not conclusive in their results, Rappaport and Wilkerson provide the reader a greater understanding of how to measure these types of changes through different valuation techniques.[5]

While it is widely known that evaluating direct benefits could alter the findings for some studies, it is also apparent that more research is necessary on the effect on income, employment, and personal consumption figures. Since these figures show the most valuable effects of stadiums in metropolitan areas, this study judges the effects strictly on fiscal terms. Consequently, this study has used these three figures as dependent right hand side variables. In addition, more recent data on 12 SMSAs were collected to expand previous studies by Baade and Dye, Rappaport and Wilkerson, and a myriad of other authors.

In order to update previous studies on stadium construction economics, the current study examined more recent data between the years of 1990 and 2005 for 12 SMSAs. Along with the more recent data set, and an expanded number of SMSAs, dummy variables were created to econometrically assess the overall changes in the local

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[4] Ibid

[5] Rappaport and Wilkerson 2001, 55-85

economic atmosphere. These variables proved to be invaluable due to their ability to allow greater impact examination. This thesis provided a comprehensive literature review on the economics of stadium construction and impact studies.

A pooled regression for 16 years of data across 12 SMSAs was run to capture overall local changes caused by sport stadium construction. The results supported and refuted past research that used similar regression techniques and variables. The results that conflict with past research provide evidence of positive benefits for local communities housing a sports franchise.

The study also analyzed the impact of stadium construction on employment levels in SMSAs. The most valuable results came in the form of changes to income per-capita. As mentioned in the previous chapter, income per-capita showed positive significant effect as a result of stadium construction, both football and baseball. Although these changes were based on only two professional sports, they are still positive and significant and thus deserve attention.

The results of the regressions using employment as the dependent proved to be interesting in their statistical effects due to mixed findings. While a baseball stadium in a city positively affects SMSA employment, a football stadium reduces it. A possible explanation of these mixed results is a substantially longer MLB season, comprised of more games than that of an NFL season. Due to more games being played, more employees are necessary to run the stadium week to week. In comparison, the NFL has a shorter season in which football games only occur a few days out of the week. Therefore, the values of the corresponding coefficients are both positive and negative, respectively.

In the third regressions that used personal consumption expenditures as the dependent values, positive significance did not occur. This could be due to the inability to collect data for more than four consecutive years. As a result, the regressions were run for the four years collected, 1996 to 1999. This lack of yearly data and subsequent reduced sample size could have been the cause of the low results.

Typical of all existing research and examinations of stadium impact this study had limitations associated with the methodology. To begin with, only football and baseball stadiums were assessed leaving out the other major sports within the U.S. Since other sports stadiums had an effect on the examined SMSAs the results in this study could explain more than just these two sports.

Another possible flaw was the time period of analysis. While 16 gives a good account of stadium impacts, a longer time period could have provided more robust results. In comparison to previous studies, the current study updated the data; however it also left out older, more historical data that could have provided greater evidence of changing stadium trends. In addition, if data existed for the years after 2005, a more modern understanding of the stadium game could have been provided.

Defining a stadium locale broadly or narrowly also makes a huge difference for these types of studies. If a study chooses to only examine the area closest to the stadium, it neglects to take into account “out of town” visitors. However, if a study defines a stadium locale by the entire SMSA, economic data can be trivialized by other economic growth in the SMSA. In this study entire SMSAs were examined to see the full effects of stadium construction. Nevertheless the opportunity cost of not including fans outside of a two-mile radius was too high.

Beyond issues with data collection are the larger issues of attempting to account for all aspects of stadium impact. As mentioned in detail in the literature review, this study and many others completely neglect to introduce intangible benefits into the argument for or against publicly subsidized stadium construction. Measuring civic pride, community image, and fan enjoyment is difficult but not impossible. Contingent valuation methods focused on survey analysis can capture this type of data if administered correctly. While this study provides important evidence of positive effects of stadium construction, many methodological flaws are present, leaving significant room for future research.

Future research on stadium economics should focus on more SMSAs and a larger number of professional sports. In addition, a mix between a narrow and broad geographical focus should be used to capture the differences in socio-economic areas around the stadium. This way one can see what type of SMSA would benefit most from the construction of a stadium. A longer time period would also allow greater analyses of the impact of stadium construction on each SMSA individually. Moreover, a longer time period on SMSA personal consumption data would allow for stronger examinations of the indirect effects of stadium construction.

Equally important, a greater number of independent variables should be used to account for community differences. For example, variables for race, gender and literacy could be used to generate a defining picture of the locale beyond purely fiscal measurements. For example, since Los Angeles and Denver are such different cities, when pooling both together in a regression, a greater number of independent variables would allow for community differences to actually be seen. Given this explanation, individual dummy variables for each SMSA were used to control for city characteristics. As shown in Appendix B, the results remained largely unchanged.

Even though flaws were present in this study, thorough research was completed that fostered valuable results. Being able to show positive significant effects of stadium construction on income per-capita is a major contribution of this thesis. In addition, the positive effect baseball stadiums have on employment figures in comparison to the negative effect of football stadiums raises many questions about the difference in these two types of stadiums. This study provides evidence of important benefits for a debate that frequently is unable to show any positive returns. Future research should use this study as a means for further insight into the positive and negative impacts of sports stadium construction within SMSAs in the United States.

APPENDIX A

LPINCOME

In the Table below, regression analysis was employed similar to the analysis used in the econometric analysis chapter earlier in this thesis. The main difference is seen in the independent variable choices. In these regressions, the baseball stadium construction dummy variable ($BASE_i$) and the football stadium construction dummy variable ($FOOT_i$) are regressed along with the overall stadium construction dummy variable ($STAD_i$) to see what effect the specific sport construction, along with stadium construction overall, has on the log of income in the 12 SMSAs examined. Independent variables representing employment figures and population statistics were also used in each regression.

	Reg1	Reg2	Reg3
C	**8.757*** **	**8.845*** **	**8.786*** **
	(73.113)	(75.783)	(79.125)
LEMPLYMNT	**0.077*** **	**0.066*** **	**0.071*** **
	(8.147)	(7.114)	(8.173)
LPOP_SQML	0.000	0.009	0.002
	(-0.016)	(0.803)	(0.173)
STADI	0.003	0.010	
	(0.200)	(0.803)	
FOOTI	**0.048*** **		**0.049*** **
	(2.898)		(3.029)
BASEI		**0.061*** **	**0.060*** **
		(2.624)	(2.651)
TREND	**0.040*** **	**0.039*** **	**0.040*** **
	(31.816)	(29.446)	(35.904)
R-squared		0.892	0.897
N	47	47	47
F-stat.	**310.147*** **	**307.445*** **	**323.197*** **

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

LEMPLYMNT

In the Table below, regression analysis was employed similar to the analysis used in the econometric analysis chapter earlier in this thesis. The main difference is seen in the independent variable choices. In these regressions, the baseball stadium construction dummy variable ($BASE_i$) and the football stadium construction dummy variable ($FOOT_i$) are regressed along with the overall stadium construction dummy variable ($STAD_i$) to see what effect the specific sport construction, along with stadium construction overall, has on the log of employment in the 12 SMSAs examined. Independent variables representing employment figures and population statistics were also used in each regression.

	Reg1	Reg2	Reg3
C	**10.818*** **	**10.454*** **	**10.592*** **
	(22.522)	(20.876)	(19.979)
LPOP_SQML	**0.633*** **	**0.577*** **	**0.593*** **
	(8.495)	(7.690)	(7.387)
STADI	**-0.573*** **	**-0.573*** **	
	(-6.509)	(-6.279)	
FOOTI	**-0.429*** **		**-0.533*** **
	(-3.437)		(-4.019)
BASEI		**0.407** **	**0.636*** **
		(2.251)	(3.438)
TREND	**0.032*** **	**0.029*** **	**-0.003**
	(3.437)	(2.815)	(-0.357)
R-squared	0.397	0.376	0.305
N	47	47	47
F-stat.	**30.840*** **	**28.208*** **	**20.505*** **

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

LPCON

In the Table below, regression analysis was employed similar to the analysis used in the econometric analysis chapter earlier in this thesis. The main difference is seen in the independent variable choices. In these regressions, the baseball stadium construction dummy variable ($BASE_i$) and the football stadium construction dummy variable ($FOOT_i$) are regressed along with the overall stadium construction dummy variable ($STAD_i$) to see what effect the specific sport construction, along with stadium construction overall, has on the log of personal income expenditures in the 12 SMSAs examined. Independent variables representing employment figures and population statistics were also used in each regression.

	Reg1	Reg2	Reg3
C	**2.768*** **	**2.773** **	**2.573*** **
	(3.315)	(2.562)	(2.855)
LPINCOME	**0.807*** **	**0.814*** **	**0.830*** **
	(9.546)	(7.281)	(8.927)
LPOP_SQML	**-0.060*** **	**-0.079*** **	**-0.063*** **
	(-4.377)	(-4.912)	(-4.486)
STADI	0.012	-0.010	
	(0.905)	(-0.639)	
FOOTI	**-0.094*** **		**-0.088*** **
	(-4.363)		(-4.343)
BASEI	**-0.025*** **		**-0.028**
	(-0.567)		(-0.779)
TREND	-0.009	-0.007	-0.009
	(-1.209)	(-0.819)	(-1.216)
R-squared	0.788	0.692	0.787
N	47	47	47
F-stat.	**30.441*** **	**18.395*** **	**30.245*** **

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

APPENDIX B

LPINCOME WITH CITY DUMMY VARIABLES

In the Table below, dummy variables for each specific SMSA were used to control for city characteristics. By using these dummy variables, the reader can differentiate impact by specific city as opposed to a nationwide examination. In addition to the city dummy variables, other variables were also assessed. The other variables assessed were SMSA employment, population per square mile, and the stadium construction dummy variables used in the previous regression within this thesis.

	Reg1	Reg2	Reg3	Reg4
C	**-19.976*** **	**-25.181*** **	**-24.549*** **	**-20.273**** **
	(-6.973)	(-7.481)	(-7.549)	(-6.783)
LEMPLYMNT	**2.029*** **	**2.282*** **	**2.234*** **	**2.051*** **
	(7.366)	(7.050)	(7.027)	(7.264)
LPOP_SQML	-0.225	0.000	0.011	-0.228
	(-0.807)	(0.000)	(0.033)	(-0.813)
STADI	**0.173*** **			**0.173*** **
	(7.837)			(7.725)
FOOTI			0.022	-0.004
			(0.632)	(-0.138)
BASEI		-0.036		-0.017
		(-0.738)		(-0.388)
ATL_DUMMY	**2.025*** **	**2.298*** **	**2.229*** **	**2.051*** **
	(4.656)	(4.532)	(4.421)	(-0.138)
BALT_DUMMY	**3.185*** **	**3.485*** **	**3.396*** **	**3.222*** **
	(4.627)	(4.340)	(4.256)	(4.618)
CHICAGO_DUMMY	**0.733***	0.674	0.633	**0.746***
	(1.732)	(1.372)	(1.285)	(1.744)
CINCI_DUMMY	**3.523*** **	**3.945*** **	**3.843*** **	**3.564*** **
	(6.068)	(5.803)	(5.718)	(6.020)
DENV_DUMMY	**3.202*** **	**3.815*** **	**3.734*** **	**3.235*** **
	(9.069)	(9.291)	(9.290)	(8.883)
DETROIT_DUMMY	**2.137*** **	**2.310*** **	**2.241*** **	**2.162*** **
	(4.826)	(4.470)	(4.359)	(4.812)
HOUSTON_DUMMY	**1.960*** **	**2.149*** **	**2.091*** **	**1.983*** **
	(5.040)	(4.732)	(4.638)	(5.023)
NY_DUMMY	-0.201	**-0.650***	**-0.663***	-0.202
	(-0.580)	(-1.638)	(-1.665)	(-0.575)
PHILI_DUMMY	**1.755*** **	**1.753*** **	**1.692*** **	**1.776*** **
	(3.759)	(3.226)	(3.120)	(3.760)
PITT_DUMMY	**3.241*** **	**3.609*** **	**3.514*** **	**3.279*** **
	(5.953)	(5.664)	(5.574)	(5.909)
TAMPA_DUMMY	**3.213*** **	**3.566*** **	**3.482*** **	**3.245*** **
	(4.629)	(4.418)	(4.328)	(4.623)
R-squared	0.799	0.731	0.730	0.800
N	192	192	192	192
F-stat.	**50.398*** **	**34.302*** **	**34.264*** **	**43.654*** **

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

LEMPLYMNT WITH CITY DUMMY VARIABLES

In the Table below, dummy variables for each specific SMSA were used to control for city characteristics. By using these dummy variables, the reader can differentiate impact by specific city as opposed to a nationwide examination. In addition to the city dummy variables, other variables were also assessed. The other variables assessed were SMSA employment, population per square mile, and the stadium construction dummy variables used in the previous regression within this thesis.

	Reg1	Reg2	Reg3	Reg4
C	**-19.976*****	**-25.181*****	**-24.549*****	**-20.273*****
	(-6.973)	(-7.481)	(-7.549)	(-6.783)
LEMPLYMNT	**2.029*****	**2.282*****	**2.234*****	**2.051*****
	(7.366)	(7.050)	(7.027)	(7.264)
LPOP_SQML	-0.225***	0.000***	0.011***	-0.228***
	(-0.807)	(0.000)	(0.033)	(-0.813)
STADI	**0.173**			**0.173**
	(7.837)			(7.725)
FOOTI			0.022	-0.004
			(0.632)	(-0.138)
BASEI		-0.036		-0.017***
		(-0.738)		(-0.388)
ATL_DUMMY	**2.025*****	**2.298*****	**2.229*****	**2.051*****
	(4.656)	(4.532)	(4.421)	(-0.138)
BALT_DUMMY	**3.185*****	**3.485*****	**3.396*****	**3.222*****
	(4.627)	(4.340)	(4.256)	(4.618)
CHICAGO_DUMMY	**0.733*****	0.674***	0.633***	**0.746*****
	(1.732)	(1.372)	(1.285)	(1.744)
CINCI_DUMMY	**3.523*****	**3.945*****	**3.843*****	**3.564*****
	(6.068)	95.803)	(5.718)	(6.020)
DENV_DUMMY	**3.202*****	**3.815*****	**3.734*****	**3.235*****
	(9.069)	(9.291)	(9.290)	(8.883)
DETROIT_DUMMY	**2.137*****	**2.310*****	**2.241*****	**2.162*****
	(4.826)	(4.470)	(4.359)	(4.812)
HOUSTON_DUMMY	**1.960*****	**2.149*****	**2.091*****	**1.983*****
	(5.040)	(4.732)	(4.638)	(5.023)
NY_DUMMY	-0.201***	-0.650***	**-0.663*****	-0.202***
	(-0.580)	(-1.638)	(-1.665)	(-0.575)
PHILI_DUMMY	**1.755*****	**1.753*****	**1.692*****	**1.776*****
	(3.759)	(3.226)	(3.120)	(3.760)
PITT_DUMMY	**3.241*****	**3.609*****	**3.514*****	**3.279*****
	(5.953)	(5.664)	(5.574)	(5.909)
TAMPA_DUMMY	**3.213*****	**3.566*****	**3.482*****	**3.245*****
	(4.629)	(4.418)	(4.328)	(4.623)
R-squared	0.799	0.731	0.730	0.800
N	192	192	192	192
F-stat.	**50.398*****	**34.302*****	**34.264*****	**43.654*****

*** = 10% significance level**
**** = 5% significance level**
***** = 1% significance level**

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